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ABSTRACT BOOK

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**30TH EAA ANNUAL MEETING
ROME, ITALY
28TH - 31ST AUGUST 2024**



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30th EAA Annual Meeting (Rome, Italy 2024) - Abstract Book
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13 AMPHIBIOUS ARCHAEOLOGY, WATERSCAPES, AND FLUIDITY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Nabais, Mariana (IPHES) - Crutcher, Megan (Texas A&M University) - Casimiro, Tânia (NOVA University of Lisbon) - Gabriel, Sónia (BIOPOLIS-CIBIO-InBIO)

Session format: Regular session

Water covers most of the planet's surface, and aquatic ecosystems have been important for humans throughout all times. Archaeologists working in aquatic environments tended to solidify the fluid boundaries of land, sea, and shore. But what if land, sea, shore, the object, and the human were actually inextricably bound up in one another, making such divisions far less relevant? By blurring these ideological fields, we can better understand how territories and environments are permanently changing. Humans are amphibious creatures and these ecosystems—whether beaches, dune belts, coastal lagoons, alluvial plains, river terraces, estuaries, lakes, underwater, or oceans—have been essential to our cultural development. Fish, shellfish, aquatic mammals and aquatic plants have been staple foods. Rivers, lakes and oceans served as natural highways facilitating transportation and exchange of goods, ideas and people. Human occupations near waterlines have also been the most affected by climate change and shifts in sea levels, providing great insights into adaptation to environmental conditions. The purpose of this session is to encourage discussions in fluidity, amphibiousness and hybridity in archaeology. We welcome papers on archaeological, ethnographic and experimental case-studies, waterscapes, maritime and nautical archaeology, innovations in theory, methodologies and the arts, from prehistory to the present.

ABSTRACTS

1 BIRDS EXPLOITATION IN EEMIAN WETLANDS OF NORTHERN FRANCE

Lebreton, Loic (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA)) - López-García, Juan Manuel (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA)) - Antoine, Pierre (UMR 8591 CNRS-Univ. Paris I-UPEC, Laboratoire de Géographie Physique, Environnements Quaternaires et actuels) - Auguste, Patrick (CNRS, Univ. Lille UMR 8198 - Evo-Eco-Paléo) - Deschodt, Laurent (UMR 8591 CNRS-Univ. Paris I-UPEC, Laboratoire de Géographie Physique, Environnements Quaternaires et actuels; Inrap, Institut national de recherches archéologiques préventives) - Locht, Jean-Luc (UMR 8591 CNRS-Univ. Paris I-UPEC, Laboratoire de Géographie Physique, Environnements Quaternaires et actuels; Inrap, Institut national de recherches archéologiques préventives, Nord-Picardie) - Hérison, David (CNRS-UMR 7041 ArScAn, équipe AnTET, MSH Mondes)

Recent discoveries have brought back into perspective the importance of bird exploitation during the Middle Palaeolithic. These findings demonstrate the interest of human groups in birds whether for meat exploitation or for inedible parts such as talons or feathers. They also highlight the ability of human groups to maximise the use of the resources available in their environment. The exploitation of birds to obtain non-food products is mostly documented from the end of MIS5 'Rufà et Laroulandie, 2021.

Recent excavations at Waziers and Caours sites have revealed Neanderthal occupation in Northern France during the Eemian. Thanks to their exceptional state of preservation (peat for Waziers and calcareous tufa for Caours), these sites have yielded well-preserved faunal remains, enabling us to understand the exploitation strategies of these human groups in the context of these humid environments. Both sites have yielded bird remains, particularly waterfowl, showing signs of human exploitation. The exploitation of this resource highlights the ability of these Neanderthal groups to adapt to the diversity of resources present in different environments.

References

Rufà, A., et Laroulandie, V. (2021). Unravelling the Taphonomic stories of bird bones from the middle Pleistocene layer VIII of Grotte Vaufrey, France. *Quaternary*, 4(4), 30.

2 ABOVE AND BELOW THE WATER LINE: AMPHIBIOUS APPROACHES TO ARCHAEOLOGY IN THE NORTH AMERICAN GREAT LAKES

Lemke, Ashley (University of Wisconsin Milwaukee; Advisory Council on Underwater Archaeology)

One of the most significant planetary changes since the Pleistocene has been fluctuating water levels. Changes in sea level have been documented for the last two million years, but particularly since the last glacial maximum, vast landscapes were once exposed and are now submerged. Paleoenvironmental research and modeling of submerged landscapes has shown that they were productive habitats, and underwater archaeological investigations at these locations reveal complex mosaics of plant, animal, and human communities. While large-scale fluctuations in water level characterize the continental shelf, they were also present in large inland lakes. For example, the immediate post-glacial

history of the Great Lakes is characterized by a series of high and low water stands regulated by the interaction of early Holocene climate, the flows of glacial melt waters, the isostatic rebound of recently deglaciated land surfaces and the activation of new hydrological outlets. The most extreme low water stand in the Lake Huron basin (Lake Stanley) saw water levels drop as much as 130 meters. Lake Stanley presented a radically different environment than present and archaeological research below the lake has documented a unique record of hunting sites and lithic artifacts. This paper will explore lifeways of hunter-gatherers in the Great Lakes region across the Lake Stanley time frame (11,500–8,000 cal yr BP) in an amphibious fashion, moving between and connecting terrestrial and underwater archaeological evidence. Waterways have connected people to places for millennia and this regional case study offers new insights into forager niche construction and resilience in the context of immense environmental and climatic change.

3 REVIEW AND PROSPECTS ON THE NEOLITHIC PILE DWELLINGS RESEARCH IN SAVOIE ALPINE LAKES (FRANCE)

Brigand, Robin (Service Régional de l'Archéologie, Ministère de la Culture, Lyon; UMR 8215, Lab. Trajectoires, Paris) - GORIN, Camille (Service Régional de l'Archéologie, Ministère de la Culture, Lyon; UMR 7041, Lab. Arscan, Nanterre)

In 2011, several underwater archaeological sites located in French Alpine lakes, were added to the World Heritage List. This recent UNESCO classification represented a turning point in the research history of prehistoric and protohistoric lakeshore settlements. Indeed, starting from 2015, a 16 months monitoring were conducted by Y. Billaud (DRASSM) and spread over 4 years. It involved 45 sites in the French lakes, including 9 UNESCO-listed pile dwellings and 4 others classified as historical monuments, as well as 24 other located in their buffer zones. These archaeological surveys contributed to the elaboration of an overview synthesis (in 2017) compiling the available planimetric and chronological data on the Neolithic pile dwellings of French lakes (Brigand, Billaud 2021). Since 2017, extensive fieldworks were conducted on the Neolithic site of Beau Phare (Aiguebelette lake). Moreover, latest studies on the Annecy lake showed the archaeological implications of lake-level fluctuations (dir. Magny, Vérot). These recent works has pushed research into Neolithic pile dwellings in the French Alps even further and increasingly raises the question of their long-term preservation, in the context of climate change. The aim of this contribution is to build a synthesis of the available planimetric and chronological data regarding Neolithic pile dwellings in the French lakes. Using exploratory data analysis and GIS spatial analysis, the goal is next to model the vulnerability of lakeshore sites and to prioritize the action to be taken to ensure their conservation. Based on this documentation, it will eventually be possible to consider a long-term strategy for the study, the conservation and the cultural mediation of Neolithic pile dwellings. Finally, in a context of global warming, leading to inevitable erosion of the lake's cultural heritage, it is necessary to take action and to initiate new research projects to preserve pile dwellings sites on Alpine lakeshores.

4 SKIN BOATS IN THE BALTIC SEA? EVALUATING THE MARITIME MOBILITY OF THE PITTED WARE CULTURE

Fauvelle, Mikael (Lund University) - Horn, Christian (University of Gothenburg) - Alfv, Jacob (University of Gothenburg) - Artursson, Magnus (University of Gothenburg)

The Pitted Ware Culture (PWC) dominated the Baltic Sea and the Kattegatt Sea during the second half of the Early Neolithic and Middle Neolithic, c. 3500-2300 BC, gradually occupying the coasts of central and southern Sweden as well as major islands and archipelagos including Åland, Gotland, Öland and Bornholm, and parts of eastern Denmark and Jutland. Long known as proficient fishers and seal hunters, recent archaeological work has documented long-distance over-water connections between PWC communities, suggesting that the PWC people were proficient mariners. Very little is known, however, regarding the boats that were used by the PWC to fish, seal, and conduct maritime trade. In this paper we explore different possibilities for PWC watercraft technologies. We argue that several lines of both direct and indirect evidence point to skin boats as the most likely form of watercraft used by the PWC for every-day activities and long-distance voyages. We will discuss the implications of the use of skin boats by the PWC for our understanding of the political and economic landscape of neolithic Scandinavia.

5 CONNECTING FARMERS AND FISHERS: EXAMINING POTENTIAL INTERACTIONS BETWEEN COASTAL AND INLAND LAND USE IN MIDDLE BRONZE AGE SOUTH-EAST IRELAND

Spillane, Ben (University College Cork) - Howle Outlaw, Carolyn (Mizen Archaeology)

Thirty years of research and development-led archaeological investigation has revealed that prehistoric Ireland was the scene of a complex series of inland and coastal land use systems, food economies and habitation types, all of which could vary regionally and over time. And yet, for an island nation, where maritime activity would have been of significant importance, there is little existing research on potential interactions between inland and coastal land use in prehistory. Rather than viewing inland and coastal habitation as separate spheres of human activity, we argue that both could have been interrelated, with developments in one affecting the other.

We will examine these potential connections in the coastal counties of Waterford, Wexford and Wicklow in south-east Ireland during the Middle Bronze Age (c.1600–1150 BC). In this region, inland land use was comprised of small farmsteads along with Fulachtaí Fia, pyroclastic sites that became increasingly commonplace after 1300 BC. Coastal land use was heavily linked to shell midden deposition. Although the deposition of shell middens had declined nationally during the Late Neolithic (c. 3500–2500 BC), a sharp increase in shell deposits occurred in most regions during the Bronze Age (c. 2100–800 BC), whilst in some areas such as the south-east, they remained a rarity. Though taphonomic processes could explain the lack of shell middens along the south-east coast, we argue that human agency and contemporary developments in inland land use could have also influenced this pattern.

Through an integrated Bayesian analysis of the coastal and inland dating evidence, we will suggest that a growing reliance on transhumance and pastoralism during the 14th to 11th centuries BC, particularly exemplified by Fulachtaí Fia, affected the need for and use of shell middens. Essentially, we will argue that a regional preference for an inland form of land use took precedence over coastal variations.

6 LOST WAX? USING ANCIENT GREEK WARSHIP BRONZE RAMS TO INFER THE EXTENT OF THE BEESWAX INDUSTRY IN THE ANCIENT MEDITERRANEAN

Zak, Claire (Texas A&M University)

Bronze-cast rams affixed to Greek warships are not readily associated with beekeeping. Yet, most metal objects of the ancient Mediterranean world after c. 3500-3000 BC were created using the cire perdue or lost-wax casting method. Considering all of the metal objects from the archaeological record, this technique required an immense quantity of beeswax, necessitating an industry of wax production and by extension, the cultivation of honey bees (*Apis mellifera*). Through the examination of Greek warship's bronze rams, created using the cire perdue process, and archaeological beehives, archaeologists can make inferences about beeswax production and its relationship with ancient navies. The investigation of this topic requires a combination of archaeological material from both terrestrial and underwater sites, and integrated methods of investigation using textual analysis, 3D modeling, experimental archaeology, and statistics. The result of this inquiry demonstrates the necessity to fluidly blend traditionally distinct disciplines and strands of evidence to not only answer new questions but to refresh what questions are asked. This paper presents new research regarding the estimated quantities of beeswax necessary to cast the warship rams and the number of honey bees and beehives required to produce that honey using both rams and beehives found in the archaeological record.

7 WATER AS LEGAL MATTER? AN EXAMPLE FROM THE EARLY MEDIEVAL LAKEBUILDING CALLED THE BULWARK ON GOTLAND

dAgnan, Peter (Lund university)

In the 1130's a vast square wooden platform was erected in the middle of a shallow lake on the island of Gotland in the middle of the Baltic Sea. On top of the platform there was a range of houses built in different techniques. After 100 years of research we still don't know the purpose of this strange place. One hypothesis suggests the site was a juridical thing, where people gathered and came to agreements. The water thus served as a neutral point where peace was absolute.

If the hypothesis is right this artificial island could teach us more of early medieval thought and practice of waters and juridical organization in the landscape. The houses and the way they were built may hold more answers to this fascinating and classical Scandinavian problem. A new research project at Lund university, taking advantage of the latest aids in digital archaeology, aims to answer some of these answers.

8 THE KRAO COAST HERITAGE INITIATIVE: DOING COASTAL ARCHAEOLOGY IN SOUTHEASTERN LIBERIA

Crutcher, Megan (Texas A&M University) - Kondeh, Prince (Independent Scholar; Indiana Wesleyan University)

West Africa remains understudied within the discipline of maritime archaeology. One such area is the West African nation of Liberia, which was settled by African-descended people starting in 1822. Historians of Liberia have tended to focus on the arrival and actions of the African American settlers in Liberia during the 19th century. However, people were living on Liberia's coast for centuries prior to the arrival of the settlers. One of these groups is the Krao, known to most authors as Kru, who became famous in the 19th century for working aboard European and American ships. The Kru trace their origins to modern Liberia's Sinoe County, where the oldest town in Liberian history was marked on European maps as early as 1620—200 years before Liberia's founding as a nation.

Our project, the Krao Coast Heritage Initiative, works alongside communities in southeastern Sinoe County, Liberia on the first amphibious archaeological project in the nation of Liberia. This paper presents preliminary project results in three key domains: Krao origins and migration to the coast during the medieval period; heritage conservation and

maintenance of traditional livelihoods; and the history of Krao maritime labor. These three themes illustrate the longevity of Krao history and the importance of multitemporal approaches in coastal archaeology in West Africa. Emphasizing the broader regional and global significance of these stories, our research is a groundbreaking collaboration with Liberian Kru (Krao) communities for heritage preservation. In addressing the historical exclusion of Krao voices from archival sources, dominated by European perspectives, this initiative becomes an essential step toward a more inclusive understanding of Liberia's maritime heritage. Timely in the face of sea level rise and epistemicide, our project serves as a crucial effort to maintain the landscapes and memories of Krao maritime heritage.

9 OUT OF THE BLUE: REVALUATING PILGRIMAGE FROM A MARITIME PERSPECTIVE IN THE EARLY MEDIEVAL PERIOD ACROSS THE IRISH SEA

Machin, Joanne (University of the Highlands and Islands)

The sea during the Age of Saints in the medieval period, was perceived as a physical periphery and a Christian spiritual margin of dark foreboding despite acting as a conduit for merchants, travellers, missionaries, and pilgrims alike. Traversing the sea affirmed belief, accentuated religious ritual, facilitated social, cultural, and commercial contact by acting as a conduit linking disparate communities and stimulated ecclesiastical and secular infrastructure.

Using a case study area of Galloway in Southwest Scotland, within the Irish Sea Zone, a historical-archaeology multi-disciplinary approach has been devised. The research combines experiential study and phenomenological 'marinimity' to delineate seascape characteristics and sea-to-land perspectives. Amalgamated with research of placenames, written sources, cartography, and material remains these seascape elements provide a fresh perspective to traditional terrestrial-based pilgrimage discussions.

This paper revisualizes the periphery of the sea from the sea, giving a maritime pilgrimage viewpoint. Theorizing how the sea was synonymous with destruction from a theological perspective in the medieval period, embraced maritime pilgrimage and influenced terrestrial pilgrimage routes, respectively. Furthermore, the multidisciplinary methodology provides the detail for the narrative that the case study area contained a spiritual maritime highway where secular and religious sites are purposefully sited within coastal margins of encounter due to peripheral sea characteristics.

10 THINGS UNMOORED: AQUATIC ITINERARIES AND WATERY ENTANGLEMENTS IN SMALL-ISLAND SEASCAPES OF THE EARLY MODERN CARIBBEAN

Antczak, Konrad (Universitat Pompeu Fabra; Unidad de Estudios Arqueológicos, Universidad Simón Bolívar)

This paper follows things – archaeologically recovered artefacts and historically documented commodities – on their aquatic itineraries through the Venezuelan Caribbean during the early modern period to understand how these became entangled with humans through space and time. Such a “following” necessarily entails marshalling a robust theoretical framework that dovetails the concepts of itineraries of things and assemblages of practice, theories of material entanglement, and spatial notions of small-island seascapes to make the best use of the abundant archaeological and archival data available. Here, I reveal how, on the one hand, Venezuelan things such as sea salt, cacao, and coarse earthenwares, and, on the other hand, British things such as ceramics, tea, and rum punch were unmoored by the mobilities potential of the sea and itinerated far and wide, making waves on distant shores. On a deeper level, as they became increasingly unmoored by the sea and entangled with mariners, some new and fashionable things began exerting more magnetism than ever before, entrapping middling seafarers in novel entanglements and making them discerning Atlantic consumers and harbingers of early modern individualism.

11 HUMAN-OCEAN INTERACTIONS PAST, PRESENT AND FUTURE: A TRANSDISCIPLINARY APPROACH

Mooney, Dawn Elise (Museum of Archaeology, University of Stavanger)

Gathered marine resources such as driftwood, seaweed, shellfish, coastal plants, and eiderdown were key elements of past subsistence, but are often overlooked in studies of past human-ocean interactions. This paper presents the project 'Marine resource gathering and infrastructure in the Norse North Atlantic (MARGAIN)', recently funded by the Research Council of Norway's 'Oceans' program. MARGAIN uses historical and ethnographic sources, archaeological survey and excavation, and environmental archaeology to work towards a better understanding of how marine resource use influenced settlement patterns and ways of life in the North Atlantic, from the Viking Age until the early 20th century. Most studies of coastal sites in this region have focused on the development of commercial fisheries, but we aim to examine the coast as a lived space. We move away from conceptualising this region as 'marginal', and towards understanding its centrality to coastal communities, with humans as part of the marine ecosystem. Our focus on interactions between humans, plants and animals in the littoral zone acknowledges that the lived experience of the inhabitants of our sites extended beyond the water's edge, and that their lives cannot be understood without transgressing this (artificial) boundary.

The results of MARGAIN will be used to inform and promote sustainable human-ocean interactions in the present and future. For example, driftwood, which was used as fuel and timber in North Atlantic coastal communities, is now declining due to climate change and river management. Where past communities collected driftwood, we now find plastic pollution. Through films, workshops, and a touring exhibition, we will invite comparison between the marine resources exploited in the past and what washes up on the shore in the present. By foregrounding issues such as this, we propose that archaeology can be a powerful tool with which to combat 'shifting baseline syndrome'.

12 COASTAL SHORELINE CHANGE OF AN ANCIENT HUMAN SETTLEMENT ON THE GULF OF MEXICO: A CASE STUDY OF ISLA PIEDRA

Inurreta Diaz, Armando (Texas A&M University)

Situated along the Gulf of Mexico, on the northwest corner of the Yucatan Peninsula, lies the northern coastal plain of the State of Campeche. This region's shoreline is significantly influenced by coastal processes and ecological succession driven by low-energy waves that transport and deposit sediment. As a result, a distinctive muddy shoreline has formed, characterized by extensive wetlands, including estuaries, mangrove forests, late estuaries, and vegetated islands known as petenes (hardwood hammocks). This dynamic ecological frontier serves as a transition zone between marine and terrestrial environments. Within this coastal zone, ancient human settlements – ranging from simple shell middens to more complex architectural sites – have been exposed to these coastal dynamics. Surprisingly, limited research exists on how these natural processes have shaped the landscape of these settlements over time. This study aims to unravel the transformation of Isla Piedra's coastal landscape – an ancient settlement along this coast – during its occupation and in the present day. The investigation begins by establishing the intricate relationship between coastal geomorphology and the location of ancient human settlements. Subsequently, change detection methods are applied to a series of satellite images of the coastline, and analyzed through remote sensing techniques. By identifying these changes, the research proposes a reconstruction of Isla Piedra's shoreline during its primary ancient occupation phase. This understanding serves as a foundational basis for future studies, shedding light on site formation and the adaptive strategies developed by the island's inhabitants throughout history.

13 VULNERABILITY OF UNDERWATER ARCHAEOLOGICAL SITES COPING WITH CLIMATE CHANGE: THE WATERISKULT PROJECT

Germinario, Luigi (University of Padova) - Mazzoli, Claudio (University of Padova)

Climate change has a dramatic environmental impact on seas and oceans, not only on ecosystems but also on the tangible evidences of human past survived underwater. The submarine world is the guardian of millions of submerged ruins, settlements, wrecks, and artifacts, whose protection greatly depends on mitigation and adaptation policies. The European project WATERISKULT (<https://wateriskult.geoscienze.unipd.it>) aims at providing the first quantitative assessment of the vulnerability of underwater cultural heritage in a changing climate, with a focus on archaeological stone artifacts and structures. The research approach is interdisciplinary (involving petrography, marine biology, underwater archaeology, oceanography, hydraulic engineering, and analytical chemistry) and based on a mixed field and laboratory experimentation. The key-factors of climate change addressed are ocean acidification and extreme weather events: their impact is investigated by a series of laboratory simulations and underwater exposure tests and monitoring, aimed at exploring the stages and rates of archaeological stone decay. The risk assessment is integrated by studying the current stone decay in selected underwater sites in the western, central, and eastern Mediterranean Sea (in France, Italy, and Cyprus), describing the link between deterioration, material properties, and environmental setting. By such approach, WATERISKULT is expected to enhance the knowledge of ancient materials and their interaction with the underwater environment, stressing the connection with past and future human actions.

14 HIDDEN RIVERS: EXPLORING FLOWSCAPES THROUGH REMOTE SENSING TECHNOLOGY

Gustavsen, Lars (The Norwegian Institute for Cultural Heritage Research)

Rivers form an integral part of the temperate zones of Northern Europe and have historically played a crucial role in shaping their physical and cultural landscapes. Embodying elements of sustenance and life while being agents of destruction, this inherent duality is the basis for various cognitive phenomena, including religion, myth, and folklore. Despite their significance, however, these cognitive dimensions are often overlooked in archaeological studies. It can be argued that this is at least partly a consequence of significant alterations to the terrain caused by a combination of natural processes and human interaction, which have included the infilling and levelling of past features, thereby posing a considerable challenge in the reconstruction of former landscapes. Consequently, the present landscape provides only a partial insight into its historical counterpart.

To counter this, a novel approach is proposed in which large-scale geophysical surveys and remote sensing technologies, such as high-resolution LiDAR and satellite imagery, enable us to map not only archaeological features but also former natural elements such as palaeochannels. Through this approach, valuable insights into the archaeological

landscape can be gained, shedding light on the role of rivers in structuring the landscape and on the character of former human-nature interaction. Moreover, this endeavour contributes to a broader theoretical discourse, where the landscape forms an active agent that humans interact with rather than being relegated to a passive backdrop where human activity takes place.

15 UNDERWATER REALMS. PLACE-MAKING UNDER THE SEA IN THE BRONZE AND IRON AGE MEDITERRANEAN

Yamasaki, Mari (PCMA - University of Warsaw)

Humans create places by transforming the space around them and endow it with value. The traces of the many ways in which people in the past turned spaces into places are a frequent object of study in archaeology. However, this interest has mostly been limited to dry land, while underwater place-making practices have been largely ignored. Scholars tend to dismiss the expanse of water below the sea surface as an undifferentiated space and often extend this concept to past cultures.

Evidence for the material modification of underwater spaces in antiquity is indeed limited, but this does not mean that underwater place-making did not exist. In fact, the transformation of spaces into places does not necessarily require their physical modification, but may operate on the immaterial and conceptual level. For instance, the fencing of open space to demarcate property may be just as effective in limiting access to a private lawn as a religious taboo in forbidding the trespass into sacred land. Places can exist in the physical world and be at the same time imaginary. Likewise, underwater spaces can be transformed into places of human engagement and meaning through visual representations, narratives, beliefs and ritual practices, independently of the building of subaquatic structures.

In this paper, taking the archaeological evidence as the starting point, I will discuss instances of real and imagined underwater places from the Aegean and Eastern Mediterranean between the Late Bronze and the Iron Ages.

15 UNITED EUROPE OF THINGS? MATERIALITIES CREATING MEDIEVAL RITUAL LANDSCAPES (C. AD 1000-1550)

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Webley, Robert (University of Reading) - Sawicki, Jakub (Czech Academy of Sciences in Prague) - Vargha, Mária (University of Vienna) - Parvanov, Petar (Bulgarian Academy of Sciences) - Lewis, Michael (Portable Antiquities Scheme; British Museum)

Session format: Regular session

The proposed session aims to bring together researchers from across Europe examining persistence and change in medieval ritual landscapes through material culture, such as through lived religion, personal/household devotion, ritual deposition and the material practices of religious institutions. We will be continuing conversations under the 'United Europe of Things' banner from previous EAA meetings - fostered by the European Medieval Finds (EMF) network (<https://ypp.com.pl/emf/>) - but here our focus is on the theme of how material culture is deployed in ritual action in the landscape. Another important strand we seek to weave in from previous meetings pertains to digital approaches to big data, specifically as they can be applied to questions of persistence and change in medieval ritual practices.

The Middle Ages saw huge religious transformations, experienced differently in various regions of Europe, alongside apparent persistence of established Christian tradition. How did different trajectories of conversion and reform influence personal devotion and engagement at a landscape level, and how did this change through time? On the other hand, to what extent did earlier traditions persist and how may this be contextualised: were there 'persistent places' that saw continued deliberate deposition? The session hopes to elucidate the regional differences and similarities in social interaction with religious landscapes across the period c. AD 1000-1550.

This session welcomes contributions with the following emphases:

- Material culture and persistent places
- Lived religion and personal devotion
- Multi-scalar approaches contrasting urban, rural, fluvial and other devotional landscapes
- Theoretical approaches to religious/ritual material culture
- Evidence from public and metal-detected finds
- Big data approaches to religious material culture
- Interactions with material culture of different social communities within a shared landscape
- Papers from across Europe, but discussions focusing on the fringes of medieval Christian Europe are particularly welcome.

ABSTRACTS

1 LATER MEDIEVAL 'PLACED DEPOSITS': REFLECTIONS ON AGENCY, MATERIALITY AND COSMOLOGY

Gilchrist, Roberta (University of Reading, UK)

Archaeologists have become increasingly alert to material evidence for a wide range of ritual practices that were not recorded in historical documents, such as objects and materials that appear to have been deliberately placed within medieval buildings or settlements, and in landscape contexts including cultivated fields and water courses. How might we account for ritual deposition within the cultural context of medieval Christian Europe? Until recently, single examples of such practices were dismissed as oddities, or regarded as superstitious behaviour or persistent pagan survivals. However, many placed deposits occur in spatial contexts that were tightly controlled by the Christian clergy, including monastic landscapes, parish churches and cemeteries. The church did not record these practices and they may not have encouraged them, but they evidently tolerated them, even within the most proscribed spaces. This paper reviews theoretical approaches to the interpretation of medieval placed deposits, reflecting on their proposed materiality, agency and intended causality. It argues for a contextual approach to archaeological interpretation grounded in medieval cosmology and the practices of lived religion, rather than assuming long-term continuities and cross-cultural intentions behind ritual deposition.

2 "CHARACTERFUL" MATERIAL CULTURE: BIASES, CHALLENGES AND DATA MANAGEMENT SOLUTIONS IN LARGE-SCALE ARCHAEOLOGICAL CULTURAL HERITAGE DATA

Oksanen, Eljas (University of Reading)

Scientific databases, including those produced for archaeology and cultural heritage applications, are artefacts shaped by a variety of factors. These include institutional policies, the unique characteristics of the primary sources, the requirements of associated research projects, the expertise and priorities of the data service developers, and the technology at their disposal. This diverse set of influences affects the utility of the data for broader audiences, including (and arguably especially) in big data analysis and research.

This presentation will examine applications of spatial "big data" analysis to the study of medieval ritual landscapes, considering the potential and challenges inherent in large object databases from a data management and FAIR data (Findable, Accessible, Interoperable and Reusable) perspective. The specific case study will be on metal-detected finds data from the Portable Antiquities Scheme in England and Wales database, but the questions raised have wide-ranging relevance.

How do the numerous subjective and contingent biases that inform the character and quality of such databases impact on research methodologies and workflows? For example, how do specific, local factors affect the reporting and recording of public finds data, especially in the study of particular landscapes and 'persistent places'? Therefore, what kind of Open Science research data management practices and documentation standards should be developed to enhance the reusability of both the primary data and the research results? This presentation aims to share experiences from practical work in Data Sciences-led archaeological research and foster a dialogue that might lead to collaborative solutions.

3 THE MATERIAL CULTURE OF CHRISTIANISATION - CONTROVERSIES AND NEW APPROACHES

Vargha, Maria (University of Vienna)

The present paper introduces the approach of the ERC StG project RELIC (Modelling Religiopolitics. The Imperium Christianum via its Commoners) to studying changes in material culture related to large-scale social and religious processes, such as Christianisation.

The historiography of religious conversion and the pagan-Christian shift observed by archaeology is vast. However, it often appears as a binary opposition of paganism and Christianity, which simplification should be re-evaluated, and instead, a gradual, non-exclusive adaptation from non-Christian to Christian should be advocated.

The project proposes an approach to study Christianisation on multiple spatial scales; firstly, it aims to focus on predominantly unpublished and unutilised archaeological data archives about the most informative sites, which refer to the Christianisation of the commoners. On a general (macro) level, the site location of rural churches and field cemeteries can be contextualised in relation to each other and the networks of secular and ecclesiastical power centres, such as the seats of the king and his lords and ecclesiastical dignitaries. Secondly, the analysis of the spatial relations of these sites can be supplemented with the inter- and intra-site level analyses of material evidence from well-researched and published sites, including the study of burial customs, liturgical objects, and grave accessories. The results of the archaeological analysis will be compared and contrasted with historical evidence and existing historical narratives on conversion and Christianisation.

The present paper aims to review the traditional approaches and elements of material culture connected to the Christianisation of everyday people and propose new methodological frameworks for their investigations.

4 **BY SWORD AND WORD: EXPANSION AND CHRISTIANIZATION OF THE SOUTHERN RUS' BORDERS AT THE END OF THE 10TH-11TH CENTURIES**

Diachenko, Dmytro (Institute of Archaeology of the National Academy of Science of Ukraine)

The decline of Viking age transcontinental trade forced the rulers of the young Rus state to look for alternative sources of enrichment. The view of the Grand Princes of Kyiv was focused on the fertile southern lands. Unfortunately, these regions were unpopulated due to raids by warlike Turkic nomads.

During Prince Volodymyr's reign, the situation gradually began to change. He began constructing fortified lines, hill-forts, and even full-fledged towns on a large scale. These processes required significant economic and human resources. The chronicle explicitly states that as a result of his numerous military actions against various peoples of Eastern Europe, in addition to tribute, Prince Volodymyr "gathered together the best men" and populated new lands with them.

This policy was also continued by Prince Yaroslav, his son. He pursued an active foreign policy and regularly conducted military campaigns against neighbouring states. By resettling Slavic and Turkic, Polish, Baltic, and possibly Finno-Hungarian peoples, the prince solved the problem of population shortage. The burial monuments with the material culture of these peoples on the southern border of his state along the river Ros are evidence of this.

The process of Christianization was instrumental in the reduction of cultural and religious differences among a multicultural population. Disagreements in traditional law were normalized by introducing the first unified legal codes (Russkaya Pravda). The control over the observance of the norms by the local population was based on the bureaucratic apparatus, which at that time began to differentiate itself from the paramilitary units of the prince (Druzhdina). At the same time, adherence to these norms ensured a certain "cultural autonomy", which can be seen in the funeral rites and the material culture of the immigrants at the end of the 10th and the beginning of the 11th century.

5 **MY REFUGE AND MY FORTRESS: A GEOSPATIAL STUDY OF FORTIFIED CHURCHES**

Downs-Tepper, Liam (University of Vienna)

Anything designed for a single purpose brings with it a purity and clarity of function. A meat grinder does one thing and does it with aplomb. A mousetrap is the ideal tool to have on hand if the goal is the trapping of mice. The moment multiple purposes are introduced, however, the situation becomes more complex - and even more so if those purposes are at odds with each other. What purpose is a priority? Are design choices a question of compromise? Or do they in fact compromise each other?

Such is the conundrum offered by fortified churches. They are a contradiction in terms: both military and ecclesiastical, intended to be both inviting and threatening, peaceful and violent.

This paper examines the cultural and spatial aspects of Europe's fortified churches. The goal is to provide new insight into the geospatial rationale behind different types of fortified church. It aims to use an interdisciplinary comparative approach to determine, on a fundamental level, the commonalities across disparate areas that lead to the construction of a fortified church - as opposed to some other form of fortress, or church, or fortified town - and further the different varieties of fortified church that exist.

Among the aspects that this paper explores is the transfer of architectural and spatial knowledge through Europe, following the movements of various crusading orders. It also highlights the relatively common structure of minority ethnic groups being responsible for fortified churches, delving into the concept of peasant fortifications. This is paired with an assessment of various theories from years of scholarship, intended to explain the "why" and "where" of fortified churches.

6 **EARLY ADOPTERS IN ANCIENT LANDSCAPES: GOTLAND'S FIRST CHURCHYARD BURIALS**

Ljung, Cecilia (Uppsala University) - Klevnäs, Alison (Stockholm University; Uppsala University) - Noterman, Astrid (Stockholm University)

The Baltic island of Gotland offers a rare archaeological resource in the form of intact graves from the first generations who were laid to rest in churchyards. Burial at newly established church sites is seen here from around the mid-eleventh century. Many of the first graves beside churches still use some customs which mirror traditional practices, notably dressing the dead in late Viking Age costume.

Other aspects show more complete rupture with the past. In contrast to other areas of Scandinavia, on Gotland the placement of the first churches broke with landscape traditions, with locations chosen close to significant farms rather than in conjunction with ancient grave fields. This represented a striking disjuncture since it brought to an end

centuries - even millennia - of mortuary continuity at the existing sites, some of which had attracted burials since the Bronze Age.

Practices at the new sites suggest radical change in the conceptualization of persons and bodies and how they related to community. This is when we see complete representation of the population for the first time, whereas previously burial had been afforded only to a subsection, mainly adults and often men. On the other hand, the first churchyards introduce spatial division of the sexes, with women placed on the less valued north sides.

Current dating suggests there was a considerable period during which the dead were divided between markedly different landscape and social settings, with burial and commemoration continuing in both early churchyards and ancient burial grounds, and also some novel rural locations of other kinds. This paper presents preliminary results from a pair of projects investigating the bioarchaeology and ritual treatment of the early adopters of churchyard burial and asking how they related genetically and socially to the community members who maintained the old ways of death.

7 **RURAL CHAPELS AS SITES OF POPULAR DEVOTION IN MEDIEVAL ESTONIA**

Valk, Heiki (University of Tartu)

The Baltic crusades in the Eastern Baltic region ended with the Christianization of the formerly pagan areas and the making of Medieval Livonia which greatly corresponds to the territories of present-day Estonia and Latvia. The network of parishes was sparse and the parishes were mostly big. The number of parish churches was especially low on the eastern fringe of Western Christianity.

The lack of churches was compensated by the dense network of rural chapels of different size and shape. These small sanctuaries, made mostly of timber, became objects of popular devotion - an expression of the cult of saints. The local rural chapels fell in ruins or were destroyed in the period of early post-medieval wars (1558-1625), but their ruins or sites, reflected until recent times in oral lore and toponyms, were still used for offering also later. Offering and its dynamics is archaeologically represented by coin finds, gained both from excavations and by metal detecting. In Estonia, Christianized gradually in 1215-1227, the earliest coin finds from rural chapel sites date from the 2nd quarter of the 13th century. The first chapels were located at major trade roads, but since the mid-13th century there is evidence also from other localities. Bigger chapels seem to have been built on the halfway between towns or castles, but coins were offered also at the local level. The practise of coin offering, expression of popular Christianity and devotion, increased in the 15th century and gained its peak from the mid-16th to the late 17th century. As votive gifts, coins of the lowest value were used.

8 **DEVOTION ON THE DOWN-LOW. MATERIALITY OF UN-INSTITUTIONALIZED RITUAL PRACTICES IN MONASTERIES IN THE LATE MEDIEVAL NETHERLANDS (CA. 1100-1600)**

Mulder, Fardau (Groningen Institute of Archaeology, University of Groningen)

Religious rituals were at the core of monastic daily life in the Middle Ages. These included the liturgical rituals, but also un-institutionalized practices, often expressed in material culture e.g. magical amulets, clay figurines and ritual depositions. Such non-liturgical devotional practices are generally not well known from normative sources concerning monasteries, but their representation in the archaeological record and local archives demonstrate they were an integrated part of monastic life. Patterns in such customs can help understand which factors were important in shaping monastic identity, like gender, region, and/or chronology. It also allows us to better understand the room for agency and local variety within the strict monastic environment. This paper focuses on un-institutionalized devotional practices in Dutch Late Medieval monasteries (ca. 1100-1600), by discussing some specific Cistercian monastic sites. It will discuss which objects we find that are associated with devotional practices, and in what contexts they are found, to create a better understanding of the monastic ritual landscape in the Late Medieval Netherlands.

9 **THE MATERIALITY OF PILGRIM CULTURE IN A MEDIEVAL URBAN LANDSCAPE**

Sawicki, Jakub (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic)

In 15th century Aachen, during events associated with the display of relics, 142,000 pilgrims were counted at the gates on a single day. Pilgrims, who arrived dressed in distinctive attire (specific hat, staff, and bag) also sought to acquire souvenirs imbued with the sanctity of the famous local relics. Considering these data, it can be ventured that pilgrims are a constant element of the medieval urban landscape. Not only in cities that were centres of worship but essentially in every town (or village) to which pilgrims returned with proofs of their journey.

What is then urban space associated with pilgrimages? Holy churches and monasteries? Hospitals, inns, and other resting places for travellers? Workshop of paternosters, holy clay figurines, and other popular utensils displaying devotion? Archaeological evidence suggests that pilgrim badges are found in less self-evident places. From the well-studied Wrocław, approximately 75% of all badges come from one of the city marketplaces, while in the Netherlands, a significant portion of finds originates from canals.

In this presentation, I would like to discuss urban material culture associated with personal devotion, primarily with pilgrimages but not exclusively. Based on the archaeological state of research, it turns out to be surprisingly scarce, limited only to a few types of objects and often originating from unusual contexts.

10 PERSISTENCE AND CHANGE IN THE MEDIEVAL LANDSCAPE: CONTEXTUALISING RELIGIOUS BADGES FOUND IN NORTH-WEST NORFOLK (ENGLAND)

Lewis, Michael (British Museum)

An important collection of pilgrim badges is housed by (King's) Lynn Museum, Norfolk; most of these were found in the mid-late nineteenth century through mudlarking. Lynn (Lene) was to become an important port during the Middle Ages because of salt production, also benefiting from the changing course of the River [Great] Ouse to the Wash, and thereon the North Sea, and the Continent. In this context, of a changing landscape, the intriguing discovery of pilgrim badges on the old course of the river (south of Lynn) provides insights into medieval ritual practice and religious belief. This paper will therefore seek to contextualise the urban badge collection with more recent rural finds, suggesting why medieval people were deliberately (it might be assumed) - perhaps in an act of persistence - depositing religious badges in this changing landscape. Importantly, the religious badges will be examined against finds of a 'secular' nature. Finally, thoughts will be given on why these rural badges are varied in the cults (both insular and continental) they represent.

11 THE AFTERLIFE OF PILGRIM SIGNS IN EUROPE

Søvsø, Mette (Museum Vest)

The number of finds of pilgrim signs from large parts of Europe (in the shape of badges, ampullas and other artefacts sold at places of pilgrimage) has been steadily increasing the last decades. Mainly because of metal detecting in rural areas and excavations in medieval towns. The comprehensive public databases including data about thousands of European finds has given new opportunities for detailed artefact studies. Research on pilgrim signs have for many years focused on travel activity and destinations, pilgrimage industry, iconography and cultural exchange. We know from written sources, that pilgrim signs were manufactured in hundreds of thousands, and the finds distribution shows a large geographical spread into medieval societies and landscapes. To a lesser degree focus has been on the afterlife of the artefacts: What happened to them, after they were brought home by the pilgrim, and when they were no longer attached to his or her dress or equipment? The subject has divided researchers: Were they considered to be metal scrap that could be remelted or even just worthless trash? Or did they still have religious value and meaning as useful objects in everyday life?

Based on Danish finds as well as published finds from European databases, this paper will present some observations both when it comes to secondary traces of use and wear and secondary contexts. The study indicates that the objects were in a number of cases reused, reworked or transformed and it seems that they can have had an extended afterlife in which they were treated as functional objects in the true sense of that term, in a time and a context when religio-magical praxis was present deep within the tiniest details of human life.

12 MEDIEVAL PAPAL BULL SEALS: FROM WRIT TO RITUAL

Pestell, Tim (Norwich Castle Museum and Art Gallery)

Papal bullae, the lead seals attached to papal charters for their authentication, have become familiar finds to UK metal-detectorists, as well as being made on the excavation of many church and monastic sites. This paper will look at how these bullae were used in their primary role and what this might tell us about the issuing of these documents by the papal chancery between the twelfth and sixteenth centuries. I will then go on to demonstrate how the seals themselves took on a numinous aspect, exploring the ways in which bullae were physically modified, revealing their secondary roles as amuletic objects. It is apparent from both Portable Antiquities Scheme data and contextual evidence from excavations, that a more nuanced picture emerges of the ways in which bullae were valued and seen as having agency. Using a case study of finds from the medieval Diocese of Norwich, it will be shown that far from being random finds in the landscape bullae might reveal structured practices of deposition indicating ritualised behaviour. The implications of the English experience of bullae practice will then be set into its European context.

13 THE TANGLED MEANINGS AND RELATIONSHIPS OF LANDSCAPES AND MATERIAL THINGS IN THE LATER MEDIEVAL PERIOD

Standley, Eleanor (University of Oxford)

This paper will explore two related strands: 1) devotional material found in landscapes, and 2) depictions of landscapes found on material culture. The first is an unsurprising approach and will consider forms of devotional material culture that were purposefully embedded within landscapes or buildings. This will include purposefully hidden or hoarded de-

votional objects, particularly those deposited at the Reformation in England. The second intends to consider attitudes and meanings associated with landscapes (or waterscapes) and how and why they were incorporated into the design of devotional and ritual material.

The case studies will include chance or excavated finds recovered from landscapes in England, but also other material culture decorated with ritual landscapes, such as English domestic drinking vessels decorated with 'forest' scenes; northern European ivory carvings with religious or romantic scenes set in 'wild/semi-wild/garden' spaces; and alabaster altar panels made in England where 'places' form part of the religious scenes and support the visual-reading of them. These material things open the possibility of understanding the qualities associated with 'scapes' and how they were considered and interacted with within the home or a devotional space. This is of particular interest as 1) the terminology of 'landscape' or 'waterscape' did not exist in the period under consideration, and 2) the combined approach can reveal the tangled meanings of, and relationships between, landscapes and material things.

14 DEVOTION MADE MANIFEST: A REGIONAL CASE STUDY FROM MEDIEVAL ENGLAND

Webley, Robert (University of Reading)

Most studies of religious practice in medieval Europe focus on the structures, material culture and locations of the church and other formalised religion. In England, evidence from large-scale excavations of medieval material can now be combined with publicly recorded metal-detected material to afford unprecedented insight into devotional objects and religious practice beyond a church context. This paper offers initial assessment of such data as collected by the Medieval Ritual Landscape project, which began in 2023 at the University of Reading, UK.

Analysis will focus on medieval and post-Reformation devotional practices across North Yorkshire. This large county contained over fifty religious houses, the major city of York and sizeable urban centres, including Scarborough. Rural evidence, coming from the major long-term excavations at the deserted medieval village of Wharram Percy, as well as from recent, unpublished excavations, alongside metal-detected material, completes a significant dataset. Through this new material culture data, I will explore the competing influences on devotional practice in different contexts across the medieval period in an attempt to elucidate both similarity and difference. As part of the transition into the post-medieval period, I shall also consider persistence of practice in a county famed for the Pilgrimage of Grace (1536) and its Catholic recusancy in the later 16th century. By considering archaeological evidence of religious practice across various settings, this project will provide new insights into lived religion for a much wider group of people in the medieval period.

15 LANDSCAPES OF BELIEF IN MEDIEVAL & POST-MEDIEVAL PERTSHIRE, SCOTLAND: A EUROPEAN CASE-STUDY IN REFORMATION AND RESISTANCE

Hall, Mark (Perth Museum)

This contribution will seek to interrogate the long durée of changes in belief (from early medieval through to post-medieval), pivoting about the sixteenth-century and later Reformation (itself a long-term process rather than a short-term event), and as evidenced by material culture. Thus, a range of things – sculptures (including Pictish sculpture rearticulated in later centuries), bells, relics and other holy and magical matter with perceived amuletic/apotropaic efficacy – will be addressed in the context of the belief networks they helped to power-up, along with traditions of practice, doctrines and specific places (personal and communal). The entwining of magic and belief with the changing rhythm of material culture through the agency of human use and reuse, giving material culture a biographical trajectory. The examples will range across a remote parish church and its setting at Struan, near Blair Atholl; the urban environment of Perth and urban and rural monastic settings (including St Serf's Loch Leven).

16 WEARING THE MEDIEVAL RITUAL LANDSCAPE: RELIGIOUS BELIEF AND RITUAL ACTIVITY EXPRESSED BY SCOTTISH DRESS ACCESSORIES

Prosser, Lydia (Durham University and National Museums Scotland)

Objects that were worn as part of dress had an important role in the enactment and perpetuation of medieval ritual and belief. Such items reflected participation in broad traditions and well as denoting access to ritual behaviour that was sometimes restricted, for instance to those of episcopal rank, or members of a guild whose identity was firmly situated in Christian theology and iconography. Focusing on dress accessories allows us to consider how ritual landscapes were embodied at a personal level, displaying as they do the physical marks of touch and wear, and alluding to individual interpretations of general practice and deviation from expected behaviour.

Scotland is often left out of general discussions of late medieval material culture and Scottish objects are frequently interpreted with the presumption that the meanings they reflected merely mimicked trends across Western Europe, especially England. Yet, Scotland itself was not a homogenous entity. Geographical realities bred distinctions between the rural Highlands and Islands, which retained long-established connections with Ireland and Scandinavia, and the

Lowlands with its burghs and trade links with the Low Countries. Factors such as war with England and the lack of a university in Scotland until the fifteenth century impacted the movement of craftspeople and the transmission of ideas such as belief in the beneficial properties ascribed to gemstones.

This paper will put Scotland firmly in the centre, championing the largely-untapped evidence of Scottish metal-detected finds and using Scottish sources to explore how ritual belief was expressed through dress accessories from the twelfth century to the fifteenth. Chronological and regional trends will be explored and a number of examples presented where a uniquely Scottish character can be identified. This research supplements the EMF network's broad aim of assembling a more nuanced picture of similarity and difference in portable material culture across Europe.

17 PERSISTENCE, SUBSTITUTION, RUPTURE? CERAMIC MATERIAL CULTURE IN THE SOUTHEASTERN IBERIAN PENINSULA BETWEEN THE 15TH AND 16TH CENTURIES

Busto-Zapico, Miguel (University of Granada) - García-Porras, Alberto (University of Granada)

The end of the Middle Ages and the beginning of the Early Modern period in the southeastern Iberian Peninsula are periods of great interest for studying the material manifestation of various processes of change. Interactions with the material culture of different communities (Nasrid-Castilian) and religions (Muslims-Christians) within a shared and constantly changing landscape are observable.

The subject of study in this work is the ceramic material culture, primarily focusing on pieces used on the table with some type of covering. The geographical scope of the study is the southeastern Iberian Peninsula, the area occupied by the Nasrid Emirate and the later Kingdom of Granada, between the 15th and 16th centuries. Results of comparative archaeological analyses (functional, typological, and morphometric) are presented, conducted on ceramic materials from the sites of Teba (Málaga), Cuarto Real de Santo Domingo (Granada), Macael, and Vera (Almería). The developed study methodology combines the use of databases and statistical analyses for handling large datasets.

Changes in ceramic forms can be observed, involving the substitution of some, the emergence of new production methods, or the use of other types of glazed and enameled coverings. Many of these changes are observable throughout Western Europe, but in the southeastern Iberian Peninsula, they are more pronounced, reflecting a cultural rupture.

Through this study, we can analyze how different phenomena of conversion, assimilation, migration, repopulation, and expulsion of different groups developed. We can explore whether there was a persistence of previous traditions regarding ceramic production and consumption, whether there was substitution, and if it was gradual or radical, seeking to understand how it manifests. Perhaps we are dealing with a non-linear phenomenon with advances and setbacks that combine phases of persistence, substitution, and rupture.

18 SACRED SWORDS OF THE ALPS - EXPLORING A FORGOTTEN MEDIEVAL TRADITION IN TYROL

Messner, Florian (University Innsbruck)

Since ancient times, the Alps have not been an insurmountable obstacle, but their valleys and passes have permitted lively traffic between north and south. In the past, the numerous passes were probably even more important than they are today, as they often shortened journey times considerably. At the same time, these crossings always involved a certain amount of risk; the weather could change quickly and surprise unwary travellers. It is therefore not surprising that from the Bronze Age at the latest, deposits were made at mountain passes, whether in gratitude for surviving a storm, a successful crossing or for religious reasons that are no longer traceable today.

To date, there are no known finds of swords from the high mountains from the early Middle Ages. This situation changed in the Tyrolean region (nowadays split between Austria and Italy) and thus probably also supra-regionally from the High Middle Ages onwards, which was previously unknown in the academic community. Only intensive research in the framework of my doctoral thesis on medieval swords from the Tyrolean region allowed me to assign six swords to sites in the mountains or on passes, with the highest sword find coming from the Pass d'Uffiern (Switzerland), at an altitude of 2,628 metres.

In my paper, I would like to look at the particular characteristics of this ritual landscape, what the sites have in common and where they differ. Due to the lack of written sources from the Middle Ages for this ritual behaviour, conclusions are drawn primarily from the local topography and the swords themselves. I will also look at the quality and traces of use of the weapons in order to show that these swords can indeed be used to grasp a ritual concept in a harsh landscape previously unknown to the scientific community.

19 THE EARLY MEDIEVAL AGGLOMERATION OF BOJNÁ - A PLACE THAT SOURCES POWER

Robak, Zbigniew (Institute of Archaeology, Slovak Academy of Sciences)

The complex of archaeological sites located in the vicinity of the village of Bojná in western Slovakia has been known for a relatively short time, but it became an important part of the scientific landscape of early medieval archaeology.

The sites have yielded thousands of artefacts related to early medieval elite culture, mainly parts of attire and weaponry, as well as objects associated with Christianity. This contribution aims to present the history of the site and the most important finds. The scope of the presentation spans from the 7th century when the first fortified settlement was established in Bojná until the creation of Tematín Castle in the 13th century. During this time, the centre of power was moved to different locations within the agglomeration, but always remained within its borders. The agglomeration reached its greatest momentum at the turn of the 9th and 10th centuries when the Vály stronghold was one of the largest military centres of the entire Great Moravia. Even after the decay of the fortress in the 1st half of the 10th century, iron hoards were deposited on the hill. The only justification seems to be the "tradition of the place" and symbolic rituals. However, the nobleman's court and rotunda did not disappear, and their function even seems to have become more important with the development of early medieval feudalism. Finds such as gilded spurs confirm the extraordinary position of the inhabitants of the area even in the Late Middle Ages.

18 FISH * FORMS * FUNCTIONS: THE IMPORTANCE AND SOCIETAL ROLE OF AQUATIC RESOURCES IN PREHISTORIC SOCIETIES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Groß, Daniel (Museum Lolland-Falster) - Kramberger, Bine (Institute for the protection of cultural heritage of Slovenia, Centre for Preventive Archaeology (ZVKDS, CPA)) - Mansrud, Anja (University of Stavanger, Museum of Archaeology, Department of Cultural Heritage) - Hellmuth Kramberger, Anja (Alma Mater Europaea - Fakulteta za humanistični študij, Institutum Studiorum Humanitatis (AMEU - ISH)) - Theodoropoulou, Tatiana (Université Côte d'Azur, Cultures et Environnements, Préhistoire, Antiquité, Moyen Âge (CEPAM))

Session format: Regular session

Along with hunting and agriculture, aquatic resources represented an important aspect of subsistence in past communities. The various fishing techniques are proven through the finds of artifacts such as fishing equipment, through pictorial representations, and bones.

In this session we want to discuss the role that aquatic resources played in prehistoric societies as well as methods and tools for assessing their societal impact. We aim to discuss the role of fish and marine mammals in the livelihoods of past communities, since for certain periods and cultures, the fish not only served as a food source, but also had a symbolic or mythological meaning. We aim at coming closer to answering the question of the internal and external perception of "fishers".

We would like to invite contributions dealing with the use of aquatic resources and fishing techniques, but also theoretical contexts to discuss, for instance:

>> The importance of marine resources as food source and methods and techniques for acquiring them

>> the symbolic-religious meaning of the fish during different prehistoric periods

>> the archaeological analysis and evaluation of the relevance of aquatic resources in mixed economies

>> the social functions of fishing in certain communities. Were marine resources famine food, feast, seasonal abundance exploitation, export and trade, competition, 'social refugia', etc.?

We want to welcome colleagues at all career levels and offer particularly young researchers a platform to present their research results.

We also encourage studies that go beyond data presentation and contextualize their findings in a social perspective. Hence, ideas and methodological discussions are as welcome as archaeozoological, iconographic or techno-typological studies, to name a few.

ABSTRACTS

1 THE AFFECT OF MATERIAL DYADS: FISHING AS INTRASPECIES COMMUNICATION

Mansrud, Anja (Museum of Archaeology, University of Stavanger) - Radchenko, Simon (Museum of Archaeology, University of Stavanger)

This contribution aims to refresh the theorization of fishing in prehistoric coastal communities by moving beyond optimizing models reliant upon conceptions of economic rationality to explore the intra-social role of fishing. It takes a closer look at a soapstone sinker, engraved with geometrical patterns and a figurative ornament interpreted as representing a flatfish, that was accidentally discovered on the coast of Rogaland in Southwest Norway thirty years ago. In this talk, we report on results from experimental study and image-based 3D modeling of the sinker, and further employ it as a point of departure to explore the role of material culture in interspecies communication. Finds of fishbones, fishhooks, sinkers, harpoons, leisters, flutters and net needles attest to the fundamental importance of

coastal fishing in South-Western Norway from ca. 8000 BCE onwards. Fishing during the Middle Holocene period is commonly considered a mundane activity, crucial for everyday sustenance, and an entirely human achievement. By drawing on fish ethology, ethnography, and multispecies perspectives, we argue that the realm of the social encompasses more than human action. The activity of fishing relies on social and performative aspects - it is a technical action entangling humans, fish, artefacts, and bodily techniques, gestures and skills, in manifold and complex ways. Fishing takes place at the brink of two different worlds and actors' habitats, each with the capability to affect, i.e., insert influence or have an impact on the other. We further suggest the concept of material dyads; meaning objects applied to mediate the human-non-human interface and facilitating contact, communication, or control, as a fruitful concept for widening our understanding of past fishing practices.

2 FISH PEOPLE: HUMAN-ANIMAL RELATIONSHIPS IN IDENTITY CREATION IN THE IRON GATES DURING THE MESOLITHIC-NEOLITHIC TRANSITION

Rasmussen, Jason (University at Buffalo)

The Danube river which runs through the Iron Gate gorge (modern borders of Romania and Serbia) was central to the life of the many communities which lived alongside it. Fishing for sturgeon would have required the cooperative hunting of multiple individuals in the water and onshore/rocks to bring down a single specimen with specially crafted stone clubs (Dinu 2010). Over 200 carved local stone statues featuring combined human-sturgeon features have been found in Lepenski Vir – opposite one large whirlpool ('vir' = 'whirlpool'). Burials often feature individuals wrapped in a cloak with shell beads sewn into them resembling the bony scales found on sturgeon during the mating-harvest season (Živaljević 2023). A recent review of skeletons of the region and period show that one-third of the burial populations have a non-metric trait in the inner ear caused by extensive periods of being submerged in extremely cold water suggesting that swimming in the Danube was practiced extensively by communities (Villotte et al 2014).

The Iron Gates was a large region with access to a wide range of animal resources across many different environments including forests, grasslands, and wetlands. The partial remains of red deer, aurochs, wild boar, domesticated dog, wolf, and many species of water birds are found in burials, settlement areas, and cooking contexts but none of these are integrated to the extent that fish is folded into the personal collective identity. This presentation seeks to examine the way the people of the Iron Gates incorporated fish into their self-identity along with the use of other species in trying to understand what attracted the various communities to integrate them so extensively. It will look at the embodied act of hunting/swimming, the pressures to create a group identity during the Mesolithic-Neolithic transition, and the implications of crafting a group identity in prehistory.

3 WHO WAS THE FISHER(MAN) WITHIN THE BRONZE- AND IRON AGE COMMUNITIES? REVIEW OF ICONOGRAPHIC AND ARCHAEOLOGICAL DATA

Hellmuth Kramberger, Anja (Alma Mater Europaea – Institutum Studiorum Humanitatis) - Kramberger, Bine (Institute for the Protection of Cultural Heritage of Slovenia (ZVKDS), Centre for Preventive Archaeology (CPA))

Archaeological research and archeozoological analyses have revealed that fishing and collecting aquatic resources was an important integral part within the lives of prehistoric coastal and mainland communities. However, less information is available about the gender and the social status of the fisher. In our research we therefore addressed the question of whether it can be defined which group of people were involved in fishing in the Bronze and Iron Ages in Europe and Western Asia. What evidence do we have for this period, the 2nd and 1st millennium BC, that can provide us with insight into the question? On the one hand, especially in the Eastern Mediterranean and Western Asia, we find depictions, which are presenting people who are fishing and gathering aquatic resources using various techniques, and on the other hand, we have a number of finds uncovered within the graves, which include fishing equipment such as fishing hooks. A comprehensive review of depictions, graves (grave goods as well as anthropological analysis) has shown that fishing was done mostly by men in various prehistoric societies. However, with the appearance of a hierarchical societies in the metal ages, especially in the Bronze and Iron Ages, fishing was probably not only an important economic activity, but, similar to hunting in later periods, it also played an important role in the daily life of the highest class of the population in Central Europe, as well as in Western Asia. Furthermore, the pictorial representations in particular make it possible to identify very specific fishing techniques such as the use of swim bladders in Assyria in the early 1st millennium BC, which would not be evident from material legacies.

4 "O BEAUTIFUL FLOUNDER! O QUEEN OF THE SEA!" ARCHAEOLOGY, DEPICTIONS, MYTHS AND TRADITIONS RELATED TO THE HALIBUT

Brun, Wenche (Museum of Archaeology, University of Stavanger)

The line from the 17th-century poem *Swimming Animals and Fish of the Northern Ocean* by Petter Dass, reflects the important position of the halibut in the north of Norway, but the supremacy and magic of this large fish wrapped in myths and folklore seems to have long traditions, earlier than the written word.

Along the coast of west-Norway, the seascape with its resources must have been of utmost necessity during pre-history. The island of Åmøy in the county of Rogaland offers a glimpse into the Scandinavian Bronze Age period through the numerous shore bounded rock art panels. At this site the coastline holds a mega locality emphasizing the immersive significance of the maritime surroundings and marine resources through the motives of boats, fishing activities and fishes. The four carved representations of halibuts at this site will be discussed together with other relevant archaeological representations.

Throughout the world, the halibut is a recurrent motive in rock art, both painted and carved. Still, the halibut motives at Åmøy are traditionally referred to as uncharacteristic elements rarely represented within the context of South Scandinavian rock art. Even so, or maybe because of this – an approach combining traditional belief, superstition, and folklore with material culture might add value to the frames of interpretation.

5 PREHISTORIC FISHING IN THE ŽEIMENA RIVER, NORTHEASTERN LITHUANIA

Piliciauskas, Gytis (Lithuanian Institute of History) - Prancėnaitė, Elena (Klaipėda University) - Matiukas, Aldas (-) - Osipowicz, Grzegorz (Nicolaus Copernicus University) - Peseckas, Kęstutis (Lithuanian Institute of History) - Piličiauskienė, Giedrė (Vilnius University)

Between 2015 and 2023 professional divers, who are also archaeology enthusiasts, have discovered ten ancient fishing sites while diving in the Žeimena River. Preliminary underwater archaeological investigations at some of them revealed that they date back to a wide range of periods, from the Mesolithic to the Middle Ages, and at some of them not only wooden weirs and other fishing gear are preserved, but also a rich archaeological layer with remains of hunting and food processing and even human bones. Such underwater archaeological sites are extremely rare in the world, as fish weirs built in rivers usually do not survive many years. This is why prehistoric fisheries were studied mainly at the sea, lagoons and lakes, while an actual importance of rivers is often underestimated. We will present data of the newest underwater investigations at Žeimena River and discuss a strategy and methods of an upcoming systematic underwater survey of the Žeimena riverbed and detailed excavations at most valued Stone Age fishing stations.

6 HUNDREDS OF MARINE FISH AS OFFERINGS AT SALANGO, COASTAL ECUADOR, DURING THE MIDDLE GUANGALA PHASE (AD 300-600)

Lacorne, Camille (Muséum national d'Histoire Naturelle) - Lunniss, Richard (Universidad Técnica de Manabí) - Bearez, Philippe (Muséum national d'Histoire Naturelle)

The Salango Sanctuary (600 BC/AD 600) is of fundamental interest for understanding the relationship between man and the sea in the tropical Pacific coast. In 2015, the discovery of a ritual deposit containing thousands of fish remains from the Middle Guangala Period (300/600 AD) provided unique evidence of these complex practices as well as on fishing activities in south-central Ecuador. Approximately 3,300 bones have been identified and may represent the remains of about 340 individuals belonging to 49 different species. The assemblage is largely dominated by pelagic species, particularly scombrids weighing 2 to 3 kilograms. The presence of the dolphinfish, a taxon that has not yet been reported in the archaeological record of Salango, also supports the hypothesis that fishing was mainly conducted offshore by boat. The preservation in situ of numerous anatomical connections and the large number of remains found virtually intact suggest that the fish was deposited whole, undoubtedly with the aim of representing the exploited environment and, more broadly, the marine world. In this respect, Salango seems to represent a unique manifestation of pre-Columbian symbolic practices on the Ecuadorian coast.

7 A FISHING CAMP ON THE DESERT SHORE: FISHHOOK TECHNOLOGY AND ICTHYOARCHAEOLOGICAL DATA FROM A MID-HOLOCENE SITE IN THE ATACAMA DESERT

Power, Ximena (Instituto de Investigaciones Arqueológicas y Museo R.P. Gustavo Le Paige (IIAM), Universidad Católica del Norte) - Macari, Josefina (Independent researcher) - Rigaud, Solange (CNRS, Université de Bordeaux, Ministère de la Culture, PACEA) - López, Patricio (Museo de Historia Natural y Cultural del Desierto de Atacama) - Durán, Valentina (Independent researcher) - Talep, Claudia (Independent researcher) - Requena, Nicolás (Independent researcher) - Silva, Claudia (Museo de Historia Natural de Concepción) - Cases, Bárbara (Independent researcher) - Alday, Camila (McDonald Institute for Archaeological Research)

After four millennia of the peopling of the Americas, hunter-gatherers of the Pacific coast of South America developed specialized coastal and maritime technology during the Middle Holocene, ca. 8000 – 4000 cal yr BP. In the Atacama Desert coast, the specialization process included artifacts such as fishhooks, harpoons, and navigation technology and the exploitation of a broad spectrum of aquatic resources recovered from large shell mounds widespread during this period. Here, we present the first study results of the Quebrada Blanca-2 site, located in the interfluvial region of the Atacama Desert coast (20°48'34" S), dating back to 6700 yr BP. The settlement features, local topography, stratigraphy, fish technology and ichthyoarchaeological data suggest that this site functioned as a short-term camp where shell fishhooks production and fishing of sandy and rocky shore fishes were the main activities carried out on-site. Other elements such as cactus-spine fishhooks, fishing weights, fishing lines, and meat drying areas suggest a fishing task-oriented site. This contribution aims to develop a detailed contextual analysis of the site to evaluate the role of the fishing artifacts and infrastructure, explore the fishing methods of the target prey, and the social practices related to the fishing activity. Due to the complex and intricate stratification of the shell-matrix sites in the Atacama Desert and worldwide, we also outline some theoretical and methodological expectations to differentiate fishing task-oriented camps from multi-task/residential camps in maritime fisher-hunter-gatherers contexts and archaeological assemblages.

8 AQUATIC RESOURCES AND THEIR ROLE IN HUMAN LIVED EXPERIENCES AT MESOLITHIC LAKE ONEGA/KARELIA

Eckelmann, Rebekka (University of Helsinki) - Batanina, Olga (University of Helsinki) - Mannermaa, Kristiina (University of Helsinki)

To this day aquatic resources are a key element of subsistence for the majority of hunter-gatherer-fisher communities in the boreal and subarctic zones of Eurasia. Archaeological research indicates this most likely also applied to the Early Holocene populations in North-Eastern Europe, including the area of Mesolithic Lake Onega. However, the most prominent site in the area – the Yuzhny Oleniy Ostrov burial ground (YOO) – provided near to no material evidence for fish or fishing. This stands in stark contrast to the near omnipresence of mammalian fauna at the site and led to a long debate on the relative importance of fishing vs. hunting for the Mesolithic community there.

Only subsequent research into settlement and camp sites in the area and recent biomolecular analyses clarified the true extent of the importance of aquatic resources to the YOO population – which was enormous. Accordingly, fishing (and seasonal fowling) must have been a substantial part of these people's lived experiences, yet there is barely any evidence of it within the mortuary sphere. Due to archaeology's reliance on material evidence and focus on the burial ground, it is the animals represented at that site, which so far have dominated much of the conversation regarding the human-animal interactions at Mesolithic Lake Onega, effectively marginalizing the impact the aquatic character of these sites had on its population.

In this paper, we attempt to trace how subsistence based on aquatic resources affected the lived experiences of the people of Mesolithic Lake Onega and contrast them with the perceived experiences of the dead. To this purpose we will employ direct and indirect proxies, including faunal remains, bioarchaeological analyses and ethnographic data, to explore what it meant to live in a lacustrine world at 7th millennium BC Lake Onega.

9 FISHING DYNAMICS AND AQUATIC RESOURCE UTILIZATION IN LOWER DANUBE COMMUNITIES DURING THE 5TH MILLENNIUM BC

Savu, Mihaela (Christian-Albrechts Universität)

The 5th millennium BC marked a period of dynamic change in the Lower Danube region, influencing settlement patterns and economic strategies. Fishing played a significant role in these communities, supplementing their diets rich in plant and terrestrial animal resources. The proximity of these settlements to large bodies of water facilitated the exploitation of aquatic fauna, contributing to both their sustenance and economic endeavors.

This presentation examines the multifaceted involvement of fishing in Lower Danube communities during the 5th millennium BC. It explores how fishing practices not only directly supplemented the diets of these communities but also indirectly influenced other aspects of life. While evidence of fishing tools and aquatic fauna remains provides

direct insight into fishing activities, the absence of fish depictions in ancient representations prompts questions about cultural attitudes towards aquatic resources. Additionally, the utilization of aquatic fauna in contexts beyond the practical ones pertaining to sustenance further highlights the significance of fishing within these societies. Through the analysis of archaeological data, this study aims to provide insights into the intricate relationship between prehistoric communities and their aquatic environment in the Lower Danube region during the 5th millennium BC.

10 ADAPTATION AND INTEGRATION: FISHING STRATEGIES IN STONE AGE SOUTHERN SCANDINAVIA EVIDENCED BY STATIONARY WOODEN FISHING STRUCTURES

Koivisto, Satu (Museum Lolland-Falster) - Robson, Harry (University of York) - Groß, Daniel (Museum Lolland-Falster) - Philippsen, Bente (Norwegian University of Science and Technology) - Schmölcke, Ulrich (Leibniz Zentrum für Archäologie; Museum Lolland-Falster) - Måge, Bjørnar (Museum Lolland-Falster)

A growing body of archaeological evidence for Stone Age stationary wooden fishing structures found in Danish wetlands and submerged areas demonstrates the importance of aquatic resources to local Mesolithic and Neolithic populations. Between 2012 and 2022, extensive wetland excavations in the prehistoric Syltholm Fjord in Lolland, south-east Denmark, provided further evidence for prehistoric fishing practices and their fine-tuned chronology, emphasising the significance of mass fishing with fixed wooden structures for the Neolithic and Early Bronze Age coastal populations. Recent bioarchaeological studies have revealed no significant changes in the aquatic-rich diets of the Danish Ertebølle hunter-fisher-gatherers during the earliest Neolithic, who appear to have coexisted with the incoming Funnel Beaker farmers for decades or even centuries before the apparent genetic population turnover from c. 3800 BCE onwards. Interestingly, the data suggest a gradual shift to a mixed economy by the incoming farmers, and the process of Neolithisation appears to have included elements of cultural diffusion, as evidenced by new forms and types of material culture in this region. How is this reflected in the fishing-related materials and the apparent continued use of earlier sites in prime fishing locations? Can we detect any changes in the strategies and equipment used to exploit aquatic resources from the Mesolithic and into the Neolithic, especially in the use of mass-fishing devices such as weirs and traps? Further research is required to refine how the newcomers adapted to their new coastal, lacustrine and estuarine ecotones with rich and diverse aquatic resources. The well-preserved organic evidence from water-logged fishery sites allows us to explore and complement research into the Neolithisation process and subsequent developments, and to examine the adaptation and integration of aquatic livelihoods into Neolithic lifeways – involving also potential learning and gradual taking over of productive fishing grounds from indigenous hunter-fisher-gatherers.

11 THE NORWEGIAN (PRE)HISTORIC TRADITION OF STONE-BUILT EEL-TRAPS IN RIVERS AND CREEKS

Kvæstad, Christopher Fredrik (Stavanger maritime museum)

In 2019, in connection with the building of the new E39 main road between Ålgård and Lyngdal in Southwest Norway, an archaeological survey revealed the forgotten remains of stone structures used for trapping eel (*Anguilla Anguilla*) in the watercourses of the river Figgjo. This initiated an investigation in the traditions of eel-fishing in the water systems in a larger area. These purpose-built eel-traps, often misinterpreted to originate from more recent times, were widely used until the mid-20th century.

Magnus Lagabøte's State Law, promulgated by King Magnus VI of Norway between 1274 and 1276, stands as one of the earliest written records in Norway. It is emphasizing the role ownership and punitive actions, stating that if someone disrupts an eel fishery for someone else shall be fined by both the king and the owner of the fishery. This suggests the existence of a longstanding legal framework, extending back into prehistoric times, which guaranteed legal rights to essential resources like dependable seasonal river fishing for inland farming communities. In Southern Norway these eel-traps demonstrate that subsistence fishing with specialised trapping installations expanded beyond the more known and researched salmon and trout fisheries. Eel traps, strategically positioned to account for riverbed topography and proximity to farmsteads, served as continuously maintained infrastructural fixtures for the utilization of seasonal fish migrations over many centuries.

The consumption of eel was perceived ambivalently within a cultural context. Despite being abundant and rich in fat, making them nutritious and valuable for trade, their serpent-like appearance and ability to traverse long distances over land contributed to their taboo status and negative associations in local mythology and folklore.

12 WHALING IN PREHISTORIC EUROPE? AN ETHNOARCHAEOLOGICAL APPROACH

Weski, Timm (private researcher)

European people hunted whales from late Medieval Times up to the 19th century in open rowing boats with hand thrown harpoons, lances and ropes of organic material. Perhaps this has a long tradition as artefact made of whale-bones or depictions of whales on megalithic monuments are indicating. Because archaeological evidence for this hunting technique is poor, it is necessary to look at ethnographic examples. These show that people, some of them

can be regarded as early farmers or even hunters and gatherers, were chasing large maritime mammals, using similar techniques as those known from early modern times. Apart from harpoons and lances with heads out of stone, bone or mussel, ropes out of skin or plant fibre, floats or drags are recorded. Further paddled skin-, bark- or logboats were employed. Handling of the gear required an experienced crew of several members and often several boats were hunting together the same whale. Still more people were needed to cut up the whale after it had been killed and towed to land. The distribution of meat, blubber or teeth/baleen followed a regional, but strict social order.

13 HUMANS AND FRESHWATER ECOSYSTEMS - MESOLITHIC POPULATIONS AND EXPLOITATION OF WETLANDS ALONG THE ADIGE VALLEY (TRENTINO, ITALY)

Dipino, Noemi (University of Ferrara; MUSE - Science Museum of Trento) - Fontana, Alex (MUSE - Science Museum of Trento) - Visentin, Davide (University of Ferrara) - Fasser, Nicolò (University of Ferrara) - Nannini, Nicola (MUSE - Science Museum of Trento) - Flor, Elisabetta (MUSE - Science Museum of Trento) - Thun Hohenstein, Ursula (University of Ferrara) - Duches, Rossella (MUSE - Science Museum of Trento)

The beginning of the Holocene in the Adige Valley (TN, Italy) was characterised by a rapid climatic improvement that brought about significant environmental changes, marking the end of the long deglaciation process begun several millennia earlier. The new ecological structure of the valley consisted of a system of still freshwater basins formed by the meandering course of the Adige River. This latter, offered new and rich resources to the human populations that attended the valley at the beginning of the Holocene.

Within this general framework, our research aims to reconstruct the interactions between humans and the complex ecological mosaic of the Adige Valley by studying of freshwater animal remains, especially: fish, beavers, otters and pond turtles. The faunal remains analysed (about 20,000) come from various multi-layered sites that permit the tracing of the behavioural evolution of Mesolithic groups and how they dealt with ecosystem changes.

For this specific presentation, we decided to focus exclusively on the fish fauna which was studied thanks to a comparative osteological collection at the MUSE Science Museum zooarchaeology laboratory in Trento, Italy. This study allowed assessing the aquatic biodiversity, the seasonality of fish deaths and the different fishing techniques. Regarding the latter point, a key part of the research is the experimental activities dedicated to the reconstruction of fishing techniques and the treatment of fish for food purposes in prehistoric times.

14 ARCHAEOLOGICAL, ETHNOGRAPHICAL, AND EXPERIMENTAL RECONSTRUCTIONS OF FISHING IN THE NEOLITHIC SETTLEMENT OF DAKTARIŠKĖ 5, WEST LITHUANIA

Iršenas, Marius (Vilnius Academy of Arts) - Butrimas, Adomas (Vilnius Academy of Arts) - Slah, Gvidas (Vilnius Academy of Arts) - Rimkus, Tomas (Vilnius Academy of Arts; Klaipėda University)

The largest Neolithic wetland settlement in West Lithuania, located between the former lakes Biržulis and Stervas. Excavated material included approximately 11.000 potholes, a substantial flint inventory, as well as bone and antler axes, daggers, and amber artefacts from the Narva, Corded Ware, and Globular Amphora cultures.

The preservation of organic material in deep neolithic cultural layers and exceptional fishing conditions in the narrow water flow between Biržulis and Stervas lakes resulted in a large collection of fishing equipment, including harpoons, paddles, three types of net weights (Sinkers), and floats made from pine and birch bark.

The most fish-rich lake in the region of western Lithuania was wiped out during the Stalin reign (1950-55), which meant a great loss for nature, the economy, the way of life of local fishermen and fishing traditions. When we started the excavation of Biržulis in 1978, we also tried to collect ethnographic data from old local fishermen, as the local fishing traditions were ruined. Former fishermen (most of whom were born at the beginning of the 20th century) live in small communities around the lake. In each season of our excavations, we had the opportunity to receive explanations from the old generation of local fishermen about the archaeological artefacts that date back to the Neolithic cultural layer, and explanations about the traditional methods of making such equipment in their families in the first half of the 20th century.

Using these samples, the photographic material, and the comments of old fishermen on the archaeological finds we find every day, we are trying to recreate the manufacture of net floats and weights during the experiments we are currently carrying out and compare them with the Stone Age finds.

15 FISH TRAPPING IN 3D. TECHNOLOGICAL APPROACH TO WOODEN MESOLITHIC FISH TRAPS IN THE SCANDINAVIAN ALPINE AREAS BY 3D MODELLING

Mjaerum, Axel (Museum of Cultural History, University of Oslo) - Friis, Ellen (Museum of Cultural History, University of Oslo) - Gómez, Jorge (CNRS - University of Rennes)

Many mountain environments lack a natural fish population, which has sparked a debate regarding the introduction of fish by humans in these areas. In 2023, archaeologists excavated a 7000-year-old fish trapping enclosure system in the low alpine lake Tesse (850 masl.) in southern Norway. This discovery is the oldest known of its kind in all parts of Scandinavia and is one of the few examples of preserved Mesolithic woodworking in the region. The find provides a unique opportunity to study past fishing traditions, early woodworking, and lithic tool technologies. However, it also creates challenges in handling, documenting and interpreting the fragile and partially decomposed wooden remains.

During the excavation campaign, more than 60 poles were discovered and documented in situ at site, using 2D and 3D imaging, digital measuring, and other techniques. Subsequently, eight of the best-preserved poles were documented with blue light high resolution 3D scanning technology. This work allowing a detailed examination of production and use-wear traces on the wood. By integrating various sources of data, such as analysing the use-wear on stone tools, dendrochronology studies, radiocarbon analysis, and cross-referencing with other archaeological and ethnographic evidence, this study seeks to enhance our understanding of the fish trap and related technologies. This knowledge is vital in uncovering the origins of mountain fishing.

33 EARTHEN ARCHITECTURE AND ITS ENVIRONMENTAL DIMENSION, FROM THE PAST TO THE FUTURE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Pastor Quiles, María (University of Alicante) - Antolín, Ferran (DAI; University of Basel)

Session format: Regular session

Earthen architecture is known in different forms and building techniques, from wattle and daub, to mudbricks, to shaped or rammed earth, and is documented across all time periods and continents (except for Antarctica). Earth is rarely used alone in architecture, but combined with other materials, such as plants. It is a fragile construction type that suffers from erosion and, partially due to its vegetal component, it has even been deliberately damaged by governmental policies (e.g., the sebakh in Egypt during the 19th and 20th centuries). Diverse research has focused on the study of past earthen architecture, although many questions remain open, such as the environmental impact of the extraction of tons of mud from the surroundings of a settlement or its integration into plant economy strategies providing either the support for the construction or as tempering material.

This session welcomes papers dealing with:

- The identification of earthen architecture in unexpected contexts, such as burials.
- New techniques for the study of earthen remains, that help us understand the technology used, the origin of the raw materials (including plants), the maintenance work of the constructions, as well as their original appearance (e.g., painted plaster, but also of the parts of the construction built with more perishable organic materials), including 3D modelling efforts, etc.
- The correspondence between certain earthen construction types and the local environmental conditions and agricultural practices, as well as the environmental impact of earthen constructions.
- The sustainability of archaeological heritage in earthen architecture and current and future challenges regarding its preservation.
- Reflections on the connections between past, present, and future of earthen architecture and the environmental lessons we can learn.

Papers presented to this session will be invited to be submitted to the forthcoming Special Issue on the same topic in World Archaeology.

1 DIACHRONIC APPROACH TO LATE PREHISTORY EARTH BUILDING RECIPES IN SOUTHEASTERN IBERIAN PENINSULA: A MILLENNARY TRADITION OF SUSTAINABLE ARCHITECTURAL PRACTICES

Pastor Quiles, María (University of Alicante; Catalan Institute for Classical Archaeology) - Mateu Sagués, Marta (Catalan Institute for Classical Archaeology) - Jover Maestre, Francisco Javier (University of Alicante) - García Atiénzar, Gabriel (University of Alicante) - López Padilla, Juan Antonio (Museo Arqueológico Provincial de Alicante) - Llorio Alvarado, Alberto J. (University of Alicante) - Barciela González, Virginia (University of Alicante) - Busquier Corbí, José David (Abydos Arqueológica S. L.) - Hernández Pérez, Mauro S. (University of Alicante)

Earth has been widely used by human communities to build all kinds of structures since the beginning of sedentarism. But, have prehistoric mud “mortars” changed over time and regarding their relation to the use of available natural and anthropic resources?

The present work deals with this question by looking at the case of the territories in the Southeastern Iberian Peninsula from the 3rd to the 1st millennia BC. It is based on a comparative macro and microscopic analysis, with major reliance on thin-section micromorphology, of samples from multiple sites from the Chalcolithic to early Iron Age chronologies.

The main aim is to characterise these earthen mixes produced as a building material over time. Also, to address their components and features resulting from their preparation as involved in procurement and reuse strategies (as part of the notion of circular economy) to get the most out of the materials at disposal. Elements included in mud as a building resource, either naturally, by accident or as part of stabilising processes, can be of different origin and nature, from vegetal residues of agricultural activity to pyrotechnological substances, among others. Identifying and studying these ingredients is key to better glimpse past construction practices that have much in common with today’s human needs in terms of architectural sustainability.

2 EARTHEN ARCHITECTURE, ENVIRONMENT AND TASKSCAPES IN NEOLITHIC NORTHWESTERN GREECE

Kloukinas, Dimitris (Numismatic Museum Athens)

Rescue excavations and systematic research during the last three decades have brought to light a wide number of Neolithic settlements and sites in northern Greece. These show variability in both habitation patterns and architecture, and are situated in various geographic and environmental settings. Rubble areas of burned daub belonging to conflagrated post-framed buildings and associated structures are major components of most excavated sites. The superstructural remains offer ample evidence on the soils and sediments used, as well as on the exploitation and processing of timber and other vegetal resources. The latter include, for instance, remains of reeds, leaves/leaflets and plant tempers (chaff, chopped straw and grass-like materials) that are preserved as impressions or in their silicified form. Nevertheless, the analytical potentials of daub remains have not been fully explored.

The current paper focuses on a number of extensively excavated Neolithic sites providing rich assemblages of well preserved superstructural material. They include the extended settlements of Avgi, Kleitos I and Kleitos II, the riverside site of Koromilia and the lakeside settlement of Dispilio in the Kastoria and Kozani Prefectures of northwestern Greece. The attempt will be to approach the interplay between chaines operatoires, taskscapes and environment through the study of daub fragments and relevant architectural evidence. How does the exploitation of certain resources relate to their availability and accessibility in the immediate or more distant surroundings? How do local environments influence the building techniques applied? Are there transformations through time associated with changes in environmental proxies? What were the taskscapes performed by the inhabitants of Neolithic northern Greek communities within different environmental settings?

3 EARTHEN LONG-BARROWS CEMETERY AT SŁONOWICE, SOUTHERN POLAND - MONUMENTAL TOMBS ON THE EASTERN FLANK OF THE TERRITORY OF MEGALITHIC IDEA

Tunia, Krzysztof (Polish Academy of Sciences, Institute of Archaeology and Ethnology)

On the territory of Poland, megalithic structures appeared in the 4th millennium BC within the Neolithic Funnel Beaker culture. Stone tombs of this type were noticed in northern Poland in the 19th century. The loess uplands of the upper Odra and Vistula River basins – in southern Poland – seemed to be an area devoid of this form of sepulchral objects. The breakthrough was the research started in Słonowice in 1979. They led to the discovery of a huge sepulchral complex of the Funnel Beaker culture. The tombs discovered in Słonowice, although referring to the idea of megalithic constructions have specific features. Instead of erratic boulders traditionally serving as the building materi-

al, inaccessible in the loess uplands, local materials – earth and wooden beams – were used to build these structures. The walls were built in the form of palisades and the interior of the tombs – between the walls – was filled with an earth embankment. The sepulchral complex in Słonowice consisted of 11 trapezoidal tombs and a square-shaped place surrounded by the earthen ramparts. It can be assumed to be related to funeral ceremonies.

The fertile loess highlands of the upper Vistula River basin are an area of intensive agriculture from the Neolithic up to now. This activity led to strong erosion processes that completely or almost completely destroyed these monuments of earthen architecture. Nowadays their underground parts can only be discovered by means of aerial photography, Airborne Laser Scanning techniques in forested areas or – by chance – during large-scale rescue excavations.

The immense complex of the earthen funeral architecture in the megalithic rite at Słonowice is the only one fully explored in this part of Europe.

Elaboration of the results of excavations was funded in whole by the National Science Center, Poland, grant no. 2021/43/B/HS3/03024.

4 TELL-TYPE SETTLEMENTS FROM MUNTENIA AND DOBROGEA (SOUTHEASTERN ROMANIA): RAW MATERIALS, FORMATION PROCESSES, AND THEIR LANDSCAPE

Haita, Constantin (Muzeul National de Istorie a Romaniei)

Tell-type sites in Muntenia and Dobrogea are multilayered settlements, attributed to Boian and Gumelnița cultures, dating from the period 4900-3900 cal BC. They are anthropic mounds with circular/oval area, with a maximum diameter of 200 m, marked by delimitation structures, a well-developed stratigraphy, up to 12 m of continuous accumulation, formed by successive construction, occupation and destruction phases, and an organization of the inhabited space. Archaeologically recovered structures are interpreted as fired or unfired structures, passage areas, waste zones, and various zones of activity. Pits and trenches are also identified within the complex stratigraphy of these sites.

Dwellings are made of wood and clay/daub materials and present a detailed micro-stratigraphy, corresponding to the construction and to the successive phases of repairing and fitting out.

The raw materials were available in the vicinity of the settlement. The daub-type material is made either from loess sediments or from fine alluvium, and is mixed with vegetal materials as straw and chaff. Plants, especially those growing in wetlands, were also used for roof and soil matting.

This study presents case studies developed on tell-type sites located in various geomorphologic backgrounds (terrace, alluvial bar, lake shore, island), discussing data on their general stratigraphy and forming processes and emphasizing their relationship with the landscape.

5 NEOLITHIC VINČA-BELO BRDO BUILDING ACTIVITIES

Penezic, Kristina (Biosense institute, University of Novi Sad)

The Neolithic tell-site of Vinča-Belo Brdo with its over 8 meters of Neolithic deposits is a consequence of almost 800 years of continuous living at one place, with numerous building and re-building phases. Damaged by the Danube erosion over the past millennia, and with a long excavation history that started in 1908, this site stands for an absolutely dated yardstick for the phasing of the Late Neolithic in the Central Balkan area. The thick archaeological layers represent deposits of numerous phases of construction of houses typical for the Vinča period. These houses were produced in the wattle and daub technique, consisting of up to three rooms, with ovens inside and elaborate architecture. Recent studies indicated that the sourcing of the building material was done in the vicinity of the site, collecting available underlying sediments for both the daub production and the numerous levelling layers within the settlement. The sheer size of the archaeological layers today indicates monumental environmental alterations with the collection of the raw material. The build environment created in such major construction works modified the appearance of the prehistoric settlement, and probably influenced the perception of both the landscape and the imminent environment of the site for its inhabitants during their lifetime at the Neolithic settlement. This paper will present results of recent studies of environmental proxies related to the site (entomological evidence and biomarker study on house remains) and will try to infer the social dimensions of numerous building phases over a long time span and the rise of the tell.

6 EARTHEN HERITAGE IN THE EASTERN MEDITERRANEAN BETWEEN ARCHAEOLOGY AND SUSTAINABILITY (EARTHHERITAGE PROJECT)

Bombardieri, Luca (Università di Siena) - Amadio, Marialucia (University of Ghent) - Ghislandi, Sabina (University of Genova) - Rellini, Ivano (University of Genova)

The proposed paper aims to present the preliminary results of the EARTHHERITAGE Project, a two-year research programme finalised at the analysis, documentation and preservation strategies of the Eastern Mediterranean earthen architectural heritage, focusing on the island of Cyprus.

Cyprus has been selected as a case study because of the long-established tradition of earthen buildings, which has endured on the island since early prehistory. Through an interdisciplinary and synergic dialogue between archaeological, geoarchaeological and architectural approaches, the purpose of the EartHeritage research programme is to conduct multiscale analyses on earthen architectural evidence in one of the prehistoric contexts of the island, Middle Bronze Age Erimi (ca. 2000-1600 BC), which it has been selected as an exceptional case of good preservation of the earthen structures. The main objectives of the project are: to integrate archaeological and geoarchaeological analyses on prehistoric mudbricks and earthen building materials with in-depth geomorphological and pedological examinations of the natural environment of the southern region of Cyprus; to use the data set resulting from archaeological and geoarchaeological analyses to conduct technical experimentation on implemented earthen products; to verify the applicability of implemented earthen products as sustainable materials in the conservation and preservation practices of archaeological structures in Cyprus; to propose activities for the valorisation of the archaeological context examined by this research programme, leveraging the identity of the earthen architecture on the island.

The data presented in the proposed paper includes the first geoarchaeological and geomorphological results of the EartHeritage project which derive from the analyses conducted in 2023-2024 on archaeological and geological materials collected from the Middle Bronze Age site of Erimi and its surrounding natural environment.

7 TOWARDS SUSTAINABLE CONSERVATION: 'PHYSICAL' CHALLENGES FOR VULNERABLE EARTHEN HERITAGE

Mamma, Rachele (Sapienza University of Rome) - Laneri, Nicola (University of Catania) - Gueli, Anna (University of Catania) - Carafa, Paolo (Sapienza University of Rome)

Earthen building materials renowned for their exceptional versatility and cost-effectiveness, face significant challenges linked to perishability, particularly under adverse climatic and environmental conditions. To address these issues, a proposed solution will involve in future the development of a computer ontology-based platform capable of systematically tracking various restoration methods and the conservation status of earthen architecture, relating them to climatic and anthropogenic factors.

The initial experimental phase of the research entails the fabrication of mudbricks samples and the construction of a mudbrick wall model. In a controlled laboratory environment, simulations are conducted to assess the impact of timing and environmental processes – such as sun and wind exposure, water absorption, vibrations, and chemical air pollution – on the integrity of the mud units. Concurrently, elemental and mineralogical analysis provide crucial insights into the origin of tempers and the compositional characteristics of raw materials.

Methods of conservation and consolidation of the earthen features will be preliminary tested on a local site in Sicily and then applied on the case study of Tel Muhammad, a Babylonian context of the II millennium BCE. This endeavour sets the stage for a more comprehensive understanding of the impact of environmental phenomena and climatic changes on mud architectures.

8 NEW SETTLERS IN NEW FASHION: MUDBRICK ARCHITECTURE AND ITS SOCIO-ENVIRONMENTAL CHALLENGES IN PHOENICIAN EIVISSA

Cutillas-Victoria, Benjamin (Institute of Nanoscience and Nanotechnology, NCSR Demokritos.; Universidad de Murcia) - Lorenzon, Marta (University of Helsinki) - Esquembre Bebia, Marco Aurelio (ARPA Patrimonio SL) - Sanz Kite, Bernia (ARPA Patrimonio SL) - Ramon Torres, Joan (Consell Insular d'Eivissa)

Phoenician colonization brought forth significant cultural and environmental challenges for displaced groups across the Mediterranean Sea. A paradigmatic case of community establishment in new territories occurred during the 7th century BC with the Phoenician colonisation of the island of Ibiza. The arrival of the Phoenicians led to the foundation of two colonies, Sa Caleta and Eivissa (Balearic Islands, Spain), and the appearance of a new building tradition associated with Levantine practices and mudbrick architecture. This contribution aims to present the results of the geoarchaeological study of a representative sample of earthen building materials from these two sites. The analysis utilizes sediments as a reflection of social dynamics. Our methodology combines traditional and multidisciplinary techniques (XRF, XRD, CHN, Granulometry, Petrography, Phytoliths) to extract comprehensive information regarding technological, socio-economic and environmental data. The results revealed distinct catchment areas and different recipes, possibly indicating the Phoenicians' adaptation to Ibiza's specific conditions. Thus, this study provides an opportunity to analyze the development of mudbrick architecture on an island where this building tradition was completely unknown until the arrival of the Phoenicians.

9 UNEARTHING WALLS AND EMPIRES: A GEOARCHAEOLOGICAL EXPLORATION OF ARTASHAT/ARTAXATA, ARMENIA

Holmqvist-Sipilä, Elisabeth (University of Helsinki) - Lorenzon, Marta (University of Helsinki) - Cutillas-Victoria, Benjamin (NCSR Demokritos, Athens, Greece) - Myrsini, Gkouma (M.H. Wiener Laboratory for Archaeological Science, American School of Classical Studies at Athens, Athens, Greece) - Vrydaghs, Luc (MARI - Vrije Universiteit Brussel, Department of Art Studies and Archaeology, Brussels, Belgium) - Lichenberger, Achim (University of Münster, Germany) - Schreiber, Torben (University of Münster, Germany) - Zardaryan, Mkrtich (National Academy of Sciences of Armenia, Yerevan, Armenia)

In this talk, we focus on the geoarchaeological exploration of earthen building materials to offer insights into construction techniques and social structures in the Caucasus. We view these phenomena particularly over an extended period, which is an understudied topic. Artashat/Artaxata, located in the Ararat region of Armenia, presents a long history of occupation and displayed a consistent use of earthen architecture across historical periods. This interdisciplinary investigation explores mudbrick architecture as a proxy for understanding environmental and social dynamics during the 1st millennium BC, employing geoarchaeology, archaeobotany, and building archaeology. The study delves into changes and continuities in architectural forms and practices, reconstructing technological and social processes to address issues such as raw material procurement, material re-use, and the consistency of construction practices. Geoarchaeological analysis of earthen building materials from various parts of the ancient city reveals evidence of material re-use over time specifically between the Urartian and Hellenistic period.

10 BOTANICAL BLUEPRINTS: A CHRONOLOGICAL EXAMINATION AND METHODOLOGICAL ASSESSMENT OF MUDBRICKS FROM ELEPHANTINE ISLAND, EGYPT

Izak, Jessica (DAI Berlin) - Antolin, Ferran (DAI Berlin)

Mudbricks are an essential architectural element of Old Egyptian settlements but there is still very limited information on production techniques and particularly on the types of plant remains used as temper. These may differ for different regions (due to ecological particularities), time periods (due to economic changes) or even according to the type of construction within one chronological phase. This work is a first step towards a comprehensive approach to mud brick production on the island of Elephantine in Egypt, covering the time from the Middle Kingdom to the Greco-Roman period. The study aims to discern variations in botanical components during mudbrick production.

Seven mud bricks and three mortar samples were analysed for composition, with the main focus on botanical remains. Additionally, the research addresses the practicality of mudbrick analysis through applied experiments. A comparative study between flotation in chemical solutions (chloride and sodium carbonate) and the standard wash-over method was conducted. The goal was to identify the quickest and easiest approach, saving the need for mechanical pre-treatment of the mudbricks. Another experiment aimed to determine the optimal subsample size for analysing the organic fraction. Three differently sized random sub-samples were taken, analysed, and compared to establish an efficient sub-sample size, ensuring representative results and reducing the time required for the analysis of large samples.

Preliminary results show notable differences in the botanical remains associated with various historical periods and architectural building structures. These differences add to our understanding of the relationships between mudbrick composition and context. As well as expanding our knowledge of ancient building practices, this research also offers wider insights. Analysing the mudbrick components can serve as a proxy for understanding regional economic dynamics and shed light on resource use and the impact of human activity on the local environment.

11 WALLS MADE FROM EARTH ...EXPERIENCES FROM A ROMAN PERIOD RAMMED EARTH RECONSTRUCTION PROJECT AT XANTEN, GERMANY

Kienzle, Peter (LVR-Archaeological Park Xanten (Germany))

Ancient authors, such as Pliny and Vitruvius, placed earthen constructions to a distant past and to foreign countries. Nonetheless, rammed earth, mud bricks and wattle-and-daub seems to have been a common building material in the Roman lower Rhine area, a region scarce of stone. Next to the scarcity of useable stone, the cost of transport, the availability of the material and the climatic conditions determined the choice of material for many civil houses.

From 2007 to 2014 three two-storey town houses were reconstructed at the LVR-Archaeological Park at Xanten based on evidence gained in a long and detailed archaeological excavation. The reconstruction work employed rammed earth technology, timber framing, and wattle-and-daub. The reconstructed houses show, that rammed earth houses are far from being low and crude cottage-style thatched huts with poor housing conditions. They are indistinguishable from other Roman houses erected in stone or brick.

By now, considerable experience was gained on the construction process, the quality of the living conditions in the buildings and the durability of the material. Our perception of Roman (civil) architecture is determined by the remains of masonry and brick buildings. However, recent and more sophisticated archaeological evidence proves, that large

numbers of buildings made of perishable materials were common in Roman times and in almost all other periods in history.

12 ANCIENT AND MODERN EARTHEN ARCHITECTURE COHABITING IN THE THEBAN NECROPOLIS (LUXOR, EGYPT): PLACING CUPBOARDS, BIRDHOUSES, AND SILOS IN PHARAONIC TOMBS

Oliveira, Ana (American University in Cairo)

For most of the 19th and 20th centuries, the Theban necropolis was filled with modern mud structures with diverse uses, from silos and cupboards (saffat, soma, dulab) for storing grain and other commodities, to sleeping platforms (menama). These traditional devices were usually made of mud mixed with straw tempered and dung. Unfortunately, they are virtually extinct now, and have tended to be overlooked within archaeological contexts. However, during the last decades, these features have gained the interest of several researchers such as C. Simpson, S. Ikram, or M. Correas-Amador, among others.

This paper presents preliminary and unpublished archaeological data of the modern mud structures documented in a series of reused Middle Kingdom (2030 - 1650 BC) and New Kingdom (1550-1070 BC) tombs at Dra Abu el-Naga North, in the concession of the Spanish archaeological mission within the Theban Necropolis. Earthen architecture altered the original plans of the pharaonic tombs, adapting them for inhabitation by the living. Cupboards, silos, dressers, shelves, and pigeon-houses were built in unfired mud by the Qurnawis, the contemporary inhabitants of the necropolis.

Modern and ancient/pharaonic earthen architecture structures and devices coexist in the same site, as attested by a Middle Kingdom funerary garden made of mudbrick (2000 BC), small mud shrines (1550 BC), and plastered mud-brick funerary shafts dating to the Second Intermediate Period (1550 BC). The modern use of earthen architecture is a continuation of an ancient tradition that was once part of the life (and afterlife) of the pharaonic era inhabitants of the necropolis. The understanding and protection of both the ancient and more recent features may offer invaluable insights into the daily life of the modern inhabitants of Egypt (and Sudan), but also of their ancient counterparts.

13 A COMPARATIVE APPROACH TO CONSERVATION AND RESTORATION ANALYSIS OF ARCHAEOLOGICAL EARTHEN ARCHITECTURE IN WESTERN ASIA USING ENVIRONMENTAL AND CLIMATIC DATA

Volpi, Luca (Universidad Autónoma de Madrid) - Lanzaro, Nicola (Sapienza Università di Roma)

As pointed out in one of the meeting reports of the UNESCO World Heritage Programme on Earthen Architecture (WHEAP), there is a lack of comparative studies on the conservation of earthen architectural heritage at a regional level. The present paper aims to discuss a comparative methodology for the analysis of conservation and restoration of archaeological earthen architecture in Western Asia using environmental and climatic satellite data.

Earthen architectures have a tendency to decay in a short time once exposed to weathering. Other factors may participate in the decay of earthen architecture, such as moisture, clay salinisation, the wet-dry cycle, as well as roots, animals, fungi, and human activities. Each archaeological site has unique environmental and climatic characteristics that must be considered when developing effective conservation strategies. However, some sites in Western Asia are subject to similar climatic stresses.

In order to develop a comparative methodology, environmental and climatic data provided by various international organizations (e.g., MODIS, AVHRR, and VIIRS satellite sensors, the Global Wind Atlas, the World Climate Organization, and the World Meteorological Organization) will be used. This data will then be processed in a GIS environment to generate comparative maps. The research will help highlight whether there are substantial differences in conservation and restoration interventions between regions and the challenges faced in different geographical areas. The aim is to propose an approach to compare different conservation strategies and their effectiveness based on various climatic and environmental factors. Furthermore, the analysis of comparative maps will allow us to determine which type of climatic erosion has the greatest impact on the structures of a specific site. The research is part of the EnEAp project, a CIVIS3i-MSCA postdoctoral project funded by the European Union's Horizon 2020 research and innovation programme under grant agreement N°101034324.

34 ARCHAEOLOGY, LANDSCAPE AND SKYSCAPE. HOW MATERIAL ARCHEOLOGY CHANGE AND PERSIST WITH DIFFERENT ONTOLOGICAL AND EPISTEMOLOGICAL INTERPRETATIONS

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Balbi, Jose (Colchester Archaeological Group (UK)) - Gonzalez García, Antonio (Instituto de Ciencias del Patrimonio (INCIPI) CSIC) - Mejuto, Javier (Cultural astronomy Space Sciences. Universidad Nacional Autónoma de Honduras) - Martz de la Vega, Hans (Escuela Nacional de Antropología e Historia de Mexico) - Iwaniszewski, Stanislaw (State Museum of Archaeology, Warsaw,)

Session format: Regular session

This session is dedicated to the SEAC-EAA community and continues the success of the last five years of presentations at the EAA. The studies presented in this session explore the relationship between Material Archaeology, Landscape, and Skyscape, focusing on their ontological and epistemological aspects in Europe and other major cultural regions worldwide. These interdisciplinary studies have played a crucial role in understanding the relationships between different cultures, their interpretation of the heavens and landscape, and the elements established by ancient architecture. Our goal is to investigate people's way of life, practices, and worldviews through the use of new techniques to study the elements established by ancient architecture at archaeological sites and their connection to the landscape or sky. In particular in this session we encourage presentations dealing with how Archaeoastronomy and in particular the study of the orientations, alignments and/or the location of monuments in the landscape and their possible relation with the sky can provide clues into understanding cases of change/resilience in different societies. This modality allows us the contribution of different sciences and is the objective of the session. These are the questions that we aim to answer in the scope of the academic study of the work carried out in the field.

ABSTRACTS

1 CRYPTA BALBI. A ROMAN LANDSCAPE STUDY FROM AUGUSTUS TIME TO THE DNA PROJECT TODAY

Balbi, Jose (Colchester Archaeological Group (UK)) - Balbi, Carolina (Universidad de Buenos Aires - FADU) - Balbi, Lucia (Universidad de Buenos Aires - Facultad de Medicina)

In 1889 the Museo Nazionale Romano was founded as a consequence of the reunification of Italy and with the aim of becoming one of the "centers of historical and artistic culture of United Italy". The Crypta Balbi is one of the four buildings that make up this museum complex and is made up of a complete block in the heart of Rome.

We have carried out measurements and studies of the original architectures in the heart of Ancient Rome and neighboring Campus Martius, which will be described although their astronomical orientations do not present surprises since they correspond to the Roman construction logic of the 1st century Bce.

Our study is part of an evaluation of the architecture and landscape in Roman constructions from the beginning of our era. In a first step we have evaluated the city of Ravenna (Italy) and Arles (France), about which we published our conclusions at the EAA Urban community session at the Kiel Annual Meeting in 2021, with material collected before the Pandemic, and which we return to with the present study.

The Roman Crypta Balbi was conceived as a public space, it had a theater, temples, workshops, habitable places and other amenities. Its history can be followed during the Middle Ages and our work culminates with the "DNA project" carried out among the currently locatable family members, to determine the current locations of the descendants, certain statistics achieved with the DNA matches that make up a long study in progress, which we hope will provide a renewed vision of the Roman cultural legacy from the perspective of Architecture, the contributions of DNA technology and the study of landscape and celestial alignments.

2 THE LEGACY OF THE FOLIATED CROSS: SURVIVAL OF CRUCIFORM SYMBOLS IN THE CHORTI MAYAN CULTURE IN HONDURAS

Mejuto, Javier (Universidad Nacional Autónoma de Honduras) - Rodas-Quito, Eduardo (Universidad Nacional Autónoma de Honduras)

The symbol of the cross has been used by the Mayan culture in different contexts, from cosmological meanings explaining the apparent annual solar movement, to the abstraction of the corn plant, referring to the creation of the world by the god of corn, its time and as a symbol of the earthly world, as it is cultivation is typical of the agricultural cycle and its associated calendar. A classic example of what has been called a foliated cross is clearly represented in the classic archaeological site of Palenque.

The last vestiges of this symbology are reported in the period of the caste war in Quintana Roo, in the northeastern area of the Yucatan Peninsula. The idea of a cycle of agricultural renaissance persists in some communities such as Santiago Atitlán in Guatemala. However, this symbology has not been reported further south in the Mayan cultural area.

This work presents the way in which the foliated cross has seemed to remain within the body of Chortí Mayan beliefs in a syncretic manner with Christian symbolism, in a certain way similar to what was reported in the Mexican state of Quintana Roo. Likewise, possible relationships with the agricultural cycle carried out in a community in the western part of Honduras are sought.

3 THE TEMPLE PUNCHAOCANCHA OF INCA TUPA YUPANQUI ARCHITECTURAL COMPOSITION AND EXCEPTIONAL CELESTIAL ALIGNMENTS

Pinasco Carella, Alfio (Universidad Ricardo Palma)

In the splendor of Tahuantinsuyo, the Inca Empire (ca. 1470), the emperor Tupa Yupanqui arrived to the famous oracular sanctuary of the god Ychsma, the “Maker of the World”, located in a small valley of the arid coastal plains, facing the immense Pacific Ocean and at the foot of the central Andes mountain range. Uplifting the local oracular cult of the sanctuary, he renamed it as Pachacamac, the Inca god organizer-energizer of time-space. The Incas remodeled and enhanced the urban and architectural layout of the sanctuary aligning its structures primarily towards solstices, major lunar extremes, and the rise of Alpha and Beta Centauri (Pinasco 2017, 2022). The urban complex proves to be a great astronomical sanctuary.

As the ultimate imperial paradigm Tupa Yupanqui built, on the fringe of the sanctuary and on the highest hill, the imposing temple Punctaocancha, painted in red, and with the broadest view of the sanctuary, the sea, the river, the valley and the Andes.

The special architectural layout of the Temple and its exceptional astronomical orientation would have had foremost ideological importance for the Inca empire of Tupa Yupanqui, which motivates this present study.

4 ARCHAEOASTRONOMIC DESCRIPTION, LANDSCAPE AND SKYSCAPE OF INKAHUASI DE LUNAHUANÁ

d’Ans Alleman, Barthélemy (Instituto Peruano de Astronomia; Planetarium Maria Reiche)

This work reviews the concept of “New Cusco” to the Inca settlement of Inkahuasi de Lunahuaná proposed by Hyslop (1985) to which Cieza de León also refers in his “General Chronicle” of 1553. Hyslop found similarities and parallels in the functions of the architectural structures between Inkahuasi and Cusco that seem to replicate the mythical-spatial division system of the capital of the Inka Empire during the government of Túpac Yupanqui. The archaeoastronomic orientations have been reviewed and complemented with the landscape and celestial analysis of the complex, also taking into account the new excavations (CHU: 2016) in sectors of sacred spaces and places of worship where small ushnus were found. These new findings are particularly interesting for our analysis, since the ushnu is a main element of the Inca ceremonial apparatus associated with the imperial cult of Tahuantinsuyo associated, among others, with the solar cult. This structure is generally associated with the main sites of imperial settlements where they were astronomically oriented.

5 CHRONOLOGY AND ECLIPSES IN MESOAMERICA. ESTABLISHMENT, RESISTANCE AND ABANDONMENT OF EPOCHS AND GOVERNMENTS IN THE HEGEMONIC CENTERS

Martí de la Vega, Hans (National School of Anthropology and History, Mexico.) - Pérez Negrete, Miguel (Instituto Nacional de Antropología e Historia, Mexico.)

Mesoamerica was a supra cultural area that occupied part of the countries of Central America and Mexico in pre-Hispanic times, and in which peoples such as the Mayans, the Teotihuacans and the Mexicas developed. They recorded in codices, stone monuments, ceramics, and others, the cycles of the celestial bodies such as the Sun, Moon, and Venus, as well as eclipses. They also oriented the architectural structures and layouts of the settlements with respect to the landscape and calendrical-astronomical and mantic principles. Fundamental astronomical phenomena of the Sun have been detected, such as the solstices and zenithal steps, of the Moon as the standstills, and of Venus, as the extremes, as well as some families of days of fundamental intervals and cycles of its calendar and worldview.

All of these aspects were assigned a type of agency (ontology), as the case may be. For example, the agency of the days governed daily activities and tasks, those of the night the dreams and unfoldings, the Venusian questions of war. We study eclipses and detect that they are associated with changes in temporal depth, such as the beginning and end of eras and governments, reflected in the establishment and abandonment of settlements, hegemonic centers. We have it recorded in written history that has lasted since time immemorial and in structures and their orientations, both

reflected in the chronology defined, mainly, by archaeology. Through a narrative, we will show exceptional cases based on the chronology of archaeological sites that functioned as hegemonic centers for vast regions of land.

6 ANCIENT SKIES: PROGRESS AND ISSUES WITH DIGITAL TOOLS APPLIED TO ARCHAEOASTRONOMY

González-García, Antonio César (Instituto de Ciencias del Patrimonio, Incipit)

Nowadays, it is customary to use several digital tools for the archaeological research. All of them are also applied and with increasing interest in the field of Cultural Astronomy and particularly in Archaeoastronomy. Besides, this field is producing some tools of its own that can also be of use to mimic phenomenological approaches within the field of landscape archaeology, for example.

In spite of these, many of them are some times used to substitute field work, particularly troublesome is the indiscriminate use of Google Earth satellite images to derive measurements of orientations. Although this is a useful tool in several cases, it must be used with care and caution (see, e.g., Rodríguez-Antón et al. 2017).

In the present talk I’d like to review the digital methods presently used to derive data for archaeoastronomy, see how they are used, indicate a number of possible problems, and also a few ways forward to move in the future years in the aim of delving these tools as a complement for our data gathering and analysis, to enhance the and complement the interpretation of their skies by ancient peoples.

7 ANOTHER LOOK AT SKYSCAPE

Iwaniszewski, Stanislaw (Posgrado en Arqueología Escuela Nacional de Antropología e Historia - Instituto)

In all disciplines, scholars seek to examine the subject matter and produce a body of knowledge about their specific fields of inquiry. To describe the results of their explanations and interpretations, they often use concepts that help identify the topics we study. These concepts, like scientific knowledge, are subject to change. As soon as a concept is introduced to a field, it has the potential to serve multiple purposes, and its meanings can evolve over time. Consequently, the meanings of the concepts are often reviewed and revised.

The concept of skyscape was first defined in the mid-2010s when Fabio Silva and Nick Campion co-edited a book entitled *Skyscapes: The Role and Importance of the Sky in Archaeology* (Oxford: Oxbow Books 2015), and coincided with the launch of the *Journal of Skyscape Archaeology*. The term is synonymous with that of archaeoastronomy but is believed to be more neutral and value-free than the former one.

Fabio Silva, Daniel Brown, and others started to employ a triadic scheme of “scape” terms such as skyscape, landscape, and seascape, which may be understandable in the British context but hardly adaptable to other regions. Recently, in 2022, Fabio Silva presented a paper in which he justified the use of this concept in archaeoastronomy.

Despite multiple attempts, scholars have yet to conduct a more comprehensive study of human-celestial relationships in the past. In this paper, I aim to explore the concept of “skyscape” from various angles. I suggest that skyscapes are a temporal phenomenon that is entangled with the forms of dwelling and being of its inhabitants. To better understand how skyscapes are created, I plan to focus on various factors such as affordances, activities and tasks, signs, and systems of cognitive representations.

8 SKYSCAPE, RELATIONAL LANDSCAPE, AND THINGNESS AT TZINTZUNTZAN ARCHAEOLOGICAL SITE

García Reyna, Ricardo Arturo (Escuela Nacional de Antropología e Historia.)

The archaeological site of Tzintzuntzan, located in the current state of Michoacán, Mexico, was one of the main capitals of the Purépecha dominion. Previous studies in Archaeoastronomy rule out that the orientation of its architecture responds to celestial phenomena. However, data collected in our 2022 fieldwork season demonstrates the opposite.

First, we present the new findings in the orientation of the architecture (Yácatas), the surrounding landscape, and the apparent movement of the solar disk over the horizon. We discuss this evidence through the concepts of “skyscape” by Fabio Silva and “relational landscape” by Stanislaw Iwaniszewski.

Subsequently, relying on Heidegger’s ideas about the thing, we question the thingness and being-in-itself of the pre-Hispanic architecture of Tzintzuntzan. We discuss that pre-Hispanic architecture’s form, location, and orientation are aspects of its thingness, as well as the relationships with the landscape, celestial forms, time intervals, and human activities. The thingness of architecture lies in its ability to trigger relationships between the different elements and actors that surround it.

9 THE CULTOON STONE CIRCLE

Mom, Vincent (Digital Preservation Projects Foundation) - Higginbottom, Gail (Instituto de Ciencias del Patrimonio (Incipit))

In a moorish area on the peninsula of Rhinnes on the island Islay, about 5.5 miles North East of Portnahaven (Portnah-abhainne) lies the stone circle of Cultoon. The Cultoon circle is the largest of three on the island of Islay. Of 14 stones, currently two are more or less standing upright, the others have fallen, or have never been standing on their envisaged positions. Excavated in 1974 and 1975 by the Islay Historical Works Group (Euan MacKie), their conclusion was that it was abandoned in the middle of construction. Richards, in his book 'Building the Great Stone Circles of the North' (2013), puts the emphasis of such circles on the actual building process, instead of the finished result. However, as the actual building process was not completed we theorise a different possibility. Rather, that this incomplete monument is a possible reference to, and provide clues of, change, and thus in this way, it could perhaps be a "monument of the moment" of change, where moment has an unknown length of time, and is not restricted to a single cause. Also, the littered and cluttered site has become a memory-scape of a dramatic event, perhaps encapsulating the failure of the construction as well as the changes that occurred externally. We combine information about cultural changes occurring in Britain at the time of Cultoon's creation, along with data about the uniqueness of Islay's standing stone orientations overall, with the newest landscape and astronomical information we have created for the site of Cultoon, to discover something of the mystery of this monument and its place in the changing world of the Late Bronze Age. Our digital landscape and astronomical tools are Horizon and Stellarium, along with the 10m elevation data available from the Ordnance Survey in Britain.

10 GEOMORPHOLOGICAL AND ARCHAEOASTRONOMICAL ANALYSIS OF AN EARLY TO MIDDLE NEOLITHIC LANDSCAPE, CRANBORNE CHASE, SOUTHERN BRITAIN

Burley, Paul (University of Minnesota)

Cranborne Chase in southwest England is a well-known area of Neolithic archaeology where a nexus of population growth, cultural evolution and resource extraction during the 4th millennium led to development of one of the highest densities of earthen monuments, including numerous long barrows, the largest and longest cursus in Britain, and many other structures. Natural physiographic characteristics of the study area in tandem with anthropomorphic modification of local vegetation patterns on the downs since the Mesolithic provided a distinctive setting where the Early- to Middle-Neolithic cultural landscape developed. However, reasons for siting monuments at certain locations within the complex chalkland landscape, the purpose of specific and unique architectural forms and features of the earthen structures, and spatial relationships between the pattern of monuments and elements of the surrounding environment as a whole remain largely enigmatic. This paper presents methods and results of an astrometric analysis of topographic position, monument orientation, and viewscape from earthen monuments at Cranborne Chase. Results of this study demonstrate that spatial and temporal relationships between the earthen structures and elements of the surrounding landscape, seascape, and skyscape are key to recognizing and understanding the symbolism and signification expressed by the monumental architecture. The cultural landscape – including the pattern of both natural features and earthen monuments at Cranborne Chase, the South Hampshire Lowlands, and surrounding region – expresses spatial and temporal unification by alignment between Earth and sky, and the living and the dead. In that way, the cultural landscape is related to a Neolithic cosmology emphasizing features of the landscape and skyscape.

37 LANDSCAPES OF SUSTAINABILITY: RESOURCE EXPLOITATION IN THE MEDITERRANEAN

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Nixon, Lucia (Wolfson College, Oxford) - Kopal, Elif (Mimar Sinan Güzel Sanatlar Üniversitesi)

Session format: Regular session

In the Anthropocene, the interaction of humans with their environment is mostly defined by resource exploitation. Recently archaeologists have realised that many of these interactions are based on a desire for sustainability; in some cases there is clear evidence for human intention to make resource exploitation sustainable. In this Regular Session we want to look at archaeological evidence for sustainability in the Mediterranean past, and how sustainability can dovetail with resource exploitation.

Landscape archaeology gives us a very useful perspective to investigate both the dynamics of resource exploitation and ways of managing specific landscape features (arable land, pasturage, coastlines, wetlands, highlands). It seems likely that sustainability was often built into resource management, including production above subsistence. Sustainable strategies would enable people to manage predictable risks to their resource base, such as crop failure or temporary scarcity of grazing land.

In societies practising agriculture and animal husbandry, there are usually four main resources – arable land; pasturage or grazing-land; water or the means of procuring it; and connectivities of various kinds. In order to maximise resources, people may invest in agricultural terraces; they may find ways of separating agriculture from grazing-land; they will need to manage water; and they will also need to determine the patterns of connectivity which will enable them to select resources efficiently. Other resources may be relevant too (potting clay, trees, quarry areas, ore sources). Archaeological evidence can help us to detect and date resource strategies, in order to see how different kinds of exploitation fit together in a specific landscape.

We look forward to abstract submissions using archaeological evidence to suggest patterns of sustainable resource exploitation in specific Mediterranean landscapes, and to having energetic discussions on approaches to ecological sustainability in various Mediterranean economies.

ABSTRACTS

1 ENVIRONMENTAL IMPACT ON PLEISTOCENE CRETE: FAUNAL TURNOVER AND RESOURCES IN AN ISLAND ECOSYSTEM

Strasser, Thomas (Providence College)

It is long known that in island environments the endemic fauna is susceptible to extinction by humans. There are many examples of *Homo sapiens sapiens* doing precisely that in relatively recent times. Crete has been an island for all of hominin evolution. In Late Middle Pleistocene Crete (ca. 300,000 BP), there was a major turnover in the faunal suite from the Kritimys (dwarf elephants, hippopotami and large mice) to the *Mus* biozone (large elephants, smaller mice, deer both dwarf and normal size). *Homo heidelbergensis* was on the mainland by this time, and it is suggested here that this hominin was on Crete and may have factored into this faunal turnover.

In the Aegean this hypothesis has not been addressed much due to the lack of evidence for pre-Holocene hominins on the islands. This lacuna, however, has been filled by recent archaeological discoveries on the islands of Crete, Gavidos and Naxos. There is also evidence from Flores that demonstrate pre-*H. sapiens sapiens*' seafaring abilities and suggest their potential causality of the extinctions there. Since the endemic fauna were naive due to lack of predation, they were unafraid and easy to hunt. If hominins contributed to the faunal turnover on Crete, the prey would have sustained the hunter-gatherer group for a time, but in the long run, hominins would have needed to reconsider their resource base. Late Pleistocene and Holocene extinctions are reviewed to examine the scenarios for such an event on Crete, and their impact on resource management and sustainability.

2 AUTUMN LAMBING IN THE MEDITERRANEAN: THE ANCIENT HISTORY OF A SUSTAINABLE PRACTICE

Balasse, Marie (AASPE CNRS MNHN Paris France) - Gutierrez, Eléa (AASPE CNRS MNHN Paris France) - Sierra, Alejandro (Departament de Prehistoria, Universitat Autònoma de Barcelona, Spain) - Pignaut, Pierre (AASPE CNRS MNHN Paris FRANCE) - Gourichon, Lionel (CEPAM CNRS, Université Côte d'Azur, Nice France) - Bréhard, Stéphanie (AASPE CNRS MNHN Paris FRANCE) - Alhaique, Francesca (Servizio di Bioarcheologia, Museo Delle Civiltà, Roma, Italy) - Fidanoska, Aneta (Archaeological Museum of Republic of North Macedonia, Skopje, North Macedonia) - Balasescu, Adrian (Romanian Academy · Institute of Archaeology, Bucharest, Romania)

Agropastoral systems in the Mediterranean take a great variety of forms in response to a wide range of climatic, orographic and socioeconomic contexts. The predominance of caprines (sheep and goat) is a frequent common feature, and a particularity is the existence of autumn lambing. Annual rhythms of pastoral systems are strongly determined by animal births season, which defines the annual availability of animal products (milk in particular) and the organization of agropastoral tasks. In temperate latitudes, ewes alternate on an annual scale between a period of fertility and a sexual rest. This reproductive cycle, inherited from their wild ancestor, is mainly driven by the photoperiod. In contrast to the dominant pattern of spring lambing in today's temperate Europe, in the Mediterranean area lambing can also be scheduled in autumn, bringing benefits in terms of use of natural resources. Autumnal lambing in the Mediterranean is enabled by the conjunction of three factors: (i) the physiological capability of some Mediterranean breeds for an "out-of-season" fertility period; (ii) intentional scheduling by the herder, by separating females and males and reuniting them in the spring; (iii) abundant forage resources to support autumn lactation: in present-day Mediterranean climate, autumnal rains create favorable conditions. In this regard, autumnal lambing constitutes a form of sustainable pastoralism in the Mediterranean area. Recent studies involving stable isotope analysis in sheep teeth showed autumn lambing in the early and middle Neolithic (6th and 4th mill. BCE) in the northwestern Mediterranean, suggesting that all three conditions were met at least in different occasions in the past. We will present new findings on sheep birth season and the occurrence of autumn lambing in Neolithic contexts across the northern margin of the Mediterranean over a broad longitudinal range from North Macedonia and Greece to southern France.

3 UNVEILING SUSTAINABLE FARMING STRATEGIES IN THE LATE BRONZE AGE ARGIVE PLAIN, GREECE: A CRITIQUE AND APPLICATION OF CARRYING CAPACITY ANALYSIS

Timonen, Riia (Leiden University)

This presentation critically examines the use of carrying capacity analysis as a tool for studying sustainable farming strategies in the Bronze Age Mediterranean. It identifies key factors influencing regional carrying capacity and assesses whether these factors reflect intentions toward sustainability in past agricultural decision-making.

Sustainability in food production was crucially important for the Late Bronze Age (LBA, c. 1600 – 1200 BCE) communities inhabiting the Argive Plain, located in the northeastern Peloponnese, Greece. Given the region's dense settlement pattern within a notably confined subsistence area, it serves as a unique context for investigating sustainable farming strategies.

Three key factors – agricultural space, crop yields, and labor organization – have previously been identified as having a notable impact on the carrying capacity of the LBA Argive Plain. While archaeological evidence suggests that spatial limitations might have been alleviated by terracing, low-scale irrigation and manuring, labor costs related to these strategies may have made them unsustainable in the long term. In addition, the organization of Argive Plain communities – whether in large central settlements or small agricultural hamlets – affected the arrangement of different farming tasks and, consequently, their long-term sustainability.

This paper suggests that notable changes in regional carrying capacity, the maximum population size that can be comfortably sustained in a specific environment, reflect levels of regional sustainability. Measuring the scale of changes to the carrying capacity caused by a set of known Late Bronze Age farming strategies can shed light on the ways local farmers made decisions and whether they aimed for long-term sustainability or more immediate rewards in terms of food security.

4 UNRAVELING MULTIFACETED RESOURCE MANAGEMENT: INVESTIGATING DRY STONE WALL SYSTEMS IN MEDITERRANEAN CROATIA

Fera, Martin (VIAS - Vienna Institute for Archaeological Science, University of Vienna) - Doneus, Michael (Department of Prehistoric and Historical Archaeology, University of Vienna) - Doneus, Nives (VIAS - Vienna Institute for Archaeological Science, University of Vienna)

Dry stone walls, as a ubiquitous feature worldwide, play a significant role in shaping landscapes and reflecting the cultural heritage of regions. While they have garnered increased attention in Croatia, particularly in landscape architecture and historical geography, archaeological research on these structures remains limited, largely due to challenges posed by dense vegetation cover such as evergreen maquis.

This presentation will focus on a case study from the Mediterranean region of Punta Križa, on the island of Cres in Croatia, where dry stone walls are prevalent. Our research utilizes Airborne Laser Scanning (ALS) technology to create high-resolution digital feature models, offering a viable method for large-scale documentation in areas obscured by dense vegetation. Through the integration of ALS data with Geographic Information Systems (GIS) and a Harris Matrix framework, our spatio-temporal interpretation reveals a wealth of information on the complex sequence of human activity associated with dry stone wall systems.

By examining the intricate network of dry stone walls within the Punta Križa landscape, we aim to demonstrate the multifaceted nature of these systems and their role in shaping regional dynamics over time. Additionally, we will explore how the study of dry stone walls contributes to our understanding of vernacular agro-pastoral practices, cultural adaptations, and landscape evolution in the Mediterranean context.

Through the presentation of our methodology, findings, and interpretations, we seek to highlight the importance of archaeological research in elucidating the significance of dry stone wall systems and their broader implications for understanding human-environment interactions in Mediterranean landscapes.

5 LIVING OFF/WITH THE LANDSCAPE IN THE HINTERLANDS OF ATHENS: INSIGHTS FROM THE KOTRONI ARCHAEOLOGICAL SURVEY PROJECT (KASP) AT ANCIENT APHIDNA

Kinnaid, Tim (University of St Andrews) - Dakouri-Hild, Anastasia (University of Virginia) - Davis, Stephen (University College Dublin) - Andrikou, Eleni (Ephorate of Antiquities of East Attica)

The Kotroni Archaeological Research Project (2019-2023) centers on understanding the relationship between the natural and human landscape from prehistory through the present day in the diachronic landscape of Aphidna and its immediate catchment area. Aphidna, being a rather remote rural site near the border of ancient Athens is an excellent case study for the ambivalent and frequently pivotal role of so-called 'marginal' sites relative to 'core' ones. Aphidna was on one hand steeped in the foundational history of the Athenian polis, which saw in it a primordial, ancestral place tied to its own myths and legends. On the other hand, it was regarded by Athens as a rustic, charming frontier that

in some ways existed in its own world. In this paper, given the interesting dynamic of this particular landscape (both 'belonging', and 'other/distant/frontier'), we seek to tease out evidence about long-term, diachronic sustainability practices in the Aphidnian landscape. We examine approaches to arable land and erosion management in the form of terracing, the utilization of local resources in the immediate vicinity of the site (such as pottery and brick clay, marble, and iron ore), and the management and usage of water in the form of mills and other waterworks. We also take a detailed look at the archaeological record compiled through intensive survey, to determine how self-sufficient the local community was and to what extent it reached out to Athens and other areas beyond to access goods that made a demand of the environment. The picture emerging from ancient sustainability practices is then juxtaposed with less sustainable major infrastructure works in the area, namely the modern Marathon dam, which radically altered the landscape in the early 20th c. to provide water for modern Athens.

6 SUSTAINABLE AGRICULTURAL PRACTICES IN THE IONIAN CHORA: RURAL SETTLEMENT PATTERNS AND TERRACE FARMING

Koparal, Elif (Mimar Sinan Fine Arts University)

KLASP is a survey project conducted in Urla – Çeşme peninsula at the western tip of Anatolia. Field surveys combined with remote sensing and spatial analysis investigated the rural landscapes around the polis centres and diachronically recorded sites. It is a common phenomenon that the surface visibility of the rural sites is relatively much lower. Also dating is a problem due to the use of much simpler coarse wares instead of well-identified fine wares. In order to tackle this obstacle, the terraces and the olive groves mapped by making use of aerial and satellite images as well as pedestrian surveys. A model was created by using the distance to terraces, rock-cut presses and basins, olive groves as a parameter for a sampling strategy for areas to be covered by intensive surveys. This led to the discovery of quite a few number of rural sites and documentation of terraces. Historic Landscape Characterization (HLC) is also used as a tool for measuring the changes in land use practices.

Terraced landscapes have been crucial to rural development and demonstrated a model for sustainable and multifunctional land-use systems. This paper covers the morphology analyses for defining the history of terrace agriculture in the peninsula, and land use dynamics during the Iron age in the chora of Ionian poleis. It is known that terrace farming has been applied since ancient times in many arid and semi-arid regions of the world as one of the basic elements of land use and food production system in order to develop a sustainable land-use by expanding the potential of arable land. It is also crucial to understand the interactions between the city and the country during the antiquity. From this perspective this paper investigates the agro-pastoral economy of the polis states in Urla-Çeşme peninsula.

7 LANDSCAPE ARCHAEOLOGY AND SUSTAINABILITY IN GRAECO-ROMAN SPHAKIA, SOUTHWEST CRETE

Nixon, Lucia (Wolfson College, Oxford)

Sphakia is a former eparchy, now deme, with a large area (466 km²) of highly dissected terrain and a wide altitudinal range: in only 16 km, the landscape changes from palm trees on the coast to elevations of approximately 2400 m. Sphakia is dissected by some 15 gorges running south to the Libyan Sea.

The Sphakia Survey covers three main epochs: Prehistoric (PH), 4500–900 BC; Graeco-Roman (GR), 900 BC–AD 961; Byzantine-Venetian-Turkish (BVT), AD 961–1898. Information was also collected for the 20th and 21st centuries.

This paper's methodology is based on two assumptions. The first is that we are largely dealing with agropastoral economies usually made up of free land-owners. The second is that free agropastoralists would instinctively want to be sustainable, using resources without using them up, especially if they wanted to produce above subsistence.

Indications of agropastoral sustainability in dissected terrain include the following. First, planted arable needs to be as separate from pasturage as possible. Second, in hilly areas like Sphakia, it is likely that people will use terracing to maximise slopes with enough soil for planting, and to prevent soil erosion. Third, bees do not require arable; it is better to put larger numbers of beehives in stonier places on which enough plants will grow to provide bee fodder. People who separate arable and pasturage, terrace slopes to create 'extra' arable, and place larger numbers of beehives away from arable spreads may be deliberately employing strategies for sustainability. Fourth, it is likely that people will attempt to make use of all available altitudes, possibly on a seasonal basis.

In this paper, I focus on agriculture, pastoralism, bee-keeping, and where possible, the use and management of cypress timber. The Graeco-Roman evidence suggests that people were using sustainable strategies for most of these activities.

8 HOW TO HYDRATE (IN) AN ANCIENT METROPOLIS: RESOURCE EXPLOITATION FOR SUSTAINABLE WATER SUPPLY IN PERGAMON

Korkut, Y. Berslan (Department of Archaeology and History of Art, Koç University, Istanbul, Türkiye) - Becker, Fabian (Department of Earth Sciences, Institute of Geographical Sciences, Freie Universität Berlin, Germany)

Since the beginning of research in Pergamon in the late 19th century, scholars recognized the significance of studying the surrounding landscape to understand the city itself. Early researchers such as Alexander Conze (1831-1914) likened Pergamon and its environs to a cohesive entity, conceptualizing Pergamon as the head and its surroundings as the body. Thus, understanding the body became imperative to comprehend what nourished the head.

In line with this understanding, the current paper specifically focuses on the material resources used in the construction of water supply systems that sustained the growing population of Pergamon with fresh water from distant sources within the micro-region 2nd century BCE onwards. The examination includes pivotal structures such as the earliest pressure pipeline, the Attalos Pipeline (2nd century BCE), and the extensive 42 km Madradağ Pipeline (2nd century BCE), as well as the notable Kaikos-Line (2nd century CE), which was built to meet the growing demand of the Roman Pergamon, boasting over 45 aqueducts, among these, the monumental Karkassos Aqueduct standing at approximately 42 meters in height and 530 meters in length. The paper aims to quantify the material resources exploited for these infrastructure-building programs, such as the volumes of clay for water pipes; stones, rubble, and mortar for aqueducts, and firewood for production.

For this purpose, the ongoing research program, “The Transformation of the Pergamon Micro-Region Between Hellenism and Roman Imperial Period” (TransPergMicro), provides a sturdy foundation with a conceptual socio-ecological model for interdisciplinary collaboration among Archaeology, Physical Geography, and Historical Building Research (Bauforschung).

By adopting a diachronic approach, this study aims to illustrate the considerable effort and resources invested in establishing a sustainable water supply for Pergamon, thereby shedding light on the historical evolution and challenges encountered in ensuring the city’s water resilience.

9 ENGINEERING SUSTAINABILITY: ROMAN DAMS AND WATER MANAGEMENT IN THE MEDITERRANEAN AGRICULTURAL ECONOMY

Sökmen Adali, Emine (Social Sciences University of Ankara)

Resource exploitation in different contexts points to various forms of practices, landscapes, and management strategies throughout the Anthropocene. This paper focuses on the Romans’ water management systems, with a particular focus on dams, to illuminate how they endeavored to achieve sustainability within the Mediterranean’s agricultural economy. By examining archaeological evidence and historical records, this study highlights Roman dams not merely as feats of engineering but as pivotal components of a broader strategy aimed at harmonizing resource exploitation with environmental stewardship.

In the context of the Mediterranean’s climate, topography, and agricultural demands, Roman water management strategies exhibit a profound understanding of sustainable practices. The Romans integrated traditional knowledge with innovative engineering to develop dams that ensured a reliable water supply, mitigated the risks of water scarcity, and supported extensive irrigation. These endeavors were crucial for sustaining agricultural productivity, supporting the empire’s economy, and maintaining the social fabric in a region prone to environmental fluctuations.

By exploring the multifaceted role of Roman dams—from enhancing arable land and managing pasturage to securing water resources and facilitating connectivity—this paper argues that Roman’s approach to water management exemplifies a model of sustainable resource exploitation. The archaeological evidence of Roman dams in the Mediterranean landscape serves as a testament to Roman’s legacy in integrating sustainability into the fabric of its resource management strategies.

10 FADING CITIES. HYDRAULIC INSTALLATIONS IN LATE ANTIQUE AND EARLY BYZANTINE POMPEIOPOLIS

Tatbul, Mustafa (Bartın University) - Brizzi, Massimo (Durham University) - Ricci, Giovanni (Cooperativa Archeologia, Italia)

The excavations carried out since 2009 by the Turkish-Italian expedition in Zimbilli Tepe (District of Kastamonu, Central Anatolia) commonly identified as the site of the Roman colony of Pompeiopolis in Paphlagonia, have exposed evidence of the transformation of a rich Late Antique urban residence into a rural site through successive phases.

The activities that can be recorded during this transformation have as their common thread the creation, replacement, adaptation and reuse of infrastructures in terms of the use of water related facilities: its transport, conservation and disposal. In this paper we will try to interpret different “water economies and water related management strategies

both fresh water and waste” that have occurred in the private space of this block in relation to the construction and abandonment of public city infrastructures, such as aqueducts and sewers, and also the transformation of the surrounding landscape using other proxy palaeo-environmental data coming from the deposits investigated in the water facilities themselves and various other archaeological contexts. We hope to demonstrate different strategies in terms of water sustainability among the different phases of the Domus.

42 EUROPE-SOUTH ASIA RELATIONS IN THE MEDIEVAL AND MODERN PERIODS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Hueglin, Sophie (University of Tuebingen; Newcastle University) - Arfeen-Wegner, Percy (Ruhr University Bochum) - Hauser, Mark (Northwestern University) - Tripathi, Sila (National Institute of Oceanography (retired))

Session format: Regular session

In this session, we would like to give voice to the usually silent witness – the material evidence – of the trade and maritime connections between South Asia and Europe. The focus will be on the medieval and modern periods where it is mostly possible to combine historical sources, material evidence and sometimes even oral tradition. We think of topics like:

- the gemstone trade with Europe
- the spice trade evidence at ports like Muziris or Rome
- underwater remains like shipwrecks with cargo (e.g. teak timber or Basel Mission tiles) as witnesses of trade and exchange between the two regions
- the influences on the built environment through colonization and mission activities
- the activities of different colonizing nations or missions of different persuasions
- the evidence for change or resistance to new lifestyles and mindsets in both regions
- the absorption of South Asian products, religions, and cultures in Europe.

While presenting our research, we would like to discuss at the same time how research and teaching on this topic might need to be decolonized in the future.

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ABSTRACTS

1 TRADE BETWEEN THE ROMAN EMPIRE AND ANCIENT INDIA, A REVIEW OF ARCHAEOLOGICAL & LITERARY SOURCES

Kumar, Pardeep (Assistant Professor, Deptt of History, Kanya Mahavidyalaya Kharkhoda, Sonapat, Haryana, India) - NAVNEET, NAVNEET (JMI UNIVERSITY NEW DELHI INDIA)

The trade interactions between Ancient India and the Mediterranean world constitute a pivotal aspect of ancient commercial history, elucidated primarily through the combined lenses of archaeological evidence and literary sources. Delving into the nuances of this historical exchange necessitates a meticulous examination of material remains and textual records, each offering unique insights into the multifaceted dynamics of ancient commerce. Research on the trade between the Roman Empire and Ancient India was started in 1946 by Sir Mortimer Wheeler and French archaeologist J.M. Casal at Arikamedu near Pondichery in. Archaeological finds, especially in Arikamedu and Pattanam the ancient Muziris provide excellent corroborative evidence for its trade relationship. Only from few sites –such as Arikamedu, Pattanam, Kaveripattanam and Kanchipuram archaeological reports have been published. Roman Empire

artifacts like pottery, glass objects and coins were found at these sites during recent excavations. The south Indian sites of Muziris and Arikamedu, occupy central positions within this intricate web of commerce, as evidenced by its mention in ancient texts. In this paper, we endeavor to synthesize archaeological and textual evidence, focusing on pottery, glassware, stone objects, and coins, to unravel the intricacies of Roman-Indo trade relations, thereby contributing to a nuanced understanding of ancient commercial network.

2 TIDES OF SPICES - COMMODITIES, LUXURY, AND VALUE IN THE PRE-MODERN INDIAN OCEAN

Autiero, Serena (Ruhr Universität Bochum)

This paper delves into the historical, cultural, and economic aspects that contributed to the transition of Asian spices from being coveted luxuries to essential staples in the Mediterranean with a diachronic perspective.

Initially, spices such as black pepper, cinnamon, and cloves were perceived as symbols of luxury, reserved for the affluent elite due to their rarity, exotic origins, and arduous procurement. Spices not only enhanced taste but also served practical purposes (e.g. as preservatives). Moreover, the use of spices extended beyond their culinary applications, encompassing their use in perfumes, medicines, and religious rituals.

The transition of some spices, such as black pepper, from luxury to staples in the Mediterranean world in ancient times can be attributed to a confluence of factors, including expanding trade networks, improved transportation systems, and changing socio-economic dynamics. These factors can be analysed through the lenses of globalization studies and connected theories. In particular, the gradual reduction in the cost of transportation, coupled with increased accessibility, facilitated the integration of spices into everyday life.

While archaeological findings, historical records, and written sources can provide insights into the distribution, consumption, and perception of goods in ancient societies, they can only offer a limited understanding of their value and distribution, therefore of their status. In short, we face the dilemma of assessing value without using quantitative methods. Therefore, understanding the social and economic dynamics of the time is crucial.

This abstract, drawing from historical texts and archaeological evidence, provides insights into the changing perceptions of spices, tracking a narrative of transformation from luxury to staple. This shift highlights the dynamic interplay between commodities and culture.

In conclusion, the assimilation of Asian spices into everyday life in the Mediterranean world offers room for wider discussions about ancient global trade and its transformation over time.

3 LOOKING FROM THE EAST: TRADE ROUTES AND MARKET CENTERS IN MEDIEVAL EURASIA

Papa, Luca (SAGAS, Università degli studi di Firenze, Italy) - La Salvia, Vasco (DISPUTER, Università G. D'annunzio Chieti, Italy) - Moderato, Marco (CASES, Universitat Pompeu Fabra, Spain) - Merola, Antonio (DIRIUM, Università di Bari, Italy) - Ganimede, Sara (DISPUTER, Università G. D'annunzio Chieti, Italy) - Vadakkiniyil, Dinesan (Kerala Council for Historical Research, India) - Petřík, Jan (Masarykova University, Czech Republic) - Hill, David (APAC Carlsbad, New Mexico)

This paper examines the material evidence of trade and maritime connections between South Asia and Europe, focusing on the Malabar harbour of Madayi during the Middle Ages. Situated on a laterite plateau overlooking the Kuppam river delta and the Indian Ocean, Madayi served as a crucial hub for maritime activities. Nonsystematic archaeological surveys reveal human activity from the early medieval to the Colonial period in key areas such as the Jewish Pond, the Fort, and the Mosque. A significant aspect of the study revolves around the examination of imported ceramics, particularly Chinese celadon pottery or so-called 'green ware', as a crucial marker of trade connections. The research underscores the prevalence of these ceramics in major ports along the Indian Ocean, both in the western and eastern spheres. However, the scarcity of such evidence in the Mediterranean challenges prevailing Eurocentric viewpoints, prompting a reevaluation of the medieval world system.

By spotlighting the peripherality of Europe in the medieval world system and emphasising the interconnectedness of regions extending from the Arabian Peninsula to the southern Chinese seas, the study prompts a critical rethinking of traditional narratives. The findings highlight the need for a more inclusive and nuanced understanding of historical trade routes, thereby enriching the discourse on the material evidence of South Asian and European connections in the Middle Ages.

4 EUROPEAN PERIOD SHIPWRECKS IN INDIAN WATERS

Tripati, Sila (CSIR-National Institute of Oceanography (retired))

The history of European shipwrecks began in Indian waters after the arrival of Vasco da Gama at Kapukad in Kerala, west coast of India on 17 May 1498. The marine and other related documents state that between the 15th century and 18th century CE several ships were wrecked off Goa, Cochin, Lakshadweep, Odisha and other waters off India during their journey from the European countries to India and back. A majority of the ships have wrecked due to storms,

hidden rocky reefs, woodborers, unskilled navigation, etc. The CSIR-National Institute of Oceanography (NIO), Goa, has undertaken the exploration of shipwrecks off Goa, Mincoy, Poompuhar, and Konark. In this paper, the Portuguese shipwreck in Sunchi Reef off Goa, which led to the recovery of storage jars, barrel of handgun, Chinese ceramic, elephant tusks, hippopotamus teeth, guns, iron anchor, gunshot, bases of glass bottles, lead pipes and sheets, copper strap, stone and clay bricks and many dressed granite blocks has been discussed. Among the shipwrecks explored in Indian waters, the wreck at Sunchi Reef is the oldest and is evidence of Indo-Portuguese trade and commerce during the early 17th century CE.

5 BEYOND EAST VERSUS WEST: EXPLORING THE DYNAMICS OF ARCHITECTURAL PRACTICES IN MALABAR, C. 15TH-17TH CENTURIES

Arfeen-Wegner, Percy (Centre for Religious Studies, Ruhr University Bochum)

Conventional narratives have traditionally depicted a significant rupture in architectural traditions across Malabar, South India, with the advent of Portuguese influence in the 16th century. While acknowledging the era's marked socio-economic transformations, particularly within the Indian Ocean trade dynamics, it is essential to question if cultural shifts were uniformly sudden or drastic, as is often assumed.

This paper aims to investigate shifts in building traditions and practices through a meticulous examination of the evolution of the iconic overhanging timber roof frame, spanning c. 15th-17th centuries. The study will scrutinise aspects of building technologies, techniques of execution, and motifs of constructions, with a focus on two pivotal inquiries: a) the heuristic value of framing architectural evolution through the dichotomy of "east" versus "west", where the west is often portrayed as an 'imposing' force and the east as a 'passive recipient', and b) whether changes in building traditions can solely be attributed to external political influences, notably the arrival of the Portuguese.

This paper contends that the reception of building traditions was complex and multifaceted. It demonstrates that the evolution of building practices involved extensive experimentation with techniques, as well as considerations of adaptation, internalisation and even rejection within regional contexts. This nuanced understanding challenges simplistic narratives of cultural imposition and underscores the agency and adaptability inherent in architectural evolution over time.

6 A RICE GRAIN'S JOURNEY IN THE BIG WORLD'S BARN - GLOBAL NUMISMATICS

Schwinghammer, Philipp (Thuringian Society of Coins and Medals/German Numismatic Society)

The presentation includes a global statistical analysis of coin finds worldwide with a current sample of more than 2 billion coins, which is intended to outline the global monetary circulation from 1000-1900 AD. On the basis of published finds and archaeological online databases, coins will be examined in the sense of travelling objects. The following questions will be relevant here: When did the first Asian or European coins migrate to other continents? What forms of imitations, counterstamps and cultural appropriation in the sense of an officially monetary or private use can we recognize in allochthonous or autochthonous monetary transactions? What is the general view of global distribution of coin finds? The aim of this presentation is to show these global connections. In addition, a system of imitation levels has been developed, by which different types of imitations can be named and a certain relative and developmental chronology of imitations of coinage can be traced. We can also recognize a certain chronological sequence between the application of graffiti, counterstamping and the start of imitative coinage, which traces the transition between an appropriated and an independent coinage.

7 MINTING MADNESS ON THE COROMANDEL COAST: SPATIAL PATTERNS AND ORGANIZATION OF EUROPEAN MINTS BETWEEN THE 17TH AND 18TH CENTURY

Hauser, Mark (Northwestern University) - Varma, Supriya (Azim Premji University)

Beginning in the sixteenth century with the Portuguese but reaching its apex in the 17th century, mints were a critical element of the built landscape in early colonial enclaves of Southern South Asia. Typical explanations for this distribution include a host of economic factors driving the need for a stable currency system, including the facilitation of trade, revenue generation, and the consolidation of colonial power. Rather than focusing solely on numismatics, this paper aims to map the distribution of mints as an element of the built landscape on the Coromandel Coast, offering an alternative explanation. It suggests that a multi-scalar analysis is required to understand this phenomenon comprehensively, encompassing cultural attitudes towards currency from disparate shores, to the immediate and concrete measures used to evaluate the quality and value of metal, and outward to economic reforms that were exogenous to both Europe and South Asia. Specifically, there was a manipulation of cultural exchanges and conflicts that ensued as European minting practices intersected with South Asian monetary systems. Furthermore, this study highlights the complexities of early colonial interactions and the power dynamics between South Asian polities and European colonies. It explores how the establishment of mints served as a tool for projecting the authorities of South Indian polities

and inserting European economic influence, while also revealing fractures in early colonial economies and conflicts with European colonial enclaves.

57 WHAT DO WE NEED TO KNOW TO UNDERSTAND STONE AGE MIGRATION AND MOBILITY?

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Högberg, Anders (Linnaeus University, Sweden; Palaeo-Research Institute, University of Johannesburg) - Hofmann, Daniela (University of Bergen) - Furholt, Martin (Kiel University)

Session format: Regular session

Human migration is the multi-directional movement of people and their thoughts, relationships and materiality – in large groups, smaller units or as individuals over long distances or internally within a region. Archaeological evidence documents extensive spatio-temporal continuity as well as change, revealing a variety of Holocene transformation processes. And, aDNA-studies have contributed with important knowledge about gene flow between populations, with multiple evidence of prehistoric human interaction.

Yet, we still have a relatively poor understanding of how Stone Age migration and mobility impacted on and affected humans and their material lives at various spatio-temporal scales, and we don't know how it played out in terms of changing relationships and social interaction. For this session, we invite papers that explore these topics.

We call for contributions that discuss integrated approaches in research that deal with various aspects of mobility and migration and combine data with theoretical and interpretative approaches. Papers should exemplify how we can explore theory and data in new ways to present informed analyses and results regarding innovation, knowledge-transfer processes and/or spatio-temporal variation in social processes. In all, we hope this session will bring us closer to grasping what we need to know to understand Stone Age migration and mobility.

ABSTRACTS

1 EMPIRICAL, OPEN AND MULTISCALAR: RESEARCH STRATEGY IN THE ARCHAEOLOGY OF MIGRATION

Johannsen, Niels (Department of Archaeology and Heritage Studies, Aarhus University)

The rapid ascent of genomic and genome-wide human aDNA research during the last 10 years has changed the role of migration in large parts of archaeology dramatically. While much energy has been devoted to critiquing and further developing this type of research, so far there has been limited strategic debate over what a coherent research strategy for studying migration archaeologically might look like. On the one hand, meaningful research strategies are likely to vary significantly according to the periods, geographical areas and individual cases studied – on the other, I will argue that it is nonetheless useful to discuss some general traits that may benefit most archaeological studies of concrete migration processes. In this talk, I propose that such studies in general should benefit from being empirical, open and multiscalar. Using examples from the study of migration processes in Neolithic Europe, I lay out what each of these three traits entails and argue why we can expect them to be beneficial traits.

2 SURFACE WATER DISTRIBUTION AS A CONSTRAINT ON HOMININ MOBILITY IN THE CENTRAL AZRAQ BASIN DURING THE MIDDLE PLEISTOCENE

Beller, Jeremy (Centre for Early Sapiens Behaviour (SapienCE), University of Bergen) - Collard, Mark (Department of Archaeology, Simon Fraser University)

The Levant was a cross-roads for hominins during the various Out of Africa dispersals. Understanding how Pleistocene hominins utilised the region is, therefore, an important task for archaeologists. Here, we report a study that investigated this issue in the Azraq Basin, a large endorheic catchment close to the eastern edge of the Levant. In the late 1980s, Lorraine Copeland and Francis Hours argued that the Acheulean of the central Azraq Basin has two different facies, the Desert Wadi Acheulean (DWA) and the Late Acheulean of Azraq (LAA). They posited that the DWA is earlier and more primitive than the LAA. They also observed differences in the facies' distributions, with the DWA being found along upstream portions of major wadis and the LAA occurring within and on the periphery of the spring-fed wetlands at the centre of the basin. According to Copeland and Hours, the different distributions were linked to the changing distribution of surface water. They proposed that the DWA was made when a palaeolake covered much of the center of the basin, while the LAA was produced during subsequent localised warming conditions when the palaeolake had receded into a series of marshy ponds. In our study we collated published data to assess how well Copeland and Hour's hypothesis is supported by the results of the large amount of fieldwork undertaken in the

region over the last 40 years. We found that Copeland and Hours' hypothesis holds up well: it still appears that over time Late Acheulean groups contracted towards the wetlands as surface water decreased. This has implications for the recently proposed idea that Pleistocene hominins migrated into the Levant from the Arabian Peninsula via 'palaeohydrological corridors'. Specifically, it suggests that if such movements occurred, they most likely took place during warm and wet periods.

3 THE GENETIC MAKEUP OF THE LAST HUNTER-GATHERERS OF SOUTHERN BELGIUM

Rivollat, Maité (University of Ghent, Belgium; Durham University, UK) - Toussaint, Michel (University of Ghent, Belgium) - Blevins, Kelly (Durham University, UK) - Robert, Prudence (University of Ghent, Belgium) - Crombé, Philippe (University of Ghent, Belgium) - Fernández-Domínguez, Eva (Durham University, UK) - De Groote, Isabelle (University of Ghent, Belgium)

During the Late Upper Palaeolithic and the Mesolithic, the climate warmup allowed human groups to re-populate north-western Europe after the Late Glacial Maximum. It is known that substantial human migrations came from southern refugia. Recent genetic analyses show a complex makeup of ancestries, with a mix of a component found in individuals associated to the Aurignacian culture and other eastern components in local Mesolithic individuals in neighbouring France and Germany.

Southern Belgium, and more specifically the middle-Meuse valley, is well-known for its very rich archaeo-anthropological record. Human remains have been found dating to the Middle Palaeolithic to the Bronze Age and a number of caves provide a unique fossil assemblage for the Mesolithic period – something which is lacking in the surrounding areas. In the frame of the project ROAM: Migration, diet, and health of the first permanent settlers of Belgium: inter- and multi-disciplinary perspectives, we aim to apply a multidisciplinary study to these remains to better understand the permanent re-colonization of northern Europe after the last ice age.

Here, we present the very first results from the ancient DNA investigation of the Mesolithic remains from several caves from the Meuse Valley. First, we will explore the genetic origins of the first permanent settlers in the region, discussing their affinities with neighbouring known individuals. Second, we will investigate the group structure of the individuals buried in these collective sepulchral caves, which will give insights into their funerary practices.

4 STRUCTURAL CHARACTERISTICS OF THE FORMATION OF THE LBK DIASPORA AND CONSEQUENCES FOR DAILY LIFE

Pechtl, Joachim (Institute of Archaeology University of Innsbruck)

LBK is most likely Europe's best researched Neolithic culture providing a vast body of find materials accompanied by extensive scientific analyses. This allows for clear identification of processes of long lasting and repeated mobility. Reaching from regional personal mobility to largescale colonization of Central Europe mobility seems to be a basic condition of LBK society. Especially formation of the LBK diaspora might have deeply affected the cultural system including both material culture as well as economic and symbolical behavior. For testing this thesis comparison is made to effects known from modern examples of migration and colonization, among these bottleneck effects in cultural diversity, hybridization and formation of creole culture versus strict segregation, conservative behavior and durable focus on the place of origin. Material culture as well as settlement structures, burial customs and economic strategies of the LBK are considered. Such analyses give way to discussing the spreading mode of the LBK and its direct consequences for everyday life of early farming people.

5 PATTERN IN DIVERSITY; UNDERSTANDING COMMONALITY AND THE SPREAD OF FLINT MINING ACROSS EUROPE

Baczowski, Jon (University of Southampton) - Werra, Dagmara (Institute of Archaeology and Ethnology Polish Academy of Sciences)

Obtaining flint with the method of deep-mining is a widespread practice across the Neolithic of Northwest and Central Europe. The pursuit of mined flint, often to produce axeheads, resulted in amongst the largest, long-lived, and most complex Neolithic monuments in the form of deep-mines and their associated extraction horizons. Mine products travelled long distances from source, often after being refined at settlements in the mining regions. Flint mine material also formed the basis of economies at notable settlements, such the Funnelbeaker Culture settlement at Ćmielów, Poland, which contains vast quantities of material from two mines, Krzemionki and Świeciechów. This talk will discuss commonality that underlies cultural practices and the mining methodology. We will question if and how we can track and interpret the spread of mining and the movement of material and methodology across Northern Europe. Are the similarities of mining methods across a wide geographic region coincidental? Is the establishment of deep-mines associated with the spread of pioneer Neolithic communities, or the result of a fusion between indigenous and immigrant farming communities? Overall, the importance of mining reached far beyond the extraction face and was an important cultural activity that connected communities.

6 SPATIOTEMPORAL MODELLING OF THE MESOLITHIC-NEOLITHIC TRANSITION AND THE ARRIVAL OF NEOLITHIC FARMERS WITH ANATOLIAN-DERIVED ANCESTRY IN SOUTHERN SCANDINAVIA

Rose, Helene (Department of Historical Studies, University of Gothenburg) - Paulsson, Bettina (Department of Historical Studies, University of Gothenburg)

The Neolithic transition in Southern Scandinavia was delayed by more than a millennium compared to Central Europe, but recent genetic ancestry studies have demonstrated a swift arrival of Neolithic farmers with Anatolian-derived ancestry starting around 4000 BC. Resulting in a close to complete population turnover with limited genetic contributions from the previous local hunter-gatherer-fisher populations. This paper will contextualise recent results and present the on-going works of a spatiotemporal investigation of the transition in the region of present-day Denmark. We will provide a comprehensive overview of existing dating evidence based on an extensive literature review and present our novel integrative modelling approach, that combines radiocarbon data with prior information from archaeology, osteology, dietary stable isotopes and aDNA within a Bayesian framework. The adoption of agriculture is one of the most fundamental changes in human prehistory and our results provide detailed insights into spatiotemporal aspects of the transformation processes across Southern Scandinavia and contribute to the ongoing debate about Stone age migration and mobility.

7 INNOVATION PROCESSES AND KNOWLEDGE-TRANSFER SYSTEMS WITHIN SOUTH SCANDINAVIAN STONE AGE MOBILITY. A TRANSDISCIPLINARY APPROACH

Högberg, Anders (Linnaeus University; University of Johannesburg) - Brink, Kristian (Sydsvensk Arkeologi AB) - Brorsson, Torbjörn (Ceramic Studies) - Malmström, Helena (Uppsala University)

From archaeological and genetic data, we have evidence of mobility and migration events in south Scandinavia during the centuries around 4000 BCE (i.e. the beginning of the Early Neolithic in this part of the world). They occurred in specific situations that varied at multiple spatio-temporal scales with different rhythms in various contexts. But even though we know that these events happened, we actually have little knowledge about how they impact on and affected humans and their material lives.

In an ongoing project we explore innovation processes and knowledge-transfer systems within south Scandinavian Stone Age mobility. Drawing on competences from Archaeology, Genomics, Science and Technology Studies and Migration Studies, we: integrate analyses of large-scale archaeological excavation records with archaeogenetic data; explore spatio-temporal variation in mobility, population change and change in human's material lives; correlate these with each other, and; re-theorize Stone Age migration to test various models on mobility against our results. Our ambition is to interpret transformation processes to explain qualities of the roles played by innovation processes and knowledge-transfer systems within Stone Age mobility.

In this paper we present preliminary results from our work and discuss aspects of applying an integrated multidisciplinary approach to Stone Age migration studies and how migration impacted on and affected humans and their material lives in south Scandinavia during the centuries around 4000 BCE.

8 GENES, VESSELS, AND MIGRATIONS: HARNESSING CERAMIC TECHNOLOGY, PROBABILITY THEORY, AND NETWORK ANALYSIS TO UNDERSTAND THE EMERGENCE OF CORDED WARE

Kroon, Erik (Leiden University, Faculty of Archaeology)

5,000 years ago, a migration had a fundamental impact on Europe. Migrating communities spread across Europe within two centuries, leaving lasting changes in connectivity, language, and genetics. Yet these migrating communities did not enter an empty continent. Across Europe, they encountered indigenous communities with millennia-old roots. What interactions between these migrating and indigenous communities resulted in the changes seen in the archaeological record?

Modern migration studies show processes of learning and knowledge exchange are pivotal to the integration (or lack thereof) of migrants in host societies. Therefore, this paper develops an innovative approach to ceramics to shed light on learning processes 5,000 years ago.

Ceramics are ideal to study learning because each vessel bears traces of the production techniques which potters learned and applied to fashion them. The approach developed here uses a combination of the chaîne opératoire approach, network analysis, and probability theory to quantitatively compare these learned production processes and infer the amount of shared technical knowledge from them.

This approach is applied to ceramic assemblages from migrating Corded Ware and indigenous Funnel Beaker West communities in the Netherlands. The results demonstrate migrating communities repeatedly learned from the indigenous communities they encountered across Europe and applied this knowledge to produce Corded Ware vessels.

This finding is a crucial complement to archaeogenetic studies of this period and underlines the importance of looking at learning for understanding migrations during the Stone Age, and beyond.

9 STICKING TO YOUR ROOTS: CULTURAL DESCENT WITH MODIFICATION EXPLAINS THE CONTINUITY IN HUNTER-FISHER-GATHERER LITHIC PRODUCTION AT THE EARLY NEOLITHIC TRANSITION

Lundström, Victor (University museum of Bergen, University of Bergen)

In light of recent developments on ancient DNA and migration studies, it appears as if traces in the material culture record has taken the back seat, or at best, a complimentary role. In such complimentary cases, focus is directed on the presence or absence of lead artefacts and their formal morphological variation, often with implicit assumptions that similarity equals cultural relatedness. However, lurking in the blind spot lies the possibility that such formal variation arose independently. This is a crucial problem in migration studies void of ancient DNA, as the material cultural record, coupled with outdated culture historical frameworks, often leads to a 'whodunnit' situation. As a proposed solution to this problem, advancements within cultural phylogenetics and cultural evolution allows for the quantitative assessment on whether material traces are the result of unbroken cultural descent, independent invention or complete population replacement. In this paper, I present the results on such an analysis from 51 lithic assemblages along the west coast of Norway that date to the Late Mesolithic (8500-6000 cal BP), as well as parts of the Early and Middle Neolithic (ca. 5950-4500 cal BP). In contrast to its south-Scandinavian periphery, which indicates more or less a complete genetic and cultural population replacement at the Early Neolithic transition (ca. 6000 cal BP), Western Norway testifies to robust indications of continued hunter-fisher-gatherer cultural ancestry. This continuity did not evolve without change, however, as it featured both the loss of old cultural traits, as well as the invention and perhaps borrowing of novel ones. The underlying mechanisms of these changes will be discussed in relation to climate induced population dynamics, which prompted new forms of social learning in lithic production techniques.

10 NEOLITHIC TRANSFORMATIONS IN SOUTHERN NORWAY: MIGRATION, CULTURAL DYNAMICS, AND ECONOMIC CHANGE

Lechterbeck, Jutta (Arkeologisk Museum, Universitetet i Stavanger) - Bergsvik, Knut Andreas (University museum of Bergen) - Schülke, Almut (Kulturhistorisk museum Oslo) - Kirleis, Wiebke (CAU Kile)

The paper delves into the intricate social, economic, and migratory processes leading up to the adoption of agriculture in Southern Norway during the Neolithic period. Situated at the northern margins of the Neolithic world, the development in this region challenges the conventional model of neolithization characterized by rapid shifts from hunter-gatherer to agricultural economies. This prompts a reevaluation of migration and cultural transmission theories, and the aim of the paper is to develop an interpretative framework which considers the unique features of the archaeological material in Southern Norway and applies relevant perspectives on social and economic dynamics.

During the Mesolithic period Southern Norway was inhabited by coast-oriented forager groups. The subsequent Neolithic period (c. 4000/3900-1700 cal BC) witnessed diverse regional dynamics, marked by varying degrees of contact with agricultural populations in Southern Scandinavia, but no full-scale agrarian practices until c. 2300 cal BC. Instead, there were diverse lifestyles, cultural expressions, and economic practices across the area, which indicate dynamic social contact networks and mobility.

Our approach employs multiscale archaeological and archaeobotanical case studies spanning the 4th and 3rd millennia cal BC in four different regions of Southern Norway. Our archaeological case studies focus on depositional patterns and spatial distribution patterns of stone and flint tools, drawing comparisons between Hordaland (W-Norway) and the Inner Oslo Fjord area (SE-Norway). Archaeobotanical cases examine changing woodland use, management, manipulation, and land cover opening over time, incorporating relevant data from Rogaland (W-Norway) and a detailed pollen record of a laminated core from Lake Skogstjern, Bamble, Telemark county (SE-Norway).

The paper aims to provide a more nuanced basis for discussion for the assessment of the social and economic processes that led to the adoption of agriculture in Southern Norway during the Neolithic period.

11 MOBILITY OF COMMUNITIES IN THE FINAL ENEOLITHIC AND EARLY BRONZE AGE IN POLAND AND SLOVAKIA: INSIGHTS FROM STRONTIUM ISOTOPIC ANALYSES

Jarosz, Pawel (Institute of Archaeology and Ethnology PAS) - Szczepanek, Anita (Institute of Archaeology and Ethnology PAS; Department of Anatomy Collegium Medicum Jagiellonian University) - Horváthová, Eva (Archeologický ústav SAV)

Strontium isotopic analyses ($^{87}\text{Sr}/^{86}\text{Sr}$) were conducted to ascertain the geographic origins of individuals interred in graves dating to the Final Eneolithic and Early Bronze Age at various cemeteries in Southeastern Poland and Eastern Slovakia. Samples for isotopic studies were derived from the enamel of both human and animal teeth. The study region

encompasses diverse geological substrates, facilitating the distinction between local and non-local individuals, along with the determination of $87\text{Sr}/86\text{Sr}$ value ranges characteristic of the indigenous populations. The analytical results revealed that a majority of the examined individuals exhibited local isotopic signatures. However, an exception was noted in the Subcarpathia region, where a noteworthy proportion of “non-local” individuals was identified. Intriguingly, grave goods associated with these individuals also included artifacts of non-local origin. The grave furnishings of isotopically distinct individuals were found to be highly diverse, with a single complex containing both locally and non-locally sourced items. Furthermore, the observed elements of funeral customs suggested a lack of explicit emphasis on reflecting the geographic origin of the interred individuals in the grave inventory. This nuanced approach to grave goods composition underscores the complexity of socio-cultural dynamics during the Final Eneolithic and Early Bronze Age in the study area. This research was funded by the National Science Centre Poland, grant numbers NCN 2020/39/B/HS3/00454 and NCN 2020 UMO-2020/37/B/HS3/03816.

58 ARCHAEOLOGIES OF GLOBAL OUTLANDS. NON-AGRICULTURAL ECONOMIES AND INTERCONNECTED SOCIETIES

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Escribano-Ruiz, Sergio (University of the Basque Country (UPV/EHU)) - Hennius, Andreas (Upplandsmuseet)

Session format: Regular session

The old saying goes that “All roads lead to Rome”, if so, it would imply that all roads start somewhere else. It is becoming increasingly clear that the beginnings of these roads are to be found far out into the peripheral outlands beyond the agrarian regions and central places – such as boreal forests of northern Scandinavia, far-distance oceans and islands or tropical mountain-regions of the Far East. This session addresses social and economic patterns opposed to the hegemonic view of agriculture as the main human activity in the pre-industrial world and seek to explore common denominators for how life was shaped for people involved in a non-agrarian resource extraction.

Thus, this session aims to follow the multiscalar interactions underlying the large-scale exploitation and extraction of non-agricultural resources in a given place and time. Specifically, the aim is to bring together researchers interested in questions related to the exploitation of non-agricultural lands and non-cultivated products, and how these were integrated into long-distance networks of production and exchange. Considered peripheral areas and/or practices, there is enough evidence to believe and demonstrate that they were fundamental driving forces in societal developments in the past. It is precisely in this direction that this session search to provide empirical evidence.

While any related topic is welcome for the session, we encourage papers that address issues associated to, and derived from, large-scale economic activities concerning for example forest exploitation, fishing, livestock and handicrafts. Papers should consider long-distance commercialisation, but also the consequences of these practices on local societies and in relation to the actors involved.

ABSTRACTS

1 ARCHAEOLOGIES OF GLOBAL OUTLANDS NON-AGRICULTURAL ECONOMIES AND INTERCONNECTED SOCIETIES – AN INTRODUCTION

Escribano-Ruiz, Sergio (University of the Basque Country (UPV/EHU)) - Hennius, Andreas (Upplands Museum)

When the European colonisation of North America began after the first voyage of Christopher Columbus, the acquisition of furs from the large, forested parts of the continent was a key activity of the settlers. For a long time colonisers traded furs and pelts with the indigenous north-Americans and this was an important driving force for transatlantic travel and also catalyst for the European economy. If we turn to the Scandinavian Iron Age a thousand years earlier, a similar process can be observed. During this period, furs, iron, and antler from the boreal forests, were traded for other equally exotic items on the Eurasian continent. The result was that objects from most of the old world ended up in the soils in the agrarian regions in southern Scandinavia and in the Baltic islands. Similar processes, where non-agrarian products create surplus and wealth, can also be identified in eastern, central, and southern Asia, even if thousands of years earlier. Intense trade relations along the silk roads linked Asia and Europe for a long time. The trade around the Indian Ocean connected eastern Africa with south-east Asia. Likewise, the Atlantic tied together Europe and Africa with North and South America from the 16th century CE onwards. It is becoming increasingly clear, that a large-scale, non-agrarian production in Outland regions, such as boreal forests, mountainous regions or the open oceans have been fundamental for the economy, in different parts of the world for a long time.

The central marketplaces are relatively well understood, in comparison to the state of knowledge on the relationship between production areas and the trade networks in the central areas which is still limited. In this introduction we will

discuss the need for an Outland perspective on production and trade for a better understanding of societal developments.

2 MARGINAL LANDSCAPE - MARGINAL DATA?

Engevik, Asbjørn (University of Bergen)

The physical characteristics of the high mountains of Norway, with its steep and rugged terrain and harsh climate, has caused this area to be seen as marginal. However, more than 4500 pitfall traps and an almost infinite amount of hunting blinds and stone cairns, together with trails, gathering places, rock-shelters, ruins, and stone huts, clearly show that these areas have been exploited right from the Stone Age, until today.

However, our perception of marginality in prehistoric times seems to be defined in contrast to well-known modern standards, such as easy access to food, transport, and shelter. Areas that seem inaccessible and remote to us today, are thus easily perceived as marginal. It is therefore a need to challenge our present-day notion of marginality. If we wish to understand how prehistoric landscapes, such as the high mountains have functioned, we must bear in mind that our view on prehistoric marginality may be just a mere reflection of our modern way of life.

In this paper I am going to review the Iron Age material from the mountainous landscape of Norway, to show that the high mountains were not marginal. Instead, I suggest that it is the sources and data sets, that are deficient and inadequately interpreted. Empirical evidence shows that these so-called marginal areas contained a great variety of important resources. I also suggest that these high mountains were deliberately chosen for specific societal activities, which reflect the always underlying connectivity between agricultural settlements in the lowlands and the people who exploited the mountainous areas.

3 RESOURCE EXTRACTION AND NON-AGRARIAN PRODUCTION IN THE FORESTED NORTH - COMMODITIES FOR TRADE ON SUPRA-REGIONAL NETWORKS

Hennius, Andreas (Stiftelsen Upplandsmuseet)

Swedish Iron Age archaeology has for long had a focus in settlements and burials in the southern, agrarian parts of the country. Exploitation of the forested areas of the north have been interpreted in relation to the spread of agriculture northwards during the Viking Age and medieval period (from about 800 and onwards). The non agrarian resource extraction has been regarded as a passive adaptation to a low-yield agrarian production, and products like furs and iron could be traded as commodities at the Viking Age emporia.

New research, however, show a very different picture. A large-scale exploitation of the non-agrarian resources from the outlands was initiated much earlier. Already during the 4th – 5th centuries an intensified hunt for both terrestrial and marine mammals can be identified, as well as a largescale iron production, and somewhat later a largescale production of tar. In addition, there is an intensified trade with for example furs, antler and lithic materials.

The outlands increasingly appear as an integrated part of society as well as an important driving factor in societal development much earlier than previously reckoned. The development also shows the emergence of far-reaching trade networks well before the Viking age, where the non-agrarian resources from the forests most probably were of fundamental importance. These networks connected the forested north with the European continent and further beyond.

4 CRISES IN THE OUTLAND USE. THE ROLE OF REPLACEMENT INDUSTRIES IN LOCAL STRATEGIES

Pettersson, Susanne (Independent) - Svensson, Eva (Risk and Environmental Studies, Karlstad University) - Johansson, Annie (County Administrative Board, Varmland)

The outlying lands in boreal Scandinavia were full of diverse resources. These resources were extracted for different purposes. Some were used for self-subsistence by the peasants, others were made into commodities for trade. In this presentation the peasants conducted large scale commodity production and acted in trade networks. The forests are full of bloomery iron production sites and pitfalls for elk hunting. The heyday occurred during the 9th to the 12th century AD. There was a remarkable decline in bloomery iron production c. 1200 AD followed by a similar decline in the use of pitfalls c. 1250 AD. Simultaneously, pig iron in blast furnaces in the Mining District increased rapidly, and comb makers in the towns switched from antler to bones from butchered cattle. One example of the decline is the rural settlement Skinnerud. The economy was based on iron and hides from the outland and when this production was out of demand the settlement was abandoned and the land became an infield. At the same time there was an increased use of shielings for livestock breeding and agriculture, and a change of technology in the bloomery iron production. Another novelty was an increased quarrying for soapstone traded in local and regional networks. We interpret this as peasant strategies to meet the crisis caused by the failing market in bloomery iron and elk related products.

5 THE INTEGRATION OF INDIAN FOREST-DWELLERS INTO SHORT- AND LONG-DISTANCE EXCHANGE NETWORKS IN THE MEDIEVAL PERIOD

De Simone, Daniela (Ghent University)

In the latter half of the second millennium BCE, networks of trade and exchange developed throughout South Asia. Urban polities thrived on the extraction of timber and non-timber forest products (NTFPs), feeding them into networks across the region, the Indian Ocean and the Bay of Bengal. South Asian forest-dwellers remained first-tier suppliers of the 'spice trade' until the early nineteenth century, when the British started to 'legally' appropriate forested land from indigenous owners. Colonial ethnography misrepresented South Asian forest communities as primitive, remote and isolated therefore research on their past is rare and limited in scope. However, evidence from the Nilgiri mountains in southern India, a region of montane subtropical forests, suggests that the forest-dwellers inhabiting the area were connected to short- and long-distance trade and exchange networks. Assemblages excavated from sites in the Nilgiri mountains, dating between the 12th and 16th century, include artefacts imported from the surrounding lowlands, where temples were built in the forests at the feet of the Nilgiri mountains, between the 11th and 14th century, and had inscriptions recording the donations of NTFPs from merchants for the upkeep of religious establishments. This paper discusses the integration of the Nilgiri forests into the trade of NTFPs on the Malabar coast.

6 MODERN CARTOGRAPHIC TOOLS REVEAL THE ORIGIN OF ROME, PISA, ARLES, AND OTHER CITIES BORN ALONG A PROTOHISTORIC CIRCUM-MEDITERRANEAN PEDESTRIAN PATH

Perrone, Antonio (WEDAP)

Several onsite surveys and the analysis of the orography, performed with a geospatial software, have suggested the hypothesis of the spontaneous birth - in prehistoric times - of a pedestrian path that turned around the Mediterranean Sea.

This path, not only the naval routes, seems to have supported - in that age - the commercial and cultural movements spread all around the Mediterranean Sea.

The path often presented obstacles such as rivers, swamps, gulfs, deep valleys, rocky walls and impenetrable woods. These obstacles, obliging a stop or a slowing-down, constituted the privileged place where guides, porters, boatmen, innkeepers and stores were ready to offer their services to the travellers and merchants. Thus, little by little, in the prehistoric era, in those places, the first urban settlements arose.

The orography of the Mediterranean Sea has been analysed, from LiDAR data, with various cartographic software among which QGIS. The geospatial databases utilized for the research have been, among others, those produced by various public Italian, European and American bodies.

The performed analysis offered a lot of elements that allows say that - thanks to the mentioned path - very numerous cities and settlements were born near the coasts of the Mediterranean Sea. Among these cities - along the northern part of the Mediterranean Sea - there are Edessa, Valona, Brindisi, Benevento, Capua, Terracina, Rome, Pisa, Aix-en-Provence, Arles, Montpellier and Narbonne.

Among other things, the work discusses the case - outside the Mediterranean but towards this sea - of the possible ancient roads that connected the sites of Gobekli Tepe and Karahan Tepe, along what would later become the Silk Road. Such ancient connections between East and West could make us rethink the epochal transition of prehistoric men from hunter-gatherers to not only breeders-farmers but also to breeders-farmers-merchants-travellers.

63 SHIFTING FOCUS: THE CULTURAL CONTEXT OF FIGURINES IN THE EUROPEAN NEOLITHIC

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Becker, Valeska (University of Copenhagen) - Hofmann, Daniela (University of Bergen) - Iversen, Rune (University of Copenhagen)

Session format: Regular session

Figurines and other figurative representations, both anthropomorphic and zoomorphic, are an essential part of many cultural phenomena of the European Neolithic. They have been widely discussed in research with respect to their making and meaning, but their interpretation is still elusive even today. Nevertheless, they continue to fascinate, as they offer a glimpse into the mind of Neolithic people and can be used to reconstruct their makers' view on the world and on themselves.

This session aims to contribute to discussions surrounding the social significance of figurines. Rather than discussing typologies or single individual pieces, we want to focus on figurines embedded in their cultural context. What characterizes societies that use figurines in contrast to those who do not? Which role do figurines have alongside other

manifestations of belief, such as enclosures, burials in settlements and cemeteries, depositions or even other figural objects?

In this respect, changes and discontinuities are especially interesting: changes in quantity, quality, shape/appearance, sensory qualities, use and depositional modalities, but also changes in distribution over time, within the same cultural phenomenon or throughout larger areas.

Presentations can address figurines in their associated cultural context roughly between the seventh and the fourth millennium calBC.

ABSTRACTS

1 THE ANTHROPOMORPHIC-VASE IN THE "STRUCTURED DEPOSITION" AMONG THE CULTURES OF CENTRAL-NORTHERN ITALIAN PENINSULA, AT THE END OF 6TH MILLENNIUM BCE

Bersani Pancheri, Monica (University of Trento, Department of Humanities) - Ciela, Marika (University of Trento, Department of Humanities) - Pedrotti, Annalisa (University of Trento, Department of Humanities)

The report presents the results of PhD research completed in 2019, which primarily focuses on two categories of anthropomorphic vessel, the face-pot and the vessel adorned with one or more human figure motifs. One of the main objectives of the study was the analysis of the archaeological context of discovery. These artefacts, dating back to the period between the 7th and 5th millennia BCE, originate from 229 sites across the Levant, Anatolia, the Balkans, Central Europe, and Italy, with a specific emphasis on those from the Italian Peninsula and Sicily. Out of the 927 identified pieces, only 197 provide reliable information on the archaeological context in which they were found. Most of these artefacts have been found in fragmentary form, in contexts that suggest a potential cultic and ritual nature, such as funerary contexts, caves, and "house of worship". An assemblage of artefacts retrieved from pits, often interpreted as waste deposits, is possibly linked to ritual practices, as anthropomorphic vessel remains are accompanied by fragments of symbolic items like grindstones, deer antlers, miniature vessels, clay figurines, rhytons, animal parts, and polished stone axes. This consistent archaeological pattern suggests a "structured deposition", where the above-mentioned specific objects are intentionally deposited in fragmentary form, a practice already observed in various geographical and chronological contexts by other scholars.

The discussion primarily focuses mainly on the analysis of the practice of "structured deposition", a performance crucial for reconstructing the social practices related to the deposition of artefacts with a symbolic value, in the central-northern part of the Italian peninsula. It uses data from 27 artefacts, found in 17 different archaeological contexts, from 9 localities.

2 A PARTY TO REMEMBER? A UNIQUE FACE POT ASSEMBLAGE FROM THE MIDDLE NEOLITHIC OF THE CARPATHIAN BASIN

Sebok, Katalin (Institute of Archaeological Sciences, Eötvös Loránd University)

Anthropomorphic figurines and face pots seem to have 'coexisted peacefully' in the Alföld Linear Pottery Culture and the cultural units deriving from it—amongst others, the Szakálhát and Bükk cultures and the Esztár and Sátorajújhely pottery styles—representing the Middle Neolithic of the Carpathian Basin, roughly between 5600 and 5000 cal BC. The main factors considerably hindering the interpretation of these finds have always been the lack of context and a relatively high degree of fragmentation: most figurines and almost all previously discovered face pots are surface finds or have come from the fill of waste disposal pits; besides, in general, the bigger the original artefact was, the smaller part of it has persisted. These circumstances add greatly to the significance of the assemblage, discovered in a settlement of the Szakálhát Culture at Rákóczifalva-Bagi-földek in 2006, that contained the best part of six relatively large face pots with a complex incised and/or mono- or polychrome painted decoration—a find that had never been published before. The presentation gives a brief survey of the main characteristics of the unearthed archaeological feature, including its structure, position within the settlement and the landscape, local analogies, and the vessels and their fragmentation pattern, in an attempt to decide whether it was created by intent, and if yes, what can be revealed about the actions and reasons behind. Besides, by skimming the main results of the analysis of the vessel forms and decorations, the author provides a short overview of her current understanding of the cognitive background and social implications of the findings in focus, as well as their position within the stylistic, cognitive, and social development represented by face vessels and anthropomorphic figurines bearing a similar decoration of the easternmost Linear Pottery tradition.

3 NO FACE FIGURINES – MULTIPLE FACES OF INTERPRETATION

Kogalniceanu, Raluca (“1 Decembrie University” of Alba Iulia, Romania)

The Hamangia communities from south-eastern Romania and north-eastern Bulgaria are best known through the discovery and research of the Durankulak cemetery (Bulgaria). The other large cemetery excavated at Cernavoda (Romania) at the middle of the 20th century is less known due to the lack of publication shortly after its investigation. Our reassessing of those investigation in the last decade brought to light interesting data, especially interesting differences between the two cemeteries. In terms of Hamangia settlements, there are few excavations in Romania, mostly from the last century, but the ones from Bulgaria come to complete the image.

In terms of Hamangia figurines, the most famous ones are “the Thinker” and “his wife”. But most of the Hamangia figurines are different from these two. The diversity of postures (standing, sitting), states (pregnant or not) and representations (mostly faceless) of the Hamangia figurines are the illustration of a variety of concepts that might have been in circulation at that time in that particular cultural context. A reevaluation of the Hamangia figurines (beyond the Thinker and his wife), and of their individual contexts of discovery is needed. We will consider both cemeteries and settlements and try to outline an overview of the anthropomorphic figurines. We would also discuss the lack of zoomorphic and male representations (with one notable exception mentioned above), fragmentation issues and the possible significance of the Hamangia anthropomorphic figurines according to context of discovery.

4 ON THE SOCIAL CONTEXT OF FIGURINE FRAGMENTATION AND DEPOSITION: INSIGHTS FROM THE CUCUTENI-TRYPILLIA SITE OF STOLNICENI

Terna, Andreea (Christian-Albrechts-Universität zu Kiel, Institut für Ur- und Frühgeschichte)

This paper explores the social significance of anthropomorphic figurines within the Cucuteni-Trypillia society during the first half of the 4th millennium BCE, by looking into the fragmentation and depositional practices at the site of Stolniceni in the Republic of Moldova. This period witnessed the development of so-called mega-sites, considered to have functioned on an egalitarian ideology and decentralized decision-making processes. The anthropomorphic figurines from this period exhibit a notable degree of morphological standardization and a prevalence of fragmented pieces over intact ones, sparking debate over the intentionality and symbolic meaning behind their breakage. However, little attention has been paid to the depositional context of the fragmented parts. By analysing the intra-site distribution of fragmentation patterns and preservation rates and then comparing the results with other type of finds, like zoomorphic figurines and ceramic vessels, we were able to identify specific practices in the deposition of anthropomorphic figurines. Particularly striking are the differences observed between residential households and the so-called mega-structures, the later considered to be integrative buildings linked to decision-making processes. Our findings suggest that these structures may have also served as site for figurine fragmentation, raising further questions about the political and social implications of this practice.

5 ANTHROPOMORPHIC FIGURINES IN NEOLITHIC AND COPPER AGE CONTEXTS: INSIGHTS FROM THE PIETRELE SITE, ROMANIA

Müller, Michael (free researcher)

This study presents findings from over two decades of excavation at the Neolithic and Copper Age site of Pietrele in the Lower Danube region of Romania, spanning from the late 6th to late 5th millennium BC. A total of 638 complete and fragmented anthropomorphic representations were unearthed, showcasing a diverse range of materials including burnt clay, bone, hard animal material, and marble, fashioned into various forms such as freestanding figurines, anthropomorphic vessels, applications, rattles, and ornaments.

Notably, figurines crafted from hard animal materials like bone, antler, and shell emerged in Southeastern Europe exclusively during the Copper Age, primarily associated with the KGK VI cultural groups in the Eastern Balkan peninsula. In contrast, burnt clay was also employed to fashion zoomorphic figurines within the same geographical and temporal framework, whereas hard animal materials were reserved exclusively for anthropomorphic representations.

While the figurines at Pietrele exhibited a widespread distribution within general activity zones of the settlement, differences in their states before deposition and their distribution suggest distinct object biographies for figurines made of different materials.

Of particular interest, alongside Copper Age artifacts on the settlement mound, Neolithic pottery sherds and figurines were also retrieved from certain layers in between the Copper Age settlement phases, prompting speculation regarding their origins. Subsequent discoveries of Neolithic settlement layers surrounding the Copper Age settlement mound, from which earth material for mound construction was sourced, support the inadvertent incorporation of Neolithic artifacts, including figurines, into the mound. It remains speculative whether the chance discovery of Neolithic figurines by Copper Age inhabitants influenced the depiction of their anthropomorphic representations.

This paper aims to explore not only the distribution and contexts of Neolithic and Copper Age anthropomorphic figurines at Pietrele but also to elucidate their potential relationship across the two epochs.

6 UNUSUAL OR DIFFERENT NEOLITHIC IMAGES: ALLUSIONS TO MATERIAL OR SOCIAL FACTS AND PHENOMENA?

Marangou, Christina (Independent researcher, Athens, Greece)

The parallel reality of Neolithic material objects imitating “real things”, which either exist in nature, or result from the anthropogenic production, includes several subjects on various scales, complete or partial, isolated, in compositions, or interconnected. Common themes, their originals presumably existing in the natural world or used in every-day life, include humans, animals, objects and structures, such as buildings, domestic appliances or equipment and watercraft. However, more rarely, uncommon, different, if not deviant, three-dimensional representations of beings, structures or/and objects may occasionally suggest particular or divergent morphologies, postures, actions, events or disorders. Attempts at their “readings”, considering potentially represented or related creatures, facts, or performances within their presumably associated contexts, inevitably depend on existing evidence of material traces. Moreover, if such evidence is scarce, as in the case of surface finds, available information deriving from their own or comparable chronological periods, cultures and social contexts may also be considered.

The present paper endeavours to discuss, under an anthropological perspective, possible research directions towards hypotheses for potential interpretations and meanings regarding rare Neolithic examples of such represented divergent entities. Considering that they could possibly embody real or fictional presences, occurrences, behaviours or practices, their interconnections with the associated natural, material and sociocultural environment are examined. Examples originate mainly from Greece and neighbouring regions.

7 MORE THAN MEETS THE EYE: SOMATOPERCEPTION THROUGH NEOLITHIC FIGURINES

Mina, Maria (University of the Aegean)

In the proposed paper anthropomorphic and zoomorphic figurines are approached through an interdisciplinary approach, which combines archaeology with visual psychology to explore perceptions surrounding humanness, animality, and social identity in the Greek Neolithic. Rather than accessing the ancient mind through the study of artefacts, it is suggested in reverse order that understanding initially the involvement of visual perception in the production and handling of figurines can elucidate prehistoric cognition. Visual perception is defined as a cognition process in which humans see an object (in this case human or animal bodies), incorporate it, and then organise it within their brain to process it mentally. It is argued, therefore, that Neolithic figurines as representations of human and animal bodies could generate perception of the self and other entities.

Within the framework of visual psychology, which is employed for the purposes of the study, Neolithic figurines are approached as bodily schemata (i.e., shorthand representations of what the human or animal form should appear like) which can elucidate the concepts associated with the producers’ own bodies (somatoperception), and the materialisation of the body schema in the form of clay models (somatopresentation). Far from assuming universal human or animal archetypes underpinned by neurological processes, it is emphasised that visual schemata are culturally and historically contingent and it is within their relevant context that we need to understand them. The exploration of select Greek Neolithic figurines through the principles of visual psychology may offer new insights into the way the collective identity and humanness were mentally constructed and materially expressed diachronically.

8 SHAPED, FIRED, DISCARDED, DEPOSITED IN THE RONDEL DITCHES. THE LARGEST EUROPEAN FIGURINE COLLECTION IN 3D, CT, PETROGRAPHY, USE-WEAR AND GIS

Kanáková, Ludmila (MUNI - Ústav archeologie a muzeologie) - Nosek, Vojtěch (MUNI - Ústav archeologie a muzeologie) - Tóth, Peter (MUNI - Ústav archeologie a muzeologie) - Kreiter, Attila (MUNI - Ústav archeologie a muzeologie)

A total of 370 fragments of female ceramic figurines were found on post-Linear Neolithic settlement site Těšetice–Kyjovice Sutny. During a narrow span of 4750–4500 BC figurines were manufactured, fired, used, and discarded. All figurines were found fragmented, and all fragments in one location were preserved in only two cases. The majority of fragments do not correspond to whatever else. Although some part of fractures might be caused by post-depositional destruction by waste accumulation processes on the settlement, many of them were intentional. The fragments were deposited mainly into the ditches of the rondel enclosure. Without speculations with regard to religion or symbolism, we analyse the level of variability in all steps of the figurine operational chain to clarify, if these steps were realised on individual, communal or up-communal level of activities and how then was the role of figurines in the settlement not only in the moment of acting with them, but in all steps of their life cycle. The Těšetice rondel enclosure is the unique rondel site associated with larger collection of figurines. Certain intersection of socially cohesive behaviour or activities then took place here, performed in rondel constructing and figurine operating.

9 LIVING FAUNA MADE OF CLAY? A COMPARISON OF ANIMAL BONE FINDINGS AND INTERPRETATIONS OF ZOOMORPHIC FIGURINES

Luckner, Julia (Institut fuer Ur- und Fruehgeschichte Kiel)

Zoomorphic figurines were a central component of Neolithic and Eneolithic Europe and probably also of everyday life. However, it is questionable to what extent they reflect reality and what significance they or what they represented had. Should they really be regarded as naturalistic depictions or are they purely imaginary? In order to clarify such questions, 285 zoomorphic figurines from the Starčevo-Körös-Criș, Vinča and Kodžadermen-Gumelnița-Karanovo VI cultural areas were examined in detail. In 72 cases from 18 different sites, the animal bone findings were compared with the animal species depicted as figurines. Among other things, it was investigated whether there is a correlation between the animal species depicted and the animal species found in the sites. Based on these results, an attempt was made to draw conclusions about the different meanings of the animal species. Furthermore, it was analyzed whether cultural or site-related trends can be identified and whether different or similar world views can be inferred from this.

10 CHALCOLITHIC FIGURINES: THE NATURAL FORM OF UNGULATE PHALANGES AS AN ANTHROPOMORPHIC SCULPTURE FROM THE BOTAI CULTURE, KAZAKHSTAN

Merts, Victor (S.Toraighyrov Pavlodar State University) - Usmanova, Emma (Saryarka Archaeological Institute, Buketov Karaganda University, Kazakhstan; Margulan Archaeological Institute, Almaty, Kazakhstan) - Zakharov, Sergey (Margulan Archaeological Institute, Kazakhstan) - Pleshakov, Anatoly (Kozybaev North Kazakhstan University) - Olsen, Sandra L. (Division of Archaeology, Biodiversity Institute, University of Kansas)

The Chalcolithic Botai culture of north Kazakhstan, (fourth millennium BCE), is known for its subsistence focus on horses. Among the most intriguing Botai artifacts are 63 decorated ungulate phalanges. Most were derived from horses, but two were from kulan and five probably

from saiga. An additional 16 have been retrieved from another Botai settlement, Krasnyi Yar. This study aims to interpret the significance of these ornate objects. Similar ones have a broad temporal and spatial distribution across Eurasia, but whether there are cultural connections is difficult to prove. Most likely, the naturally anthropomorphic form of the phalanges encouraged ancient artists far and wide to engrave designs on them that probably reflect clothing and female body features. During manufacture, a phalanx was first smoothed, then engraved with designs on the dorsal and volar surfaces that probably represent the neckline, belt and designs on a dress. The sides were incised with short horizontal notches that suggest the garment's side seams. Pattern compositions consist of four main elements: straight lines, diamonds, triangles and V-shapes. In the settlements, the phalanges were found in pits, between and inside houses. The

number of left phalanges was double those of right at Botai, which may have some mythological meaning associated with women. Versions of the symbolism of the decorated phalanges in the Botai community and communication network are proposed:

- ancestral idols that participated in various rituals, ranging from those of household to funeral and memorial or
- fertility symbols.

Whether there is a symbolic link between females and the animals chosen for these figurines is uncertain. Possibly the natural form of ungulate phalanges, regardless of species, made them candidates for these beautiful artifacts. Perhaps these idols were symbolic "texts" of a magical incantation related to a fertility cult in the form of the female image.

11 PREHISTORIC LADIES FROM NORTH MACEDONIA

Spirova, Marina (Archaeological Museum of Republic of North Macedonia) - Kolishtrkoska Nasteva, Irena (Archaeological Museum of Republic of North Macedonia (retired))

One of the characteristics of the Neolithic and subsequently Chalcolithic period in North Macedonia is the abundance of discovered terracotta figurines. They can be observed at all of the sites belonging to both of the periods. Most of them were excavated in buildings - houses, but they are also found in sanctuaries, where their presence as manifestations of belief is accompanied by other objects of the cult.

Their dimensions range from miniature to relatively large ones, 5-50 cm. The size is closely related to the place of their discovery within the home, the larger ones deserving the place closer to the fireplace. Furthermore, significant number of the representative female figurines are simultaneously depicting a house. In this way, we draw information about the architecture, as well as the tradition of honoring the woman-mother. On the other hand, through the figurines, we perceive the desire for dressing up. Thus, they offer a glimpse into the fashion trends of the said periods, as seen in the clothes, jewelry and hairstyles.

The time frame in which we discover them ranges from the 5th to the 3rd millennium BC (Neolithic/Chalcolithic).

12 TURNING WEST: ON THE DISAPPEARANCE OF FIGURATIVE REPRESENTATIONS IN NEOLITHIC WEST-CENTRAL EUROPE

Bristow, Rebecca (University of Copenhagen)

At the start of the fifth millennium BCE, as the central-european Linearbandkeramik culture (LBK) was broken down in smaller cultural groups, the traditional making of figurative representations was either transformed or radically abandoned. For thousands of years, these clay figurines and vessels representing humans and animals had been a hallmark of early Neolithic lifestyle. They were found in hundreds in Southeastern Europe during the sixth millennium and continued to be produced as the Neolithic reached Central Europe, although in smaller numbers. By the start of the fifth millennium BCE, however, figurative representations seem to have disappeared from west-Central Europe, or turned into highly abstract symbols. This dissolution of a thousand year old figurative tradition may have played a fundamental part in the broader cultural changes of fifth millennium Central Europe.

This paper discusses the end of the figurative tradition in west-Central Europe in the context of cultural continuity and change.

13 THE CHANGE FROM ANTHROPOCENTRIC TO ZOOCENTRIC FIGURAL REPRESENTATIONS IN NEOLITHIC CULTURAL CONTEXTS OF THE SOUTHWESTERN CARPATHIAN BASIN

Botic, Katarina (Institute of Archaeology, Zagreb, Croatia)

Among the finds of the first farming communities, which inhabited the southwestern periphery of the Carpathian Basin at the beginning of the 6th millennium BC, a modest number of anthropomorphic and zoomorphic figurines have been discovered. These figurines belong to the regional Starčevo cultural phenomenon, but are rarely published with the full context of the finds. They also belong to a supra-regional context, including possible fragmentary stands of monumental figurines as described by E. Bánffy in the context of the clay-dominated south-eastern/Balkan world. By the mid-6th millennium, the Starčevo cultural context declined and new ones appear, Vinča and Ražište. While in the Vinča context, anthropomorphic figurines and the so-called altars are fairly numerous, in the Ražište context they are missing, as well as zoomorphic ones. In this later context, figural representations appear on the vessel rims or on the body, but in a highly stylised form. Although called zoomorphic applications, these stylised heads also appear on figurines and so-called altars in the Vinča and Ražište contexts. The question arises why there was such an obvious change in the understanding and importance of the human body, or why the focus and form of presentation of the body changed during the 6th-5th millennia BC. This study provides an insight into the diversity of cultural contexts in which figurines and other objects appear, and analyses the possible transformative processes of the identity of these communities. Study is supported by Transformation of identities through the past (TIPS) Project funded by the European Union - NextGenerationEU.

72 BIOLOGICAL ANTHROPOLOGY INSIGHTS INTO BEHAVIORAL AND CULTURAL CHANGES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Crevecoeur, Isabelle (CNRS; Université de Bordeaux) - Brukner Havelková, Petra (Natural History Museum; Charles University) - Velemínský, Petr (Natural History Museum) - Varadzinová, Lenka (Charles University) - Varadzin, Ladislav (Czech Academy of Sciences)

Session format: Regular session

What triggers cultural and behavioral changes and to what extent can anthropological evidence be mobilized to understand the factors and the mechanisms underlying these transformations? Are the abrupt cultural changes in time and space that archaeologists capture in their records, including those in subsistence (foraging vs food-production) and settlement (mobility vs sedentism) strategies as well as those in raw material procurement and use (introduction of new components or technology, shifts in production and consumption), related to cultural diffusion, local adaptation, or population changes? These questions are central to archaeology regardless of the chronology or the geographic area.

This session aims at bringing together biological anthropology approaches and perspectives that tackle the questions of population continuity/discontinuity during cultural and behavioral change. Welcoming biochemical and morphometrical analyses with representative examples from worldwide contexts, we hope to stimulate exchanges about the various approaches that allow addressing the question of population change or stability, notably in contexts where ancient DNA data are not available or where biological anthropology approaches can be compared with a-DNA findings.

1 ASSESSING AFRICAN HUMID PERIOD POPULATION DYNAMICS USING MULTIPLE SKELETAL INDICATORS

Stojanowski, Christopher (Arizona State University)

The Holocene African Humid Period was a time of significant population movements that helped shape patterns of diversity we see throughout the Sahara and much of North Africa today. Emerging from thousands of years of relative isolation in Pleistocene refugia, hunter-gatherers likely re-entered the greening Sahara from multiple directions, creating complex patterns of interaction. Here, I present data from the central southern Sahara from the Gobero region of Niger. Excavations recovered over one hundred burials that date to between 9.6 and 4.5 thousand years ago with an occupational hiatus associated with the 8.2kya event. A robust dating program and taphonomic signatures that mark temporal horizons allows allocation of most burials to either the early or middle Holocene. In addition, the size of the Gobero assemblages allows a more population-based approach to assessing population history.

Data were collected on craniometrics, dentition, and postcranial metrics and compared to Late Pleistocene and early Holocene samples from possible refugia (primarily the Nile Valley and Maghreb). Results from different data types are not wholly consistent, but this may reflect gaps in the comparative sampling record. The early Holocene Gobero burials were craniometrically most similar to Maghrebi samples, were intermediate between North and sub-Saharan samples in terms of dental variation, and preserved more typical sub-Saharan African body proportions. Despite clear craniometric differences when comparing the early and middle Holocene burials from Gobero, dentition and long bone proportions are relatively similar between occupation phases. These results speak to the difficulties of identifying population continuity vs. replacement and the varying evolutionary or adaptive signatures that different skeletal modules may preserve.

2 INSTABILITY IN AN EARLY SEDENTARY CONTEXT: THE CONTRIBUTION OF BIOANTHROPOLOGY TO THE EXPLICATION OF NATUFIAN SOCIETY (NEAR EAST, 13000-9800 BCE)

Bocquentin, Fanny (CNRS UMR 8068 TEMPS) - Crevecoeur, Isabelle (CNRS UMR 5199 PACEA) - de Becdelièvre, Camille (AMU, CNRS, Minist Culture, UMR 7269 LAMPEA)

The Near East is characterized by early sedentism among hunter-gatherers who built the first durable hamlets ca. 15000 years ago. These Natufian communities evolved during approximately three millennia and gave birth to Neolithic socio-economic systems at the dawn of the Holocene. This general trend should not, however, conceal diverse cultural trajectories and possible transitory returns to mobile lifestyles. Among the three phases of development recognized so far (Early, Late, Final), the Late Natufian raises questions as to the linearity of the settlement process. During this phase, approximately linked to the Younger Dryas climatic downturn, territorial occupation clearly changed. Some sites were abandoned while others were used principally as cemeteries. Others again became smaller than before, and the sizes of dwelling structures were drastically reduced. Technical and symbolic productions continue the strong legacy of the previous culture, but funerary practices exhibit a sharp break, with collective management of the dead (gathered in the same funerary area or even in the same grave) superseding the kind of individual or family management strategies documented for the previous period. Although Natufian populations remained generally homogeneous through time, bioanthropological analyses of Late Natufian communities reveal that significant changes were also taking place. Using multivariate analyses on a large corpus of biological markers, and metric and morphological data, we will attempt in this presentation to interpret the differences observed and define whether they may relate to such apparent behavioural changes.

3 TRANSITIONS OF PHYSICAL BEHAVIOUR FROM THE LATER STONE AGE TO THE NEOLITHIC IN NORTHWEST AFRICA

Wylin, Glauke (Department of Archaeology, ArcheOs: Research Laboratory for Biological Anthropology, Ghent University) - De Groote, Isabelle (Department of Archaeology, ArcheOs: Research Laboratory for Biological Anthropology, Ghent University; Research Centre in Evolutionary Anthropology and Palaeoecology, Liverpool John Moores University) - Humphrey, Louise (Centre for Human Evolution Research (CHER), Natural History Museum London)

The shift from hunter-gatherers to food producing populations is regarded as one of the most profound and impactful human lifestyle transitions. This paper focusses on the Neolithic transition in Northwest Africa where it is characterized by three consecutive cultural groups: the Iberomaurusian, the Capsian and the Neolithic. Previous archaeological and genetic research has highlighted the multifaceted nature of the Neolithization process in this region as an interrelation of migrating population groups bringing with them herding practices and other innovations related to food production, together with long-term population continuity in which local groups adopted the Neolithic practi-

es. Nevertheless, due to the scarcity of bioarchaeological studies covering this time span, it remains enigmatic how this subsistence change affected human physical behaviour. To address this knowledge gap, this paper investigates changing patterns of habitual activity and mobility by using bone cross-sections to measure strength adaptations and reconstruct behavioural patterns. The results point to increased and more equal humeral strength in the Neolithic, indicating a shift from unimanual hunting activities to bimanual arm use for food processing or craft activities. The pattern of anteroposterior strengthening of the lower limbs in the hunter-gatherers, points to high mobility related to long-distance travelling. In the Neolithic population, there is an anomaly between the continuously strong femora arguing for a maintained mobility during herding practices and declining tibial strength suggesting a more sedentary lifestyle. This sudden morphological change may be the combined outcome of changed activity patterns alongside declining health and an altered gene-pool associated with the Neolithization process. These observations of both behavioural continuity and adaptations to new activities add a significant new perspective to our understanding of the impact of subsistence change on physical behaviour and confirm the dynamic nature of the Neolithization of Northwest Africa.

4 TOOTH DECAY AND WILD PLANT EXPLOITATION IN PLEISTOCENE HUNTER GATHERERS FROM MOROCCO

Humphrey, Louise (Centre for Human Evolution Research, Natural History Museum, London) - De Groote, Isabelle (Department of Archaeology, ArcheOs: Research Laboratory for Biological Anthropology, Ghent University) - Morales, Jacob (Departamento de Ciencias Historicas, Universidad de Las Palmas de Gran Canaria) - Barton, Nick (Institute of Archaeology, University of Oxford) - Bouzouggar, Abdeljalil (Institut National des Sciences de l'Archéologie et du Patrimoine, Rabat)

Grotte des Pigeons at Taforalt in Northeastern Morocco preserves a deep and well stratified sequence of Iberomaurusian (Later Stone Age) archaeological deposits dated from 23,000 to 12,600 cal B.P. The uppermost layers document a striking sedimentary transition at around 15,000 cal B.P, with the onset of a rapid accumulation of ashy midden layers signalling an intensification of human activity. Occupational deposits from the front of the cave preserve for systematic harvesting and processing of edible wild plants, including acorns and pine nuts, alongside exploitation of edible land molluscs and a continuation of hunting activities. This transition in occupational and subsistence behaviour coincided with the first use of the site for elaborate human burials in a spatially demarcated area towards the rear of the cave. Burials involve all age groups with a high proportion of infants. Skeletons preserve evidence of healed trauma and skeletal modification. The upper jaws are characterised by deliberate pattern of dental modification involving removal or one or both incisors. Analysis of oral pathology revealed a high prevalence of caries consistent with the archaeological evidence for increased reliance on plants food rich in fermentable carbohydrates and changes in food processing. Archaeological and skeletal evidence point towards a more sedentary lifestyle involving more prolonged occupation periods and/or a larger population. These changes may have been facilitated by progressive increase in temperature and humidity. There is no evidence for population discontinuity at Grotte des Pigeons but direct comparison of populations from the early and late Iberomaurusian is not possible due to the absence of human skeletal evidence from the earlier period.

5 EXPLORING ANCIENT ORAL MICROBIOMES DURING THE MESOLITHIC-NEOLITHIC TRANSITION IN FRANCE

Blunt, Sierra (Univ. Bordeaux, CNRS, Ministère de la Culture, PACEA, UMR 5199) - Bennett, E. Andrew (Chinese Academy of Sciences, Institute of Vertebrate Paleontology and Paleoanthropology) - de Belvalet, Harmony (Univ. Bordeaux, CNRS, Ministère de la Culture, PACEA, UMR 5199) - Mendisco, Fanny (Univ. Bordeaux, CNRS, Ministère de la Culture, PACEA, UMR 5199) - Pruvost, Mélanie (Univ. Bordeaux, CNRS, Ministère de la Culture, PACEA, UMR 5199)

In the last decade, the development of ancient metagenomics has considerably impacted our knowledge of past lives. Specifically, the study of dental calculus has become significant in this discipline, as it is rich in well-preserved microbial biomolecules and is common in the archaeological record. Variations in ancient oral microbiomes between chronologically and geographically distinct groups can be linked to diet, ecology, systemic and oral health, and population dynamics. Therefore, major cultural and demographic transitions can leave lasting traces in these microbial communities. For example, the transition from the hunter-gatherer economy of the Mesolithic to the agro-pastoral economy of the Neolithic are reflected in the oral microbiome through an increased abundance of both oral commensals and pathogens, the introduction of bacterial strains, and functional differences associated with starch and dairy consumption. While interdisciplinary evidence supports a generally gradual Mesolithic-Neolithic transition in the European region, studying the evolution of the human oral microbiome can contribute to our growing understanding of the Neolithisation process. However, current data regarding these shifts in present-day France is sparse, despite it being the convergence site of both the Danubian and Mediterranean migration routes. Here, we present our findings from the study of 72 ancient oral metagenomes from France dated from the Upper Paleolithic through

the late Neolithic. To determine how the transition to agriculture affected the oral microbiome, we examine changes in taxonomic composition and metabolic functions related to host diet and health. Additionally, the phylogenetic analysis of highly abundant taxa provides insight on the dispersal of microbial strains due to interactions between host groups. With these results, we discuss how ancient microbial metagenomics, when combined with archaeological and anthropological data, offers a unique perspective on cultural and behavioral changes in the past.

6 **CHANGING LAKE, COMPLEX STORY: SYNTHESIZING MULTI-PROXY EVIDENCE FOR HOLOCENE BIOCULTURAL CHANGE AROUND LAKE TURKANA, KENYA**

Sawchuk, Elizabeth (Cleveland Museum of Natural History, USA; Turkana Basin Institute, Kenya)

The Holocene archaeological record from the Lake Turkana Basin in northern Kenya evokes big anthropological questions about what triggers change and the diverse ways in which people respond. During the African Humid Period (AHP, ~15,000-5500 years ago), pottery-using fisher-foragers hunted with bone harpoons and buried their dead in beaches. As the AHP waned and Lake Turkana receded ~5000 years ago, domesticated animals and herding lifeways spread alongside new lithic and ceramic traditions. These changes coincided with the construction of megalithic “pillar site” cemeteries that are unique to the Turkana Basin and are the earliest-known examples of monumentality in eastern Africa. While it has long been assumed that cattle, sheep, and goats—and at least some cultural practices—were introduced through population movement(s) from northern Africa, many questions remain about identities and relationships among fisher-foragers and herders, and how interactions shaped (or didn't) contemporaneous behavioural shifts.

Over the past decade, bioarchaeological, palaeoenvironmental, and genetic research have massively contributed to this discussion, yet the story seems, if anything, more complicated than ever. We now know that lake levels fluctuated throughout the Holocene, and that mortuary patterns among both fisher-foragers and early herders were more complex than previously thought. Although efforts to extract ancient DNA from Turkana Basin sites have yet to be successful, recently published whole-genome data from other ancient foragers and pastoralists across eastern Africa hint at substantial admixture around this time. Rather than resolve debates about population continuity/discontinuity, new data raise further questions about human interactions and cultural syncretism underlying the mid-Holocene shift to food production. In this paper, I synthesize the current state of knowledge about Holocene biocultural change around Lake Turkana, discuss directions for future research, and reflect on archaeology's increasingly fine-scale view of major transformations in the past.

7 **WHO WERE THE FIRST FOOD-PRODUCERS OF THE NILE VALLEY? DOCUMENTING THE PAST POPULATION HISTORY THROUGH TEETH**

Martin, Nicolas (Univ. Bordeaux, CNRS, Ministère de la Culture, PACEA, UMR 5199, France) - Velemínský, Petr (Department of Anthropology, Natural History Museum, National Museum, Czech Republic) - Crevecoeur, Isabelle (Univ. Bordeaux, CNRS, Ministère de la Culture, PACEA, UMR 5199, France)

In the Nile Valley, transitioning from foraging to food-production occurred between the early 6th millennium BCE and the advent of the 5th millennium BCE, in a context of gradual climate change. From a biological point of view, this change in subsistence strategies was also accompanied by significant morphological variations, especially in the craniofacial region. Assumptions on whether this variation resulted from in-situ adaptation or population discontinuity have been debated for the past several decades. In this work, we analyzed dental remains from a large sample of individuals (n= 361) from Late Paleolithic to Neolithic sites in the Nile Valley. We measured mesiodistal and buccolingual crown dimensions of the whole dentition in these individuals. Using microcomputed tomography, we also analyzed dental tissue proportions and enamel thickness patterns of the U11, UM1 and UM2. Furthermore, the enamel dentine-junction (EDJ) of the first and second upper molars were submitted to a geometric morphometric analysis through a surface deformation-based and landmark-free method. The results highlighted significant differences in tooth size apportionment, dental tissue proportions, enamel distribution patterns and EDJ shape between the last hunter-gatherers and first food-producers. We suggest that such substantial shift in crown dimensions, at both the outer and inner levels and in EDJ morphology, cannot be related to an in-situ adaptation or morpho-functional adaptation scenario. On the contrary, we suggest that this is consistent with some level of biological discontinuity. Our results also highlight regional biological variability among the Neolithic food-producing populations, differentiating Central Sudanese from Nubian groups. All of these data contribute to a better understanding of the emergence of food-production in the Nile Valley and suggest complex scenarios of migrations rather than cultural diffusion.

8 **EXPLORING THE INDIVIDUAL AND COLLECTIVE EXPERIENCES OF THE MESOLITHIC AND NEOLITHIC TRANSFORMATIONS, DIRECT BIOANTHROPOLOGICAL INSIGHTS FROM THE CENTRAL BALKANS**

de Becdelievre, Camille (AMU, CNRS, Minist Culture, UMR 7269 LAMPEA)

With a continuous Early to Middle Holocene sequence of occupation (ca 9500 – 5500 BC) and a broad number of contextualised bioanthropological remains (>500 individuals; > 300 radiocarbon dates), the region of the Danube Gorges (Central Balkans) is a key archaeological complex to further our understanding of Mesolithic foragers' mobility patterns, to document a pre-agricultural trajectory toward sedentism, to tackle the issues of Mesolithic - Neolithic interactions and of farming dissemination, or to explore the dynamics of the Neolithic Demographic Transition. During the last 25 years, a substantial number of research has harnessed bioanthropological data with a wide range of methodologies to refine the chrono-cultural frame of human behavioural transformations (e.g. radiocarbon dates), to reconstruct subsistence and dietary adaptations (e.g. stable isotopes), biological affinities and population interactions (e.g. epigenetic and non-metric variations, body proportions, aDNA), mobility and migrations (e.g. strontium radiogenic evidence), experienced physiological and biomechanical stress (e.g. skeletal markers of health status, bone functional adaptations and alterations), violence and injuries. The combined interpretations of these datasets with spatial and contextual information about mortuary practices (e.g. corpses treatment) or joint cultural evidence (e.g. adornments) may shed some lights on the behavioural mechanisms beyond the subsistence transition, processes of social social transformations or cultural transmission patterns. In this paper, we synthesize these different lines of evidence – external or virtual morphological and metrics, biomolecular and mortuary – at different scales from the grave to the region, from the individual to the population, from the time of experienced events to the duration of social memory in order to reconstruct the biographic and collective narratives behind the Mesolithic and Neolithic transformations and to decipher the effects and the consequences of behavioural innovations, ecological transformations, biological adaptations and population changes.

9 **ECHOES FROM AFAR: CULTURAL TRANSFORMATIONS DURING THE TRANSITION TO AGRO-PASTORALIST SOCIETIES IN THE HORN OF AFRICA (3RD MILLENNIUM BCE)**

Maréchal, Laura (Laboratory of African Archaeology and Anthropology, University of Geneva, Geneva, Switzerland; Université Toulouse Jean Jaurès, CNRS, TRACES - UMR5608, Toulouse, France; Univ. Bordeaux, CNRS, Ministère de la Culture, PACEA - UMR 5199, Pessac, France) - Hérouin, Stéphane (Direction de l'archéologie - Chartres métropole, Direction générale adjointe Aménagement et Développement, Chartres, France) - Desideri, Jocelyne (Laboratory of African Archaeology and Anthropology, University of Geneva, Geneva, Switzerland) - Mologni, Carlo (Université Côte d'Azur, IRD, CNRS, Laboratoire Geoazur - UMR7329, Valbonne, France) - Cauliez, Jessie (Université Toulouse Jean Jaurès, CNRS, TRACES - UMR5608, Toulouse, France)

During the Neolithic transition in the Horn of Africa (5th–3rd millennia BCE), several evidences point towards an increasing social complexity, from the diversification of trade networks to an economy of deferred return implying rules for controlling and sharing resources, through the cultural variability reflected in the plurality of ceramic technical traditions. Among these evidences is also the development of funerary monumentalism, reflecting willingness to commemorate the deceased while demonstrating political and/or economic power. However, beyond this meaningful insight provided by the material culture, our knowledge on the identity of the first agro-pastoralists in the Horn of Africa, both in terms of biological diversity and symbolic thought, remains scarce.

To refine our understanding of the terms and mechanisms of the transition from a hunter-gatherer to an agro-pastoralist lifestyle in this geographical context, we conduct a bioanthropological study on the site of Antakari 3 (Gobaad basin, Republic of Djibouti) (2848-2475 cal. BCE), combining the study of both the funerary practices and the morphological variability of the human groups buried in this funerary site. We here present the first results of the osteological study of the skeletal remains of 155 individuals. Through the burial space management, the biological affinities, the cultural practices and the successive phases of use of the necropolis, we propose a first insight into the identity of these populations. To further address the integration of these groups into the evolutionary history of the region - and in absence of ancient DNA data - we then present an ongoing morphometrical analysis on dental remains. We conclude by presenting future prospects to better characterize, through morphological diversity quantification, the identity, settlement processes and local adaptation of these populations during the Neolithic transition.

BIOARCHAEOLOGICAL RESEARCH OF THE IRON AGE POPULATIONS OF THE CARPATHIAN BASIN - PAST, PRESENT, AND FUTURE

Gyenesei, Katalin (Eötvös Loránd University, Doctoral School of Biology; Hungarian National Museum, National Institute of Archaeology) - Szeniczey, Tamás (Eötvös Loránd University, Department of Anthropology) - Czifra, Szabolcs (Hungarian National Museum, National Institute of Archaeology) - Hrabák, Zita (Hungarian National Museum, National Institute of Archaeology; University of Szeged, Doctoral School of History) - Gémes, Anett (Eötvös Loránd University, Doctoral School of Biology) - Hajdu, Tamás (Eötvös Loránd University, Department of Anthropology)

The Iron Age (IA) of the Carpathian Basin (CB) is characterised by significant changes which began in the 10th century BC and lasted until the 1st century AD.

Transdanubia was inhabited by the bearers of the Hallstatt culture in the Early and Middle Iron Ages (EIA and MIA); meanwhile, at the foothills of the Northern Hungarian Mountain Range and at the Great Hungarian Plain (GHP), the Mezőcsát and later the Vekerzug populations lived. The appearance of Celtic groups in the Late Iron Age (LIA) transformed the whole CB. Interestingly, IA burial rites show remarkable heterogeneity. The Hallstatt, as well as some of the Vekerzug and Celtic groups, cremated their dead, whilst the Mezőcsát population, several of the Vekerzug and Celtic people, inhumated the deceased.

The IA of the CB is notable for several population movements, mainly described using historical sources and archaeological observations; but there are limited anthropological studies. Thus, the aim of our ongoing research is to revise previous studies and expand our understanding of the IA populations of the CB by introducing new osteological materials.

Due to their burial practice, the Hallstatt groups are considered almost anthropologically unknown. As for the Mezőcsát and Vekerzug cultures, the question arises whether they descended from the local Late Bronze Age inhabitants adapting lifestyle and some characteristic artefacts from the steppe region or did an eastward influx of populations during the EIA and MIA partially or fully assimilated the autochthons. The Celtic migration is also recognizable in the heterogeneous LIA osteological materials, however, according to previous and recent results, the local component remained more dominant.

This project is supported by the Bolyai Scholarship, the New National Excellence Program (ÚNKP-23-5, ÚNKP-23-3-SZTE-61), project no. 405906 of the HNM NIA, the grant of the Hungarian NRD Office (FK128013), and project no. C2284509 KDP-2023.

ESTABLISHING A SOCIO-POLITICAL BIOARCHAEOLOGY IN HISTORICAL TIMES: IMPACTS OF STATUS-QUO TRANSITIONS ON LIFEWAYS AND DEATHWAYS IN THE MEDITERRANEAN SOUTHERN EUROPE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Michael, Dimitra (Laboratory for Interdisciplinary Research in Archaeology, (L.I.R.A.), School of History and Archaeology, Faculty of Philosophy, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece) - Karligkoti, Anna (Science and Technology in Archaeology and Culture Research Centre, The Cyprus Institute, Nicosia 2121, Cyprus) - Nikita, Efthymia (Science and Technology in Archaeology and Culture Research Centre, The Cyprus Institute, Nicosia 2121, Cyprus) - Triantaphyllou, Sevi (Laboratory for Interdisciplinary Research in Archaeology, (L.I.R.A.), School of History and Archaeology, Faculty of Philosophy, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece)

Session format: Regular session

Human history is characterized by repetitive cycles of socio-political transitions. The establishment and collapse of major political and economic entities, such as the Roman Empire, the processes of colonization and decolonization throughout the globe and in the Mediterranean southern Europe in particular, societies transitioning between political systems, such as oligarchy or monarchy or democracy, are just a small glimpse of the complex transformations that human populations have faced throughout history. Such status-quo changes often have significant implications for human health, dietary patterns, mobility/migration, physical activity, social organization, gender relations and mortality practices. Many of the changes observed in the above dimensions are frequently associated with structural violence and intersectionality.

Bioarchaeologists are uniquely equipped to examine such impacts by placing the human body and the burial environment at the center of enquiry. Aiming to better comprehend the varied responses to status-quo transitions we invite bioarchaeologists of diverse expertise (e.g. human, animal and plant remains) to share methodological and theoretical advancements for the sub-discipline of socio-political bioarchaeology. We are particularly interested in case-studies that incorporate literary sources, material evidence and bioarchaeological approaches; combine macroscopic with bi-

omolecular analyses; focus on health inequalities under the prism of possible social, gender, age or ethnic inequities; employ experimental bioarchaeological approaches to study human cremations or patterns of conflict; implement multi-proxy methods to address complex issues such as heterogeneous frailty and the osteological paradox. We are interested in both regional case-studies focusing on a single transition or on multiple socio-political changes, as well as wider comparative investigations.

We hope that this session will generate a productive dialogue between scholars of different research foci, offering insights that could inform us about similar transitions that people face in the world today.

ABSTRACTS

1 THE SICTRANSIT PROJECT 2016-2024. TRANSITIONS IN ECONOMY AND SOCIETY IN EARLY MEDIEVAL SICILY, FIFTH TO THIRTEENTH CENTURY; A BIOARCHAEOLOGICAL STUDY

Carver, Martin (University of York) - Molinari, Alessandra (University of Rome Tor Vergata) - Fiorentino, Girolamo (University of Salento at Lecce)

The aim of the Sictransit project was to study the material lives of Sicilian farmers, merchants and their families over seven hundred years of the Middle Ages (550-1250). During this period the country was governed successively by Byzantine, Islamic, Norman and Swabian rulers, but our interest lay primarily with the people that history seldom mentions, those who farmed the land, grew, made, sold and delivered its produce, lived, worked, married and died in its villages and towns. Who were these people, how mobile were they and how did they fare in good times and bad? Some were Christians, some were Muslims, others Jews – how far did the people of different faiths intermingle? What made Medieval Sicily a peaceful and affluent or a turbulent and belligerent society?

These questions are important today as we face the widespread movement of refugees, issues of religious tolerance and political and economic insecurity. Medieval Sicily provides a proving ground for their investigation: a large fertile island located between continental Europe, North Africa and West Asia, it was open to influences and predation from each quarter.

Our objectives were to combine history, archaeology, bioarchaeology and biomolecular archaeology to investigate life in town and country, agriculture, diet, trade, mobility and spirituality in the four successive regimes. The development of a joined up synthesis, interweaving the results from different disciplines and understanding the significance of when they converged or diverged, was not simple. It has engaged our team and presents an important challenge for the future.

This presentation draws on the research of the SICTRANSIT team, OI Craig, Michelle Alexander, Nathan Wales, Léa Drieu, Jasmine Lundy, Alice Ughi, Aurore Monnereau, Madeleine Hummler, Veronica Aniceti, Derek Hamilton, Paola Orrechioni, Antonino Meo, Francesca Colangeli, Fabio Giovannini, Gabriele Ciccone, Milena Primavera, AnnaMaria Grasso. For list of publications see <http://sicily-in-transition.org>.

2 SEX, SURVIVAL, AND THE FALL OF THE ROMAN EMPIRE: GENDERED DIFFERENCES IN STRESS AND MORTALITY IN LATE ANTIQUE GAUL

Quade, Leslie (Austrian Archaeological Institute)

Late Antiquity (c. 300-700 CE) has often been conceptualized as a period of socio-political rupture marked by the collapse of the Western Roman Empire and the transition to the Medieval period. The impact of this transition on health and well-being has not yet been thoroughly explored, including considerations of potentially gendered health consequences. This research examines how transitions occurring during Late Antiquity affected stress, health and mortality in Roman and Late Antique males and females from Gaul. The skeletal remains of 410 adult individuals are assessed for mortality and survivorship through age-at-death distributions and Kaplan-Meier survival analysis, as well as macroscopic and biochemical skeletal stress markers, including dental enamel hypoplasia and concentrations of the 'stress' hormone cortisol in teeth.

Results demonstrate an overall similarity between time periods and the sexes in the frequency of dental hypoplastic defects and cortisol concentrations. Because these indicators reflect stress and health during childhood, this suggests that transitions in Late Antiquity were not differentially affecting males and females in early life stages. However, significant differences were identified in mortality (age-at-death) and survivorship over time between Roman and Late Antique burial populations, with female mortality notably affected. Adult females were more likely to die in early adulthood (18-35 years) than males in Late Antiquity, and both males and females in the Gallo-Roman period. Environmental shifts, trade localisation, and sociocultural changes in Late Antiquity could have placed new pressures on existing systems of structural inequalities, resulting in increased female mortality in early adulthood.

3 HELLENISTIC BIOARCHAEOLOGY: WHAT DO WE KNOW, WHAT QUESTIONS ARE STILL PENDING AND HOW DO WE ANSWER THEM?

Nikita, Efthymia (The Cyprus Institute)

This presentation focuses on the state-of-the-art in Hellenistic period (4th -1st c BCE) bioarchaeology. This period has been characterized by flourishing cultural exchanges, scientific and artistic innovations, as Greek cultural influence expanded across the Mediterranean and beyond. At the same time, the Hellenistic period witnessed serious political turmoil as the dominance of the Greek civilization reached its end while a new power, Rome, started emerging. As will be demonstrated, despite the cultural and political interest that this period exhibits, the bioarchaeological information available regarding its citizens and how they experienced being part of the Hellenistic world is scant. This presentation will offer an overview of this limited information, shedding some light on the dietary patterns, mobility and health (physiological and mechanical stress) of these individuals. Importantly, it will highlight the existing gaps in our knowledge, especially compared to earlier and later historical periods, and it will propose theoretical and analytical ways forward. The research on which this presentation is based has been conducted in the context of the MetaMobility Project.

4 INVESTIGATING THE IMPACT OF MULTIPLE AND CONSECUTIVE STATUS-QUO TRANSITIONS ON HUMAN LIFEWAYS IN ANCIENT AMPHIPOLIS

Michael, Dimitra (Laboratory for Interdisciplinary Research in Archaeology (L.I.R.A.), School of History and Archaeology, Faculty of Philosophy, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece) - Snoeck, Christophe (Archaeology, Environmental Changes and Geo-Chemistry, Vrije Universiteit Brussel, AMGC-WE-VUB, Pleinlaan 2, 1050 Brussels, Belgium) - Tselekas, Panagiotis (Laboratory for Interdisciplinary Research in Archaeology (L.I.R.A.), School of History and Archaeology, Faculty of Philosophy, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece) - Sverkos, Ilias (Laboratory for Interdisciplinary Research in Archaeology (L.I.R.A.), School of History and Archaeology, Faculty of Philosophy, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece) - Malamidou, Dimitra (Ephorate of Antiquities of Serres, Ethnikis Antistasis 48, 62122 Serres, Greece) - Triantaphyllou, Sevi (Laboratory for Interdisciplinary Research in Archaeology (L.I.R.A.), School of History and Archaeology, Faculty of Philosophy, Aristotle University of Thessaloniki, Thessaloniki 54124, Greece)

Experiencing different socio-political regimes is considered to shape the human body, in biological as well as in cultural terms. Historical knowledge of various types of political systems and aspects of social hierarchies can offer the capacity to actually measure how different regimes may impact on human health and lifestyle from the less privileged individuals to the most favored “elite” groups in a society. The BIOSOCIOPOLIS project, funded under a Marie Skłodowska-Curie frame, aims to develop a new interpretive model to reveal the extent to which multiple and consecutive socio-political transitions, affect human lifeways and deathways, in a diachronic perspective. Amphipolis in northern Greece, experienced many different political models, including colonization, political autonomy, consolidation and imperialization (5th c. BC-2nd c. AD) and was thus chosen as an ideal case study. A well-contextualized sample from the inhumation burials of the diachronic cemeteries of Amphipolis has been selected on the basis of representation for the time period as well as for the diverse mortuary evidence linked to “elaborate” and “modest” burial features. As Amphipolis moved from an autonomous entity to participatory in a political network and eventually to a provincial subject of an empire, it passed from a state of managing its resources for its own benefit to serving the needs of others. This could theoretically affect various parameters of social organization and reflect consequently to the general well-being and physical strenuousness. To test this hypothesis, physiological stress and oral health indicators, traumatic lesions and activity patterns are being recorded, and will be presented in relation to age, sex, time period and contextual data (burial types and artifactual evidence). This approach, which is completely novel for historical populations of the broader region of northern Greece, is expected to induce significant progress, both on a methodological level, as well as for humanities in general.

5 SEX-RELATED DIFFERENCES AND SOCIAL STRATIFICATION IN HELLENISTIC/EARLY ROMAN MENAINON, SICILY

Caruso, Antonio (The Cyprus Institute) - Nikita, Efthymia (The Cyprus Institute)

Historical sources are polarized when describing the place that men and women occupied in the Greco-Roman society, with the latter apparently suffering important inequalities in terms of food access, occupation and health in general. However, such sources are characterized by a male elitism bias and tell us the story of a wealthy minority living in large urban settlements. Instead, the vast majority of the people lived in rural settings or smaller communities, and have been largely neglected by both ancient historians and, until recently, modern bioarchaeologists. This work aims at shedding light into male-female inequalities in the rural community of Menainon during the Hellenistic/early Roman period. The Hellenistic period in eastern Sicily marks an important transition of the political power; whereas the island started as a focus point of the great Greek colonization, it evolved into the first Roman province. Within this

framework, osteoarchaeological methods have been used in combination with historical and archaeological sources to explore differences and inequalities of lifestyle between males and females. Specifically, the analysis of diet (dental diseases, stable isotopes), occupation (activity-related skeletal changes) and health (non-specific stress markers) has been used to test to what extent the historical record represents the “marginalized” communities living in rural areas.

6 INVESTIGATING THE IMPACT OF SOCIOCULTURAL TRANSFORMATIONS ON HEALTH QUALITY IN A BIG CITY. THE POPULATION OF THEBES DURING CLASSICAL ANTIQUITY

Karligkioti, Anna (The Cyprus Institute; American School of Classical Studies at Athens) - Aravantinos, Vasilios (Ephorate of Antiquities of Boeotia, Hellenic Ministry of Culture and Sports) - Charami, Alexandra (Ephorate of Antiquities of Boeotia, Hellenic Ministry of Culture and Sports) - Nikita, Efthymia (The Cyprus Institute)

During Classical Antiquity, central mainland Greece was characterized by important historical events that shaped the Greco-Roman world. In particular, the turbulent history of the region was marked by a series of major wars, the formation of alliances, as well as economic and cultural prosperity and decline. Boeotia played an active role in the aforementioned events, while its capital, Thebes, was one of the main powers in the region until its destruction by Alexander the Great in 335 BC. Since then the area remained under the influence of the Macedonians until its occupation by the Romans in the 2nd century C.E.

The above social, political and economic changes had a great impact on the inhabitants of the area. As such, they offer an ideal context for examining health levels and lifestyles in Boeotia over time. Although Classical Antiquity in Greece has been thoroughly studied in relation to both its history and archaeology, bioarchaeological studies of historical period assemblages are extremely few, with only three focusing on Boeotia. Specifically, two concern the population of Akraifeia (Nikita et al. 2019, Tritsaroli 2017) and one concerns the population of Agia Triada (Michael et al. 2017).

The current work examines how socio-political changes affect demography, health, diet and activity and aims to identify variations in relation to biological sex and social stratification during classical antiquity, through the study of human skeletal remains found in the northeastern cemetery of Thebes.

7 EMBODIED DIFFERENCES IN ADULTHOOD STRESS AND MORTALITY BY SEX AND HISTORIC PERIOD (ROMAN IMPERIAL AND BYZANTINE PERIODS) AT OYMAĞAÇ-NERIK, TURKIYE

Marklein, Kathryn (Department of Anthropology, University of Louisville; Center for Archaeology and Cultural Heritage, University of Louisville) - Deurell, Sara (Department of Anthropology, University of Louisville; HMB Professional Engineers (Archaeology Division))

The historical narratives of empires, their “rises” and “falls,” are generally reconstructed from the archaeological or literary remnants of geopolitical “cores” and peoples within. While important for understanding sociopolitical transitions, these narratives are not reflective of all local and regional experiences and responses to geopolitical change. Examining human skeletal remains, in tandem with archaeological, zooarchaeological, and paleobotanical data, provides a comprehensive reconstruction of sociopolitical transitions, especially in rural areas, which are oftentimes underrepresented in historical records. In this study, we interrogate the consequences of a political transition, from the early Roman Empire (c. 0-400 CE) to the Byzantine Empire (c. 500-900 CE), on a rural community in northern Anatolia (Oymağaç-Nerik, Samsun province). First, we examine overall changes in mortality (age-at-death distributions) and adulthood morbidity (antemortem fracture, osteoarthritis, and tibial periosteal new bone formation) occurring in this agricultural community, then situate these diachronic findings regionally within other late Roman/Byzantine populations in Anatolia and broadly within contexts of famine, plague, and war. We subsequently compare rates of fracture, osteoarthritis, and tibial periosteal new bone formation in estimated adult females and males between periods to identify differentially-embodied experiences correlated with phenotypic sex. Overall, this case study provides an opportunity to assess how rural communities may have been impacted by the transformation of the Eastern Roman Empire and contributes to ongoing archaeological and bioarchaeological studies examining the causes and consequences of imperial “falls.”

8 THE TRANSITION FROM MUSLIM WORLD TO PORTUGUESE KINGDOM IN SOUTHERN PORTUGAL (11TH-13TH CENT.)

Maurer, Anne-France (Hercules Laboratory and IN2PAST, Universidade de Évora, Portugal) - MacRoberts, Rebecca (Hercules Laboratory and IN2PAST, Universidade de Évora, Portugal) - Lopez-Aceves, Judith (School of Archaeology and Ancient History, University of Leicester, UK) - Ortega-Gonzalez, Alvaro (School of Archaeology and Ancient History, University of Leicester, UK) - Valente, Maria Joao (Universidade do Algarve / CEAACP, Portugal) - Fernandes, Teresa (Research Centre for Anthropology and Health (CIAS), University of Coimbra, Portugal; Departamento de Biologia. Escola de Ciências e Tecnologia. Universidade de Évora) - Teixeira, Joao (Australian Centre for Ancient DNA, School of Biological Sciences, University of Adelaide, Adelaide, SA, Australia; Centre for Interdisciplinary Studies (CEIS20), University of Coimbra, Coimbra, Portugal; Evolution of Cultural Diversity Initiative, The Australian National University, Canberra, ACT, Australia) - Schöne, Bernd R. (Institute of Geosciences, University of Mainz, Germany) - Oliveira, Luis Filipe (Universidade do Algarve / I.E.M-FCSH-Nova, Portugal) - Tete Garcia, Cristina (Comissão de Coordenação e Desenvolvimento Regional do Algarve, CEAACP / Universidade do Algarve, Portugal)

The TRANSCULTURAL project, developed between 2018 and 2022, conducted multi-disciplinary research to study the remains of different medieval Portuguese communities. The aim was to enhance comprehension of the transition from the Muslim to the Christian period during the emergence of the Portuguese Kingdom. The objective was to complement existing historical and archaeological sources for this period of economic and political transition, which continues to be inadequately understood. Specifically, the project aimed to explain the repercussions of this transition on different social groups, their coexistence, and their intercultural dynamics.

This presentation will showcase the mobility patterns observed among the last Muslims buried in Loulé prior to its conquest by the Christians, and the first Christians buried in Cacela-a-Velha after the conquest of this fortified village by the Order of Santiago (both sites located in Algarve, southern Portugal). These patterns are deciphered through the analyses of the biogeochemical composition of skeletal remains (bone $\delta^{34}\text{S}$, tooth enamel $\delta^{18}\text{O}$ and $87\text{Sr}/86\text{Sr}$), as well as of some botanical samples. Utilizing a machine learning methodology in tandem with probability assignments, and integrating genomic, archaeological, anthropological and historical datasets, our objective was to elucidate the complexities of this transitional period and the dynamics of conquest in the southwestern region of Iberia.

76 EXPLORING SOUNDS AND MUSIC IN ARCHAEOLOGICAL LANDSCAPES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Díaz-Andreu, Margarita (ICREA; Departament de Història i Arqueologia, Universitat de Barcelona (UB); Institut d'Arqueologia (IAUB)) - Dordevic, Zorana (Departament de Història i Arqueologia, Universitat de Barcelona (UB); Institut d'Arqueologia (IAUB)) - Kopij, Kamil (Instytut Archeologii, Jagiellonian University) - Kumbani, Joshua (Departament de Història i Arqueologia, Universitat de Barcelona (UB); Institut d'Arqueologia (IAUB))

Session format: Regular session

Although past soundscapes have increasingly captivated the attention of researchers in recent decades, their exploration still significantly lags behind the study of the indoor acoustics of ancient monuments and sites. Therefore, this session aims to serve as a platform to stimulate discussion regarding the role of sound and music in past landscapes. It encompasses a diverse range of themes including music archaeology and archaeoacoustics, the social significance of sound, and heritage preservation.

As objectives the session proposes, first, to induce conversation concerning the acoustic characteristics of archaeological sites and past soundscapes, and of the musical instruments and other sound devices such as animal call tools played in the open air. In this context, we warmly welcome papers focusing on emerging technologies that facilitate the analysis of sound behaviour in outdoor environments. To foster a dialogue on the social significance of sound beyond enclosed spaces is the session's second objective. A related topic to discuss is how communities may have employed specific acoustic features of particular areas to evoke a sense of identity. Also, the artistic representation of sound and musical instruments within past landscapes may be considered as a debate topic. Thirdly, this session endeavours to facilitate the exchange of ideas regarding the preservation of endangered past soundscapes. Finally, this session seeks to provide some insights on the difficulties encountered by the interdisciplinary nature of the field of archaeoacoustics in which, in addition to archaeologists, scholars also include acoustic engineers, musicologists, soundscape specialists, anthropologists, art historians and heritage experts.

This session is organized by the Artsoundscapes, Cult-Aural and Acoustics and proxemics of 'contiones' projects and it is open to everyone.

ABSTRACTS

1 THE SONG OF LOA. REFLECTIONS ON SOUNDSCAPE INFLUENCE IN ROCK ART OF LOA MEDIO

Candela, Jose (University of Chile)

Chile is a particular South American country. Its extended, narrow territory contains climatic environments ranging from tundra to desert climates. In the middle of the Atacama Desert, we find the Loa River, the longest river in Chile, with an extension of 440 km. Despite its hydrographic basin of 33,570 km², the Loa has a relatively low flow rate due to the desert characteristics of the area. However, this did not impede it from becoming the axis of the development of the Atacama society for several centuries. This paper attempts to seek influences from the soundscape of this river in the rock art survey of the Loa Medio from an enactive and embodied perspective. To do this, we will review the sound characteristics of the Loa in the location of Santa Barbara (3,000 meters above sea level) - a rural area located at the foot of rock art of the Loa Medio - analyzing how this specific soundscape may have informed the in site artistic practices and their results. I propose that this review will allow us to better know and understand, from a sensitive perspective, how this type of ancient art was generated.

2 BEYOND THE MOVE: A SYSTEMATIC ANALYSIS OF DANCE SCENES IN THE ROCK ART OF ZIMBABWE AND SOUTH AFRICA

Kumbani, Joshua (Institut d'Arqueologia UB (IAUB), Universitat de Barcelona; Departament de Història i Arqueologia, Universitat de Barcelona) - Díaz-Andreu, Margarita (Institució Catalana de Recerca i Estudis Avançats (ICREA); Institut d'Arqueologia UB (IAUB), Universitat de Barcelona; Departament de Història i Arqueologia, Universitat de Barcelona)

Dance is an activity intimately connected to music and sound, typically performed outdoors. It holds a social significance that extends well beyond mere entertainment, but it does not exclude it. In this paper, we aim to focus on dance within the archaeological record of southern Africa, specifically exploring dance scenes depicted in rock art sites. For the last three decades the depictions of dances in South African rock art have been associated with the medicine or trance ceremony, but a thorough study is needed to confirm this association. Moreover, in our paper we would like to conduct a comparative analysis of the recorded dance scenes from South Africa with others from Zimbabwe, to explore whether there are regional differences in the way dances are portrayed and their potential function. Attention will be focused on the gender of the figures, the dance postures, costumes, and all associated paraphernalia.

This work comprises a comprehensive review of dance scenes found in both published and unpublished literature, as well as a search of the SARADA database, with a specific focus on dance in the rock art of Zimbabwe and South Africa. Through the examination of these dance scenes, the study aims to reveal the socio-cultural dynamics of past hunter-gatherer groups who created the art. The anticipated identification of both similarities and differences in dance depictions can provide insights into the ceremonial and recreational practices of these ancient communities.

This article is part of the ERC Artsoundscapes project (Grant Agreement No. 787842) that has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme. PI: Margarita Díaz-Andreu.

3 ETHNOARCHAEOLOGY AND ARCHAEOACOUSTICS: SEVEN CUP-MARKED SOUNDING ROCK SITES IN THE HIGHLANDS NORTH TO THE GREDOS MOUNTAIN RANGE, SPAIN

Jiménez Pasalodos, Raquel (Universidad de Valladolid)

Within the framework of an ethnoarchaeological survey focused on identifying seven acoustically significant rocks and rock outcrops in the landscape of various areas on the north face of the Gredos mountain range, in the provinces of Ávila and Salamanca (Spain), a compelling long-term cultural phenomenon has emerged. This phenomenon involves the utilization of natural rocks for sound production, resulting in distinct cup-marks on the rock surfaces.

This paper aims to provide an initial exploration of seven archaeoacoustical sites exhibiting these features. It will introduce the methodologies employed during the identification of these sites, propose a classification, and endeavor to explain the acoustic phenomena involved. Notably, these phenomena cannot be solely attributed to the lithophonic properties of the rocks. The paper will also delve into the potential association of these acoustic features with ancient practices. This archaeoacoustical approach is founded on the methodologies developed under the ArtSoundscapes research project, supported by the European Union's Horizon 2020 research and innovation programme ERC, under grant agreement No 787842.

4 **CLAY - SHAPE - SOUND, WHAT'S SO RATTLING? NEW RESEARCH PERSPECTIVES ON CERAMIC RATTLES FROM PRESENT-DAY POLAND**

Taton, Katarzyna (Doctoral School of the University of Rzeszów)

Ceramic rattles are quite simple sound tools. They have been known since the Neolithic – when clay became a popular raw material for making objects of everyday use. Although they are not present in today's Polish folk musical instruments, there were periods of their great popularity here. Currently, there are more than 1200 preserved ceramic rattles or their fragments. Many of them are still capable of producing the sound.

As archaeological objects, rattles are subject to contextual and material examination using the latest research techniques, such as petrography and computed tomography. However, rattles are also sound tools and modern methods also include archaeometric sound research, i.e. in-depth analysis of the structure of their spectrum, but also numerical modeling with reverse engineering methods. This allows for the detection of momentary features, often impossible to capture in an auditory assessment. The hitherto unknown phenomena, like presence of ultrasounds or the existence of groups-types of sounds, are therefore revealed. The observations will shed some light on the acoustic landscape in which the constructors of rattles, their users and recipients functioned. They will allow for the identification of previously unknown socio-cultural phenomena.

5 **THE MANY SOUNDSCAPES OF EFLATUNPINAR HITTITE OPEN AIR SANCTUARY**

Erbil, Yigit (Hacettepe University) - Ünlü, Elif (Boğaziçi University) - Bolat, Senem (İzmir Yüksek teknoloji Enstitüsü) - Yiğit H. Erbil, Elif Ünlü, Senem Bolat

Water was seen as an effective purifying element in Hittite ritual practices. Its cleansing power can be seen in the form of lustrations or even full baths. Through the cult given to the river and the spring-goddesses, Hittite texts attest to the sacred character of water. As deities, rivers were usually associated with mountain gods. The rock reliefs and monuments located near the rivers are the root of this association.

Eflatunpinar monument is a stage within the natural landscape that dominates the landscape both visually and aurally. The sound of water surrounds the whole monument by design. The natural spring located to the northeast of the pool gurgles loudly as its waters are directed into channels to run neatly outside the east and north of the walls of the pool from where they would be allowed to pour into the pool at different locations where each outlet or a combination of outlets create different levels of sound. The increasing proximity to the monument augments this aural experience. The audience of the rituals taking place within this setting would have been engulfed in a meticulously engineered soundscape with water being the primary source, which would also have been combined with human and animal sounds of ritual participants.

This talk aims to investigate the possible combinations of aural experience at different parts of the monument using aural modelling. To achieve that water sounds were recorded at the monument at five different points. Sounds were also recorded at three listener positions. Present and virtually reconstructed versions of the monument were simulated using Odeon software. Auralizations were created based on the recordings, subjectively calibrated for listener positions and finally convolved with an original ritual music composed for this study.

6 **EXAUDISSIMI LOCI: FROM WHICH ROSTRA IN ROME COULD THE SPEAKER BE BEST HEARD?**

Kopij, Kamil (Institute of Archaeology Jagiellonian University) - Pilch, Adam (AGH University of Krakow) - Drab, Monika (Wrocław University of Science and Technology) - Popławski, Szymon (Wrocław University of Science and Technology)

This study delves into the audibility of speech across various speaking platforms in ancient Rome during the late Republican and Early Imperial period, specifically focusing on the rostra vetera, rostra aedis Castoris, rostra Augusti, rostra aedis divi Iulii, the Capitoline Temple, and the Temple of Bellona. Employing a rigorous approach, we employ acoustic simulations using the virtual reconstructions of these historical venues considering not only the geometry of the space but also the acoustic properties of the construction materials.

Our investigation incorporates three distinct levels of background noise (36, 49, and 55 dBA) to mirror the diverse auditory environments of ancient Rome. Additionally, crowd size estimation relies on insights gained from contemporary crowd studies in analogous scenarios. By combining these elements, we aim to answer a fundamental question: which rostra, during a specific historical period, maximized the intelligibility of the speaker's message to the largest audience?

Preliminary results suggest intriguing variations in acoustic properties across the different speaking platforms. The observed variability extends not only between different rostra but also among different background noise scenarios, implying a significant fluctuation in crowd sizes. This prompts consideration of whether speakers could have chosen a specific speaking platform based on the anticipated volume of the crowd.

This interdisciplinary study not only sheds light on the practicalities of communication in ancient Rome but also contributes to a deeper understanding of the intersection between architecture, acoustics, and public discourse. Ultimately, our findings aim to identify the rostra that, during a given period, optimized the audibility of speeches, providing valuable insights into the communication dynamics of this pivotal era.

7 **DEEP LISTENING TO THE RUINS**

Nissin, Laura (Tampere University) - Tiekso, Tanja (University of Helsinki)

Recent archaeological research has witnessed a shift known as the sensory turn, which moves away from solely visual studies towards a more comprehensive understanding of the past through multiple senses. This shift entails exploring the sounds and soundscapes of ancient built environments, which have traditionally been examined primarily through the lens of sight and vision alone. In our paper, we introduce listening as a possible method for exploring these environments.

Our methodology combines archaeological fieldwork with experiential artistic research practice, more specifically, deep listening. Employing experimental methods in archaeological research has a long past. In recent sensory archaeology, methods that use the bodily experiences of researchers as a means of conveying information of past sensations, have become even more sought-after. Such embodied, experiential techniques are believed to lead to a more inclusive and comprehensive understanding of the ancient sensorium and thus the ancient societies (see, e.g. Hunter-Crawley 2019, Tringham and Danis 2019, Tilley 2019; Rowan 2024, Garland 2023; cf. Hamilakis 2013).

In our research presented in this paper, we introduce the method of deep listening for exploring ancient architectural soundscapes. Deep listening is a method for listening intended for musical composers and musicians including also those who do not have classical musical training. The method is invented by American Composer Pauline Oliveros in artistic collectives since the 1960s (e.g. Oliveros 2005). In her recent artistic research concerning posthuman and urban soundscapes, Tanja Tiekso has developed the method of deep listening further (e.g. Tiekso & Lummaa 2022). In our paper, we will introduce our methodology of listening, in which we use sound recording, sound mapping and listening diary as our research tools. The presentation is based on our current fieldwork at three archeological sites: Pompeii, Forum Romanum and Ostia Antica.

8 **REPORT OF ARCHAEOACOUSTIC AND ANTHROPOLOGICAL STUDY OF THE ROTUNDA IN BÉNY (2016-2021)**

Lovász, Irén (Karoli Gaspar University of the Reformed Church in Hungary University)

Multidisciplinary studies were made during fieldworks of our international research group in the medieval Rotunda of Bény (Bína), in Central Europe where unusual sound phenomena can be experienced. The unique feature of the Rotunda are the 12 mysterious vaulted niches within.

First oral history as an anthropological method of study was used and local people were interviewed to understand local legends relating to the rotunda.

Then fieldwork was undertaken to test the rotunda's archaeoacoustic and resonant properties with the contribution of Professor Paolo Debortolis (I), University of Trieste. Equipment, methods, results with our conclusion were presented and published in the III. Archaeoacoustic conference in Tomar, Portugal in 2017.

In the next turn of study we expanded our research team and changed the concept and technical facilities of the recordings. After taking into consideration the possible use of human voices in the niches and in the whole rotunda we also changed the position of microphones. First we used male voice and the testing method of our invited guest Professor legor Reznikoff (F), the respected scholar of archaeoacoustic research.

A simultaneous study was carried on with complete acoustical machinery and sophisticated technology by Paul Oomen (NL), sound artist, researcher, founder of 4Dsound Studio in Budapest, in order to document and understand the most prominent acoustical properties in the Rotunda. Our research describes the acoustical reasons for observed phenomena and draws conclusions on the likeliness of an intentional sound design in the architecture of the Rotunda. Based on the acoustic findings, it may be concluded that the village myth is partly true as far that each niche has significantly different resonances, these are clearly audible and measurable in the niches when excited by the human voice.

9 **EXPLORING THE MONASTIC SOUNDSCAPES IN MEDIEVAL CATALONIA: PRELIMINARY RESULTS**

Dordevic, Zorana (University of Barcelona) - Costa Badia, Xavier (University of Barcelona) - Alvarez Morales, Lidia (University of Barcelona)

This paper explores the essential role of bells in shaping the monastic soundscapes of medieval Catalonia. The primary focus of this case study is directed towards three monasteries - Santa Maria de Gerri, Sant Pere de les Maleses, and

Sant Pere del Burgal - and a church of Santa Maria de Aneu, all established between the 9th and 10th centuries within the north-west region of Alt Pirineu in Catalonia. This research has two main objectives: firstly, to determine the aural community created by each of these religious establishments, and secondly, to explore the potential communication interlinking these religious establishments and how it changed over the seasons. The methodological approach involves on-site acoustic measurements and audio recordings of bell sounds to obtain the sound intensity across frequencies. Subsequently, we explore the propagation of sound through the Geographical Information System (GIS), utilizing the ArcGIS software and freely available Sound Mapping Tools fed with the data obtained during on-site acoustic measurements. The resultant sound propagation map further facilitates an analysis of the environmental and seasonal influence on the propagation of bell sounds, thereby delineating the aural footprint within which messages could potentially be communicated. Preliminary conclusions highlight the aural coverage of bell sounds in configuring the monastic soundscapes in medieval Catalonia.

10 INVESTIGATING NEW SOUNDS FROM A RECREATED MEDIEVAL ORGAN WITH PAIRS OF CONICAL PIPES

Chinaglia, Walter (Centre International de Musiques Médiévales- CIMM (Montpellier, France); Centre for Cultural Heritage Studies, University of Insubria, Como (Italy))

The Harding Bible (Dijon, Bibliothèque Municipale) was written and illuminated at the Cistercian monastery of Cîteaux during the leadership of the third abbot Stephen Harding. It includes an illustration (MS14, vol.3, folio 13v), dated to about the second decade of the twelfth century and showing Psalmist King David with his four musicians, one of which playing an eight-keyed organ with eight pairs of conical flue pipes.

Although this image of an organ is often regarded as unreliable – to be reconsidered in the light of squashed perspective and multiple viewpoints - I believe that it provides sufficient elements for a realistic reconstruction and hence further investigation on the role of the pairs of equal-length pipes.

For historical accuracy, the construction of typical organs of the period had to be taken into account, thus for windchest and conical pipes reference was made to the coeval treatise *De diversis artibus* by Theophilus.

As a natural result of the building process, the lengths of the pipes of the reconstructed instrument, as well as their arrangement on the windchest and the lineup of their mouths, correspond to the illustration in the manuscript.

Yet, regarding the sound some questions arise, which this research aims to examine:

How were the pairs of pipes used - at their perfect unison or slightly mistuned, resulting in an undulating sound? Would this oscillation be a plausible sonic model for medieval organs? Could it be considered as a precursor of the Italian Renaissance organ stop 'Voce Umana'?

11 PRECOLONIAL URBAN SOUNDSCAPES IN ISLAMIC EAST AFRICA

Baumanova, Monika (University of West Bohemia, Pilsen, Czech Republic)

Islamic cities of the global Middle Ages are well known for their spatial organisation, where residential houses were distributed in clustered blocks, with public spaces represented by mosques, winding streets, as well as other features like open spaces and markets. The role of mosques in the urban layout, for example, have been studied for their part in power negotiations, in representing individual quarters, building identity of the community or for attesting shared values.

This paper presents how understanding the socio-spatial organisation of Islamic towns may be significantly aided by studying the characteristics of urban sensory landscapes. Presenting a case study from the Islamic world, it focuses on the Swahili coast that extends from the Horn of Africa to the south of the continent, as the largest Islamic region in eastern Africa, and also one of the first where Islam became a dominant religion. Utilising selected analyses from the field of acoustics, the paper considers the layout of several precolonial sites dated to approximately 12th-15th century, in order to assess the distribution of mosques and the role of call to prayer in the urban soundscape of the towns. Apart from the placement of built features, the role of natural sounds is also considered. The derived observations may be used for comparison of urban soundscapes within the Islamic world, as well as in cross-cultural analyses, e.g. with contemporary towns of Christian Europe.

12 RE-CREATING THE SOUNDSCAPE IN A WORLD WAR 2 CONCRETE BUNKER

Mølgaard, Martin (Museum Skanderborg)

This paper will focus on development of soundscapes in historic buildings. Museum Skanderborg, together with the Struer Museum, Midtjyllands Museum and Aarhus University, has worked to map historical soundscapes to give guests an even better experience of the historic buildings they visit.

Each museum selected a historic building for the project, and at Museum Skanderborg the choice fell on a former German command bunker. The bunker was part of the Luftwaffe's headquarters at Skanderborg and is used today as a museum building.

The buildings themselves are seen as historic objects. Still standing as they did when they were abandoned. Already at the sight of the building, guests feel a historical encounter, which is typically only reinforced when meeting the building's interior. Guests experience the feeling of authenticity, but in silence. By adding a soundscape to the building, the building is brought back to life and gives visitors an experience of the life that once took place.

Together we have developed the use and understanding of sound within museum communication in authentic buildings, where sound is perceived as intangible cultural heritage and functions in such a way that it becomes an integral part of the authentic experience that the buildings provide opportunities for.

In this paper will share challenges and experiences regarding the mapping and selection of the sounds in the bunker, the implementation, and the guests' experience of the soundscape. By recreating parts of the acoustic characteristics of the former soundscape in the bunker, the functions of the individual rooms come to life again through the sounds and give the guests an experience of the bunker as it was intended when it was built and used by the German soldiers.

13 THE PAST HAS EARS: REFLECTIONS ON OVER 10 YEARS OF INTERDISCIPLINARY RESEARCH IN ARCHAEOACOUSTICS

Katz, Brian (Sorbonne Université / CNRS / Institute d'Alembert)

Hearing is one of our most pervasive senses, lacking the equivalent of closing our eyes or averting our gaze. The acoustics of heritage sites represent an intangible consequence of their tangible construction and furnishings. Acoustic qualities imbue spaces with an immersive, spatial character that is inherently egocentric due to the nature of auditory perception, contrasting with the external observation possible in visual perception. Therefore, methods for communicating acoustic heritage must capture acoustics' spatially immersive and listener-centric essence.

While physical and digital reconstruction methods have been employed in acoustics for decades, recent advancements in computational technologies have significantly enhanced the quality and resolution of acoustic modelling, particularly in large-scale spaces where acoustics play a crucial role amidst increasing complexity.

This paper traces our journey from studies in the History of Science, examining historical endeavours to comprehend and enhance room acoustics, to our current use of digital simulations to deepen our understanding. Building upon this foundation, studies in Theatre Studies have explored the intertwined evolution of acoustics and vocal practices through immersive virtual reconstructions of performance spaces. More recent investigations in Musicology and Ancient and Medieval Christianity have delved into dynamic and interactive reconstructions, enabling analyses of live performance variations resulting from evolutions in acoustic conditions over time.

This presentation offers an overview of these interdisciplinary projects and examines the technical and methodological challenges arising from the collaborative efforts between acousticians, computer scientists, and humanities scholars in the developing field of archaeoacoustics.

83 WHAT'S GOING ON WITH FINDER-COLLECTORS WHERE YOU ARE?

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Thomas, Suzie (Universiteit Antwerpen) - Oksanen, Eljas (University of Helsinki; University of Reading) - Deckers, Pieterjan (Katholieke Universiteit Leuven) - Wessman, Anna (University of Bergen)

Session format: Regular session

In this lightning session we invite researchers, archaeological heritage managers, and others to provide short and succinct updates concerning current initiatives, policies, viewpoints, and debates around finder-collectors in their countries and regions. Finder-collectors include archaeological citizen scientists, metal-detectorists, fieldwalkers, mudlarks and other hobbyists who may find, collect, research or engage with archaeological heritage in different ways. Participants may focus on different aspects of this phenomenon but may wish to reflect on one or more of the following questions:

- Has policy recently changed or are changes being discussed in relation to finder-collectors in your country?
- Are digital finds recording schemes or other relevant cultural heritage infrastructure running or being developed in your country?
- Do you have finder-collectors contributing to your archaeological research?
- Are you carrying out ethnographic research on finder-collectors?
- What ethical controversies emerge in relation to finder-collector practices in your country or region?
- What practical challenges emerge in relation to finder-collector practices in your country or region?

We are asking for short 6 slide 6 minute talks. As discussion of finder-collectors can sometimes be a sensitive topic, we ask that participants, including the audience, engage in debate and discussion in a respectful manner.

ABSTRACTS

1 PORTAL OF AMATEUR COLLABORATORS AND REGISTER OF INDIVIDUAL FINDS OF THE CZECH REPUBLIC

Marik, Jan (Institute of Archaeology of the CAS, Prague) - Antal, Robert (Institute of Archaeology of the CAS, Brno)

The searching of archaeological finds is reserved exclusively for professional archaeologists under the conditions of Czech legislation. In practice, however, many archaeological institutions have been cooperating at various levels with the finder-collectors for several decades. Different approaches to collaborators and the finds themselves, their documentation and storage in collections have been subject to many discussions concerning the ethics and legality as well as the very meaning of such collaboration.

In 2021, the Portal of Amateur Collaborators and Register of Individual Finds was launched. The aim was to identify amateurs who could and were prepared to collaborate with archaeologists within the legal limits and to set up the fundamental ethical and methodological procedures. The portal was created as a platform to support collaboration between professionals and amateurs.

The use of the portal is not obligatory; therefore, its start was relatively slow. The launch of the portal was marked in the first months by a heated debate on legal and ethical aspects. At present, it is only used to a greater extent in only some regions. The main obstacles to its wider use are administrative constraints resulting from outdated legislation and a lack of manpower on the side of professional archaeologists.

Although the portal currently covers only a small part of the finder-collectors community in the Czech Republic, its considerable contribution is to open a discussion on the unification of cooperation procedures and searchers and the possibilities of using their capacities for the protection and research of archaeological heritage.

2 A MAJOR TRAIN WRECK: THE 'NEW' FINDS REPORTING APP OF THE AUSTRIAN FEDERAL MONUMENTS AGENCY

Karl, Raimund (Universität Wien)

Modern technology often seems to offer quick fixes for age old-problems. Yet, "we've now got an app for that", in and of itself, doesn't necessarily solve the problem; and especially doesn't relieve those who want to fix it of their duty to consider the foreseeable outcomes of their actions: *quidquid agis, prudenter agas, et respice finem* (Gesta Romanorum; Oesterley 1872, 431). The ongoing train wreck caused by the Austrian Federal Monuments Agency's (BDA) most recent attempt to solve the 'problem' of (the lack of) 'archaeological' finds reporting by members of the public (despite a legal duty to do so) by purchasing "an app for that" serves as an abject lesson for this. Instead of fixing the problem, the thoughtless acquisition of an entirely unsuitable 'quick fix' has created a possibility to commit perfect crimes, both of defamation and of 'laundering' illicitly trafficked portable antiquities; while doing nothing to actually improve 'public' finds reporting. This paper will examine what led to this utter train wreck for heritage management.

Oesterley, H. 1872 (ed.). Gesta Romanorum. Berlin: Weidmann.

3 THE FINDS WE NEVER SEE. ARCHAEOLOGICAL ARTEFACTS KEPT AS TROPHIES BY LICENSED METAL DETECTORISTS

Falkenberg, Josefine (Archaeological Heritage Office Saxony)

In the German federal state of Saxony, every artefact found in the ground without clear ownership legally belongs to the federal state, not the landowner or finder. While a reward for a finder is mentioned in the legal text, the nature of this reward is not defined. Ever since 2018 metal detecting has become increasingly popular, with many different people wanting to explore their surroundings and their history. Two and a half years ago the Archaeological Heritage Office reacted to growing numbers of people wanting a license for metal detecting in Saxony. A position was created to better deal with administrative work, finds and necessary lectures as part of the licensing process. Practical challenges of this position include the also growing number of illegal detectorists. Aside from openly illegal treasure hunters who post about themselves, their activities and their finds on social media archaeology is faced with people going through the lengthy process of becoming registered only to never hand in their discoveries. If controlled by the police, these collectors have valid licenses to show. When asked for finds by archaeologists, research has supposedly never taken place or nothing was ever discovered. The assumption is, that finds are collected, shelved or sold under the cover of legality. While this generally concerns finds from all ages, a clear favour with the collectors seems to lie

4 MANAGEMENT OF ARCHAEOLOGICAL HERITAGE, SEARCH AND COLLECTION IN UKRAINE: THE TIME MACHINE WORKS

Videiko, Mykhailo (Kyiv Metropolitan Borys Grinchenko University) - Motorzhyna, Mariia (Kyiv Metropolitan Borys Grinchenko University)

The 19th century in the lands of Ukraine, which was a part of two empires, became a time of intensive searching and collecting. At the same time, part of the land was private, part was state-owned, and ownership of archaeological artifacts was distributed accordingly. At the beginning of the 20th century, many collections became the public domain through a network of museums, and collectors moved to fund archaeological research. The communist regime after 1917 monopolized land, archaeological artifacts and archaeological research.

The 1991 division of land into public and private lands, while preserving the remaining monopolies with weak public institutions and the absence of state control, resulted in the mass destruction of cultural heritage due to unauthorized prospecting. Large number of searchers-collectors were involved in illegal treasure searches. They and their collections are outlawed.

In the conditions of war, the scale of illegal search has decreased. Two trends became active: the transfer of collections to museums and the confiscation of archaeological objects from smugglers and collaborating collectors for the benefit of the state. Some of such gatherings were looted by the Russian occupiers or destroyed along with their owners due to military actions and lost forever.

Attempts to catalog and digitally record the finds obtained during the search are limited by the ethical problems of dealing with the things obtained in this way. Problem is the existence of a state monopoly in the absence of effective control over the processes.

The uncontrolled situation clearly poses a threat to cultural heritage. Attempts to discuss changes in the legislation have failed, although there is an understanding of their need. Looking for a way out, it is worth turning to the experience of the beginning of the 20th century, when cultural heritage was saved by the common efforts of state, public and collectors.

5 RESEARCH TO THE RESCUE? A HELPING HAND FOR HERITAGE MANAGERS IN ESTONIA

Kuriso, Tuuli (Tallinn University)

As in many countries that allow metal detecting, there is a considerable administrative burden in Estonia in managing data related to metal detecting. This has led to delays of several years in the processing of public finds, which has weakened local hobbyists' trust in the state (represented by the National Heritage Board). In addition, heritage management resources are often stretched, and major changes to the system or significant digital developments require political will and a longer timeframe for implementation. Alternatively, research and targeted outreach activities have the potential to influence the system from the outside. In this paper I will briefly present three aspects of an ongoing research project that will hopefully lead to positive changes in the current system. These are basic research (a case study of Estonian plough zones), a machine learning experiment (medieval and early modern coins), and a public engagement plan derived from the needs and interests of local hobbyists.

6 INTERNAL ENEMY. WHO IS DESTROYING THE UKRAINIAN ARCHAEOLOGICAL HERITAGE?

Ivanova, Oleksandra (National University of Kyiv-Mohyla Academy) - Zotsenko, Ivan (Institute of Archeology, National Academy of Sciences, Kyiv, Ukraine)

First of all, it is worth noting some details of Ukrainian legislation in the field of heritage protection. The Law of Ukraine "On the Protection of Archaeological Heritage" defines this heritage as: "a set of archaeological heritage objects that are under the protection of the state, and the territories connected with them, as well as movable cultural values (archaeological artefacts) originating from the objects of archaeological heritage". Such a definition artificially narrows the terminology at the expense of tying archaeological objects to objects and territories and requires proving the connection between a specific object and an object or territory. In the case of archaeological objects of unknown or illegal origin, this is usually unprovable. Exactly this provision of the law, in our opinion, creates a large number of problems with the extraction and circulation of archaeological artefacts inside of the country.

Also, the number of finder collectors has increased tenfold over the past 20 years due to restrictions on the purchase of metal detectors and their price.

Particular attention should also be paid to Internet platforms and antique shops that sell archaeological artefacts and the legislative acts regulating this process in Ukraine.

The problem of private collections, which include objects of archaeology obtained illegally, also exists and is increasingly becoming political in nature (both at the local and state level).

The last issue we would like to raise is the acceptance by official museums and the introduction of illegally obtained objects into scientific circulation by scientists. Today, gifts of certain unique artefacts to museum institutions, or purchases of such items by patrons at illegal auctions, have become a fairly popular practice among private collectors. This is a complex issue, around which there is a lively discussion in the Ukrainian scientific community and there is no consensus.

7 NEW CHALLENGES IN RELATION TO METAL DETECTING IN HUNGARY

Rác, Tibor (Ferenczy Museum Centre; Community Archaeology Association)

In autumn 2021, the 1st National Community Archaeology Conference was held in Hungary, a forum for summarising the results of cooperation with the non professional sector, especially metal detectorists, and for methodological systematisation of applied archaeological procedures. Analysing the presentations of the second national conference, held two years later in 2023, we find that in just two years the number of cooperative programmes supported by museums has doubled, many new actors have emerged in the field of community archaeology and cultural heritage institutions have started to adapt their policies to the new trends. At the same time, while acknowledging the obvious scientific results, the unfolding debates and roundtable discussions have revealed striking differences of opinion, revolving around metal detecting, field recording protocols, the framework for self-guided work and the institutional background. This short presentation will reflect on the new challenges in relation to metal detecting brought about by this rapid development and the changing institutional background.

85 TRADE HUB? SAFE HAVEN? RITUAL CENTRE? THE ROLE OF DITCH SYSTEMS AND CENTRAL SITES IN THE NEOLITHIC

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Maurer, Jakob (University for Continuing Education Krems) - Hukelova, Zuzana (Institute of Archaeology of the Slovak Academy of Sciences) - Wunderlich, Maria (Kiel University) - Bistáková, Alena (Institute of Archaeology of the Slovak Academy of Sciences)

Session format: Regular session

The Neolithic is traditionally considered a period of little social differentiation and a rather flat hierarchical structure. In possible contrast, e.g., the Linear Pottery (LBK) dwelling landscape displays a distinct variety of settlement types, some of which sport earthen enclosures. Due to their size, their long-time use, exceptional finds and imports, they are frequently assessed as sites of central significance. Although enclosures generally seem to be a rather late feature on many LBK-sites, they are thought to be key to identifying “central settlements” and surrounding dwelling clusters. The first appearance of an enclosure within an existing settlement network might reflect a change in social behaviour and/or group interaction.

They are also relevant for ongoing discussions about a possible “crisis situation” at the end of the LBK, not least in the context of numerous human remains found in ditch systems, e.g., in Schletz (Austria) and Vrábľa (Slovakia). The purpose of such ditches as well as the interpretation of human remains recovered from these structures may vary from one site to another and seems to be manifold.

In our session, we want to take a closer look at potential Neolithic central sites and their hinterland with a focus on enclosures, which have been described as fortifications, as “a manifest sign of social identity”, as trading places, burial grounds or ritual sites. We welcome contributions discussing various aspects that might shed light on the purpose and role of enclosed Neolithic sites (e.g., their architecture, development and function; the persons, communities and practices involved in the history of such sites; the geographic or diachronic situation contextualising – perhaps explaining – sites with enclosures). Although our focus is set to the Early Neolithic, we also encourage contributions from other Neolithic periods or ethnoarchaeological contexts, presenting comparative evidences and interpretations.

ABSTRACTS

1 TRANSFORMATIONS OF A SOCIO-SPATIAL SYSTEM DURING THE NEOLITHIC IN SW SLOVAKIA: VRÁBLE AND THE ŽITAVA VALLEY

Furholt, Martin (Kiel University) - Cheben, Ivan (Slovak Academy of Sciences) - Bistáková, Alena (Slovak Academy of Sciences) - Wunderlich, Maria (Kiel University) - Furholt, Kata (Kiel University) - Köhl, Till (Kiel University)

In this paper, we will present the results of our 12 year fieldwork on settlement and social organization in the Žitava valley during the Neolithic, i.e. the LBK, Želiezovce and Lengyel periods. During the Early Neolithic, this region is characterized by the presence of one outstandingly large settlement with a double enclosure ditch, as it is found in Vrábľa Veľké Lehemby and Farské. We were able to reconstruct a regional settlement history from 5300 to 5000 BCE, which shows a gradual settlement concentration of farmsteads in Vrábľa at the costs of the other sites in the valley. This concentration process culminates around 5100 BCE, after which an enclosure ditch is dug around one neighborhood of Vrábľa, which in additions saw complex ritual activities, involving, among others, the deposition of more than 90 human bodies in and along the enclosure ditches. After 5000 BCE, settlement in Vrábľa rapidly dissolves and the whole settlement structure is transformed into a more dispersed, and decentralized pattern, which is however compensated with a number of rondels, or circular enclosures, which represent, we argue, non-domestic central places. In this paper, we want to discuss the social significance of those different enclosed sites in the Žitava valley in their changing socio-spatial contexts.

2 UNIQUE SETTLEMENTS COMPLEXES OF LBK AND ŽELIEZOVCE GROUP IN SW SLOVAKIA: ARCHAEOLOGICAL RESEARCH IN VRÁBLE SITE

Bistáková, Alena (Institute of Archaeology (Slovak Academy of Sciences)) - Cheben, Ivan (Institute of Archaeology (Slovak Academy of Sciences)) - Furholt, Martin (Kiel University) - Wunderlich, Maria (Kiel University) - Furholt, Kata (Kiel University) - Hukelová, Zuzana (Institute of Archaeology (Slovak Academy of Sciences)) - Fuchs, Katharina (Kiel University) - Köhl, Till (Kiel University)

The large settlements of Vrábľa “Veľké Lehemby” and “Farské” can currently be ranked as some of the most important Neolithic sites in Central Europe. The reason for this is not only the size of the three neighbouring settlement complexes of the LBK and the Želiezovce group, but also the uniqueness of the discovered finds. The three separate settlements extend over an area of almost 50 ha. The geophysical survey identified more than 300 longhouses, which were evenly distributed and arranged in the same pattern in each settlement area (Areas I-III). Settlement Area I was fully enclosed by a ditch and was interrupted by six entrances.

In this paper we present the course of archaeological research (2012 - 2023), which was carried out at the settlement complex in Vrábľa (5250-4950 BC) with varying intensity. The systematic research in the first years/stages focused on the examination/exposure of selected longhouses. They were identified according to the geophysical plan, based on the occurrence of pairs of long pits situated along the outer walls of the houses. Since 2017, the research has also focused on investigating the area of the five entrances of Areal I. In addition to the findings of regular (?) skeletal graves situated in the areas of the entrances, human skeletons were also found directly at the bottom of each ditch. In the research seasons 2022-2023, a unique discovery of a mass deposit of human skeletons, for which the absence of a skull is a common feature, was found in the western end of the trench at entrance 2. We can currently speak of at least one hundred individuals buried in Vrábľa. It is possible that the number may increase with further research.

3 HEADLESS SKELETONS IN THE DITCH: UNRAVELLING THE COLD CASE AT THE SETTLEMENT OF VRÁBLE-VEĽKÉ LEHEMBY (SLOVAKIA, 5250-4950 BCE)

Hukelova, Zuzana (Institute of Archaeology (Slovak Academy of Sciences)) - Bistáková, Alena (Institute of Archaeology (Slovak Academy of Sciences)) - Cheben, Ivan (Institute of Archaeology (Slovak Academy of Sciences)) - Furholt, Kata (Christian-Albrechts-Universität zu Kiel) - Furholt, Martin (Christian-Albrechts-Universität zu Kiel) - Köhl, Till (Christian-Albrechts-Universität zu Kiel) - Wunderlich, Maria (Christian-Albrechts-Universität zu Kiel) - Fuchs, Katharina (Christian-Albrechts-Universität zu Kiel)

Comprising of three Linear Pottery villages, counting 313 houses, Vrábľa – Veľké Lehemby is one of the largest Neolithic conglomerates in Central Europe existing between 5250 and 4950 BC. Around 5000 cal BCE, a double-ditched enclosure was constructed around the southwestern settlement. Here, the remains of at least 61 headless individuals were discovered, 53 of which were concentrated at the area of one of the gates. Body depositions in ditches are known from the Neolithic, but Vrábľa–Veľké Lehemby is the only site where the skulls are missing.

How did these people die? Why were they seemingly carelessly thrown in the ditch and not regularly buried as some other individuals from the site? Were everybody or only selective groups treated this way? How, when and why were

the skulls removed? Did the individuals die at the same time or were they buried in the ditch over a longer period? Many of the questions related to this puzzled case remain open and the story is continuously being unravelled.

In this paper, newly acquired osteological results are presented. The focus is put on the biological profile of the buried population and skeletal evidence of how and when the skulls could have been detached from the bodies. Preliminary observations point more to a careful rather than a violent removal of heads. Thus, this finding may not necessarily represent evidence of bloodshed and bitter rivalry, but point to a complexity of Neolithic society in terms of ritual behaviour – in which the ditch seems to have played an important role.

4 SURROUNDING A LBK-“CENTRAL SITE”. FIRST RESULTS ON THE DIACHRONIC AND SPATIAL DEVELOPMENT OF THE “SCHLETZ SETTLEMENT CLUSTER”/LOWER AUSTRIA

Längauer, Julia (University for Continuing Education Krems, Center for Museum Collections) - Hascher, Cornelia (University for Continuing Education Krems, Center for Museum Collections) - Pieler, Franz (State Collections of Lower Austria) - Teschler-Nicola, Maria (Natural History Museum Vienna) - Irrgeher, Johanna (Montanuniversität Leoben, Department General, Analytical and Physical Chemistry) - Schober, Michael (Montanuniversität Leoben, Department General, Analytical and Physical Chemistry) - Prohaska, Thomas (Montanuniversität Leoben, Department General, Analytical and Physical Chemistry) - Duboc, Olivier (University of Natural Resources and Life Sciences Vienna (BOKU), Institute of Soil Research) - Maurer, Jakob (University for Continuing Education Krems, Center for Museum Collections)

Asparn/Schletz in the Lower Austrian Weinviertel is one of the most prominent Linear Pottery Culture sites in Europe, due to evidence suggesting a massive violent attack on the settlement around 5000 BC. The fortification of the site, its size, long-time use and exceptional finds have all contributed to its classification as a “Central Site”. Nevertheless, not much thought was given to what it might actually have been the centre of.

The research project “United by Crisis?”, funded by the GFF Lower Austria, aims to explore the diachronic and spatial development of LBK sites in the hinterland of Asparn/Schletz. Since the end of 2022, multiple Line Walking surveys have been conducted as well as a thorough examination of finds existing in collections and research in archival sources. This work has gradually unveiled a more detailed picture of possible founding strategies of LBK sites in the region, of interactions and potential functional roles of sites and of the overall development of the “Schletz settlement cluster”. Additionally, within the project, the creation of a local isoscape of the study region, Sr Isotope ratio analysis of human remains, further anthropological work and C14-dating will shed light on the potential origin of the slain individuals and deliver additional information on what happened at the site of Schletz itself. In this talk, we aim to discuss initial findings from our ongoing research, which we consider to be crucial for a better understanding of the social developments that led up to the special role of Asparn/Schletz and the events that happened there.

5 DEFINING STRUCTURE OF A “CENTRAL SITE”? STRATIGRAPHY, ARCHITECTURE AND FUNCTION(S) OF THE DITCHES SURROUNDING ASPARN/SCHLETZ

Pieler, Franz (State Collections of Lower Austria) - Längauer, Julia (University for Continuing Education Krems) - Hascher, Cornelia (University for Continuing Education Krems) - Maurer, Jakob (University for Continuing Education Krems)

The fortified Bandkeramik site of Asparn/Schletz is amongst the most prominent Neolithic sites in middle Europe, due to the gruesome evidences of a massacre, in which, around 5000 BC, many inhabitants seem to have met their ends.

Interdisciplinary research carried out in recent years and the ongoing project “United by Crisis?” shed new light on the connections of the potential regional central hub with the wider Bandkeramik world as well as with the regional dwelling cluster. In parallel to these regional studies, the structures of Asparn/Schletz have been assessed in closer detail, revealing that, in contrast to preliminary reports, all ditches in Asparn/Schletz date to the late Bandkeramik, long after the settlement – and its adjacent secondary sites – had been established. Evidences further imply a surprisingly dynamic history of the enclosure, with stages of construction, decay, secondary use and reconstruction. During episodes of disrepair, the ditches were used for pit ovens, and – after they were partly filled in, either actively or due to erosion – as burial ground. This seemingly contradicts the conventional picture of a fortification as a representative feature on a place of some central significance, but rather suggests a purpose-built defensive structure, which was only maintained as long as need dictated. We therefore assume that the construction of the ditches was not so much an act of an enhanced show of authority, but more likely a reaction to changes in the greater Bandkeramik world and/or to scenarios of menace, possibly to the entire regional network.

6 INDICATIONS OF A CRISIS? UPDATED EVIDENCE DRAWN FROM THE HUMAN REMAINS DISCOVERED AT ASPARN/SCHLETZ

Teschler-Nicola, Maria (Natural History Museum Vienna) - Novotny, Friederike (Natural History Museum Vienna) - Längauer, Julia (University for Continuing Education Krems, Center for Museum Collections Management) - Hascher, Cornelia (University for Continuing Education Krems, Center for Museum Collections Management) - Maurer, Jakob (University for Continuing Education Krems, Center for Museum Collections Management) - Pieler, Franz (State Collections of Lower Austria)

The Late Linear Pottery site of Asparn/Schletz in Lower Austria is considered an exceptional phenomenon in the Central European distribution area of this culture due to the structure of the site and the diversity of the human skeletal remains uncovered in different contexts. In contrast to the initial bioanthropological analyses, today the remains of around 130 individuals form the basis for further considerations and systematic analyses. The majority of these skeletal remains were recovered from a ditch and show massive, often multiple injuries; those who died in this way had remained unburied and were therefore exposed to different taphonomic processes. Further clusters are formed by “normative” inhumations within the settlement, which corresponded to the rites of the time, as well as by skeletal remains recovered from within the settlement, i.e. from a well and settlement pits (often mixed with animal bones).

These finds and their diversity in relation to the area of discovery within the settlement as well as their taphonomic changes not only imply a diverse and complex way of dealing with dead bodies. Injuries – healed as well as fatal – in conjunction with (unspecific) stress markers and other alterations, e.g., due to overload, also strengthen the perception of a “crisis situation”. Within and alongside the current, transdisciplinary GFF-project “United by crisis?” this hypothesis is checked with an extended methodological approach (e.g. imaging and histological techniques as well as isotope and aDNA analysis to resolve questions of origin).

The present contribution i) deals with the taphonomic transformations and possible ritual practices in how human bodies are treated and ii) presents for discussion up-to-date results of a systematic analysis of pathomorphological features that might have characterised life in a “transitional phase” and the socio-cultural changes associated with it.

7 DITCH, PIT, GRAVE: ON THE BURIAL PRACTICES IN THE SETTLEMENT OF ASPARN-SCHLETZ AND FURTHER LBK SITES IN LOWER AUSTRIA

Hascher, Cornelia (University for Continuing Education Krems) - Längauer, Julia (University for Continuing Education Krems) - Novotny, Friederike (Natural History Museum of Vienna) - Teschler-Nicola, Maria (Natural History Museum of Vienna) - Pieler, Franz (State Collection of Lower Austria)

The analyses of burials at Asparn-Schletz in Lower Austria contributes a rich narrative to broader discussions on Early Neolithic burial practices. In the context of the Linear Pottery Culture (LBK), various “regular” burial complexes were excavated within the settlement of Asparn-Schletz. These include multiple burials (such as V 614) and notably adorned burials (e.g. V 692). The presentation will contextualize these burials from Asparn-Schletz with LBK settlement burials recovered at a wider geographical range in Lower Austria.

In Asparn-Schletz the burials were found in the western and northern sectors, some in close vicinity to the houses, others within the ditch system, and provide detailed insights into burial positions, orientations, and potential ritual aspects. Some regularity can be seen in the composition of age and gender. Additionally, some of the pathological changes observed at the human skeletal remains and their possible relation to the diversity of the burial place and how the corpses of the dead were dealt with are debated. As part of the GFF project “United by Crisis” all settlement burials are radiocarbon-dated in order to determine their chronology, which will also be discussed.

By examining burials from Asparn-Schletz in contrast with those from other sites, the presentation aims to shed light on the multifaceted roles of ditch systems and central sites and to get a nuanced understanding of Neolithic societal structures, emphasizing mortuary practices and potential symbolic elements.

8 THE CENTRAL POINT OF THE REGION FROM THE NEOLITHIC TO THE BRONZE AGE? SETTLEMENT AGGLOMERATION IN PLOTIŠTĚ NAD LABEM (BOHEMIA)

Langova, Michaela (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic) - Schimerová, Eva (The University of Hradec Králové) - Burgert, Pavel (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic) - Adameková, Katarina (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic) - Thér, Richard (The University of Hradec Králové) - Vokolek, Vít (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic)

The presence of a fortified compound, the creation of which requires considerable collective effort, is indicative of the capabilities and motivation of a given community. Moreover, the construction of a fortification, its duration, and the manner of its demise and destruction can point not only to the life of a local community, but often also to events of supra-regional significance. Where the attributes of centrality can be traced at a single site over a longer period,

across different archaeological cultures, the choice of site is unlikely to be related solely to the preferences of the community in question, but rather reflects favourable natural conditions.

One of these places is located north of Hradec Králové (Eastern Bohemia) near the Elbe River in Plotiště nad Labem. Systematic excavations, especially from the 1960s - 1970s, have revealed a large number of prehistoric finds there. It is clear that from the Neolithic to the Early Bronze Age the site showed a high degree of centrality of at least a regional character. From this site and their immediate surroundings, it is possible to mention several rondels, palisade enclosure, cremation as well as inhumation graves and a concentration of imported items for the Neolithic period, in addition to a high concentration of settlements. At the same time, Eneolithic finds are also abundantly documented from this site from practically all archaeological cultures described so far in Eastern Bohemia. In addition to an enormous concentration of settlement and burial finds from the Early Bronze Age, a fortified settlement is also known from the site. This fortification, which is the only known from the whole Eastern Bohemia, and its connection to the specific natural conditions that made Plotiště nad Labem the centre of the entire region since the Neolithic period will be the main topic of the paper.

9 LARGE SETTLEMENTS AS CEREMONIAL CENTERS IN THE BRZEŚĆ KUJAWSKI CULTURE (POLISH LOWLANDS: 4350-4000 BCE)

Wieczaszek, Kalina (University of Gdańsk) - Pyzel, Joanna (Maria Curie-Skłodowska University in Lublin) - Czerniak, Lech (University of Gdańsk)

The phenomenon of the Brześć Kujawski culture (BKC) in the eastern part of the Central European Lowland (4350-4000 BCE) was formed in the process of intense demographic growth and settlement agglomeration. A complex settlement system emerged, including large settlements built with longhouses that operated as ceremonial centers that brought together a network of surrounding farmsteads and hamlets. At the same time, in other regions of the "Danubian Neolithic World", the opposite process was taking place: the dispersion of village communities for which undeveloped enclosures and cemeteries became the central places.

In the paper we analyze the evolution of central places from Schletz-type settlements in LBK, through rondels in SBK, to central settlements in BKC. We focus mainly on the formation of central BKC settlements in Kuyavia and the accompanying phenomenon of extraordinary intensification of commemoration practices addressed to distant ancestors. A detailed comparative analysis of two closely adjacent microregional groups gathered around central settlements (Osłonki surrounded by a ditch and palisade and Brześć Kujawski) revealed new phenomena that allow us to better understand the process of formation of central settlements and their functioning in a network of various social connections. Among others it turned out that beneath the surface of the demonstrated unification (longhouses, ceramics) there were deep differences that could express both the groups' separate origins and the conscious creation of differences in order to strengthen their own identity.

10 SETTLEMENT AGGREGATION, EARTHWORKS, AND SOCIAL COMPLEXITY: PONDERING AN ARCHAEOLOGY OF RISK

Salisbury, Roderick (Comenius University in Bratislava; Austrian Archaeological Institute, Austrian Academy of Sciences)

Neolithic ditched enclosures are common features in Central Europe. New findings, including around small and lesser known tell-like mounds, indicate that they are more common than previously thought. Ditches have been variously interpreted as defensive, for animal management or flood control, or as tools for inclusion, exclusion, and social memory. Direct relationships between ditches and enclosed spaces are not always investigated. In at least some cases, we find evidence for changes in the use of enclosed space at Neolithic tells. Construction of ditches around house clusters began at least as early as the LBK period, as indicated by recent discoveries. Ditch construction continued after population dispersal and the abandonment of large, nucleated tell-focused sites in the later Neolithic, at least in the eastern Carpathian Basin. The geographical range and persistence over time suggest several complementary functions, centered on the mitigation of risk.

Risk, as the perceived potential for some event to occur in a specified period of time, is culturally defined and contingent. Which risks are perceived, and how they are valued, communicated and managed, are shaped by socially embedded knowledge and shared experiences. In this paper, ditches are presented as resources committed to community projects to address threats that might have been partly or wholly subjective, but highly valued. In particular, we address their potential for mitigating the challenges of increasing social complexity and demographic change. Other advantages of ditches would have justified their continued construction and maintenance, even in the absence or acceptance of the original perceived risk.

88 COLONIZING THE NEW WORLD: THE IMPACT OF ROMAN IMPERIALISM ACROSS THE ATLANTIC

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Hanscam, Emily (Linnaeus University) - Hingley, Richard (Durham University)

Session format: Regular session

Over the past few decades, a considerable dialogue between archaeologists, classicists and ancient historians has taken place on the impact of Roman imperialism in the ancient and contemporary worlds. This dialogue has, however, primarily concentrated on the territories of the former Empire itself, leaving much to consider regarding other contexts. Although the continent of North America is geographically distant from the Roman Empire, ideologically it became closely entangled from the moment the 'New World' was invented in the minds of Europeans and classical parallels play a significant role in the processes and practices of colonization. This entanglement continues to the present day, with frequent (and conflicting) comparisons made between the United States and the Roman Empire, particularly during the Trump presidency. We therefore consider it long past due for a better understanding of the use of Roman frontier concepts in the colonization of the New World, focusing in this instance on the 16th century onwards. We invite papers on themes such as the impact of ideas of 'the frontier' in developing North American perceptions of space and territory, of the use of Classical place names in North American territory, of the creation of plantations, colonies and forts as a means of colonization and control, and any other relevant themes linking Roman imperialism to the colonization of North America.

ABSTRACTS

1 EARLY ENCOUNTERS IN VIRGINIA: ANCIENT BRITAIN AND NATIVE AMERICANS

Hingley, Richard (Dept. of Archaeology, University of Durham)

This paper explores the early colonization of part of North America by the English during the late sixteenth and early seventeenth centuries, addressing how Roman-period classical parallels were called upon to conceptualize encounters. The Roman-period texts that addressed the conquest of Britain during the early first century CE were directly mined to create a claim of justification for conquering territory and establishing colonies. In this process, artists and authors were able to draw upon the records of the appearance and customs of native Americans to inform their accounts of pre-Roman ancient Britons. This paper will explore the ways that classical texts were used to make such colonial claims. It will focus on the concept of the colony (or plantation), which was partially adopted from Roman texts. Can the archaeological critique of the use of classical Rome as an aspect of Victorian imperial discourse (e.g. Hingley 2000), provide an insight into this earlier use of classical parallels? What insights might archaeological fieldwork provide for this research?

2 COLONY OR PLANTATION?: THE CLASSICAL SPATIAL LEXICON OF THE EARLY ENGLISH EMPIRE

Musselwhite, Paul (Dartmouth College)

The planners, colonists, and officials of the early English empire in the Americas were not sure about what the fundamental building blocks of their empire were. Reams of documents vacillated between discussions of England's empire consisting of "plantations" or "colonies," or sometimes both. Generations of scholars have taken this seeming interchangeability as a sign that contemporaries saw the two terms as synonyms, but few have grappled with when or how the terms were applied and to what kinds of spaces, and still less have recognized that one of these terms – colony – had much clearer classical antecedents than the other.

This paper proposes to bring together written, cartographic, and material evidence to explore the application of "colony" and "plantation" as spatial constructs in early-seventeenth-century English America. It will revisit the archaeological evidence of early English settlement, particularly in the Chesapeake region, and reinterpret it in light of more recent historical research on the influence of classical humanism on early English colonial discourse. Were English settlements laid out in ways that suggested analogies to Roman *colonia*, and did this correlate with the application of the terms "colony" and "plantation"? The paper will argue that "plantation" and "colony" were deliberately deployed to reflect different understandings of the structures of society and economy within new settlements and across the nascent "imperium" of England. As part of the debate between these different interpretations, it will suggest that classical frameworks and analogies continued to be relevant beyond the initial classical humanist strain of Virginia colonization in the 1610s, and "colony" became an increasingly important part of the Stuart monarchy's vision for empire throughout the century.

3 COLONISATION OF THE NORTH AMERICAN FRONTIER IN THE MIDDLE OF THE 19TH CENTURY AND AGRARIAN REFORM IN REPUBLICAN ROME

Compatangelo-Soussignan, Rita (University of Le Mans; Centre de Recherche en Archéologie, Archéosciences, Histoire, UMR 6566)

By the late 1840s, after the annexation of Texas and the end of the war with Mexico, vast tracts of land had opened up in North America for settlement and colonisation west of the Rocky Mountains. In this context, John L. O'Sullivan in 1845 coined the term "manifest destiny," meaning that America was destined to be "the great nation of futurity"; the westward movement of civilization had no limits and was divinely ordained. According to this view, United States were no more concerned with the cyclical view of history as the rise and fall of nations and empires that prevailed since the time of the Founding Fathers. Until then, the fall of Roman Republic and/or Roman Empire had greatly inspired political debates.

However, this vision was not abandoned by other political activists in the 1840s, and resurfaced in the campaign of the National Reform Association to provide free public lands to homesteaders, notably in the new western territories opened up to colonization. From this time until the vote of the Homestead Act in 1862, the supporters of the "Vote yourself a farm" platform defended the idea of a modern yeoman republic for the United States. This was the solution proposed to guarantee the same rights and freedom to all citizens and realize the unachieved goal of the Revolution of 1776. Otherwise, decline and fall could be the destiny of the United States, just as failure of the agrarian reform promoted by the Gracchi brothers caused the end of Roman Republic and the rise of the tyrannical Empire.

We propose to examine the analogies and differences between the Roman agrarian reform and the contents of the Homestead Act. We also analyse the arguments developed by supporters of the NRA based on the model of ancient history of the Roman Republic.

4 THE ROMAN STOICISM OF IMPERIAL NEW ENGLAND, 1830-1860

Drake, Spencer (University of Cambridge)

This paper examines the co-opting of Roman virtue by Transcendentalist and Unitarian authors in antebellum New England, investigating how the expansion of a 'greater New England' across the American West and South was legitimised by its Roman colonial parallels. Styling themselves as new age republican philosophers, writers like Ralph Waldo Emerson, Henry David Thoreau, and Theodore Parker upheld the virtues of New England society as a civilising counterforce to the barbarity of the slave-holding South. Each sought to reconceptualise American expansionism along the lines of free religion, respect for indigenous peoples, and environmentalism, using Roman stoicism as a unifying foundation.

By charting the interpretation of classical thought in antebellum New Englander essays and sermons, this paper emphasises how Roman imperialism informed competing conceptions of an American empire, and how these interpretations of Roman memory came to clash in the American Civil War. Drawing from my MPhil research, it frames antebellum America as a space of internal cultural frontiers, where Northern and Southern intellectuals considered themselves locked into a death struggle for the future of the North American continent. Integral to this was their ideological legitimacy as heirs to the Greco-Roman intellectual tradition, and the qualification of Westward expansion through perceived Roman colonial precedents.

For these intellectuals, interpreting Roman expansion carried a weight in determining America's contemporary ideals and its future *raison d'être* across the North American continent. This paper concludes on how this tradition continues to the present day, and why Americans reinterpret classical memory to understand their own national values. This paper draws from Michael O'Brien's 'Conjectures of Order' and the writings of Gilbert Osofsky. It utilises extracts from Emerson and Thoreau's essays, and the sermons and personal writings of Theodore Parker.

5 EMPRESS TERESA CRISTINA AND CLASSICAL ARCHAEOLOGY IN BRAZIL: MODERN AND ANCIENT EMPIRE IN SOUTH AMERICA

Garraffoni, Renata (Federal University of Parana)

The aim of this paper is to discuss how Pompeian material culture shaped new ideas of Modernity among Rio de Janeiro elites in the 19th century. To do so, I will focus on the empress Teresa Cristina's political activities. Born in Naples, Teresa Cristina became Brazilian empress when she married D. Pedro II and created the bases for the development of studies on art, ancient culture and Classical Archaeology. Although there are many studies on D. Pedro II's connections to French Egyptology, Tereza Cristina's support to the beginning Classical Studies in the country is underestimated as her political influence among artists and elites' members in building different types of networks with Naples. I shall argue these networks enabled the elites a way to approach Brazil to Roman Empire, framing a new modern identity to the country, which became independent from Portugal a few decades early. In short, the analysis of this phenomenon thus becomes a way not only to perceive how certain segments of Brazilian society understood the

Romans but also to discuss the beginning of Classical Archaeology in the country through a gender approach. - This research has been developed with the support Spanish government through ANTIMO project, an international research group lead by Mirella Romero Recio and Jesus Sallas (Proyecto de I+D+i "La Antigüedad modernizada: Grecia y Roma al servicio de la idea de civilización, orden y progreso en España y Latinoamérica", PID2021- 123745NB-I00, MCIN/AEI/10.13039/501100011033 y FEDER)

6 FROM ARBEIA TO THE ALAMO AND BACK: COLONIAL FRONTIERS IN ROMAN EUROPE AND SPANISH AMERICA

Gardner, Andrew (UCL Institute of Archaeology)

The differences between the colonial expansion of Europeans in the Americas, and the Roman occupation of northern Europe, are many. The scale and pace of contact and conquest, the ideologies and motivations involved, the religious and cultural dimensions, and the ecological, epidemiological and technological elements all present plenty of contrasts. And yet, there are at least two reasons why we might profitably compare these episodes of colonial border-making. In keeping with much recent scholarship in 'Border Studies', comparison of different situations of frontier life can always provide insights into the dynamics of policy and practice in border situations, which can illuminate new aspects of familiar case-studies. And of course, ideas about Roman practice, even if inaccurate by modern standards, frequently played a significant role in later European empire-building, influencing the thinking of officials and military commanders. It is worthwhile, therefore, to think through the differences – and the similarities – between life in the borderlands of northern Europe over the long-term of Roman occupation, particularly in Britain, and the similarly long-lasting Spanish frontier in what became the southern US, with its infrastructure of presidios and missions. This paper will aim to outline some of the key dimensions, and analytical insights, of this comparison.

7 TALL TALES AND TELEOLOGY: ROMAN ANALOGY AND THE WINNING OF THE WEST

Kitching, Paul (Durham University)

Analogy is an essential tool for the archaeologist and polemicist alike, used differently in the processes of discovery and justification on the one hand, and communication on the other. The former concern conceptualising and warranting interpretations and are both reciprocal and reflexive; the latter concerns conveying an idea in a familiar form and is unidirectional.

This paper discusses how classical analogies were used by some nineteenth-century 'patrician' historians writing about the American frontier, for whom a primary motivation was fostering respect and pride for a nationalist cause in the present. Theodore Roosevelt's *The Winning of the West*, for instance, which considers the 'tall tales' typical of frontier lore alongside archival research, situates both within an argument extolling westward expansion and draws both directly and implicitly on unexamined analogies with Roman martial spirit, 'romanisation', imperial destiny, and a civilisation-barbarism hierarchy. It does not consider the underlying assumptions of these conceptions, nor what the experience of the American frontier might reveal about the frontiers of imperial Rome. Its definitive, teleological view of history paints a narrative of inevitable progress with analogies used not interpretatively but as shorthand.

There is no perfectly objective understanding of the past; archaeology especially, given the ontological status of material remains, is a study of the past in the present. However, the use of analogy in either interpreting evidence from the past or contextualising phenomena in the present is reciprocal and the conclusions drawn provisional. Polemic, on the other hand, is invariably unidirectional, selectively co-opting the past to communicate a pre-determined, definitive conclusion. Recognising the different uses of analogy in the historiography of the American frontier can help understand how they are employed elsewhere.

8 HOW DO I CROSS THIS HIGHWAY? OR, ASSEMBLAGE THEORY AND ROMAN URBAN DESIGN IN SMALL-TOWN TEXAS

Van Dyke, Ruth (Binghamton University - SUNY)

Assemblage theory can help us conceptualize how materials and ideas persist, gathering into diverse assemblages over time and space, sometimes with surprising and unintended consequences. In the historic Alsatian community of Castroville, Texas, Roman urban planning is a frequent topic of conversation. This surprising fact derives from the un-gainly juxtaposition of a Roman orthogonal grid system with two constraining and enabling material features: a river, and a major east-west highway. When Alsatian immigrants laid out the town in 1844, they adopted an orthogonal grid plan derived from the Laws of the Indies, a series of regulations created by the Spanish Crown for new world colonies. The Spanish adopted this idea from Roman urban design. However, Castroville town planners angled the grid so that streets would parallel a horseshoe bend in the Medina River. In the 1940s, as part of the war effort, a major east-west highway was constructed that bisected the gridded town. Today, the combination of the angled Roman grid with the highway creates acute and obtuse angles. The situation frustrates pedestrians, contributes to traffic accidents, impacts the economy, and dictates the shape of future town developments.

9 'BUILD THE WALL': ROMAN FRONTIERS AS IDEOLOGICAL NARRATIVES IN THE CONTEMPORARY UNITED STATES

Hanscam, Emily (Linnaeus University)

We know that the legacy of the Roman Empire influences national movements in the modern world; particularly in Europe, geographically linked to the former Empire, and in North America where there is a presumed intellectual link. This legacy can be acutely visible, recently seen with the leveraging of the British Iron Age and Roman past during the Brexit debates, and during the January 6th Capitol Riots in the United States which paralleled the sack of Rome. In Europe, national borders can also be a visible link to the Roman past, with some of Rome's frontiers still serving as national borders today. But, we do not fully understand the symbolic power of the Roman frontier as an ideological narrative deployed in the United States. How are ideas about the ancient Romans civilizing the barbarians and the Americans civilizing 'the West' connected? Does the narrative of the Roman frontier facilitate the contemporary notion that the US needs walls to help keep 'the barbarians' out? This paper concentrates on evolving discourse about the US/Mexico border during recent US presidential election cycles, exploring links with ideas about the Roman past.

92 STABLE ISOTOPE ANALYSIS OF CENTRAL AND EASTERN EUROPEAN SKELETAL REMAINS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Gugora, Ariana (Institute for Geological and Geochemical Research, Research Centre for Astronomy and Earth Sciences, HUN-REN, Budapest, Hungary) - Somogyvári-Lajtár, Enikő (Institute of Archaeological Sciences, Eötvös Loránd University, Budapest, Hungary; Institute for Geological and Geochemical Research, Research Centre for Astronomy and Earth Sciences, HUN-REN, Budapest, Hungary) - Novak, Mario (Centre for Applied Bioanthropology, Institute for Anthropological Research, Zagreb, Croatia)

Session format: Regular session

Stable isotope analyses of skeletal material (bones and teeth) have been an integral component of Western European and North American bioarchaeology for decades, but Central and Eastern Europe are somewhat underrepresented in this sense. It is only within the last ten or so years that isotope analyses have been used to understand the diets, lifestyles, and mobility of past populations in these parts of Europe.

As such, our aims for this session are threefold. Our primary goal is to highlight the stable isotope research performed on prehistoric and historic skeletal material from Central and Eastern Europe, potentially including samples from Austria, Croatia, Czech Republic, Germany, Hungary, Latvia, Lithuania, Poland, Romania, Serbia, Slovakia, and Slovenia, etc. We invite all types of isotope studies (e.g., C, N, O, Sr, etc.), ranging from diet and nursing/weaning to paleopathology and mobility. All time periods are welcome, as we are looking for temporally broad discussions to better understand the changes in diet, lifestyle, and mobility across Central and Eastern Europe over time. Second, we are interested in the potential research questions that are unique to these two regions. Insights may be gained about the role of culture in the dietary practices of neighboring Central/Eastern European countries; the impact of a population's shared history on the diet or lifestyle of its members; the applicability of cross-country comparisons in diet and/or mobility studies; and more. From an archaeological, anthropological, or cultural perspective, are there any differences in the stable isotope results within and between these two regions? A final aim for this session is to establish a community of researchers working in Central and Eastern Europe, with the potential for future collaboration.

ABSTRACTS

1 NEOLITHIC LAKE SHORE SETTLEMENT ARCHAEOLOGY MEETS ISOTOPIC ARCHAEOMETRY

Turck, Rouven (University of Zurich)

A complete skeletal record of humans in Neolithic features from so-called lakeside settlements in Switzerland is rare. In some cases, dislocated individual human bones are recovered from the contexts.

Initial strontium isotope studies on a small number of individuals from the greater Zurich and Zug area in Switzerland show the value of multiple sampling of single individuals: the archives of enamel, dentine and bone can reveal the complex mobility behavior of individual Neolithic individuals. Due to enamel, bone and collagen preservation seven individuals (three Horgen, four Corded Ware) are considered in the analysis strategy: the "Horgen" individuals include seven samples of enamel, dentin and bone for strontium. The "Corded Ware" individuals contain around ten analyses of dentin and enamel for strontium and three each for oxygen and carbon/nitrogen/sulphur. In particular, the elaborate referencing of bioavailable strontium in the Swiss Plateau provides an essential basis (around 20 analyses) for identifying mobile individuals.

The paper represents a kick-off to a large mobility project in Central Europe for the 4th and 3rd millennium BC. The interior of Switzerland is representing a first "core area" representing the project. In a second step, animals as well as other isotope systems such as oxygen and sulphur will be considered.

References:

R. Turck/N. Bleicher, Leben und Sterben auf dem Abfallhaufen? Eine Strontium-Isotopen-Untersuchung zu den menschlichen Skelettresten der jungsteinzeitlichen Seeufersiedlung von Zürich-Parkhaus Opéra. In: N. Balkowski/I. Hohle/K. P. Hofmann/A. Schülke (Hrsg.), Mensch - Körper - Tod. Der Umgang mit menschlichen Überresten im Neolithikum Mitteleuropas (Leiden 2023) 243-265.

2 SOME WEANING PATTERNS IN LATE NEOLITHIC POPULATION OF LATVIAN TERRITORY

Batraga, Anna (Institute of Latvian History, University of Latvia) - Czermak, Andrea (School of Archaeology, University of Oxford) - Schulting, Rick (School of Archaeology, University of Oxford) - Zariņa, Gunita (Institute of Latvian History, University of Latvia)

The transition from foraging to farming, the characteristics of the process and the regional variations are still not completely understood. In the Eastern Baltic region, the first signs of early farming are assumed to fall in the Neolithic period of the 4th–3rd millennium cal BC. The same is presumed for the area of modern-day Latvia. However, several academics argue that farming was established later, during the Bronze Age (1800 – 500 cal BC). With the introduction of farmed crops, early childhood diet and especially weaning food changed significantly. Examining if there was a shift in weaning patterns during the Neolithic can provide insights into the process.

To identify whether there is evidence of early farming in the Late Neolithic (2900 – 1800 cal BC), stable carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) isotope analyses were performed on sequential dentine samples from the first permanent molars of nine individuals from the two late Neolithic settlements of Abora and Kreiči (3484 – 1925 cal BC and 3368 – 1765 cal BC), Latvia. Teeth provide a chronological record of the dietary intake during their growth, with first molar giving insights into an individual's life history from birth to age nine. Analyses were carried out at the School of Archaeology, University of Oxford.

The results show that there are no major differences in the timing of exclusive breastfeeding, weaning and the age of cessation of breastfeeding in the Late Neolithic compared to published data from the Mesolithic/Early Neolithic at Zvejnieki. The similar $\delta^{15}N$ and $\delta^{13}C$ results indicate that there were little to no detectable changes in supplementary foods used during the weaning process. Our results show that, if the transition to farming indeed started in the Late Neolithic, it did not cause any changes in breastfeeding and weaning patterns, at least not in its initial stages.

3 THE DIETARY PRACTICES OF HUMAN COMMUNITIES AT SITE 3 IN MIECHÓW (SOUTHERN POLAND) FROM THE NEOLITHIC TO THE IRON AGE

Nowak, Marek (Institute of Archaeology, Jagiellonian University in Kraków, Poland) - Mnich, Barbara (Institute of Zoology and Biomedical Research, Jagiellonian University in Kraków, Poland) - Szostek, Krzysztof (Institute of Biological Sciences, Cardinal Stefan Wyszyński University in Warsaw, Poland) - Nowak, Oskar (Institute of Human Biology and Evolution, Adam Mickiewicz University in Poznań, Poland) - Rodzińska-Nowak, Judyta (Institute of Archaeology, Jagiellonian University in Kraków, Poland) - Przybyła, Marcin (Independent researcher)

Within the comprehensive elaboration of results of excavations conducted at site 3 in Miechów (ca. 30 km north of Kraków) isotope analyses of $\delta^{13}C$ and $\delta^{15}N$ were performed for human groups that inhabited the site since the Neolithic to the Iron Age. In total, 41 skeletons were investigated. The analyses aimed to reconstruct the nutrition strategies of communities from consecutive periods and to confront the obtained knowledge with their biological condition and current views on food management of prehistoric communities from central Europe. The results indicate a general predominance of the terrestrial diet, in which plant-based food prevailed, although it did not predominate conspicuously. However, there are indications of slightly varying nutritional strategies among successive human groups. These differences are related to the contribution of animal protein and the relationship between C3 and C4 plants. For instance, in the middle Neolithic (4th millennium BC) a greater consumption of meat can be postulated, when compared with the early Neolithic stage (late 6th and 5th millennium BC). It is also possible that a portion of the diet included food obtained from freshwater organisms. On the other hand, the proportion of meat in the diet of the early Bronze Age inhabitants (2nd millennium BC) was the lowest in the entire history of site occupation. It returned to near-Neolithic levels in the developed Bronze Age and Iron Age (1st millennium BC). Regarding plant food, the results indicate a greater variability in the plants consumed in the Bronze and Iron Ages. Levels of $\delta^{13}C$ imply some contribution of C4 plants, i.e. millet, in these periods. This complies with the recently formulated theses on younger i.e. post-Neolithic beginnings of millet cultivation and consumption in central Europe. The research was carried out under the project of the National Science Centre Poland no. 2016/23//HS3/00387.

4 EXPLORING SOCIAL INEQUALITY, DIET AND LIVESTOCK MANAGEMENT STRATEGIES AT THE EARLY BRONZE AGE COMMUNITY OF JELŠOVCE (SLOVAKIA)

Skorna, Henry (Excellence Cluster ROOTS - University of Kiel) - Wilkes, Fynn (Excellence Cluster ROOTS - University of Kiel) - Batora, Jozef (Slovak Academy of Sciences)

This study employs Carbon ($\delta^{13}C$) and Nitrogen ($\delta^{15}N$) stable isotope analysis to investigate human diet and different animal management strategies and combines it with analyses of wealth distribution in the buried of the Early Bronze Age Society of Jelšovce (okr. Nitra, Slovakia). The Early Bronze Age in South-Western Slovakia is a period of change and transition marked by shifts in social and settlement structure technological advancements, and cultural practices. This is reflected in the available rich archaeological resources. Stringed along the river Nitra, Váh, Hron and Žitava are substantial burial sites each with up to several hundred graves. Together with the pivotal settlement centre at Vrblé (okr. Nitra) they reflect on the dynamic developments in Early Bronze Age in this region. The site of Jelšovce (okr. Nitra) is an ideal case study to look at the correlation between wealth distribution and diet as it already was investigated with a wide range of interdisciplinary data. In addition to the detailed catalogue and a typological analysis, radiocarbon dates, Sr-isotope- and anthropological studies are available (including Batora 2000 and Reiter/ Frei 2015). The burial ground was used for the duration of the Early Bronze Age (2300/2200-1600 BCE) and probably provides an accurate archive of the socio-economic developments in this period. Drawing from a larger sample set of 82 human and 24 animals the dual-isotope analysis offers a unique insight into the changing diet habits, wealth relations as well as different animal management strategies in the course of the Early Bronze Age.

5 RECONSTRUCTING DIETARY PATTERNS OF INDIVIDUALS INTERRED AT THE EARLY BRONZE AGE CEMETERY IN KRZYŻANOWICE DOLNE, SOUTHEASTERN POLAND

Szczepanek, Anita (Institute of Archaeology and Ethnology Polish Academy of Sciences; Medical College Jagiellonian University) - Jarosz, Paweł (Institute of Archaeology and Ethnology Polish Academy of Sciences)

Study focuses on the stable carbon and nitrogen isotopic analysis conducted on the individuals buried at the Early Bronze Age Cemetery in Krzyżanowice Dolne, in Southeastern Poland. The research encompasses 50 individuals, with most being interred in single graves, while one mass grave containing 9 individuals was also identified. Collagen extracted from bone samples, including both human and animal remains, underwent comprehensive analysis. The findings were contextualized against a broader backdrop, incorporating Neolithic and Bronze Age samples from south-eastern Poland, along with local environmental data derived from plant macroremains dated to the Neolithic era. The isotopic values obtained from the individuals at Krzyżanowice Dolne enabled the reconstruction of the community's diet. The general dietary pattern suggested an inland orientation, primarily reliant on C3 plants, complemented by diverse quantities of animal products. Comparative analysis with data from the mobile Corded Ware culture population, as well as the Globular Amphora and Mierzanowice culture communities, revealed a notable prevalence of animal-derived food sources. Additionally, the study highlighted variations attributable to the age at death, particularly evident in a distinct group of the youngest children. However, the distinctions between adult females and males were not readily discernible. This research was funded by the National Science Centre Poland, grant number NCN 2020/39/B/HS3/00454.

6 EXPLORING DEVIANT BURIALS THROUGH STABLE ISOTOPE ANALYSES: A CASE STUDY OF THE EARLY FIRST MILLENNIUM BC JURILOVCA-ORGAME SITE (ROMANIA)

Petrache, Noria (Doctoral School of History, Faculty of History, University of Bucharest, Romania; ArchaeoSciences Platform, Research Institute of the University of Bucharest (ICUB), Romania) - Ailincăi, Sorin (Doctoral School of History, Faculty of History, University of Bucharest, Romania; Institute of Eco-Museum Research (ICEM), Tulcea, Romania) - Constantinescu, Mihai (Faculty of History, University of Bucharest, Romania) - García-Vázquez, Ana (ArchaeoSciences Platform, Research Institute of the University of Bucharest (ICUB), Romania)

The funerary customs of emerging settlers at the onset of the Late Bronze Age in Dobroudja (Southeastern Romania), assigned to the Babadag culture (c. 1000-800 BC), mirror the broader cultural shifts and social restructuring that occurred during the early first millennium BC. Given the absence of designated cemeteries and the exclusive adoption of settlement burials, often labelled as “deviant” or “macabre”, this study highlights the significance of stable isotope analysis in elucidating human behaviour and adaptation in response to socio-environmental changes.

This paper presents the isotopic data derived from 12 individuals (6 males, 4 females and 2 indeter, of different ages), discovered in a singular pit in the precolonial level at Orgame (Jurilovca), marking the first attempt to conduct stable isotope analyses within these communities. Burial practices can be seen as windows into the societal framework and cultural dynamics, potentially signifying social stratification. By employing the analysis of stable isotopic ratios ($\delta^{13}C$, $\delta^{15}N$) of bone collagen, we test the common archaeological hypothesis that deviant burials may represent socially marginalized or distinct individuals. Furthermore, we assess the interplay between dietary habits and the wide-rang-

ing spectrum of this era's climatic, cultural and environmental transformations. Through the application of isotope analysis, the study addresses questions regarding sex- and age-related variations in dietary patterns and delineates subsistence strategies that can be correlated with the societal standing of the individuals interred at this site.

The study highlights the value of isotopic analysis in archaeology by having the potential to unravel the complex web of human consumption patterns associated with burial practices, environmental adaptation, and societal evolution during the Late Bronze Age in the Lower Danube region. Moreover, this research perspective enables us to address a significant knowledge gap between two European regions that regrettably lack a comprehensive molecular mapping of their respective environments.

7 POPULATION DYNAMICS IN CROATIA: STRONTIUM ISOTOPE ANALYSIS OF CREMATED REMAINS FROM SLATINA (LATE BRONZE AGE) AND ZVONIMIROVO-VELIKO-POLJE (LATE IRON AGE)

Legrand, Emma (Archaeology, Environmental Changes and Geo-Chemistry research group, Vrije Universiteit Brussel, Belgium) - Ložnjak Dizdar, Daria (Institute of Archaeology, Zagreb, Croatia) - Dizdar, Marko (Institute of Archaeology, Zagreb, Croatia) - Rajić Šikanjić, Petra (Institute for Anthropological Research, Zagreb, Croatia) - Novak, Mario (Institute for Anthropological Research, Zagreb, Croatia) - Šlaus, Mario (Anthropological Centre of Croatian Academy of Sciences and Arts, Zagreb, Croatia) - Griffith, Jacob (Archaeology, Environmental Changes and Geo-Chemistry research group, Vrije Universiteit Brussel, Belgium) - James, Hannah (Archaeology, Environmental Changes and Geo-Chemistry research group, Vrije Universiteit Brussel, Belgium) - Snoeck, Christophe (Archaeology, Environmental Changes and Geo-Chemistry research group, Vrije Universiteit Brussel, Belgium)

Strontium isotope analysis ($^{87}Sr/^{86}Sr$) is a commonly employed method for the investigation of mobility in archaeological populations. However, as the strontium (Sr) assimilated in skeletal tissues relies on food intake, $^{87}Sr/^{86}Sr$ also allows for the investigation of diet and land-use patterns, and provides multiple lines of understanding of past populations.

Slatina and Zvonimirovo-Veliko Polje (ZVP), are two multi-phases sites located in the Drava valley, in Northern continental Croatia. In Slatina, an Urnfield culture cemetery dated to the 11th century BC was recovered, alongside a few graves from the Early Iron Age. In ZVP, a rich middle La Tène cemetery dated from the end 3rd c./first half of the 2nd BC was excavated, and is to this date the only systematically investigated cemetery from that period in Northern Croatia. Despite being separated by less by 20km, preliminary $^{87}Sr/^{86}Sr$ results on cremated samples from 5 individuals from Slatina, and 3 individuals from ZVP showed already striking differences between populations of these two sites (around 0.7130 and 0.7115 respectively). To better understand the reasons behind this variation, additional cremated samples from both sites were analyzed for Sr isotopes and concentrations. Similar analysis was also conducted on plants collected within a radius of 30km from both sites, to provide a local baseline and as part of the construction of a bioavailable Sr isoscape for continental Croatia. The aim of this study is to look into factors such as mobility patterns, dietary habits or landscape use on a diachronic perspective, to provide first insights into the variability observed.

8 UNVEILING LATE BRONZE AGE CEMETERIES IN NORTH-EASTERN SLOVENIA: A COMPREHENSIVE ANALYSIS OF $^{87}SR/^{86}SR$, $\delta^{88}SR$, AND [SR]

Gerritzen, Carina (Archaeology, Environmental Changes and Geo-Chemistry Research Unit, Vrije Universiteit Brussel) - Goderis, Steven (Archaeology, Environmental Changes and Geo-Chemistry Research Unit, Vrije Universiteit Brussel) - Črešnar, Matija (Centre for Interdisciplinary Research in Archaeology, Department of Archaeology, Faculty of Arts, University of Ljubljana) - Leskovar, Tamara (Centre for Interdisciplinary Research in Archaeology, Department of Archaeology, Faculty of Arts, University of Ljubljana) - James, Hannah (Archaeology, Environmental Changes and Geo-Chemistry Research Unit, Vrije Universiteit Brussel) - Gruškovnjak, Luka (Centre for Interdisciplinary Research in Archaeology, Department of Archaeology, Faculty of Arts, University of Ljubljana) - Potočnik, Doris (Department of Environmental Sciences, Jožef Stefan Institute, Slovenia) - Ogrinc, Nives (Department of Environmental Sciences, Jožef Stefan Institute, Slovenia) - Snoeck, Christophe (Archaeology, Environmental Changes and Geo-Chemistry Research Unit, Vrije Universiteit Brussel)

The fascination with archaeological sites in north-eastern Slovenia, particularly those from the late Bronze Age, has persisted for more than a century. Geographically, this region is bordered by the Alps in the west and extends towards the expansive Pannonian plain in the east. In recent decades, several flat cremation cemeteries dating back to the Late Bronze Age (approx. 1050-800 BC) have been unearthed in north-eastern Slovenia, also due to extensive construction activities in the area. Some of these sites house a significant number of cremations, with thorough osteological analyses conducted to date. The analysis of grave goods has been employed in previous attempts to discern social structures among various sites. Presently, ongoing modern scientific analyses are shedding new light on cremation burials and social structures in north-eastern Slovenia during the Late Bronze Age (1050-800 BC) by integrating novel methodological approaches with existing excavation reports

This research presents findings from a combined analysis of $^{87}\text{Sr}/^{86}\text{Sr}$, $\delta^{88}\text{Sr}$, and $[\text{Sr}]$ on cremated human remains from five cemeteries comprising a total of 181 individuals in north-eastern Slovenia. The concentrations and isotopic compositions of Sr in bones provide direct insights into the human diet. The investigation involving the comprehensive analysis of $^{87}\text{Sr}/^{86}\text{Sr}$, $\delta^{88}\text{Sr}$, and $[\text{Sr}]$, along with the comparison of results across different sites, offers a distinctive perspective on the social structures within north-eastern Slovenia. Offering insights into palaeomobility ($^{87}\text{Sr}/^{86}\text{Sr}$), and diet ($\delta^{88}\text{Sr}$, and $[\text{Sr}]$), of the population.

9 PRELIMINARY RESULTS OF THE MULTI-ISOTOPE ANALYSIS IN THE HALLSTATT PERIOD BI-RITUAL CEMETERY AT MODŘICE (8TH-5TH CENTURY BCE, CZECH REPUBLIC)

Vytlačil, Zdenek (National Museum, Czech Republic; Department of Anthropology and Human Genetics, Faculty of Science, Czech Republic) - Drtikolová Kaupová, Sylva (National Museum, Czech Republic) - Tvrđý, Zdeněk (Anthropos Institute, Historical museum, Moravian Museum, Czech Republic) - Kos, Petr (Institute for Archaeological Heritage, Czech Republic)

Analysis of strontium, carbon, nitrogen and sulphur isotopes has been performed on Hallstatt period (8th-5th century BCE) individuals buried in a bi-ritual cemetery at Modřice in South Moravia (Czech Republic) in order to explore their diet and mobility. The preliminary results are presented. The strontium analysis of 24 skeleton and 24 cremation burials suggest high mobility among elites and individuals with a presumed religious role, as well as craftsman, with possible links to the areas of today's Germany and Austria, as suggested by the character of the accompanying grave goods. Dietary analysis of bone collagen of 26 inhumations (accompanied by 19 samples of comparative faunal samples) suggest diet of terrestrial origin with the notable proportion of millet and surprisingly low input of animal products.

The study was funded by the Czech Ministry of Culture (DKRVO 2024-2028/7.l.a, 00023272) and the Ministry of Education, Youth and Sports (OP JAK: Ready for the future: understanding long-term resilience of the human culture; RES-HUM; CZ.02.01.01/00/22_008/0004593).

10 STABLE ISOTOPE INVESTIGATION AIMING THE DIETARY HABITS OF THE LATE ROMAN AGE COMMUNITY IN MAROSSZENTANNA, TRANSYLVANIA

Major, Istvan (HUN-REN ATOMKI) - Futó, István (HUN-REN ATOMKI) - Körösfői, Zsolt (Jósa András Museum)

Once, the Dacia province had been surrendered by the Romans in 271, the route to Transylvania was opened for barbarian ethnic groups. By the 4th century, this area formed the western edge of the extensive Marosszentanna-Chernyahov culture, which can be identified as a mixed ethnic confederation of Germans, Sarmatians and Thracians led by the Visigoths. In our study, we wanted to gain a more precise insight into the dietary habits of this group, using stable carbon and nitrogen isotope analysis of bone remains deriving from the Marosszentanna cemetery. Based on our results, it can be seen that the $\delta^{13}\text{C}$ values of the studied population are relatively less negative ($-15.4 \pm 1.2\%$), while the $\delta^{15}\text{N}$ values are in the middle of the range typical for humans ($10.1 \pm 1.0\%$). Compared to other contemporaneous groups in Europe, these new stable isotope ratio results differ significantly from the values associated to Northern European populations and are more similar to the ones found in the Mediterranean region being closer to the Transylvanian Basin. The greatest similarity was found related to the values of the mixed ethnic groups in the post-imperial age Pannonian basin, suggesting similar lifestyle. This can be seen in the medium or minimal consumption of animal protein (mainly terrestrial species) and in the greater contribution of cereal crops, partly millet.

11 NO MAN AN ISLAND: INSULAR DIET FROM THE LATE ANTIQUE SITES OF MARTINŠĆICA AND MIRINE, EASTERN ADRIATIC

Caric, Mario (Institute for Anthropological Research, Centre for Applied Bioanthropology) - Causevic-Bully, Morana (Université de Franche-Comté, UMR Chrono-environnement) - Delliste, Anaïs (UMR ArTeHiS, Université de Bourgogne) - Bully, Sébastien (CNRS-UMR ARTEHIS, Université de Bourgogne) - Novak, Mario (Institute for Anthropological Research, Centre for Applied Bioanthropology)

The results of the carbon (^{13}C) and nitrogen (^{15}N) stable isotope analysis of 24 human samples from the Late Antique-Early Medieval site of Mirine located on the island of Krk, and the same-period site of Martinšćica located on the island of Cres (both dated around 5th century CE), provides an excellent ground for comparing potentially different dietary habits from geochronologically similar site. Such studies may indicate minute but visible differences which further expands not only diet, but also the overall reconstruction of lifestyle of past populations. Stable isotope analysis of bone collagen was conducted as part of the broader archeological excavation on the aforementioned sites, and so far, provides one of the few such results from the Late Antique period of Croatia. In addition, it also gives us an opportunity to compare the obtained data with those from earlier periods, which ultimately may point to potential shifts in diet on a territory oftentimes marked with turbulent migrations phases.

12 DIETARY TRANSITIONS DURING THE MIGRATION PERIOD IN CENTRAL AND SOUTHEASTERN EUROPE: NEW DATA AND PRELIMINARY INTERPRETATIONS

Djukic, Ksenija (Center of Bone Biology, Faculty of Medicine, Belgrade (Serbia)) - Toyne, JM (University of Central Florida, Orlando, Florida, USA) - Carić, Mario (Institute for Anthropological Research, Zagreb, Croatia) - Dugonjić, Anita (Archaeological Museum Zagreb, Zagreb, Croatia) - Rapan Papeša, Anita (Vinkovci Municipal Museum, Vinkovci, Croatia) - Novak, Mario (Institute for Anthropological Research, Zagreb, Croatia)

The main aim of this study is to elucidate regional patterns in the diets of early medieval Central and Southeastern Europe. In addition, we will explore possible changes in dietary variation between and within three cemeteries from the territory of modern Croatia (Vinkovci) and Serbia (Kormadin near Jakovo and Gradina-Jelica). Based on the archaeological contexts, all the investigated cemeteries are dated into the 6th century CE. From Vinkovci, 13 individuals (2 non-sexed adults, 4 adult males, and 7 adult females); from Kormadin, 6 individuals (3 non-adults and 3 adult males); while from Gradina-Jelica, 20 individuals (3 non-adults, 4 non-sexed adults, 10 adult males and 3 adult females) were included in this study. To explore stable isotope data, we selected 58 samples (bone and tooth) from burials across the sites.

The carbon and nitrogen stable compositions for bone samples suggest a broadly similar dietary range across each site and limited variation within sites. There appears a strong focus on C3 based plant resources (such as wheat, oats, barley) with limited C4 plants (millet), although juveniles may have been supplemented with millet during the weaning stage. There also appears to be consistent terrestrial animal protein in the diet of all members of each community. Only a few higher $\delta^{15}\text{N}$ values among females may suggest possible pathophysiological stresses impacting isotopic compositions. Tooth samples in Vinkovci seem to suggest that several individuals may have started life in quite a distinct dietary regime compared to paired later life bone carbon isotope compositions, thus reflecting that some individuals experienced relocation. While representing broadly different geographic locations and regions impacted variably by ongoing Migration Period processes, at first review, there appear to be common dietary patterns characterizing these sites.

13 „WHAT HAVE THE ROMANS EVER DONE FOR US? MULTI ISOTOPE DATASET FROM LATE ANTIQUE AND EARLY MEDIEVAL SLOVENIA

Faragó, Norbert (Eötvös Loránd University) - Milavec, Tina (University of Ljubljana) - Koncz, István (Eötvös Loránd University) - Vyas, Deven (Stony Brook University) - Leskovar, Tamara (University of Ljubljana) - Vida, Tivadar (Eötvös Loránd University) - Geary, Patrick (Institute for Advanced Study, Princeton) - Veeramah, Krishna (Stony Brook University)

In recent decades, isotope research in bioarchaeology has described a very distinctive arc. A promising and revolutionary discipline in the early 2000s, it has gradually shown its potential over the past decades. However, as the technology became more mature by the 2020s, its limitations became increasingly apparent. In this process, in which isotope studies have sought links with archaeology and other bioarchaeological methods, the Central and Eastern European region has unfortunately only taken a limited part. In the present study, we aim to add to the hitherto modest knowledge base with more than 200 Sr and more than 300 C/N data from three Slovenian regions, namely the areas including Ljubljana and Celje and the Vipava River Valley, and to open new perspectives for joint paleogenomic, archaeological and cultural-historical interpretation.

Our results, although limited in themselves, combined with the results of genomic analysis, support a narrative that reconstructs the continued existence of the local population in the nearby highland settlements as the late Roman centres in present-day Slovenia were depopulated following the decline of Roman rule. On one side, evidence for this is provided by the homogeneity of human Sr data, the narrower local Sr baselines, which rather indicate a great difference in land use and nutrition habits than the arrival of new incomers. On the other side, the relatively large size of pedigrees with few unrelated individuals and the decline in genetic diversity support this reconstruction. Later, during the 9th and 10th centuries, the Sr isotopic distribution became more heterogeneous with some individuals yielding more various Sr signals and increased mobility, while a new northeast European genetic component appeared in the sites, supporting the appearance of new populations in the territory.

14 LIVING AT THE LAKE - RECONSTRUCTING THE DIET OF MEDIEVAL INHABITANTS AROUND THE LAKE OF ZURICH, SWITZERLAND

Goujon, Antoinette (Institute of Archaeology, University of Zurich)

Swiss lakesides have been popular settlement areas since Prehistory due to their natural abundance of resources. Many settlements have been documented for the Lake Zurich, ranging from the Neolithic until today. As the human remains from prehistoric periods are scarce and fragmented, historical skeletal material provides a welcome first insight into questions relating to diet and health around the Lake Zurich area. The studied sites date from the Early

Middle Ages to the Early Modern Times (c. 550–1500 calAD) and provide a vast amount of information to examine life histories: Not only are there ample archaeological and anthropological sources, but, furthermore, historical sources from the studied region and periods concerning daily life, prices, and food, adding to this discussion. The chosen human remains (n=100) have not yet been investigated through archaeometrical analyses. Apart from having great potential for approaching socio-economic and socio-cultural questions and providing abundant information on diet through interdisciplinary studies, archaeometrical analyses of human remains also shed light on possible location-related dating biases (e.g. radiocarbon reservoir effects), which have yet to be investigated in Switzerland.

This study combines historical sources, anthropological and palaeopathological examinations with stable isotope and ancient protein analyses to investigate the diet of medieval rural and urban communities around the Lake Zurich. Even though the study focuses on a specific region and time frame, the outcomes provide a foundation for further diachronic studies throughout Europe.

15 THE PALEODIET EVOLUTION DURING THE 8TH-12TH CENTURY IN THE VENETIAN LAGOON (ITALY)

Lonocce, Norma (Department of Cultural Heritage, University of Salento, Lecce, 73100, Italy) - Viva, Serena (Department of Cultural Heritage, University of Salento, Lecce, 73100, Italy; Department of History and Cultural Heritage, University of Siena, Siena, 53100, Italy) - Turetta, Clara (Institute of Polar Sciences – National Research Council CNR-ISP) - Cadamuro, Silvia (Department of Humanities, Ca' Foscari University, Venice, Italy) - Bonato, Emanuele (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice, Via Torino, 155, 30172 Venezia Mestre, Italy) - Giummolè, Federica (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice, Via Torino, 155, 30172 Venezia Mestre, Italy) - Barbante, Carlo (Institute of Polar Sciences – National Research Council CNR-ISP; Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice, Via Torino, 155, 30172 Venezia Mestre, Italy) - Gelichi, Sauro (Department of Humanities, Ca' Foscari University, Venice, Italy) - Battistel, Dario (Institute of Polar Sciences – National Research Council CNR-ISP; Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice, Via Torino, 155, 30172 Venezia Mestre, Italy)

The archaeological project at the site of Jesolo (ancient Equilo; Venice, Italy), under the direction of Ca' Foscari University, in recent years has focused on the locality of St. Mauro, where research has given centrality to the medieval cemetery that developed inside and outside the ecclesiastical buildings. The aim was to analyze in detail a significant population sample related to a community that developed in the Venetian lagoon from the 8th to the 12th century. Bio-anthropological analyses have recently been complemented by the paleodiet research, reconstructed by the stable isotopes analysis of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ found in collagen of teeth and bones from St. Mauro sample. A total of 52 individuals of various ages, sex, chronologies, and pathological condition were included in this study. Our findings revealed the presence of two distinct dietary patterns influenced only by chronology. We observed that a more fish-based diet (30–60% of the overall diet) prevailed between the 8th and 10th centuries. However, between the 10th and 12th centuries, fish consumption decreased (10–30% of the overall diet), and there was a shift towards a diet rich in terrestrial protein sources. We link this change in dietary habits to economic development also evidenced by the transformations of the site and increased trade with the hinterland. Furthermore, it was observed significantly higher $\delta^{15}\text{N}$ values in individuals from 8th–10th compared to those from 10th–12th centuries. We proposed two potential explanations: a shift in child-rearing practices, such as delayed weaning during early middle age compared to late middle age, or a change in diet of breast feeders.

16 ISOTOPIC ANALYSIS IN BIOARCHAEOLOGY: A CASE STUDY FROM TRANSYLVANIA

Fennell, Dorothea (University of South Florida) - Zejdlik, Katie (Western Carolina University) - Nyáradi, Zsolt (Haáz Rezső Múzeum) - Bethard, Jonathan (University of South Florida)

For the last several decades, bioarchaeologists have made great strides in interpreting the subsistence strategies and dietary patterns of past communities around the world. In particular, bioarchaeologists have made particular use of isotopic analyses of carbon (^{13}C) and nitrogen (^{15}N) in dietary reconstructions. This study aims to use bulk stable and compound-specific isotopic analysis to reconstruct the diet of Transylvanians uncovered from the Văleni-Papdomb archaeological site in Harghita County, Romania. The church and associated cemetery sit in a secondary valley of the Târnava Mare River, with traces of 661 burials ranging from the tenth to seventeenth centuries. Collagen was extracted from over 150 individuals, including one equine sample, by demineralization and solubilization of the bone. Samples then underwent bulk stable isotope analysis via Continuous Flow Elemental Analyzer Isotope Ratio Mass Spectrometry (CF-EA-IRMS) at the Marine Environmental Chemistry Lab at the University of South Florida. Five samples were selected to undergo compound specific isotope analysis of amino acids, to allow for a more detailed interpretation of protein sources. Samples were derivatized to N-acetyl methyl esters, then analyzed via Gas Chromatography Combustion Isotope Ratio Mass Spectrometry (GC-C-IRMS) at the Stable Isotope Facility of the

University of California, Davis. Initial results from the bulk stable analysis indicate diet was primarily focused on C3 terrestrial protein sources, though analysis of the compound-specific data is required.

17 MOBILITY AT THE PROBABLE MEDIEVAL MUSLIM CEMETERY IN OROSHÁZA, HUNGARY USING STABLE STRONTIUM AND OXYGEN ISOTOPE ANALYSES

Gugora, Ariana (Institute for Geological and Geochemical Research, Research Centre for Astronomy and Earth Sciences, HUN-REN) - Demény, Attila (Institute for Geological and Geochemical Research, Research Centre for Astronomy and Earth Sciences, HUN-REN) - Farkas, Csaba (Institute for Geological and Geochemical Research, Research Centre for Astronomy and Earth Sciences, HUN-REN) - Somogyvári-Lajtár, Enikő (Institute of Archaeological Sciences, Eötvös Loránd University; Institute for Geological and Geochemical Research, Research Centre for Astronomy and Earth Sciences, HUN-REN) - Rózsa, Zoltán (Archaeological Institute, Hungarian National Museum) - Fóthi, Erzsébet (Institute of Archaeogenomics, Research Centre for the Humanities, HUN-REN)

Orosháza, in southeastern Hungary, has a unique history. Archaeological and zooarchaeological evidence suggests that, in the Middle Ages (11th–13th centuries CE), it was home to some of the Muslims that were likely involved in trade and/or regional tax collection on behalf of the Hungarian kings. The complete absence of pig (*Sus scrofa*/*Sus* sp.) bones at the site indicates that the individuals did not consume pork, which is considered unusual in medieval Hungary. Further supporting the conclusion that these individuals were Muslim are their burial positions (skulls turned towards where they thought Mecca was), a general lack of grave goods, and their niche burials.

Here we present the first stable isotopic study examining the mobility of the purported Muslim population at medieval Orosháza. Stable strontium isotope analysis was performed on dental enamel, whereas stable oxygen isotope analyses were conducted on both enamel and bone, from skeletal phosphate, because it is impervious to post-depositional diagenetic alteration, unlike skeletal carbonate. Combining these two isotopes enabled us to distinguish between locals and non-locals, as well as to tentatively identify the most likely areas of origin for the non-locals. The results show that several of the studied individuals were not local. Instead, they were born elsewhere and traveled to Orosháza a few years prior to their deaths. The $\delta^{18}\text{O}$ values indicate that these people came from a cooler, mountainous place, potentially somewhere in the Balkans or the Volga-Ural region. This pioneering study is not only important archaeologically and historically, but also biochemically and geochemically, as it uses the more reliable skeletal phosphate for the first time in Hungary.

This project was financed by a grant from the National Research, Development, and Innovation Fund (Grant KP2020-NKA-20).

18 LIFE AT MEDIEVAL OROSHÁZA ACCORDING TO THE STABLE ISOTOPE ARCHAEOLOGICAL EXAMINATION

Somogyvári-Lajtár, Eniko (Institute of Archaeological Sciences, Eötvös Loránd University; Institute for Geological and Geochemical Research, Research Centre for Astronomy and Earth Sciences, HUN-REN) - Gugora, Ariana (Institute for Geological and Geochemical Research, Research Centre for Astronomy and Earth Sciences, HUN-REN) - Rózsa, Zoltán (National Archaeological Institute, Hungarian National Museum) - Fóthi, Erzsébet (Institute of Archaeogenomics, Research Centre for the Humanities, HUN-REN)

Learning about the dietary habits of past communities can provide a glimpse into their daily lives. Food consumption is both a biological necessity and a sociocultural phenomenon. In the case of the population of medieval Orosháza (11th–13th centuries CE), this is a particularly important fact. This site is located in the Great Hungarian Plain in southeastern Hungary and is unique in Hungarian medieval archaeological research. The archaeological and archaeozoological findings from the settlement indicate that a Muslim community may have resided there. Furthermore, their funerary practices also support this hypothesis.

In this study, we examined the diet and lifestyle of 67 individuals from the cemetery of Orosháza. The research questions were: Is it possible to identify Muslim traditions in the population's dietary habits? Were there any differences in the diet between the biological sexes? How could we characterize childhood and adulthood dietary habits? Could we observe changes in the individual's life course based on their nutrition? Could we detect connections between paleopathological conditions and dietary habits? We measured stable carbon and nitrogen isotope ratios on bone and tooth dentine collagen samples, as well as stable carbon and oxygen ratios on enamel apatite carbonate samples to determine dietary habits on both the individual and population levels.

The project was funded by a grant from the National Research, Development, and Innovation Fund (Grant KP2020-NKA-20).

19 RECONSTRUCTING DIET OF MEDIEVAL POPULATIONS IN NORTHERN CROATIA: THE IVANEC-STARI GRAD SITE AND STABLE CARBON AND NITROGEN ISOTOPE ANALYSES

Kokotovic, Tea (Institute of Archaeology, Zagreb, Croatia) - Bedić, Željka (Institute for Anthropological Research, Zagreb, Croatia) - Krznar, Siniša (Institute of Archaeology, Zagreb, Croatia) - Sirovica, Filomena (Archaeological Museum in Zagreb, Croatia) - Belaj, Juraj (Institute of Archaeology, Zagreb, Croatia)

When reconstructing the diet of medieval populations in northern Croatia, one can follow multiple lines of inquiry. So far, most of the information on this subject came from written sources, zooarchaeological and paleobotanical analysis, and paleodentological studies. Stable isotope analyses are still rare and mostly focused on earlier periods. This lack of data prompted the study of the High and Late Medieval population based on samples collected during archaeological excavations at the Ivanec-Stari grad site in northwestern Croatia. This is a multiperiod site dating from antiquity to the modern period. Archaeological excavations unearthed the remains of a Renaissance castle, three churches, and a total of 324 burials. The cemetery, used until the beginning of the 17th century, was established at the end of the 11th century around the Romanesque church. At the beginning of the 14th century, it slightly shifted around the new Gothic church-fortress built by Knights Hospitallers. Following stratigraphic data, obtained radiocarbon dates, and changes in funerary practices, burials were separated into five successive phases.

To reconstruct the dietary habits of the local population in the period between the 11th and 14th centuries, stable carbon and nitrogen isotope analyses were conducted. The series includes 30 adult human bone samples from the first three burial phases in Ivanec and 16 animal bone samples from the same geographic region. The majority of the individuals had $\delta^{15}\text{N}$ and $\delta^{13}\text{C}$ values consistent with a diet based on terrestrial food sources, primary C3 plants with relatively low animal protein intake, and, depending on the burial phase, varying quantities of C4 plants, like millet. Compared with the available stable carbon and nitrogen isotope data from the region, but also in conjunction with historical sources, archaeological context, and bioarchaeological data, these results provide new insights into the dietary trends of medieval populations in continental Croatia.

20 THE USE OF SULPHUR ISOTOPE ANALYSIS FOR DIETARY RECONSTRUCTION IN BIOARCHAEOLOGY: A CASE STUDY FROM THE SZEKLER REGION OF TRANSYLVANIA

Christelow, Hollie (University of Bradford) - Koon, Hannah (University of Bradford) - Zsolt, Nyáradi (Haáz Rezső Múzeum) - Zejdlík, Katie (Western Carolina University) - Bethard, Jonathan (University of South Florida)

For the last several decades, bioarchaeologists have reconstructed subsistence practices of past communities through stable isotope analyses. It is well known that food and drink contain isotopic signatures which track aspects of past peoples' energy and protein consumption. Carbon and nitrogen isotopic data are utilised routinely; however, additional isotopic systems are gaining importance in bioarchaeological studies. Among these, analyses of sulphur isotopes are becoming more common and have added additional information to what is known about past communities. In this presentation, a review of sulphur isotopic analysis in bioarchaeology will be presented, along with a case study from an archaeological context in Transylvania.

Szeklers are a community of Hungarian speakers who have inhabited the Transylvanian region eastern Europe for a millennium. This research focuses on a site called Papdomb which represents a local village church and churchyard used for approximately eight hundred years throughout the medieval and early modern periods, broadly dated to the 11th -19th centuries. Carbon, nitrogen, and sulphur isotopic data derived from bone collagen of adult individuals (n=95) representing the span of the site's use will be presented in this presentation. Preliminary analyses suggest that social status is a possible reason for variation observed in the isotopic data from this site. Overall, this presentation will focus on how sulphur isotopic analysis complements traditional datasets utilised in bioarchaeological contexts.

21 LATE MEDIEVAL CEMETERY ON BOKŠTO STR. IN VILNIUS: DIETARY PRACTICES OF THE ORTHODOX COMMUNITY

Kaplunaite, Irma (The Lithuanian institute of History) - Jonaitis, Rytis (The Lithuanian institute of History)

In 2006 – 2014 archaeological research was carried out in Vilnius, at Bokšto Street. An exceptional object was discovered here – the late medieval cemetery dating back to the last third of the 13th – early 15th centuries. This is the earliest currently known burial ground in the city. At that time, Vilnius, as the capital of the Grand Duchy of Lithuania, was still growing. Three different communities lived here – local pagans and newcomers Christians – Catholics and Orthodox. During the late medieval period, the majority of the population in Lithuania was still pagan and practiced cremation. Meanwhile, the Orthodox Christians who settled in pagan Vilnius were buried at Bokšto Str. cemetery in inhumation graves.

Out of 533 skeletal remains from this burial ground, 50 individuals were chosen for carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) isotope analyses of bone collagen. The results of $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ allow us to determine and evaluate the dietary habits of the late medieval Orthodox community, which left the burial ground, and reveal significant differences

in nutrition determined by biological sex, age, and social status. Additionally, in this presentation, the obtained results are further compared with later burial grounds in Vilnius and its surroundings, which facilitates distinction of the peculiarities in dietary practices of one confessional group – the Orthodox – and their changes over time.

22 HUMAN DIET IN VILNIUS IN THE 13TH - 18TH CENTURIES

Jonaitis, Rytis (The Lithuanian institute of history; Vilnius University) - Kaplūnaitė, Irma (The Lithuanian institute of history; Vilnius University) - Motuzaitė Matuzevičiūtė, Giedrė (The Lithuanian institute of history; Vilnius University) - Brindzaitė, Rūta (Vilnius University) - Jankauskas, Rimantas (Vilnius University)

Since the end of the 13th century Vilnius started to develop into the multicultural urban entity. Yet, very little is known how those processes unfolded and the different social and confessional groups subsisted and lived along each other.

We present the thorough study on the dietary habits of the chronologically and socially diverse Vilnius population. The study is based on the material from 14 different burial grounds located within the city and dated between the 13th – 18th centuries. Out of ca 2000 recovered skeletal remains, 250 adult individuals were chosen for stable isotope ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) analyses of bone collagen. The interpretation of dietary results from stable isotope measurements were done in the light of grave goods, contextual information, past zooarchaeological and botanical analyses, along with historical sources from Vilnius City. This research enables the assessment of the: a) changes in Vilnius population subsistence over time; b) diets of different confessional communities in Vilnius; c) differences between social classes and biological sex.

Our research has shown that the dietary basis of the population in Vilnius mainly consisted of C3 plants of terrestrial origin, which was supplemented with meat and dairy products. Statistically significant dietary differences were particularly evident when comparing population from the 13th – 15th centuries with the population from the 16th – 18th centuries. In addition, dietary differences were observed between adult men and women of Catholic, Orthodox and Protestant communities and between representatives of different social groups.

Project is funded by the Research Council of Lithuania (contract No. S-MIP-23-59).

93 POST-EARTHQUAKE SCENARIOS IN THE CLASSICAL AND MEDIEVAL PERIODS. ARCHAEOSEISMOLOGY AS A TOOL FOR INVESTIGATION ON AN URBAN AND ARCHITECTURAL SCALE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Arrighetti, Andrea (École normale supérieure - Université PSL of Paris; Università degli Studi di Siena) - Pecchioli, Laura (Humboldt Universität of Berlin; Technische Universität Wien; Università degli Studi ROMA TRE) - Thomalsky, Judith (German Archaeological Institute, Berlin) - Sousa, Ana Catarina (Centro de Arqueologia da Universidade de Lisboa)

Session format: Regular session

Ancient times and the Middle Ages records contain many references to natural disasters. Tectonic activity, with its associated geological processes, such as volcanism and earthquakes, has been regarded as drivers of early human evolution (as path makers) and as reasons for both the collapse of the Roman Empire (Vesuvius/Pompeii) and major changes in the modern age (Lisbon, 1755). Also, long-term tectonic processes have significantly transformed our prehistoric landscapes and former humankind's well-known worlds that can be related to changing dispersal routes, economy, site patterns and human evolution from the Holocene until the Medieval Ages.

Surviving documents and geological and archaeological evidence are essential in understanding and interpreting the data relating to traces on site, which are often the result of co-calamities. In this context, archaeoseismology provides an interdisciplinary investigation tool to gain field experience and train an interpretative approach based on scientific and humanistic methods, enriching historical seismology. In the current research framework, topics such as resilience and adaptability to seismic events, if analyzed on an urban scale, highlight peculiar aspects and choices (social, economic, architectural, infrastructural, and political) connected to the life of that community. If we focus on a post-earthquake disaster, continuity, and change, characterize the resilience of many ancient and current societies, express themselves in the advancement of building construction techniques, in the choice of migration or permanence in the affected areas, in the policy of aid in a post-disaster and the reuse of construction materials. In this way, it is possible to investigate the risk perception, such as post-disaster reconstruction or abandonment choices.

The session proposal considers projects developed in urban and territorial scale contexts in seismic areas. Investigation methodologies, techniques, and research perspectives are introduced, and focalizing the research results will better define the role of archaeoseismological data.

1 PROTECT: AN ARCHAEOSEISMOLOGY PROJECT FOR THE STUDY OF THE HISTORIC CITY CENTRE OF SIENA

Arrighetti, Andrea (École normale supérieure - Université PSL; Università degli Studi di Siena)

The archaeoseismological study of historic centres located in seismic areas allows to acquire an in-depth knowledge of the effects certain earthquakes had on material components, while at the same time providing evidence of the social, economic and political dynamics that arose in the wake of these events. These processes remain imprinted in the architecture, which often becomes the sole witness of a seismic past, the comprehension and understanding of which is in constant development. The project PROTECT – Knowledge for PReventiON – Techniques for repairing seismic damage from the medieval period to the modern era, financed by the European Union's Horizon 2020 research and innovation program together with a Marie Skłodowska-Curie Individual Fellowship, is part of this line of research. The aim is to apply, on an entirely experimental basis, the methods of archaeoseismological analysis to the historic city centre of Siena (Tuscany), thus acquiring a more in-depth knowledge of the context of study from the point of view of seismic prevention. Methodologically, the project is based on the experimental application of archaeological reading to the effects of earthquakes on the city's historic buildings, following a study of the architecture at different scales of detail. The PROTECT project intends to fill this gap by employing data from different humanistic and scientific disciplines, interweaving this information for future application in other contexts of study. The final objective will be to create an operational protocol for the archaeoseismological reading of the historic centre of Siena, or at least a part of it, and to export this model to other Italian or European realities, with a view to understanding, safeguarding and preserving the historic heritage from seismic risk.

2 THE BATHS OF VILLA DEI QUINTILI: ARCHAEOSEISMOLOGY AND WALL STRATIGRAPHY

De Pari, Marta (Università di Bari Aldo Moro; Università di Roma La Sapienza)

The site of the Villa dei Quintili on the Appian Way is part of the so-called XXL projects, which define a category of Roman brick structures distinguished by monumental scale. The villa's baths especially stand out for their elevated preservation and stratigraphic and structural complexity. They provide an ideal context for methodological investigations based on archaeology, archaeoseismology, and structural consolidation, all contributing to the conservation theme.

This paper examines the seismic history of the Villa dei Quintili, focusing on ancient structural reinforcements in the bath complex. The villa has experienced numerous earthquakes over the centuries, resulting in extensive destruction of much of the building, while other portions, characterized by ancient structural restorations, still endure. Among these are targeted interventions for structural consolidation, such as the closure of numerous openings and the reinforcement of extensive portions of earlier walls. The definitive abandonment of the bath complex likely occurred following an earthquake that sealed off some areas, preserving the opus sectile floor decoration and parts of the decorative cycle.

The paper investigates the building's seismic history and causes of instability, relying on interdisciplinary methods, including bibliographic and archival sources, stratigraphic and building techniques analysis, and crack pattern interpretation. Furthermore, it contextualizes the complex within Rome's seismic history by tracing the different construction periods; this chronological analysis provides crucial termini ante/post quem, which will serve as reference points for understanding the evolution of crack patterns. Finally, the paper aims to contribute to the debate on seismic precautions in the Roman period and will provide valuable insights into the architectural resilience of antiquity.

3 SOME REFLECTIONS REGARDING BUILDING ARCHAEOSEISMOLOGY IN CHALLENGING CONTEXTS. THE VENETIAN EXPERIENCE

Ganz, Margherita (DASStU-Politecnico of Milan)

Archaeoseismology applied to architecture has been shown to achieve very interesting results in culturally and geographically well-defined contexts. Can the archaeoseismological approach be extended to more dispersed environments? Eastern Veneto presents a very unique seismic landscape. It is prone to generating powerful earthquakes with lengthy interseismic periods, but at the same time, it experiences the propagation of seismic effects generated in neighboring seismogenic zones such as northeastern Friuli Venezia Giulia. Under these conditions it may be difficult to attribute all the damage solely to seismic activity, as moving away from the epicenter implies that other external and unpredictable factors may influence the seismic response of structures. On the other hand, the long periods between epicentral seismic events in the examined area have hindered the development of building practices commonly known as local seismic cultures: it is well known that these practices, involving post-seismic repairs and anti-seismic measures, allow us to better characterise and pinpoint the timing of construction phases of artefacts in seismic areas.

Through the presentation of some Venetian artefacts partially affected by the 1348 Carinthian earthquake, we will demonstrate that not only is archaeoseismological analysis feasible in such dispersed contexts but that it is also essential to preserve the wealth of seismic history that they contain.

4 URBAN FORM AS A SEISMIC RESPONSE

Pecchioli, Laura (Humboldt University/TUVienna/Roma Tre University)

Many construction techniques, preventive solutions, and post-disaster management advancements emerged during ancient times. Specific building systems or devices were incorporated into structures, providing seismic resistance and reducing vulnerability.

In cases of comparable construction techniques, ancient buildings offer similar damage patterns to current contexts, such as the AD 62 earthquake in Pompeii, the seismic effects identified in Ostia Antica with those in the recent earthquakes in Umbria and Marche (1997) and L'Aquila (2009). Therefore, the typical chessboard pattern of the Roman settlement, like in Ostia Antica, and the nature of the soil had a decisive task in traditional knowledge systems choices and the damage effects. In Ostia, we find a common and diffuse damage pattern in masonry structures that appears to be the effects of the horizontal seismic impacts.

Urban form, intended as the size, shape, and configuration of an urban area, the nature of the terrain, and the insertion of punctual pushing structural elements into the settlement of the city play a relevant role in traditional knowledge systems choices, the damage effects, and the seismic actions' analysis for a vulnerability assessment. The research on the masonry building aggregates after the L'Aquila and the Emilia-Romagna earthquakes showed that adjacent structures positively influenced the buildings' dynamic behavior despite their composition of low-quality material. In this context, the historical chronology must also be considered in a structural urban analysis framework to interpret collapse dynamics.

The EAE classification requires an architectural and urban reading to identify the typology of seismic effects and one probable orientation. An urban-structural- and 'formal' analysis of the agglomeration would represent a second phase of investigation or be developed in parallel. Archaeoseismology can provide information concerning the seismic vulnerability assessment, which is relevant information about ancient local reinforcement work, as a valuable prevention and disaster management tool.

5 THE 1292 EARTHQUAKE AND ITS LONG-TERM CONSEQUENCES IN URBAN LANDSCAPES OF SOUTH-WESTERN CRIMEA

Dmytro, Moisieiev (CO «Crimean institute of strategic studies»)

The earthquake of 1292 is known from the record in the Sudak Synaxarium (in Sudak it had II=VI points, MSK-64). This earthquake damaged (by archaeoseismological data): the three-apsed church with tribolons in Chersonesos, II=VII-VIII points (EMS-98); monastery on the Vinery cape (Chersonesos region), II=IX points (EMS-98); basilica in the Karalez valley (Mountain Crimea), II=VII-VIII points (EMS-98).

The epicentral area of the 1292 earthquake was located in the South Crimean seismogenerating zone, near the cape Fiolent. Consequences of this earthquake were significant for all South-Western Crimea. Stratigraphic situation in Chersonesos as well as in many other sites of region demonstrate vast destructions of the end of 13th century. Traditionally, they were interpreted as military activities of the Golden Horde. After that, Chersonesos was partially restored but fell into the urban crisis: next to the renewed blocks and churches were the ruins of the end of the 13th century and no burials of the dead under the rubble. In the end Chersonesos was abandoned by its inhabitants. However, there are no narrative sources confirming military reasons for the decay. At the same time, narrative sources neither mention a seismic nature of the crisis.

The destruction of the end of the 13th century is also known in similar to Chersonesos cities of Mountain Crimea (e.g. Eski-Kermen). This town burned out at the end of the 13th century (seismic dislocations weren't found yet). The following features of the urban crisis were traced here archeologically: significant reduction in life expectancy and low health level (comparing to pre-earthquake time: from 40-60 years to 20-30 years), e.g. pathologies of porotic hyperostosis and cold stress; no burials of the dead under ruins; transforming blocks into necropolises. Residents of Eski-Kermen abandoned the town until the middle of the 14th century.

6 BETWEEN RUINS: ASSESSING THE IMPACT OF 3RD MILLENNIUM BCE PALEOSEISMIC EVENTS ON THE WALLED ENCLOSURES OF OTA AND ZAMBUJAL (PORTUGAL)

Sousa, Ana Catarina (School of Arts, University of Lisbon; UNIARQ, Center for Archaeology University of Lisbon) - Duarte, João (UNIARQ, Center for Archaeology University of Lisbon; Faculty of Sciences, University of Lisbon) - Texugo, André (UNIARQ, Center for Archaeology University of Lisbon; CEG, Centro de Estudos Geográficos) - Basílio, Ana Catarina (ICAREHB, Universidade do Algarve) - Kunst, Michael (German Archaeologica Institut Madrid (retired); University of Frankfurt)

The Estremadura region of Portugal is notable for its concentration of Chalcolithic walled enclosures (Sousa, 2021), stone constructions with towers and barbicanes that would be especially vulnerable to seismic activity during the occupation (c. 2900 - 2100 BCE).

Portugal's Estremadura is susceptible to seismic activity of two different kinds: 1) very high magnitude seismicity offshore (with magnitudes over 8), such as the Great Lisbon Earthquake of 1755; and 2) moderate to high magnitude seismicity onshore (magnitudes 6-7) on local faults such as the Tagus and Montejunto faults that can cause events such the 1531 earthquake, which was more destructive in the Lisbon region than the 1755 earthquake. Such events can generate local intensities of VIII to X, which implies considerable damage to any man-made infrastructure, including collapses.

This presentation seeks to contextualize the impact of large earthquakes (capable of producing intensities above VIII) into perspective through indicators in the oceanic and coastal environments, since some of these earthquakes usually occur or affect the sea, causing tsunamis and landslides and respective deposits that can be dated.

The geological evidence will be compared with the archaeological record of two fortified settlements with different characteristics and where seismic activity seems to have had an impact.

In Zambujal (Torres Vedras), a large settlement that has been extensively excavated (Sangmeister-Schubart, 1981; Kunst 2017), presents some of the best-preserved structures in terms of height in this region, particularly in the barbican. The collapses recorded in Phase 4c are especially significant.

In the settlement of Ota (Alenquer), located in a fault area, the archaeological surveys carried out showed the presence of huge collapses that affected the walled structures of this site.

The impact of seismic activity on these structures is analysed in this presentation, with the hypothesis that tectonics contributed to the process of abandoning these structures.

7 NEW EVIDENCE FOR TSUNAMIS AND VOLCANIC ASHES OF THE BRONZE AGE THERA ERUPTION FROM ÇEŞME - BAĞLARARASI IN WESTERN TÜRKİYE

Sahoglu, Vasif (Ankara University) - Goodman Tchernov, Beverly (University of Haifa)

Çeşme - Bağlararası, a coastal Aegean Bronze Age settlement located along the western-most tip of the Urla Peninsula, İzmir District, Türkiye, was no stranger to natural disasters. Fallen walls and other earthquake markers and renovations suggest resilience and renovation at the site already in the 17th century BCE. A deposit recognized from a century afterwards was shown to contain preserved tsunami debris associated to the Bronze Age Thera Volcanic Eruption. A human victim of this tragedy was also discovered among the tsunami debris. The archaeological sequences at Çeşme - Bağlararası present a unique opportunity to investigate the consequences and response of the people who witnessed these events, and how it impacted the trajectory of their communities. Earthquakes, volcanic eruptions, and tsunamis are the outcome of natural tectonic processes that are disconnected from social and cultural aspects of society, yet are also a major architect of changing physical and social landscapes. Much attention has been given to questions of spheres of influence in the Aegean, and in particular waves of cultural dominance producing hybridized or altered cultural remains, such as shifts between local western Anatolian linked styles versus 'minoanized' forms similar to westward-centered populations. In this paper we will discuss the archaeological evidence and methodologies used at Çeşme - Bağlararası that led to the discovery of multiple tectonically-linked events including earthquakes and tsunamis and how it relates to the cultural sequences associated to them.

95 SECOND MILLENNIUM BCE BURIAL PRACTICES IN THE CENTRAL AND EASTERN MEDITERRANEAN FROM AN INTERDISCIPLINARY PERSPECTIVE

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Borgna, Elisabetta (University of Udine) - Bettelli, Marco (Consiglio Nazionale delle Ricerche - Roma) - Cavazzuti, Claudio (University of Bologna) - Moutafi, Ioanna (Ludwig-Maximilian Universität - München) - Stockhammer, Philipp (Ludwig-Maximilian Universität - München; Max-Planck Institut für evolutionäre Anthropologie, Leipzig)

Session format: Regular session

An abundance of Middle and Late Bronze Age burials has been excavated all over the Central and Eastern Mediterranean in the last decades and has widely increased our knowledge about burial types, material culture and their social dimensions. However, only recently excavations have focused more on the remains of social practices during and after burials, like treatments of the dead corpse, the use of fire even apart from cremation, or manipulations of burial goods and bones. It has become clear that especially in the case of collective burials like in the Aegean, burial practices were much more complex than just depositing the corpse: bones were broken, bodies mixed up, segregated, objects broken and reassembled, primary funerary sets were rearranged reflecting the intention to assign new meaning to the past. Every burial must be seen as a management and reconstitution of the past and the netherworld. Sophisticated fieldwork procedures based on geoarchaeology, spatial analysis, and cutting-edge scientific approaches in bioarchaeology and geochemistry, have been increasingly important for our understanding. Our session aims to bring together scholars working on second-millennium BCE burials in the Mediterranean, who integrate different approaches to unravel past social practices surrounding burials and their meanings, essential for the constitution of the community of the dead and the living.

ABSTRACTS

1 IDENTIFYING DEATH IN LBA NORTHERN GREECE: A DIALOGUE BETWEEN THE HUMAN REMAINS AND THE FUNERARY PRACTICES

Triantaphyllou, Sevasti (Aristotle University of Thessaloniki)

Extramural cemeteries consisting mainly of inhumations and only a few cremations appear to be the rule in Late Bronze Age northern Greece. Contrary to the mortuary homogeneity and laborious investment in grave types and prestige items observed in LBA southern Greek mainland (the Peloponnese, central Greece, and Thessaly), the mortuary scenery in northern Greece displays variability, particularly in regional terms. In the West, a standard funerary program in grave types, additional furnishing equipment, burial types, position and orientation, and associated artifacts is cross-cut by the variable deposition of wealth within the cemeteries including local artifacts and imports or imitations of foreign products such as gold, silver, amber, or glass jewelry, Mycenaean-type swords and seals, Mycenaean- and Danubian-style aromatic containers and luxurious matt-painted ceramic drinking sets. In central northern Greece, on the other hand, where tell settlements dominate the natural and symbolic landscape, formal mortuary practices are absent. Also, while single inhumations were common in the early phases of the Bronze Age, in the Late Bronze Age, there is a growing interest in multiple and secondary burials, both involving re-opening of the grave and manipulation of the body in a variety of modes ranging from relocation and grouping of body parts to incomplete burning of defleshed human remains. The formality in the layout of the cemeteries expressed particularly as an emphasis on the grouping of burials alongside the manipulation of the body and the well-planned and organized post-burial activities (e.g. feasting, rituals etc.) mark out a persistent display of descent and ancestral links. This paper aims to investigate the special features that constitute the mortuary program of LBA northern Greece and discuss them with the recovered human remains.

2 THE ASSESSMENT OF MORTUARY ACTIVITIES AND BURIAL INTERACTIONS FROM THE BLUE STONE STRUCTURE AT ELEON, GREECE

Herrmann, Nicholas (Texas State University) - Cruz, Krysten (Texas State University) - Van Damme, Trevor (University of Victoria) - Gaggioli, Amanda (University of Memphis) - Burke, Brendan (American School of Classical Studies at Athens; University of Victoria) - Burns, Bryan (Wellesley College)

The Bronze Age mortuary activity at Eleon provides a unique window into elaborate social practices surrounding the management of dead at this emerging Mycenaean community in Boeotia, central Greece. Since 2015, the Eastern Boeotia Archaeological Project (EBAP) has documented a complex mortuary construction at Eleon referred to as the "Blue Stone Structure" (BSS) (Burke et al., 2020). The BSS presents a honeycomb of burial contexts including large built chamber tombs, common cist graves, and a pit burial dating to the late Middle Helladic to Late Helladic

I period (ca. 1700–1600 BCE). The BSS construction combines elements seen in other contemporary cemeteries of the Shaft Grave period, including perimeter walls, stone markers, and a tumulus mound. This presentation focuses on tombs 5, 10, and 13, which highlight different grave types and varied burial activities including evidence of ritual interment, tomb visitation, body manipulation, skeletal interactions, and re-interment. This study explores the similarities in the formation, cultural practices, and timeline of use for these tombs, which in turn provides evidence of the social and ritual importance of the mortuary facility. The multidisciplinary team considers evidence from detailed excavations, geoarchaeological and soil micromorphological assessment of Tomb 5, ceramic and artifact analysis of grave offerings, and osteological observations of the human remains to contextualize these tombs relative to the social and ritual development of the early Mycenaean settlement at Eleon.

3 MULTIPLE INFANT BURIALS AT EARLY MYCENAEAN THORIKOS, SE ATTICA

Tsempera, Theofania (Institute of Archaeology, University of Groningen) - Theodoropoulou, Tatiana (CNRS - France) - Filioglou, Dimitris (M.H. Wiener Laboratory, ASCSA) - Stockhammer, Philipp (LMU Munich & Max Planck Institute for Evolutionary Anthropology) - Mittnik, Alissa (Max Planck Institute for Evolutionary Anthropology) - Balitsari, Anthi (F.R.S.-FNRS, Aegean Interdisciplinary Studies (AEGIS) UCLouvain) - Dederix, Sylviane (Belgian School at Athens) - Papadimitriou, Nikolas (Paul and Alexandra Canelopoulos Museum, Athens)

The “Shaft Grave period” in Mainland Greece (17th-15th c. BC) is characterized by marked diversity in funerary expression. The changes and innovations observed in the burial record (new tomb types, novel forms of multiple disposal, rich furnishing of the dead etc.) are related to wider sociopolitical transformations, one of which seems to be an increasing emphasis on familial relations. With reference to non-adult individuals and especially the very young ones, it is still unclear whether their disposal in graves found in residential areas should be seen as a sign of social inclusion or exclusion. Thus far, all available bioarchaeological analyses of such burials are outside Attica.

This paper focuses on Thorikos, a coastal site in the metal-rich area of Laurion in SE Attica. The site was inhabited since the Final Neolithic, and became important in the early 2nd millennium BC probably due to the exploitation of local metal ores. In the Early Mycenaean period (16th-15th c BC), metal trade brought great wealth to the site, as reflected in the presence of a tumulus, two tholoi, and other monumental tombs. In addition to these tombs, two funerary assemblages have been excavated in the vicinity of the settlement. Both contained non-adults and were unfurnished. In one of them, a concentration of seashells and faunal remains, some of them burnt, were retrieved in association with four fetuses. These remains have been studied at the M.H. Wiener Lab of the American School of Classical Studies at Athens, and human bone samples have been sent to the Max Planck Institute for aDNA analysis. Preliminary results of the bioarchaeological study suggest pathological alterations of the fetuses, which reflect maternal health, while the study of non-human remains raises the possibility of funerary meals. This evidence is examined within the wider context of Early Mycenaean Thorikos and Attica.

4 UNDERSTANDING MYCENAEAN LH III SECONDARY ACTIVITIES IN CHAMBER TOMBS: RESULTS OF THE INTERDISCIPLINARY STUDY OF THE ELATEIA-ALONAKI NECROPOLIS

Hoegner, Irene (Ludwig Maximilian University of Munich; Max Planck Institute for Evolutionary Anthropology)

Collective burials represent one of the most important evidence of the Mycenaean world and are a key element for understanding social belonging. This is especially true for the Late Helladic III periods where chamber tombs manifest as the main burial type and post-depositional manipulation evolves into a standard treatment, forming a characteristic expression of Mycenaean ideas of community, social belonging and descent.

Despite the rich material, the burial practices are still hardly understood in their complexity. Their study regarding their operations, their sequence, their degree of formalisation and – eventually – the steps of such a formalised cycle of treatments, is decisive for the understanding of the spatial structures within the chamber tombs.

In my PhD, I analyse selected chamber tombs from Elateia-Alonaki by integrating archaeological, archaeogenetic and isotopic datasets on an inter- and intra-grave level. I will discuss the current knowledge on secondary practices concerning the grave inventory, review the respective theoretical interpretations and present new thoughts based on my preliminary results from Elateia-Alonaki.

5 THE MYCENAEAN CEMETERY OF THE TRAPEZA: INDIVIDUAL HISTORIES FROM A LONG-TERM FUNERARY LANDSCAPE

Borgna, Elisabetta (Università di Udine -Dipartimento di Studi Umanistici e del Patrimonio Culturale) - De Angeli, Gaspare (Università di Udine - Dipartimento di Studi Umanistici e dei Patrimonio Culturale) - Freilich, Suzanne (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Högner, Irene (Ludwig-Maximilians University Munich, Germany & Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Stockhammer, Philipp (Ludwig-Maximilians University Munich, Germany & Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany)

The investigation of the Mycenaean cemetery of the Trapeza, near Aigion, Eastern Achaea, started in 2010 thanks to a collaboration between the Udine University and the Greek Archaeological Service with the Museum of Aigion, which coordinates the excavations at the Trapeza archaeological area for the Greek Ministry of Culture. This paper presents some results of our multidisciplinary archaeological, geoarchaeological and bioarchaeological analyses carried out in twelve archaeological campaigns. We have aimed to unravel the dynamic interplay between human and natural factors in the shaping of the landscape from the foundation of the cemetery in the early Mycenaean period or ca 15th BC to the abandonment and collapse including post-depositional processes well into the Early Iron Age. In order to better understand the long-term use of Mycenaean collective tombs, we applied stratigraphical methods to obtain an in-depth insight into the life-cycle of each single tomb, pointing in particular to connect the evidence of use and re-use of the corridors with the phases of occupation inside the chambers for both burial depositions and other ritual activities. Moreover, we studied different patterns of secondary practices with the dead bodies – possibly depending on changing social and ideological constraints over time – applying a multidisciplinary bioarchaeological approach in collaboration with the Max Planck Institute for Evolutionary Anthropology. These datasets enable us to study the dialectics of biological relationships and social belonging as factors for the deposition of individuals in collective burials.

6 THE EARLY MYCENAEAN AYIOS VASILEIOS NORTH CEMETERY, SOUTHERN GREECE: INTEGRATING ARCHAEOLOGICAL THEORY AND ARCHAEOLOGICAL SCIENCE

Voutsaki, Sofia (Groningen Institute of Archaeology) - Moutafi, Ioanna (Ludwig Maximilian University; The Malcolm H. Wiener Laboratory for Archaeological Science, American School of Classical Studies at Athens) - Tritsaroli, Paraskevi (Voula) (The Malcolm H. Wiener Laboratory for Archaeological Science, American School of Classical Studies at Athens) - Vika, Efrossini (University of York) - Erdil, Pinar (Groningen Institute of Archaeology; Centre for Isotope Research Groningen)

Ayios Vasileios in the Peloponnese, southern Greece, is the site of a spectacular recent (2009) discovery, the Mycenaean palace of Laconia. The Ayios Vasileios North Cemetery (AVNC) dates from the Early Mycenaean period (1750-1500 BCE), the period immediately preceding the construction of the palatial complex on the site. Therefore, studying the evolution of mortuary practices in the AVNC allows us to understand the social and political processes that led to the emergence of the palatial system in the Mycenaean world. The AVNC was excavated between 2010 and 2016 using state-of-the-art methods of excavation, documentation and analysis. In this paper we would like to briefly present the research design of the project: the research questions we are addressing (interpreting variation in mortuary practices; explaining social change), the theoretical framework within which we are situating our investigation (the importance of social practices; the concepts of personhood and agency), and the potential and limitations of the various geoarchaeological and bioarchaeological methods we are using (too many to list in an abstract).

However, the main aim of our paper is to go one step further and discuss the process of integration, synthesis and interpretation. What old questions can we re-examine using new methods of analysis? How do we deal with rapid advances in archaeological science and increasing specialisation? What new questions arise from combining different data sets? How can we bring about the integration of archaeological science and archaeological theory?

We hope that these questions will be relevant to many colleagues dealing with similar problems in the study of 2nd millennium BCE burials across the Mediterranean.

7 THE CHANGING POWER OF THE PAST AT THE LATE BRONZE AGE CEMETERY OF AIDONIA, GREECE

Kvapil, Lynne (Butler University) - Shelton, Kim (University of California Berkeley) - Price, Gypsy (SEARCH, Inc.)

Systematic excavations of chamber tombs at the Late Bronze Age cemetery at Aidonia by the Tombs of Aidonia Preservation, Heritage, and Exploration Synergasia (TAPHOS) have revealed a long history of use spanning the Late Bronze Age (c. 16th-12th centuries BCE). This paper explores the variety of ways that human remains and grave goods were managed in a context of reuse, sometimes over several centuries, and with reference to moments when past burials would be encountered anew by those reentering the tomb.

Many chamber tombs at Aidonia were reused over centuries. Some earlier burials consisted of curated inhumations of deceased individuals laid out with ornate adornments, vessels, and weapons. Anyone entering the tomb would encounter a spectacle that referenced the glory of the past embodied in the burials of each individual. The placement of the body appears to have been determined by familial relationships. Results from aDNA and bioarchaeological analysis suggest that women's familial relationships were equally or more important than those of men when positioning the body.

In the mid-14th century, individuality and familial relationships were traded for practices that appeared to privilege the corporate and the communal. Grave goods comprised a standardized assemblage creating the expectation of uniformity for those reentering the tomb. Commingled remains were often placed around the interior of the chamber, but there may have been a hierarchy of placement within the chamber, with the most valuable locations nearest those considered ancestors. Some human remains were intentionally arranged or, alternatively, removed from sight or from the tomb altogether.

The complexity of the burial practices at a single site is evidenced through careful excavation in combination with bioarchaeological approaches, pXRF analysis of metal finds, and aDNA analysis. The result is an important understanding of burial practices that were constantly negotiating and renegotiating the power of the past.

8 PRECOCIOUS PROSYMNA: MIDDLE HELLADIC III/LATE HELLADIC I TOMB DEPOSITS IN ARCHAEOLOGICAL AND ARCHIVAL CONTEXT

Cushman, Sophie (University of California, Berkeley)

With over 4,000 examples known, chamber tombs are the most common type of Late Bronze Age burial monument in Greece. Chamber tombs were first adopted on the mainland in Messenia in MH III followed shortly by sites in Lakonia and the northeast Peloponnese in LH I. However when, where, and most importantly why chamber tombs were established at specific sites has yet to be analyzed in detail. This paper reconsiders the role of Mycenae in the introduction of new burial practices at the transition to the Late Helladic period.

The ultimate emergence of the chamber tomb as the most common burial monument has significant implications for understanding the development of Mycenaean burial customs on the one hand, and the relationship between Early Mycenaean peer polities on the other. I suggest that the users of the Grave Circles at Mycenae successfully stifled competing displays of mortuary innovation by other groups at the site, but that their influence and authority did not extend beyond Mycenae at this time. By shifting assumptions about innovation and precedence away from Mycenae, this paper brings the early chamber tomb evidence into dialogue with broader trends in Mycenaean studies focused on the role of individuals and groups outside the main center(s).

I combine two methodological approaches. First, a systematic chronological and typological analysis of the pottery from Wace's chamber tombs conducted at the Mycenae Museum, enhanced by reference to the excavation records in the Mycenae Archive at Cambridge. Second, a contextual analysis of the early material from Prosymna and Mycenae to show how depositional practices and secondary ritual differed between the two sites. The combination of these two approaches demonstrates the value of returning to legacy material to challenge established scholarly assumptions about the development of chamber tomb use in the early Late Bronze Age.

9 DEPOSITION, DISARTICULATION, DESTRUCTION: THE PARALLEL TREATMENT OF BODIES AND OBJECTS IN EARLY MYCENAEAN BURIALS

Phillips, Rachel (University of Cambridge; British School at Athens)

Approaches to early Mycenaean burials (between 1600 and 1400 BCE on mainland Greece) often treat bodies and objects as two separate entities in the burial process. This paper examines the relations between the two, with a focus on the twin manipulation of bodies and objects within several early Mycenaean tombs from the southern Peloponnese. I use 'manipulation' to refer to the treatment of the body in death—its original placement within the tomb and subsequent arrangement(s). The term can also be applied to objects—the placement of specific objects and materials in direct relation to the body's remains. I focus on three actions, which were applied to both bodies and objects: deposition, disarticulation, and destruction.

I aim to show that human bodies were often manipulated in the same way as objects, in an attempt to create specific impressions of the deceased and in order to communicate specific beliefs. These acts of manipulation were transformative actions, which effected a transition from subject to object and from alive to dead. The burial, therefore, provided a visual expression of the loss of the person, as seen in the incorporation of the dead within the tomb context, and as effected in the manipulation and adornment of the bones. In this manner, the burial came to emphasise the affinities between bodies and objects, wherein bodies attained the status of objects and vice versa; a transformation of meaning appropriate for the liminal space of the mortuary sphere.

10 MORTUARY PRACTICES IN MYCENAEAN ATTICA: AN INTEGRATED ANALYSIS OF HUMAN REMAINS FROM THE CHAMBER TOMB CEMETERY AT KOLIKREPI-SPATA, GREECE

Papakonstantinou, Niki (Aristotle University of Thessaloniki; Fitch Laboratory, British School at Athens)

Funerary practices of the Greek mainland in the Late Bronze Age (ca. 1700-1100 BC) and especially the manipulation of the dead body have in the last decades become a central focus in prehistoric Aegean mortuary studies. In the Mycenaean context, tomb re-use and post-depositional activities result in the intentional disarticulation, fragmentation, redistribution and commingling of the dead and associated artefacts. The vast array of practices involving interference with past material culture and human bodies comprise a central, integral part of funerary rituals in collective tombs. Especially the Mycenaean chamber (rock-cut) tombs, which typically include multiple episodes of use, interference and secondary treatment of skeletal remains are challenging case studies for tracing and understanding the entire range of activities and rituals associated with the funerary cycle. The fragmentation of the skeleton, commingling of parts of different individuals in the same deposit, the circulation and dispersal of bones have been interpreted as important elements for establishing and strengthening social ties and corporate identities, in which the bones have an evident symbolic value.

In this framework, this paper aims to present the results of an integrated bioarchaeological analysis of the skeletal remains deriving from the Mycenaean cemetery at Kolikrepi-Spata in Attica. For the purposes of this research, a synthetic and contextual bioarchaeological approach was adopted that integrates a set of methodological and interpretative tools combining osteological data, macroscopic and microscopic taphonomic observations and archaeological evidence. The overall human bone sample includes over 95,000 bone fragments originating from 21 tombs. The results show that mortuary practices at Kolikrepi are characterized by considerable diversity, variously expressed in distinct modes of disposal, in different choices regarding the location of burial contexts within the tombs, and most importantly in the form and extent of interaction with human bodies.

11 WE VS THEM: FUNERARY COMPETITIONS AT THE PROTOPALATIAL NECROPOLIS OF PETRAS, SITEIA - CRETE

Tsipopoulou, Metaxia (Hellenic Ministry of Culture)

The Pre- and Proto-palatial un plundered necropolis at Petras, has been excavated since 2004. It comprises 29 house tombs (with complex plans), 15 burial structures (usually stone-lined pits), a rock shelter for burials, and 33 non-burial architectural features. Established in EM IB, it continued in use until the end of MM IIB. It constitutes the most extensive, long-lived necropolis of these periods on Crete, and the only one excavated in the 21st century, using all protocols, and studied by interdisciplinary experts. These analytical studies of the architecture, the stratigraphical sequences, and the various classes of artifacts and ecofacts offer new insights into the organization of the Minoan society in these periods. Within the necropolis competitive efforts are evident among the elite groups using it as suggested by the variability in architecture, grave goods, burial customs, and external relations.

During MM IB there was a major spatial re-organization and monumentalization of the necropolis. Two large ceremonial areas were created, one connected with House Tomb 2, the most important Protopalatial building, and the other associated with seven house tombs, especially with House Tomb 10, the only one facing it. House Tomb 2 was built in an area used for exceptionally rich elite burials in EM II and MM IA, thus, probably representing a claim on important ancestry going back to almost a millennium, while House Tomb 10 was built in MM IB on an area never used before. The paper presents a comparative study of these two Protopalatial house tombs, analyzing similarities and differences in the architecture, the burial customs, and the grave goods. They probably represent two antagonistic, elite social groups in the nascent palatial society, striving in life and in death for supremacy.

12 FROM DUSTY NOTES TO 3D-MODELLING: AN INTERDISCIPLINARY APPROACH TO RECONSTRUCTING THE BURIAL LANDSCAPE AT THE KOAN MYCENAEAN CEMETERY OF LANGADA

Nani, Francesca (Università di Pisa)

Chamber tombs are considered of primary importance in shaping Mycenaean culture. Thus, assessing the presence of a chamber tomb cemetery outside of the mainland plays a key role in understanding the emergence of local Mycenaean identities in the wider Aegean. This paper uses the case study of the Koan cemeteries of Eleona and Langada to show how modern interdisciplinary approaches can be combined with legacy data to offer new information on ancient landscape and burial customs.

Original excavation notes and plans, recently re-discovered in the archives of the Italian Archaeological School at Athens, have been integrated with L. Morriconi's 1967 published data and GIS-based approaches recently used in the context of the Serraglio, Eleona, and Langada Archaeological Project (SELAP). Interpolation techniques allowed to reconstruct a 3D model of the ancient landscape, irretrievably altered by human activities during the last seventy

years. By virtually sectioning the model, it has been possible to reassess stratigraphic problems and issues concerning the location of some of the tombs, improving the results of previous studies. Not only has this research provided a better understanding of Mycenaean funerary practices, but it has also shed more light on the emergence of a Mycenaean identity on Kos. Moreover, this work also provides crucial new data on Morricone's original excavation methods, demonstrating his attention for stratigraphy and landscape analysis both at the time of discovery and at the time when the finds were studied and published.

The final aim of this paper is to show how innovative approaches can be fruitfully applied to legacy data, in order to gain valuable information on past social and cultural practices surrounding burials and their meanings.

13 THE TOMBS OF THE COSMOPOLITAN LATE BRONZE AGE CITY OF HALA SULTAN TEKKE, CYPRUS

Fischer, Peter (University of Gothenburg)

This presentation deals with the results from the past years excavations in the cemetery of the cosmopolitan Late Bronze Age city of Hala Sultan Tekke, Cyprus, which flourished c. 1630–1150 BCE. The aim of the current project is the study of the complex burial practices and the tombs' diachronic use. The tombs, most often chamber tombs, were used over generations and provide an excellent complement to the sequence of occupation in the city. The tombs' contexts demonstrate, inter alia, moving and arranging human remains, and provide evidence of feasting in honour of the deceased, as well inside as outside the tombs. The aDNA results of a recent pilot study supported by the nature of the mortuary gifts and personal belongings confirm the multicultural character of the people of Hala Sultan Tekke. The material remains corroborate far-reaching trade, further underlining the role of the city as a trading center in the Mediterranean economic system. Connections, either direct or via middlemen, are confirmed with societies of the Mycenaean, Minoan, Hittite, Levantine, and Egyptian spheres of culture as well with regions as far away as Sardinia, the Baltic Sea, Mesopotamia, Afghanistan, and India.

14 IRON AGE TOMBS AT TELL ES-SAFI/GATH: NEW FINDS AND NEW ANALYSES

Maeir, Aren (Bar-Ilan University)

Tell es-Safi/Gath is a large multi-period site in central Israel, on the border between the southern coastal plain and the Judean foothills. Settled continuously from late Prehistoric through modern times, excavations for the last three decades have exposed finds from many periods and cultures. A major focus of the archaeological research was the remains of the Iron Age Philistine culture, found on the site from ca. 1200 to 830 BCE. As at other Philistine sites, while the Philistine culture is relatively well-known, insufficient data exists regarding mortuary customs and related finds relating to the Philistines. Throughout the excavations, a small amount of inter- and extramural burials have been found, part of which have been researched and published. Recently, several additional tombs were excavated to the east of the site. These tombs, the finds within, and the initial research on them, provide important on the deathscape of Iron Age Philistine Gath. In this lecture, I will present initial results of the study of these tombs, and how they related to other tombs and graves on the site and at other more or less contemporary Iron Age sites in the region. Also, I will detail the initial results of analyses of finds from the tombs, including analyses of pottery and other finds, and materials submitted for various bio-archaeological analyses (such as aDNA, isotope analyses, dental calculus analyses).

15 RECONSTRUCTING SOCIAL PRACTICES FROM 2ND MILLENNIUM BCE BURIALS IN THE NORTHWESTERN ARABIAN PENINSULA

Kremmer, Anne (University of Tübingen) - Zur, Alina (German Archaeological Institute, Orient Department) - Hausleiter, Arnulf (German Archaeological Institute, Orient Department)

Recent interdisciplinary research on late 3rd – to mid-2nd millennium BCE graves in the north-west of the Arabian Peninsula considerably expanded the material evidence of burial contexts in the region. So far, the analysis of architectural remains recognized different grave types, while stratigraphy, context, state of preservation, and taphonomic processes were less explored, thus preventing analysis of social practices. Therefore, between 2020 and 2022, a joint project of the Heritage Commission and the German Archaeological Institute funded by the DFG investigated a representative sample of graves in the burial ground at Rujum Sasa of the oasis of Tayma.

While the archaeological record indicates widely distributed communal practices, such as the presence of late EBA/early MBA Syro-Levantine status weapons, the MBA appears to be characterized by a tendency towards a locally attested architectural uniformity; systematic deposition of bones outside of graves implies the re-use of the existing grave chambers. Multiple burials and the occurrence of bronze weapons represent elements of continuity.

Preliminary analysis of the bioarchaeological record has not yet established whether multiple burials occurred simultaneously or in multiple phases. However, the presence of adult men and women, as well as subadults in the same graves, suggests that a sex or age-specific usage of the graves can be ruled out. So far relatively few pathological or

traumatic lesions could be observed, but the fragmentary and brittle nature of the remains complicates the analysis. Two individuals, whose upper bodies were partially preserved in situ, suggest that they were originally positioned on their right side.

Further interdisciplinary analysis should provide more information on the demographic profile, different burial phases and customs, and provide new insights into mobility patterns of the population. Comparative analysis will help to contextualize the Rujum Sasa burial ground with regional burial practices.

16 DEATH AND BURIAL IN THE SOUTHERN LEVANT DURING THE MIDDLE BRONZE AGE: ISRAEL AS A CASE STUDY

Cosijns, Lev (University of Oxford)

Death is an unavoidable aspect of life. Burials, the eternal resting site of a body, can reveal as much about the deceased as it does about the living the deceased left behind and their culture. The Middle Bronze Age in Israel is typically overlooked in favour of nationally and religiously significant archaeological finds from the Iron Age and Hellenistic-Roman periods. Nonetheless, important and diverse archaeological remains from the Middle Bronze Age have been discovered, including extensive undisturbed burial grounds. However, even those few who take an interest in this period largely concentrate on the region's re-urbanisation and the numerous fortifications that were constructed. This presentation aims to fill the lacuna by comparing and contrasting various burial sites, as well as highlighting how it is possible to see a shift in burial practice and the types of funerary goods found amongst the deceased. The burials will be discussed in light of several characteristics, including location, tomb type, and period. Moreover, burials that did not receive extensive analyses, such as those at Rishon LeZion and Sasa, will be highlighted in this presentation. Furthermore, new radiocarbon dates and isotopic data from the Middle Bronze Age remains of Nahal Refaim will be presented for the first time. The presented material can be used as a foundation for future investigations and comparisons of the burial culture in the Middle Bronze Age southern Levant.

17 CONCEPTUALIZING DEATH IN THE SECOND MILLENNIUM BCE LEVANT: A SEMANTIC WEB APPROACH

Pappalardo, Chiara (University of Catania) - Santamaria, Daniele (University of Catania) - Nicolosi-Asmundo, Marianna (University of Catania) - Laneri, Nicola (University of Catania)

The 'Godscapes' project seeks to combine a material approach to the study of religion with an innovative scientific model that is grounded in a semantic vision of the web, namely the Semantic Web. The ultimate aim of the project is to provide a paradigm that will scientifically define and interpret the relationship between exogenous and autochthonous elements of religiosity in the Second Millennium BCE polytheisms in the Levant. Through this methodological approach, in which machine-readable data enables software agents to query and manipulate information on users' behalf, and through the employment of selected case studies, the input archaeological data are dissected on an attempt to: 1) identify the exogenous and endogenous layers of religiosity, 2) define the diagnostic markers of Second Millennium BCE Levantine religiosity, and 3) demonstrate how the Israelite monotheism can be considered as the syncretic outcome of a complex network of inter-religious encounters originated during the Second Millennium BCE. To reach this goal, the project focuses on the analysis of four types of data – religious architecture, iconicity, funerary and textual data. In this contribution, we will address the process of metadata standardization and the output model ontology elaborated as a sub-domain of the semantic infrastructure of 'The Godscapes Ontology' (TGO) to conceptualize funerary contexts, with grave goods, body treatment, tomb concept and demographic information conveying details about mourning, burial and post-depositional practices, and thus about the personhood of the deceased on the one hand, and about conceptions of the afterlife on the other.

18 MEANINGFUL DEATHS: BURIAL PRACTICES IN BRONZE AGE SOUTH-EASTERN ITALY

Recchia, Giulia (Sapienza University of Rome, Department of Antiquities) - Canci, Alessandro (University of Udine, DIUM) - Cipolloni Sampò, Mirella (University of Tuscia) - Sabatini, Serena (University of Gothenburg, Department of Historical Studies)

Bronze Age funerary customs in south-eastern Italy show a high degree of variability even in the same regional district on a synchronic scale. Mostly, but not exclusively, the rituals entail collective burials, yet they encompass diverse practices and the use of various kinds of tombs and burial deposition places, ranging from artificial hypogea to caves, to dolmens, to, at least, one tumulus, some of which used over a certain timespan. Moreover, burials and deposition of selected human remains, reflecting complex funerary practices, are known from settlements, such as at the fortified settlement of Coppa Nevigata in northern Apulia. Attempting to reconstruct the socio-political dimension of the buried individuals, past and recent studies have explored many aspects, from the composition and variability of grave goods per gender and age, to the spatial distribution of individuals/burials, to the occurrence of both exotic goods and adopted foreign models in pottery and weaponry, to the demographic dimension reflected by the burials. Significant

links with the eastern Adriatic, particularly in northern Apulia, have emerged from stylistic affinities in pottery and metal objects, but also from symbolic aspects, such as the use of entombments closely related to fortification lines. Finally, refined biomolecular analyses to explore ancestry and mobility have been recently applied to human remains from some of these contexts.

By comprehensively reconsidering this multifaceted funerary record, we seek to explore three main points: 1) socially determined access to the grave and different burial treatments, including bones manipulation and secondary burials; 2) actual and socially constructed identities and roles, kinships and evidence of foreign components and exogamy; 3) insights from biomolecular and aDNA analyses.

19 THE BRONZE AGE CHAMBER TOMBS IN SOUTHEASTERN ITALY AND THE CHANGING ROLE OF THE DEAD AND ANCESTORS IN SOCIAL MEMORY

Cipolloni Sampò, Mirella (Università della Tuscia) - Canci, Alessandro (Università di Udine) - Wilkens, Barbara (libera ricercatrice)

Interpretations of both cultural and symbolic behaviours and social organization in the prehistoric communities of the Bronze Age are mainly based on the analysis of funerary remains. The study of archaeological evidence has focused on the data related to research for rank and power, chiefly pointed on the role of the grave goods (presence/absence, quality/quantity), ritual offers, ceremonial or cult activity that played a central role in social control.

Although the focus of interest on these data is obvious, the significance and relationship between the various practices associated with the placement of the dead all along the use of a collective grave, the potential and power of intentional management and rearrangement should not be underestimated.

The chamber tombs and their dromoi are the contexts in which ceremonies and important phases of the funerary rituals took place. These ceremonies involved manipulations of the earlier burials through several generations, and they appeared governed over time by different perspectives and needs.

The long-term change in the chamber tombs of southeastern Italy reflects different attitudes in the social memory and in the cult of ancestors and seems to have been a powerful means in communicating social identity and memory.

20 FROM THE NORTH AND THE SOUTH: NEW OSTEOLOGICAL DATA ABOUT THE TERRAMARE CULTURE FROM A MULTI-ANALYTICAL STUDY OF CREMATED REMAINS

Scalise, Lucia Martina (Department of Archaeology, University of Cambridge, United Kingdom) - Cavazzuti, Claudio (Department of History and Cultures, University of Bologna, Italy; Department of Archaeology, Durham University, United Kingdom) - Morigi, Maria Pia (Department of Physics and Astronomy "Augusto Righi", University of Bologna, Italy; National Institute of Nuclear Physics (INFN) Bologna Division, Italy) - Brancaccio, Rosa (Department of Physics and Astronomy "Augusto Righi", University of Bologna, Italy; National Institute of Nuclear Physics (INFN) Bologna Division, Italy) - Evans, Miranda (Department of Archaeology, University of Cambridge, United Kingdom) - Silvestrini, Sara (Department of Cultural Heritage, University of Bologna, Italy) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main, Germany; Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Italy) - Sommella, Eduardo (Dipartimento di Farmacia, Università di Salerno, Italy) - Benazzi, Stefano (Department of Cultural Heritage, University of Bologna, Italy) - Pomeroy, Emma (Department of Archaeology, University of Cambridge, United Kingdom)

The Terramare culture spread in the Po Plain (Northern-central Italy) between the 17th and 12th century BCE. Differences in burial practices have been observed between the Northern and Southern communities of this culture. Cremation is the only ritual documented in the South, while it is coupled with inhumation in the North. This study provides new osteological and funerary data about cremations from the Middle-Late Bronze Age necropolises of Vicofertile (Parma - Southern Po plain) and Nogarole Rocca (Verona - Northern Po plain) using a multi-analytical approach. 17 burials were analysed (12 from Vicofertile and 5 from Nogarole Rocca). We performed CT (Computerised Tomography) analysis of ten non-excavated urns from Vicofertile and one from Nogarole Rocca. After the extraction of the remains from all 17 urns, we reconstructed the individuals' biological profiles, analysed the heat-induced changes to the bones, and compared the results of the virtual analysis and excavation. We also selected some samples for Zooarchaeology by Mass Spectrometry to investigate taxonomy, and amelogenin analysis for sex estimation. The qualitative and quantitative virtual investigation of the distribution of the remains inside the vessels provided information about the funerary practices. Non-adult and adult remains were also identified. The results of the virtual approach were mostly confirmed by the physical investigation of the burials. The exceptions regarded taphonomy (e.g. the presence of concretions that were not identified in the scans), additional data about the Minimum Number of Individuals (MNI), and individuals' sex and age at death. The scans proved to be an essential tool to guide and speed up the excavation process and help preserve the integrity of the bones and vessels, as well as aiding sample selection to maximise the likelihood of successful proteomic analyses. Finally, ZooMS analysis allowed for the identification of two non-human remains, one of which was burned.

21 RITUALS, DEMOGRAPHY AND SOCIAL ORGANIZATION IN THE FINAL BRONZE AGE CREMATION CEMETERY OF VIA DEI CONSOLI IN GUBBIO: PRELIMINARY RESULTS

Bettelli, Marco (Consiglio Nazionale delle Ricerche-Istituto di Scienze del Patrimonio Culturale) - Bulletti, Clara (Alma Mater Studiorum Università di Bologna) - Caillaud, Florence (Alma Mater Studiorum Università di Bologna) - Cavazzuti, Claudio (Alma Mater Studiorum Università di Bologna) - Germini, Francesca (CNR-ISPC) - Leoni, Cristina (Alma Mater Studiorum Università di Bologna) - Postriotti, Giorgio (Soprintendenza Archeologia Belle Arti e Paesaggio dell'Umbria)

The 2007 rescue excavation carried out in the centre of Gubbio (Umbria, Italy) yielded 40 urn cremations that were probably part of a larger urnfield dated to the end of the Bronze Age (mid-12th-10th century BCE). The cemetery, located on the slopes of Monte Ingino, is related to the remains of the nearby Bronze Age settlement. After the field-work, we performed CT scan of 30 urns, which guided the micro-excavations that were carried out at the Restoration Laboratory of the History and Culture Department of the University of Bologna. The analysis of the archaeological and anthropological evidence allowed to investigate manifold aspects of life of this community, from the demography and funerary rituals to social organization and mobility dynamics. The preliminary study of cremated remains reveals that bone chromatism ranges from blu/grey to white-calcined, with the typical fractures, shrinkage, and modification of the medium and high-temperature cremations. The weight of bones ranges from 240 g (infant) to 1183 g (adult male). Urns contain only one individual, and no traces of pyre debris, which is also absent from the pits. This probably means that bones were collected from the ustrinum and washed to remove charcoal and other residuals before the final deposition in the ossuary. Bones were deposited in anatomical sequence, with the skull fragments on top of the assemblage, sometimes with bronze grave goods, mostly female ornaments. We observed the presence of adults of both sexes and subadults, which indicate the high degree of inclusivity of the Late Bronze Age urnfields in the Italian context. The cemetery of Gubbio also sheds new light on the adoption of the urnfield model across the Italian peninsula and central Mediterranean during the last centuries of the second millennium BCE.

104 ZOOCHANGES: ANIMALS AS PROXIES DURING PERIODS OF TRANSITION AND CHANGE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Almeida, Nelson (Department of History, University of Évora, Évora, Portugal; Uniarq, Centre for Archaeology, University of Lisbon, Lisbon, Portugal) - Valenzuela-Lamas, Silvia (Archaeology of Social Dynamics (ASD), Institució Milà i Fontanals de Recerca en Humanitats, Consejo Superior de Investigaciones Científicas (IMF-CSIC), Spain) - Evin, Allowen (Institute of Evolutionary Science-Montpellier (ISEM), University of Montpellier, CNRS, EPHE, IRD, Montpellier, France) - Wright, Elizabeth (BioArCh, Department of Archaeology, University of York, York, UK) - Detry, Cleia (Uniarq, Centre for Archaeology, University of Lisbon; School of Arts and Humanities of the University of Lisbon, Lisbon, Portugal)

Session format: Regular session

During the last years, the study of animal remains benefited, among others, from the implementation of molecular, isotopic and biometric techniques. These, together with other more traditional approaches, allow for the acquisition of a wide variety of information aiming to characterize human-animal relations and dynamics through time and space. In parallel, socio-cultural transitions and periods of climate fluctuation maintain their relevance in wider archaeological studies. The study of animal remains increasingly became an area of research that can enrich our knowledge in scenarios where human and environmental impacts had repercussions in animals, their management and exploitation. This session aims to bring together specialists working on the study of faunal remains with different methodologies independently of geography and chronology, aiming to understand human-animal and human-landscape relations during times of archaeological and environmental transitions and changes. Case studies and broader approaches are acceptable but studies where different techniques are combined are preferable.

1 PROXIES OF COASTAL ADAPTION: BIRD AND SEAL EXPLOITATION AT KLASIES RIVER, SOUTH AFRICA DURING THE MIDDLE TO LATER STONE AGE

Richardson, Leesha (Department of Archaeology, University of Cape Town, South Africa) - Sealy, Judith (Department of Archaeology, University of Cape Town, South Africa) - Wurz, Sarah (School of Geography, Archaeology & Environmental Studies, University of Witwatersrand, South Africa; SFF Centre for Early Sapiens Behaviour (SapienCE), University of Bergen, Norway)

Klasies River is well known for remains of early modern humans dating to ca >110 ka and has contributed significantly to our understanding of early human lifeways on the South African coast. Initial faunal analyses reported patterns in the seal and bird remains from Middle Stone Age (MSA) deposits that contrasted markedly with those seen in most Holocene Later Stone Age sites. In the MSA, an apparent lack of clear patterning in age at death of seals, and scarcity of flying birds were used to argue that MSA hunter-gathers were less effective coastal foragers than their Later Stone Age (LSA) counterparts. These studies were based on assemblages recovered from half-inch (12.7 mm) mesh sieves, leading to accidental discarding of small fragments of bone. Preliminary work on more complete bone assemblages derived from more recent excavations is yielding a very different picture. Clear patterning in seal age profiles and species of birds indicate hunter-gatherers had already developed sophisticated coastal adaptations in the MSA and modified their bird and seal exploitation strategies with the periodical movement of the coast. There are strong differences in the seal and bird profiles through MIS 3 to 5, rather than a single "MSA pattern". Some bones show evidence of purposeful hunting. In combination with the abundant shellfish remains these results support intensive coastal exploitation at least as far back as the last interglacial.

2 EARLY MIDDLE PALAEOLITHIC AVIAN REMAINS FROM MISLIYA CAVE, MOUNT CARMEL, ISRAEL: HABITAT AND BUTCHERY PATTERNS

Amos, Linda (Zinman Institute of Archaeology, School of Archaeology and Maritime Cultures, University of Haifa, Haifa, Israel) - Yeshurun, Reuven (Zinman Institute of Archaeology, School of Archaeology and Maritime Cultures, University of Haifa, Haifa, Israel) - Weinstein-Evron, Mina (Zinman Institute of Archaeology, School of Archaeology and Maritime Cultures, University of Haifa, Haifa, Israel)

Some of the earliest anatomically modern human remains outside of Africa were discovered at Misliya Cave (Mount Carmel, Israel, ca. 250-140 ka). Current studies indicate that these humans were only one of several morphologically diverse populations which inhabited the Mediterranean landscape (Qesem Cave, Neshar Ramla Homo, Skhul and Qafzeh modern humans and the later Neanderthals). Genetic studies add to this complexity, suggesting that early interbreeding events between Neanderthals and anatomically modern humans took place in this setting, opening for the exchange of not only genetic material but of material culture and perhaps novel subsistence strategies. Using identified bird remains from the Misliya sequence paired with the ecological parameters of current bird species, we examine the palaeoenvironment and climate conditions in one of the areas where these major steps in human development took place, defining the habitats early modern humans exploited within the site's catchment area.

Additionally, we present direct evidence of human agency in samples throughout the depositional sequence in the form of cutmarks on the bones of rock doves (*Columba livia*) and two species of diurnal raptor (a large eagle - *Aquila* sp. And a griffon vulture - *Gyps fulvus*). While most of the striations could easily be assigned to disarticulation and the removal of flesh, cutmarks on the distal tibiotarsus of a large eagle (*Aquila* sp.) may indicate the removal of the pedal phalanges to extract the talons for non-utilitarian use. Additionally, we identified thermal modifications on dozens of specimens including rock doves, chukar partridge, corvids, songbirds, and Ostrich egg shells, some of which indicated cooking practices. The taphonomic results suggest that early modern humans dispersing into the Levant from Africa, like the archaic hominins at Qesem Cave (ca. 300-220 ka), exploited avian resources for subsistence and non-utilitarian purposes.

3 THE UPPER PLEISTOCENE FAUNAS OF FOZ DO ENXARRIQUE SITE (VILA VELHA DE RÓDÃO): TAPHONOMIC AND PALEOENVIRONMENTAL ISSUES

Antunes, Vanessa (Centro Português de Geo-História e Pré-História (CPGP); Centro de Geociências da Universidade de Coimbra) - Figueiredo, Silvério (Instituto Politécnico de Tomar; Centro Português de Geo-História e Pré-História (CPGP); Centro de Geociências da Universidade de Coimbra) - Raposo, Luís (Museu Nacional de Arqueologia; Associação dos Arqueólogos Portugueses)

Foz do Enxarrique is an open-air archaeological site from the end of the Middle Palaeolithic (upper Pleistocene), it is located on a terrace of the Tagus River (T6), on the right bank of the Tagus River, at the mouth of the Enxarrique stream, in Vila Velha de Ródão, about 10 km from the border with Spain. Several archaeological campaigns were car-

ried out on this site between 1982 and 2001, under the direction of Luís Raposo. It has faunal remains and Mousterian industry, it is dated between 44-32 Ka (Th/U and Qz-OSL and IRSL). The faunal accumulation shows evidence of human intervention and posterior fluvial/colovional inference. It can be seen as a paradigm for the interpretation of taphonomic processes typical of open-air sites and difficulties of interpretation. Foz do Enxarrique preserves a single archaeological horizon accumulated in low energy conditions, as shown by the fragmentary bones, the predominance of remains of human-hunted animals and the presence of cut marks on some bones. On this site there is a fauna accumulation with an anthropic component, unlike other sites, especially those that occur in caves, that document palimpsest, resulting more from the accumulation produced by predators, whether mammals, birds or even reptiles. Foz do Enxarrique has taphonomic processes, typical of open-air sites.

4 HUMAN SUBSISTENCE DYNAMICS BEFORE, DURING AND AFTER THE 8.2 KA CAL BP EVENT AT EL MAZO ROCK SHELTER (N SPAIN)

Arenas Sorriqueta, Elene (Universidad de Cantabria) - Marín-Arroyo, Ana B. (Universidad de Cantabria) - Gutiérrez-Zugasti, Igor (Universidad de Cantabria) - Cuenca-Solana, David (Universidad de Cantabria) - Yang, Fei (University of Tübingen) - O'Connell, Tamsin (University of Cambridge)

The El Mazo rock shelter, situated in Asturias (north Spain), contains a Mesolithic sequence from 9 to 7.4 ka cal BP, including the 8.2 ka cal BP climatic event. The impact of this climatic event on human behavior and subsistence strategies has been a matter of debate. The analysis of the macromammal assemblage based on archeozoology suggests that the main prey was the red deer, followed by wild boar and roe deer. It also shows a significant presence of adult and juvenile individuals. Taphonomic analysis indicates that the most recurrent anthropogenic modification was fire alteration. In addition, cut and percussion marks were related to disarticulation and skinning on the prey. The high fragmentation of axial bones and fetal/newborn elements led to identification based on mammal size, limiting detailed information about hunting strategies, site seasonality, and prey transport. ZooArcheology by Mass Spectrometry (ZooMS) was used to overcome this limitation, revealing a wider range of herbivores and carnivores than previously known. Proteomics analysis showed that axial and fetal/newborn remains were mainly from red deer and wild boar. In addition, ZooMS identified species previously undetected or poorly represented in the archeozoological study, such as humans, bovines, carnivores, or beavers. The sudden temperature decrease during the 8.2 ka cal BP had a significant impact on terrestrial animal exploitation and population decline, as evidenced by the mammal assemblage. After the event, there was an intensification of terrestrial and marine resources.

5 ANIMALS AS WITNESSES OF MAJOR CULTURAL AND ENVIRONMENTAL CHANGES: 8 MILLENNIA OF SIZES AND ABUNDANCE VARIATIONS IN SOUTHERN FRANCE

Mureau, Cyprien (CNRS, UMR 5554 ISEM, Montpellier) - Forest, Vianney (INRAP Midi-Méditerranée, Nîmes) - Evin, Allowen (CNRS, UMR 5554 ISEM, Montpellier)

Southern France has a long tradition of archaeological research, as well as intensive preventive work over the last 20 years. In this exceptional geographic framework, archaeozoology benefits from a very large and well-contextualised database, but diachronic analyses and socio-economic syntheses become increasingly complicated.

As part of the DEMETER project (resp. A. Evin), an exceptional collaboration of archaeozoologists in what are now the Languedoc and Provence regions has enabled the creation of an unprecedented database consisting of species quantification data (NISIP) and bone and dental measurements acquired in almost 220 archaeological sites. Long-term changes in stature (Log Size Indexes values) and livestock compositions (relative proportion of Number of Identified Specimens) were studied over the last 8,000 years ago, starting with the Neolithic period in the region. More than 200 000 remains from 225 archaeological sites were analyzed.

The construction of the diachronic trends of size and in abundance of species revealed common trend break episodes that were confronted to paleoenvironmental and paleoclimatic reconstructions. All of these elements have contributed to the identification of five main chronological sequences that retrace the great history of animal morphologies over the last 8 millennia.

6 FROM FARM FRENZY TO PIGGY PARADISE: RE-EVALUATING LBK ANIMAL MANAGEMENT STRATEGIES CONSIDERING A LARGE AGGLOMERATION SITE FROM SOUTHWESTERN SLOVAKIA(5500-4500 BCE)

Brandt, Henriette (Institut für Ur- und Frühgeschichte Christian-Albrechts-Universität zu Kiel) - Furholt, Martin (Institut für Ur- und Frühgeschichte Christian-Albrechts-Universität zu Kiel) - Makarewicz, Cheryl (Institut für Ur- und Frühgeschichte Christian-Albrechts-Universität zu Kiel)

The Linear Pottery Culture (LBK) represents one of the earliest agricultural societies in Europe, relying on domesticated crops as well as primary livestock of sheep, goats, and cattle for their animal-based subsistence. LBK groups ap-

pear to have engaged in regionally defined, relatively homogeneous animal exploitation strategies and livestock management strategies. However, this general characterization is based on zooarchaeological data derived from faunal assemblages recovered from individual homestead sites. In this contribution, we reexamine the animal management strategies in southwestern Slovakia during the LBK and challenge the notion of apparent homogeneity. This is done by comparing zooarchaeological and stable isotope ($\delta^{13}C/\delta^{15}N$) data from homestead sites with the large agglomeration site of Vrábľe-Velké Lehemby, focusing on domesticated cattle, pig, sheep/goat, and wild deer. In contrast to other LBK settlements in the region, it is evident that the large agglomeration site of Vrábľe indicates a preference for pig exploitation, hinting at the need for rapid production of meat as well as a need for effective waste disposal. We explore if differences in livestock production systems between the agglomeration site and the smaller settlements are influenced by new socio-economic needs for surplus, feasting, or even exchange within or external to the community.

7 PALEOGENOMIC STEP STONES TO SHED LIGHT ON CATTLE DOMESTICATION

Grange, Thierry (Institut Jacques Monod) - Geigl, Eva-Maria (Institut Jacques Monod)

Archaeozoological data suggest that cattle were domesticated in northern Mesopotamia at the beginning of the Neolithic. Paleogenomic data are in support of this conclusion (1). Nevertheless, little is known about the evolution of the ancestor of domesticated cattle, the aurochs, about its distribution and diversity and how these were affected by climatic fluctuations. Similarly, the evolution of early domestic cattle is still poorly understood. We only appreciate today through interdisciplinary research combining genomic and archaeological evidence that it must have been a multi-faceted process where climatic fluctuations, population dynamics and migrations, and admixture between diverse populations have played key roles. We will present some paleogenomic data as step stones that will shed light on some of the open questions related to these various aspects, thus contributing to a better understanding of these processes.

1: Pereira Verdugo, M. et al., 2019, Ancient cattle genomics, origins, and rapid turnover in the Fertile Crescent, *Science* 365, 173–176.

8 PUSHING THE BOUNDARIES. NEW DISCOVERIES FROM SUDAN REOPEN THE DISCUSSION ABOUT THE LOCAL DOMESTICATION OF CATTLE IN AFRICA

Osypinski, Piotr (Institute of Archaeology and Ethnology, Polish Academy of Sciences) - Osypinska, Marta (Institute of Archaeology, University of Wrocław)

Until recently, the prevailing belief was that the range of aurochs in Africa - the wild ancestor of domestic cattle - was limited to the Mediterranean zone, to Wadi Halfa in the south. Hence another belief that since there were never such animals in Upper Nubia, their domestication could not have taken place. Neolithic cattle and pastoralism must therefore have originated from Middle Eastern traditions.

Yet new discoveries from Affad (Sudan, between the 3rd and 4th cataracts) prove that the range of aurochs in the late Pleistocene extended much further south. Moreover, our findings suggest a specific hunting specialization focused on this species. Shifting the previously recognized range of the occurrence of *Bos primigenius* to the south, therefore reopens the discussion about the possibility of local African domestication of cattle, regardless of the Neolithization processes in the Middle East.

Further new discoveries of domestic cattle bones in contexts dating to the 8th millennium BCE at Letti (50 km N of Affad) provide groundbreaking arguments in this debate. Importantly, the cattle remains from Letti are accompanied by ceramics and stone artefacts analogous to the well-known collections from el-Barga, el-Arab and Nabta Playa, where the presence of bones of large ruminants was also reported. In the case of the latter collections, after more or less heated discussions, zooarchaeological identifications of the cattle remains were excluded due to a certain discrepancy in the humanistic and natural science narratives. In the term “probably cattle”, the zooarchaeologist suggests, usually based on many years of experience, an indication of the species, while the archaeologist focuses on the lack of 100% certainty.

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9 “IF IT AIN’T BROKE, DON’T FIX IT”: ANIMAL HUSBANDRY AT THE NEOLITHIC AND COPPER AGE SETTLEMENTS IN EASTERN CROATIA

Tomac, Goran (University of Zagreb Faculty of Humanities and Social Sciences)

Continental Croatia, especially its easternmost regions, is rich in archaeological sites dating to the Neolithic and Copper Age. During salvage excavations at the beginning of the 21st century and systematic excavations in the following years, numerous new sites were added to an already impressive list, and the obtained data greatly contributed to our knowledge of the way of life of the prehistoric inhabitants of this region. However, compared to neighboring countries, relatively little is known about the relationship between humans and animals that were present in the area at that time. Although the number of archaeozoological analyses and publications related to continental Croatia is

increasing, this is one of the first works that compares data on subsistence strategies in the Neolithic and Copper Age in this country. The significance of this work also lies in the fact that it deals with assemblages from the Neolithic sites of Gorjani – Kremenjača and Kotlina, and from the Copper Age horizons of the sites of Tomašanci – Palača and Čepinski Martinci – Dubrava, all of which are located in approximately fifty kilometer radius, which provides us with a unique opportunity to study the transition between these two periods in a narrow geographical area.

Therefore, the aim of this paper is to try to answer questions about diachronic changes in the taxonomic composition of animal species, the complexity of animal husbandry, the differences in the importance of domestic and wild animals for the diet of the local population, and overall about the subsistence strategies and their possible variations at the analyzed sites as parts of the network of settlements in the northern Balkans and the southern Pannonian plain.

10 SOCIO-ECONOMIC TRANSITIONS IN NORTHEASTERN IBERIA: A DIACHRONIC APPROACH THROUGH CHANGES IN EQUID DIET AND MORPHOLOGY FROM LATE NEOLITHIC TO ROMANIZATION

Hanot, Pauline (Institut des Sciences de l'Évolution de Montpellier (UMR 5554), Montpellier, France) - Grandal d'Anglade, Aurora (Grupo Interdisciplinar de Patrimonio Cultural y Geológico, Instituto Universitario de Xeoloxía, Universidade da Coruña, Spain) - Huet, Thomas (University of Oxford, School of Archaeology, 2 South Parks Road, Oxford OX1 3TG, UK) - Iborra Eres, M^a Pilar (IVCR+ i. Institut valencià de conservació, restauració i investigació, Valencia, Spain) - Aguilera, Isidro (Museo de Zaragoza, Spain; Grupo Primeros Pobladores y Patrimonio Arqueológico del Valle del Ebro, Departamento de Ciencias de la Antigüedad, Universidad de Zaragoza, Spain) - Seguí, Sofia (Grupo Primeros Pobladores y Patrimonio Arqueológico del Valle del Ebro, Departamento de Ciencias de la Antigüedad, Universidad de Zaragoza, Spain) - Picazo, Jesús V. (Grupo Primeros Pobladores y Patrimonio Arqueológico del Valle del Ebro, Departamento de Ciencias de la Antigüedad, Universidad de Zaragoza, Spain) - Moya, Andreu (Itirita Arqueologia S.L, Lleida, Spain) - Nieto-Espinet, Ariadna (Grup d'Investigació Prehistòrica (GIP), Departament de Geografia, Història i Història de l'Art, 2021-SGR-01607- ARQHISTEC, Universitat de Lleida, 25003, Lleida, Spain)

Since the Late Neolithic, the Northeastern Iberian Peninsula has provided exceptional archaeological evidence of interactions between equids and human communities. However, the timing of the appearance of domestic equids in the region and the nature of these relationships remain unclear. Beyond the symbolic aspects related to the emergence of elites during the Iron Age, did equids have a decisive impact on the development of local economies in these regions?

From the Neolithic to the Roman period, archaeological records reflect cultural and economic transformations in these territories. Material culture and settlement patterns suggest that social inequalities were consolidated during the Early Iron Age, accompanied by processes of territorialization and intensification of local economies, influenced by growing contacts with Mediterranean trade networks. These socio-political changes seem to coincide with observed changes in equid treatment and archaeological contexts, implying a change in their perception and use from the Iron Age onwards.

Through the CENTAURO project, hundreds of equid bone remains from 15 sites in the Ebro Valley spanning from the Late Neolithic to the Roman period are analyzed. This research explores the potential of equids as bioindicators to study economic and political changes in archaeological contexts. This is achieved through a diachronic multiproxy analysis combining archaeozoology, geometric morphometrics, bone microanatomy and stable isotope analysis (N and C). Our objective is to contextualize these changes to assess whether domestication and changes in equid uses are reflected in dietary shifts and modifications in skeletal morphology. This will shed light on how they have been shaped and managed by humans and, in turn, assess their impact on agricultural and economic systems in these inland areas.

Note: Due to organisational restrictions, we include here additional co-authors without whom this work would not have been possible: À.Pallardó, A.Torra, J-M.Rodanés, A.Oliver, M.Morán, X.Payà, S.Valenzuela-Lamas, G.Prats, N.Alonso.

11 CATTLE HUSBANDRY AND THE ARRIVAL OF CORDED WARE IN CENTRAL AND NORTHERN EUROPE: A BIOARCHAEOLOGICAL STUDY OF A MAJOR TRANSITION

Wright, Lizzie (University of York)

The arrival of the Corded Ware Culture during the 3rd millennium BC across many areas of Central and Northern Europe was a major period of cultural transition, which recent ancient genomic work has linked to a series of migrations from the Pontic-Caspian steppe region. Previous work has also indicated that this may have been a time of economic and agricultural change, with the potential for a shift in cattle husbandry in at least some parts of the Corded

Ware range. It is not known, however, how widespread this shift was, the exact nature of it or whether or not it can in fact be linked to the arrival of new people into the region.

The CatCoW project aims to explore these issues by investigating how animal husbandry and agricultural practices may have changed at this time, and considers the hypothesis that migration from the steppe may have led to the introduction of new cattle stock and an increasing economic reliance on dairy products. In order to do this the project is taking an interdisciplinary approach integrating Archaeozoology, Archaeogenetics and Organic Residue Analysis. This paper will introduce this project and present some preliminary results.

12 ZOOARCHAEOLOGY IN PORTUGAL: DIACHRONIC PERSPECTIVE FROM THE MESOLITHIC TO THE ROMAN PERIOD: METHODS, PRACTICES AND DATA, FROM SADO TO TAGUS

Lima, Rafael (Uniarq - Centro de Arqueologia da Universidade de Lisboa; FLUL - Faculdade de Letras da Universidade de Lisboa; MNA - Museu Nacional de Arqueologia; FCT - Fundação para a Ciência e a Tecnologia) - Santos, Ana (Uniarq - Centro de Arqueologia da Universidade de Lisboa; FLUL - Faculdade de Letras da Universidade de Lisboa; FCT - Fundação para a Ciência e a Tecnologia) - Rodrigues, Miguel (Uniarq - Centro de Arqueologia da Universidade de Lisboa; FLUL - Faculdade de Letras da Universidade de Lisboa; FCT - Fundação para a Ciência e a Tecnologia) - Delicado, Cátia (Uniarq - Centro de Arqueologia da Universidade de Lisboa; FLUL - Faculdade de Letras da Universidade de Lisboa; CIAS - Centro de Investigação em Antropologia e Saúde; FLUC - Faculdade de Letras da Universidade de Coimbra; FCT - Fundação para a Ciência e a Tecnologia)

We intend to revisit the context of investigations carried out to date, revealing the diachronic changes in methodologies and the State of the Art of zooarchaeological studies in Portugal, from the Mesolithic to the Roman Period, in the area of the Tagus and Sado river basin.

We will compile data relating to mammalian, malacological, avifauna and ichthyological fauna from collections recovered in the Greater Lisbon and Sado Valley region and their integration with new ongoing research projects. This data will be analysed by chronology, from the Mesolithic to the Roman Period, as well as the different methodologies used in terms of recovery, recording and study of the fauna.

Finally, we will seek to understand which species are most and least present in ancient collections and compare those with newer projects of those same places, between the periods we will cover, thus observing preferential patterns of species recovered by archaeologists, or whether, on the contrary, these criteria do not exist.

13 TRACING THE ECOLOGICAL IMPACT OF HUMAN EXPLOITATION AND ENVIRONMENTAL CHANGES IN BALTIC SEA HARP AND GREY SEALS

Glykou, Aikaterini (Archaeological Research Laboratory, Stockholm University) - Lidén, Kerstin (Archaeological Research Laboratory, Stockholm University)

Bioarchaeology and historical ecology have shown that past ecosystems offer valuable comparisons and insights into ecosystem degradation over time. This paper presents the effects of climate and environmental changes, coupled with human activities, on two seal species in the Baltic Sea: the extinct harp seal (*Pagophilus groenlandicus*) and the grey seal (*Halichoerus gryphus*). Seal hunting was economically crucial for prehistoric Baltic coastal societies. Our analysis integrates radiocarbon dating, zooarchaeology, stable and strontium isotopes, and ancient DNA with paleoenvironmental data. Our data show that grey seals, the most dominant seal species in this area during the Early Mesolithic became locally extinct around 6,600 BCE due to intensive hunting and environmental changes. A recolonization around 4,500 BCE, is linked to a permanent connection with the Atlantic Ocean that established a gradually more marine environment. Also harp seals, immigrated into the Baltic Sea during this time and dominated faunal remains all around the Baltic for the next 2,000 years. Our data suggest that reduced salinity, interspecies competition for shared food resources, and human exploitation led to the harp seal decline or local extinction, with their final disappearance coinciding with the onset of the Medieval Warm Period. This study highlights the complex interplay between human intervention and environmental changes in shaping seal populations in the Baltic Sea.

14 BEHIND THE COPPER - GEOMETRIC MORPHOMETRIC ANALYSIS OF COPPER AGE CATTLE STOCKS FROM THE CARPATHIAN BASIN

Csippán, Péter (Eötvös Loránd University; MTA-ELTE Lendület "Momentum" Innovation Research Group) - Erdős, Olívia (Museum of the Hanság; MTA-ELTE Lendület "Momentum" Innovation Research Group) - Siklósi, Zsuzsanna (Eötvös Loránd University; MTA-ELTE Lendület "Momentum" Innovation Research Group)

After the abandonment of Late Neolithic tells and large flat settlements around 4500 BCE, a dense network of small farm-like settlements were established in the Carpathian Basin during the Early and Middle Copper Age (4500–3650 cal BCE). We suppose these small-scale communities necessarily maintained social relations with other con-

temporaneous communities. Various new materials like copper, gold, and stone products that were circulated among the communities of these small, contemporary settlements prove this assumption.

These products had high prestige value, so behind their spread were social relations, networks of knowledge, and a "Silk Road" of valuable raw materials. But what about the animals? Were they part of this network as a product of long-distance interactions? Did that influence animal keeping? Could these connections also transform the morphology of the animals of certain Copper Age settlements?

As part of our multidisciplinary research, we want to reconstruct these relations based on geometric morphometrics investigations of the stocks of the main domestic species: cattle. Following earlier studies and methods, we also used 3D and 2D techniques on metapodials and astragali to find possible similarities and dissimilarities between Early and Middle Copper Age settlements throughout Hungary.

In our presentation, we will show our preliminary results, their interpretations and discuss possible following steps.

15 GENOMIC REFUGIUM OF PRE-DOMESTICATION HORSE LINEAGES IN THE BRONZE AGE CARPATHIAN BASIN

Gerber, Dániel (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities; MTA-BTK Lendület "Momentum" BASES Research Group) - Herpai, Kornél (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities) - Borbély, Noémi (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities) - Major, István (HUN-REN ATOMKI) - Szabó, Géza (Wosinsky Mór Museum) - Bozi, Róbert (Bozi Ars Med. Vet. Clinic) - Kiss, Viktória (Institute of Archaeology, HUN-REN Research Centre for the Humanities; MTA-BTK Lendület "Momentum" BASES Research Group) - Kulcsár, Gabriella (Institute of Archaeology, HUN-REN Research Centre for the Humanities) - Mende, Balázs (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities) - Szécsényi-Nagy, Anna (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities)

Recent archaeogenomic studies (Fages et al. 2019, Librado et al. 2021) unveiled the major past population events that shaped the genomic landscape of modern day horses but regional processes, however, remained mostly unexplored. This is largely due to the extremely poor aDNA quality of prehistoric horse remains that restricts analyses to only a few individuals from the study region of the Carpathian Basin. We applied a new teeth-sampling method that yielded magnitudes higher endogenous aDNA content from samples that were previously ineligible for whole genome analyses. We shotgun sequenced new horse genomes from modern day Hungary associated with Bronze Age Bell Beaker and Vátya cultures, which provided insight into the horse keeping practices in the most crucial period for horse domestication in the turn of the 3rd and 2nd millennia BCE. Our results challenge the rapid replacement of ancient lineages by the domestic horse (labeled as DOM2 by Librado et al.), after around ~2000 BCE. We observed remnant populations as late as the middle of the 2nd millennium BCE in the Carpathian Basin, indicating regionally variable customs for horse keeping. The project is funded by the MTA-BTK Lendület "Momentum" BASES Research Group (LP2023-8).

16 AT THE DAWN OF CHANGE: ANIMAL HUSBANDRY IN THE CENTRAL EUROPEAN LA TÈNE CULTURE THROUGH ZOOARCHAEOLOGICAL AND ARCHAEOGENETIC ANALYSES

Saliari, Konstantina (Naturhistorisches Museum Wien) - Trebsche, Peter (University of Innsbruck)

Our research presents the analysis of animal remains from the Middle La Tène central settlement Haselbach in Lower Austria (>6000 identified specimens) and compares for first time published zooarchaeological data from 46 sites in nine countries in Central Europe, dating to the La Tène period (c. 450 BC to the end of the first century BC) and representing different types of sites (lowland settlements, hilltop settlements, central settlements, oppida, assemblages of ritual activity, and mining sites). The zooarchaeological results strongly suggest different husbandry strategies and indicate major changes, especially during the Middle La Tène period indicating agricultural intensification. Osteometric studies and recent genetic analysis (mtDNA) on cattle bones and teeth from La Tène sites in Central Europe provided novel insights into the complex socio-economic behavior as well as long distance networks, involving animal supply and mobility in a period of change involving centralization and increasing influence from the South during the pre-Roman late Iron Age.

17 GENETIC AND ECOLOGICAL CHARACTERISATION OF THE EXTINCT HARTEBEEST (*ALCELAPHUS SP.*) POPULATION IN THE LEVANT

Wolkowski, Uri (Department of Evolutionary and Environmental Biology, University of Haifa; The Steinhardt Museum of Natural History, Tel Aviv University) - Kolska Horowitz, Liora (National Natural History Collections, The Hebrew University of Jerusalem) - Marom, Nimrod (School of Archaeology and Maritime Cultures, University of Haifa) - Meiri, Meirav (The Steinhardt Museum of Natural History, Tel Aviv University)

The hartebeest (*Alcelaphus* spp.) is an antelope genus with an extensive range throughout Africa, where it is mostly confined to nature reserves. The hartebeest has suffered a major range contraction in the late Holocene, when the northernmost populations disappeared from the Levant at about 800 AD, and the last North African population went extinct a century ago. Hunting and habitat loss due to climate change and pastoralism are the presumed drivers of this extirpation event. In view of this fairly recent presence of a hartebeest population in the Negev region of modern-day Israel, we lay out preliminary groundwork for its potential future restoration. First, we determine the taxonomy of the extirpated local hartebeest using ancient DNA, in order to find the closest living population; and second, model the future availability of the environmental niche of the hartebeest in Israel using species distribution models.

We extracted aDNA from 21 archaeological hartebeest bones from the Late Holocene Negev and compared them with reference sequences from other populations, to determine the taxonomy of the Levantine hartebeest at the species/subspecies resolution. We also generated Species Distribution Models (SDMs) based on recent hartebeest distribution in Africa and extrapolated it to the Levant, over different time periods. Both MaxEnt and BART model extrapolations indicate that the hartebeest's climatic niche in the region is greater today than in the 8th century AD, and furthermore – will expand in the future under global warming scenarios. This research, therefore, lays necessary foundations for future decisions regarding the restoration of the hartebeest to the northernmost extent of its historical range.

18 BIOGEOGRAPHY OF LATE ANTIQUE MEDITERRANEAN SHIP RATS (*RATTUS RATTUS*) EXPLORED WITH 2D GEOMETRIC MORPHOMETRIC ANALYSIS

Harding, Sierra (University of Haifa) - Cvikel, Deborah (University of Haifa) - Marom, Nimrod (University of Haifa)

Originating in the Indian subcontinent, the black rat (a.k.a ship rat [*Rattus rattus*]) was likely introduced to the Levant in the 1st millennium BCE via trade with Persia. Recent research has explored their palaeogenomics, suggesting that there were two pulses of invasion into the Mediterranean Basin and Europe: first by the “European” ship rat (haplogroup A) and later by the “Arab” ship rat (haplogroup C). Evidence from the archaeological record indicates that this commensal rodent initially flourished along with the Rome's urbanism and transportation networks until the 5th century CE. Black rat populations waned with the collapse of the Western Empire, yet lingered in the Byzantine Levant. The second wave of colonization likely arrived in Egypt in late antiquity (6th century CE) via Red Sea maritime trade with the Arabian peninsula and again dispersed into Europe. The paucity of archaeological ship rat remains from the Byzantine/Islamic transition (7th–9th centuries CE) has impeded a more refined understanding of the dispersal patterns of the second colonization of ship rats around the Mediterranean Basin. The discovery of six black rat individuals aboard the early Islamic period shipwreck Ma'agan Mikhael B (mid-7th–mid-8th centuries CE) has allowed an opportunity to investigate the biogeography of ship rats during this obscure interval. We applied 2D geometric morphometric methods to study variations in dental morphology as a proxy for the diversity of regional origins among the archaeological group in relation to modern comparative samples from Europe, North Africa, and the Levant. Preliminary results suggest that the archaeological ship rats display greater morphological variability than any extant regional population, highlighting the role of Mediterranean ships as a nexus for maritime interaction between rat populations and potentially revealing previously unknown trade interactions between the Christian West and Islamic East during this dynamic and turbulent period of history.

19 USING FAUNAL REMAINS TO ASSESS THE IMPACT OF SCANDINAVIAN RAIDS AND SETTLERS ON ANGLO-SAXON JARROW

Leake, Megan (Newcastle University)

The Anglo-Saxon monastic site of Jarrow, home of the Venerable Bede, is one of the most extensively excavated sites of its type in Europe (Turner et al 2013). The recovery of 44 boxes of faunal remains, which went missing before the site's publication, has allowed for new research to broaden our understanding of this important site. Specifically, I will consider whether the monastic site was abandoned following raiding as previously believed (Cramp 2005), as the number of animal bones increased (Noddle and Stallibrass 2006), suggesting an occupation greater than intermittent presence. Given that diet is culturally significant (e.g. Holmes 2016), and so are animal management strategies (e.g. Valenzuela-Lamas and Albarella 2017), studying these faunal remains can give an insight into any cultural changes which occurred at Jarrow. This is especially important given the degree of uncertainty surrounding the impact of

Scandinavian settlers on Northern monastic sites after the Anglo-Saxon chronicle shifted its attention to the south. Through a combination of traditional faunal analysis, radiocarbon dating and isotope analysis the diet and grazing locations/management strategies of both the Mid-Saxon and Late-Saxon phases of the site are being reconstructed. This will provide our first understanding of how people at this site were using the landscape around them, and to what extent the arrival of a new cultural group affected this.

20 RECONSTRUCTING THE RURAL LANDSCAPE OF SALENTO DURING THE MIDDLE AGES: THE CONTRIBUTION OF ANIMAL REMAINS ANALYSIS

Abatino, Claudia (University of Salento)

Reconstructing of the transformations of the rural landscape in the Salento region in southern Italy has been encouraged in the last decade by research projects involving numerous specialists, who have cooperated to outline the historical, political, cultural and environmental framework during the Middle Ages. Byzantine, Norman, Swabian, Angevin and Aragonese dominations followed one another during this long chronological span in that region. These historical events lead to significant changes in various aspects of society, such as settlement structure, material culture, agricultural practices, religious practices and foodways. The presence of new dominations on the territory has initiated a process of cultural assimilation which has resulted in a phenomenon of coexistence and cohesion of cultures and social habits.

The study of faunal remains from some medieval villages has made it possible to reconstruct livestock management strategies over the centuries and to observe changes and/or improvements in breeding techniques. The contribution of zooarchaeology and the importance of the interdisciplinary approach to reconstruct social dynamics and historical phenomena on a chronological scale will be discussed in this paper.

21 URBANIZED ELITES AND THE PASTORALIST LANDSCAPES OF THE MONGOLIAN STEPPE: ZOOARCHAEOLOGICAL AND ISOTOPIC PERSPECTIVES FROM THE MEDIEVAL UYGHUR CAPITAL KARABALGASUN

Kohlhage, Lea (Institute for Prehistoric and Protohistoric Archaeology, University of Kiel) - Makarewicz, Cheryl (Institute for Prehistoric and Protohistoric Archaeology, University of Kiel)

The establishment of the Uyghur Khaganate (mid-eighth century CE) on the Mongolian steppe marked the first urban centers among the pastoral-nomadic polities within this region. The Khaganate's capital Karabalgasun in particular was characterized by extensive and monumental permanent architectural features inhabited by people of different ethnic, cultural and social backgrounds, including foreign craftsmen and advisors, indigenous pastoralists, travelling merchants, and a presumably itinerant royal court. Precisely how elites, who occupied a central but exclusive area of the city replete with representative buildings and high-status objects, acquired livestock products and engaged, if at all, with livestock management systems, remains unexplored. Similarly, how the adoption of Manichaeism, with its religious protocols discouraging the consumption of meat, as state religion during the Uyghur reign may have affected pastoral subsistence systems and consumption practices is unknown. We apply zooarchaeological analyses with carbon and nitrogen stable isotope analyses to faunal remains originating from the so-called citadel, the political and administrative center of Karabalgasun, to explore how the Uyghur elite preserved – and probably even emphasized – their pastoral heritage by retaining direct access to livestock and livestock products. These animals and their products were most likely sourced both from the elite's own herds as well as partially acquired from supra-regional areas – perhaps as tribute or gifts supplied by high-status visitors.

22 CHANGING ANIMAL HUSBANDRY STRATEGIES AND SOCIOPOLITICAL TRANSFORMATION IN MEDIEVAL NORTHWESTERN TUSCANY

Zaneri, Taylor (International Institute of Social History)

Archaeological research demonstrates that increasing socio-complexity transforms relationships between cities and their hinterland communities – leading to wider exchange networks that move goods, food, people and capital in larger numbers and longer distances. These transformations are often explored through the lens of the core-periphery paradigm, and as such, large-scale changes are implicitly assumed to be driven by elite or state actors and urban demands. But such changes also involve the activities and decisions of rural communities as they navigated and contributed to their shifting sociopolitical landscapes, that bring new possibilities, opportunities and constraints.

This paper offers some important insights on the changes to the late medieval economy through the lens of subsistence choices in northwestern Tuscany from 1100 to 1400. This period saw significant changes in the ways that humans exploited animals and their environments, fueled by rising populations in cities and the development of commercial industries. This paper will combine zooarchaeological analysis with GIS land-use modeling to provide an integrated picture of how medieval people in northwestern Tuscany responded to and interacted with their changing

sociopolitical landscape through their animal husbandry strategies. I will highlight the importance of the decisions of rural producers, who over this period, shifted their subsistence activities to participate in wider commercial interactions. As such, food production became increasingly specialized by environmental zone. Using this integrated methodology, I will argue that the shifts in animal husbandry strategies and human exploitation of the environment were not only driven by elite and urban demands but were, in part, the result of the decisions of producers themselves, who altered their productive activities to advance their own situation and to better position themselves in their changing sociopolitical surroundings.

23 BARDHA'A: STABLE ISOTOPES AND THE CHANGING ANIMAL HUSBANDRY PRACTICES OF A MEDIEVAL CITY

Garner, Daniel (Department of Anthropology, University of Michigan; Museum of Anthropological Archaeology, University of Michigan) - Haruda, Ashleigh (School of Archaeology, University of Oxford) - Larson, Kara (Department of Anthropology, University of Michigan; Museum of Anthropological Archaeology, University of Michigan) - Cooper, Zaria (Department of Anthropology, University of Michigan) - Wordsworth, Paul (Institute of Archaeology, University College London) - Ventresca-Miller, Alicia (Department of Anthropology, University of Michigan; Museum of Anthropological Archaeology, University of Michigan; Department of Archaeology, Max Planck Institute for Geoanthropology)

The site of Bardha'a is located in a large floodplain and within the modern-day city of the same name in Azerbaijan. Excavations of the site show a densely packed urban space that was occupied for thousands of years. This research examines fauna recovered from stratigraphic layers that have been dated from 1000-1322 CE. Zooarchaeological research indicates that a diversity of animals lived and were eaten at the site, including chickens, pigs, sheep, goats, cattle, and water buffalo. However, by 1322 CE the diversity of the animal taxa used to provision the city had been drastically reduced to primarily sheep and goat. Accompanying the decline in species diversity, is a decrease in the average age of livestock at the time of slaughter. The exact reasons for this overall shift in food procurement are still not fully understood. This study aims to investigate animal husbandry practices and livestock management practices at Bardha'a through sequential stable carbon and oxygen isotope analysis of sheep and goat dentition, as paired isotopic analyses ($\Delta^{13}C$ and $\Delta^{18}O$) of ovicaprine teeth have been used to understand landscape use, foddering, and birth seasonality. In addition, we will measure stable carbon and nitrogen isotopes of bone collagen from sheep and goats to examine the intensity of landscape use and pasturing around the site. The ultimate goal of this project is to understand if changes in food procurement were driven by changing herding practices or other factors.

24 CHANGING CATTLE HUSBANDRY IN LATE MEDIEVAL AND MODERN FLANDERS (BELGIUM): EVIDENCE FROM MORPHOMETRICS AND ISOTOPE ANALYSES

Gruwier, Ben (Archaeology, Environmental Changes and Geo-chemistry research group, Vrije Universiteit Brussel) - James, Hannah (Archaeology, Environmental Changes and Geo-chemistry research group, Vrije Universiteit Brussel) - Griffith, Jacob (Archaeology, Environmental Changes and Geo-chemistry research group, Vrije Universiteit Brussel) - Loeffelmann, Tessi (Archaeology, Environmental Changes and Geo-chemistry research group, Vrije Universiteit Brussel) - Lambert, Bart (Historical Research into Urban Transformation Processes Research Group, Vrije Universiteit Brussel) - Lambrecht, Thijs (Department of History, Universiteit Gent) - Snoeck, Christophe (Archaeology, Environmental Changes and Geo-chemistry research group, Vrije Universiteit Brussel)

In Northwestern Europe, the transition from the Late Middle Ages to the Modern era is marked by profound changes in agricultural practice. As part of the so-called (second) "agricultural revolution", innovations were implemented in animal husbandry, in response to an increasing demand for food products. Livestock, such as cattle, were improved to mature faster and become larger and more productive. These evolutions coincided with an expansion of the networks along which animals were traded. Despite having been extensively studied by agricultural historians, the timing, nature and regional variation of these trends remain poorly understood. Zooarchaeology offers an alternative line of evidence through which these issues can be addressed.

This study assesses (post)medieval evolutions in cattle husbandry in present day Flanders via a combination of morphometrics and oxygen ($\delta^{18}O$) and strontium ($^{87}Sr/^{86}Sr$) isotope analyses. Using skeletal measurements, spatial and temporal variations in the size and shape of cattle are explored as proxies for livestock improvement. Evidence of increasing morphological variability is used in concert with oxygen and strontium isotope analyses on teeth, to track diversification of source populations and mobility in animals. The results of the morphometric analyses suggest the appearance of improved cattle from the 16th century, but with notable regional variations. Postmedieval cattle assemblages show an increasing morphological variability, which is mirrored by particularly variable $^{87}Sr/^{86}Sr$ and some values suggesting trade with a coastal region. Our findings demonstrate that combining multiple lines of bioarchaeological evidence can highlight aspects of agricultural history that have been difficult to untangle using documentary sources alone.

105 HOW WERE MEDIEVAL TOWNS IN EUROPE FORMED? URBAN SETTLEMENTS BETWEEN THE EARLY AND THE HIGH MIDDLE AGES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Vassena, Mauro (Catholic University of the Sacred Heart - Milan) - Lefebvre, Bastien (University of Toulouse Jean Jaurès)

Session format: Regular session

European towns in the High Middle Ages are a somewhat little-studied topic from an archaeological point of view, which seems strange if we consider the great contribution that archaeology could make to their knowledge.

Generally, it is considered plausible that the main features of medieval towns, as we know and can still today often see them, are the results of a complex, progressive and long-lasting process of formation and development, which took a particular turn between the late Early Middle Ages and the 13th Century CE. In fact, urban spaces in the area of the Western Empire, already affected by deep transformations of the original Roman structure between Late Antiquity and part of the Early Middle Ages, persisted even afterwards in undergoing new radical changes (concerning the general configuration of urban fabric, the articulation of defensive systems, the topography and the architectural aspect of ecclesiastical buildings and seats of religious and civil power, the funerary areas, the typology of dwellings, the petrification of townscapes, the craft areas, the material forms of social stratification, the strengthening role as marketplaces).

This session aims to analyze Western European towns between the 9th and 13th centuries CE. By adopting a long-term perspective, it will be possible to identify the dynamics of urban contexts that led to more permanent and, a priori, more coherent towns. The discussion will examine and compare towns of Roman foundation with towns founded or refounded in the Middle Ages (for example wics and emporia, monastic and castral towns). A varied approach is welcome: contributions could be focused on urban organization, power and Christian topography and archaeology; significant urban excavations; archaeology and stratigraphic analysis of urban buildings and dwellings; manufactures as evidence of social changes; etc.

ABSTRACTS

1 FROM EMPORIUM TO CIVITAS IN SOUTHERN SCANDINAVIA

Søvsø, Morten (Museum WEST)

Urbanization in Southern Scandinavia began c. AD 700 with the formation of trading towns – by researchers often referred to as wics or emporia.

By AD 800, Ribe (Jutland, Denmark), Reric (Gross Strömkendorf, Mecklenburg, Germany) and Aarhus (Scania, Sweden) were all blooming trading towns situated in the border regions of the early Danish kingdom.

A controlled currency, the wotan/monster or series X sceatta, most likely issued by the Danish king, was used exclusively in these emporia hinting at royal control over the sites. This is backed by a small number of Frankish written sources shedding a bit of light over the otherwise illiterate Scandinavian societies.

In the early 9th C. the Danish king Godfred/Göttrick moved the merchants from Reric to Haithabu/Schleswig. This new town became a huge success and took over the former role of the Frisian/Carolingian emporium of Dorestad as the preferred international trading hub of northwestern Europe.

All three sites in the Danish realm; Ribe, Haithabu/Schleswig and Aarhus developed into Medieval towns allowing us to study in detail what happened between the 9th and 13th C. However, this has only to a limited degree been carried out partly since these three towns today are placed in three different countries with different legislation, research histories and research agendas.

The paper seeks to compensate for this bias by analyzing the longue durée development from Early Medieval trading town (emporium) into the more well known High Medieval town (civitas). Christianization played an important role in this process which drew much of its inspiration from Rome and ideals formed in Antiquity.

2 FROM THE STRONGHOLD TO THE TOWN. EARLY URBANIZATION IN MEDIEVAL CENTRAL EUROPE

Stefan, Ivo (Department of Archaeology, Charles University Prague)

In the 13th century, the phenomenon of the institutional, legally defined town was brought to Central Europe from the West. However, this fundamental change was preceded by a long and non-linear development of fortified settlements and proto-urban agglomerations, often linked to the seats of regional political and religious authorities. In some cases, socio-economic changes have led to the relocation of centres, while in the case of long-settled areas, signif-

icant changes in their internal structure have been observed. The paper will focus on the (dis-)continuity of central places and the changes in their functions over the long period from the 9th to the 13th century in the territory of the present-day, Czech Republic, Poland and Hungary, tracing the basic common trajectories and regional differences on the basis of well archaeologically known and documented case sites. The paper will focus primarily on tracing topographical changes, the transformation of urban area layouts and the emergence of urban stone architecture. Basic trends will be contrasted with developments in Western and Eastern Europe.

3 HIGHLIGHTING LONG TERM TRANSFORMATIONS IN MEDIEVAL SMALL TOWNS: REFLECTIONS ON SEVERAL EXAMPLES FROM BAS-ROUERGUE (FRANCE)

Chabanne, Eric (Université Toulouse - Jean Jaurès)

In the south of France, the Middle Ages have been conducive to the progressive creation of an important number of small towns that reached an apex during the 13th-14th centuries. These urban settlements have traditionally been categorized by their type of foundation (monastic burgs, castra, new towns, ...) in a determinist perspective. Moreover, the overdocumentation of the 13th-14th centuries fosters the illusion that almost nothing happened before, whereas a few research works from the last twenty years have shown that the 8th-12th centuries are also very important for small towns' development, and that these determinist categories are neither fixed, nor exclusive: small towns actually followed very diverse trajectories.

To inquire this question, the presentation will focus on several small towns located in the Bas-Rouergue territory, between the actual Tarn-et-Garonne and Aveyron's counties. In this area, urban development has not been determined by the proximity of bigger cities, and recent urbanization has not yet erased the medieval urban fabric. Hence, these towns are good cases to try and understand dynamics and trajectories that led to their actual form. By combining archaeological data and urban form analysis, it is possible to detect subtle transformations and render a long-term history of these towns' development, before the 13th century transformations.

4 NEW MONASTIC TOWNS AROUND THE AUDE RIVER IN THE MIDDLE AGES (8TH-12TH CENTURIES)

Foltran, Julien (Université de Toulouse, Traces-UMR 5608)

This research is based on the archeology of the building coupled with the analysis of ancient texts and plans.

In the second half of the 8th century, shortly after the departure of Muslims from the territories around the Aude River, in the South of France, communities of hermits were formed in sparsely populated areas, on the fringes of the cities inherited from the Antiquity. The Carolingian power favored them with the aim of religiously unifying the region, creating a network of faithful establishments and developing these territories on the fringes of the center of its power. He granted them important privileges and immunities which made them powerful abbeys, enriched by numerous donations from aristocrats. Having become spaces of peace and prosperity, they have attracted a socially diverse population with multiple activities. Thus, around the abbeys of Lagrasse, Alet, Caunes, Saint-Polycarpe, Saint-Hilaire and Montolieu, small towns were formed, with a grouping encouraged by the monks. The abbots thus provided them with large markets and, in the case of Lagrasse, determined the plan of a new town in the 12th century. Particularly dynamic, these towns constituted the network of secondary towns in the region, after the large cities of Carcassonne and Narbonne. Located on the first mountainous foothills on either side of the agricultural plain, they were key points in the urbanization of these transitional spaces until their slow decline began from the 14th century.

5 REVISITING THE (RE)CONQUEST OF SIGÜENZA: CHALLENGING MEDIEVALIST NARRATIVES THROUGH ARCHAEOLOGICAL AND HISTORICAL INQUIRY

García-Contreras, Guillermo (Universidad de Granada) - Mattei, Luca (Universidad de Granada) - Hernández-Casas, Yaiza (Universidad de Granada) - García Garcia, Marcos (Universidad de Granada) - Banerjee, Rowena (University of Reading) - Pluskowski, Aleks (University of Reading)

Sigüenza, situated in the heart of the Iberian Peninsula, currently part of the province of Guadalajara, once served as the capital of an ecclesiastical lordship during the Middle Ages. In commemoration of the nine-hundredth anniversary of its incorporation into the Crown of Castile by conquest (1124-2024), a systematic study of the entire archaeological record concerning the birth of this medieval town is undertaken. By meticulously examining various excavations and written documentation, this research challenges the purported Islamic origins of Sigüenza, advocating instead for a nuanced interpretation suggesting a deliberate establishment of a distinctly feudal city under episcopal leadership, emerging ex novo during the 12th and 13th century neither ex nihilo nor through Islamic influence.

This study aims to provide a local perspective that challenges the prevalent discourse of the Reconquista, often appropriated by certain sectors of medievalist scholarship and exploited by conservative and far-right political factions in contemporary Spain. By interrogating the historical narrative surrounding Sigüenza's inception, this research seeks

to contribute to a broader dialogue on medieval urban development and the socio-political implications of historical interpretations.

6 BITONTO (BARI): REBIRTH OF A CITY. FROM REPOPULATION DURING THE SECOND BYZANTINE DOMINATION TO THE NORMAN APEX (9TH-12TH CENTURIES)

Marinelli, Federico (Università degli Studi di Roma - La Sapienza)

In the Central Apulia region, during the High Middle Ages, a series of settlement transformations occurred, reshaping hierarchies and urban and rural spaces, each time with a distinctive outcome. An exemplary case is the city of Bitonto. For this center, after a long period of disintegration, a true "rebirth" began in the 9th century, primarily due to Byzantine administrative policies. Bitonto, once described as a minor center retaining the memory of a city "olim nobilem atque opulentam" once again became defined as a civitas during this period. The study will explore written and material sources from the urban area of Bitonto, coupled with a reconstructive analysis of the spaces. It will show how, starting from the area once occupied by the Roman municipium and traversed by the remains of the via Appia-Traiana, the synecism process began. This process involved an intensive repopulation of the area adjacent to the urban stretch of the road axis, preceding the expansion into new zones. Markers of these numerous changes, in addition to the evolution of the urban layout, include numerous ecclesiastical foundations, along with various construction and beneficence seasons affecting the main church. This church was reconstructed and expanded precisely during the significant early medieval repopulation. A fundamental economic contribution came from the Benedictine community, favored by the Normans, providing a decisive economic boost to the city. Bitonto became a center for the production and export of oil, hosting an important annual fair in the vicinity of the wealthy monastery. This complex narrative is examined with attention to both written and material sources, serving as testimonies to a prosperous period for Bitonto and Central Apulia at the dawn of the second millennium.

7 THE URBAN ORGANIZATION OF BERGAMO DURING THE MIDDLE AGES: APPROACH OF STRATIGRAPHIC ANALYSIS OF URBAN BUILDINGS

Matteoni, Federica (Università Cattolica di Milano)

The history of the city of Bergamo is well known through documentary sources, which can be enriched by the detailed study of the historical architecture preserved in town, through the stratigraphic method of architectural archaeology.

The original Roman urban system was known through archaeological excavations, but the dynamics of occupation in the early Middle age are less studied: in the 10th century church are the first concrete evidence of the bishop-count's affirmation, who began the controller of the city until 11th century before the establishment of the Municipality. This passage is documented by the civil architecture found in the upper part of Bergamo, according to an occupational process conditioned by the pre-existences, but with a new extensive occupation of the hill.

A decisive role in defining the city's organization was entrusted to the construction of the city's Cathedral, the Palazzo della Ragione and the church of Santa Maria Maggiore, which redefine the central square in the Romanesque period. The organization of the new suburban neighborhoods was conditioned by this squared, with the progressive construction of tower-houses by appearing urban family that defined the history of the city between the 12th and 13th centuries.

The houses are distributed along already marked routes, with in-line combinations which respect the property boundaries; traces of this occupation are also preserved in the current lower city. The contribute will be focus on local techniques of construction, with the archaeological analysis of the medieval buildings, to explain the development of urban organization.

8 MILAN BETWEEN THE 9TH AND THE 13TH CENTURY CE. THE FORMATION OF A MEDIEVAL TOWN

Vassena, Mauro (Università Cattolica del Sacro Cuore - Milano)

It is undoubtedly possible to affirm that at the end of the Lombard era (second half of the 8th century) the settlement fabric of Milan still maintained its Roman-imperial basic structure, even if during Late Antiquity it was affected by deep transformations (i.e. the appearance of buildings of Christian worship; the massive defunctionalization of water, sewerage, road and defensive infrastructures; the dismantling of public and private building; the spread of poorer residential buildings made of perishable materials; etc.). These transformations continued and intensified in the following period, between the 9th and 13th centuries. This paper aims to show the main topographical and archaeological features of Milan in that time frame, moving from the parallel examination of written sources and archaeological evidences. Through the synthetic presentation of the main transformations of the Christian topography, of the seats of ecclesiastical and civil power, of the defensive infrastructures and of the models and forms of living, it will be possible to identify the fundamental topographical, structural and infrastructural elements that characterized the definitive

overcoming of the Roman urban model and the progressive definition of a new typology of fully medieval urban settlement.

9 THE ADOPTION OF THE STREET FAÇADE IN MEDIEVAL HOUSES (11TH-13TH C.)

Lefebvre, Bastien (University of Toulouse)

Most of the medieval houses preserved in Western European towns have a street elevation, providing an immediate link between the public space and the private domain. Facades are generally organized in two registers, with a first floor wide open onto the street to facilitate exchanges (production or commerce) and one or more storeys dedicated to living quarters.

However, this organization was not always the rule in medieval housing. Houses of the late Early Middle Ages were usually set back from the street, separated by a forecourt. Many were also built around open spaces, with no shared walls. These houses reflect domestic practices and a relationship to urban space that is not found (or less) in the High Middle Ages.

This presentation will examine the transformations in housing between the 11th and 13th centuries, focusing on the reasons behind the fixation of facades on streets and the impact of this new organization on the structuring and dynamics of the urban fabric. Three main themes will be addressed in this presentation focused on France: firstly, the evolution of domestic activities and their requirements in terms of space; secondly, the architectural revival and, in particular, the petrification of buildings; and thirdly, the manifestations of the emergence of a new urban society.

120 DIVIDE AND CONQUER? ADVANCING MULTISCALE THEORETICAL FRAMEWORKS FOR ARCHAEOLOGICAL CERAMICS IN NORTHWESTERN EUROPE

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Hudak, Eniko (Newcastle University; Pre-Construct Archaeology Ltd.) - Willems, Sonja (Art and History Museum, Brussels; Catholic University Louvain) - Sutton, Adam (Aurelius Archaeology) - Hawkins, Kayt (Archaeology South-East, Institute of Archaeology, University College London) - Vincent, Vaiana (INRAP)

Session format: Regular session

The study of archaeological ceramics in Northwestern Europe has seen giant leaps of development in the last half-century. The increasing accuracy of methods determining ceramic provenance, type, age, production, and consumption led to a proliferation of ceramic specialisms within the profession, the main divisions lying in chronology and materials. The workflows of developer-funded archaeology further encourage these divisions to maximise archaeological potential through being studied by the most appropriate specialists. Specialists, however, often work in isolation having little or no insight into the rest of the archaeological work on the same site which can lead to major epistemological problems (especially for transitional periods) and incompatible workflows between different organisations and countries. Furthermore, while scientific techniques and quantification methods continue to be updated, many of the mainstream theoretical frameworks for interpretation have changed little in the last 50 years.

This session offers a point of reflection on the current state of archaeological theory in ceramic studies and advocates for expanding the scope of ceramic interpretations. By stepping outside the modern boundaries of the material, chronological, geographical, and current theoretical frameworks, we can discover the intersection of approaches and enrich our understanding of archaeological ceramics.

We invite papers from specialists and researchers working on ceramics dated to between the 1st century BCE and the 15th century CE (pottery, ceramic building material, etc.) from Northwestern Europe including but not limited to these topics:

- Theoretical approaches to ceramic production and consumption
- Decolonising the ceramic narrative from production to perception
- Multi-perspective approaches to ceramic micro- and macroeconomies
- Ceramic identities in the Roman world: personal and collective choices of making, using, and discarding pots
- Ceramics of transitional periods (e.g., Late Iron Age – Roman, late Roman – post-Roman)
- Outside the sherd-centric world: intersections of interpretations of ceramics and other artefacts.

ABSTRACTS

1 LATE ROMAN GERMANIC POTTERY IN NORTHWEST EUROPE: FROM ETHNIC MARKER TO A COMPLEX MOBILITY NETWORK

Van Thienen, Vince (Ghent University, Department of Archaeology)

Germanic pottery from the late Roman period initially served as an ethnic marker to identify invading or immigrated Germanic groups. With the paradigm shifts regarding ethnicity in archaeology (Jones 1997, Lucy 2007), the ethnic interpretation was replaced by a cultural one, however with the same net result, i.e. an uncritical style-based provenance for Germanic pottery found within the Roman Empire supported by static classifications that mirrored historical divisions: the Saxons invaded/migrated from the North Sea, the Franks from across the Lower Rhine, the Alemanni from the Upper Rhine, etc.

In extension, the fabric-based classification of Germanic pottery is equally oversimplified as demonstrated by recent thin section analyses based on nearly 450 samples from northwest Europe. The use of unidirectional and monochronological migration models severely underestimate the complexity of the mobility of Germanic pottery, as well as their social and economic values.

The current theoretical framework is based on Burmeister's (2000) application of the sociological model of Bourdieu (1977) to study past migrations with material culture. Concerning the late Roman situation, this translates to the high chance of Germanic (handmade) pottery travelling with communities rather than being traded.

New evidence argues a more diversified approach where Germanic pottery can transition between private and public sphere depending on socio-economic context and exchange mechanisms are incorporated in the ceramic mobility. This approach is validated by findings from handmade pottery as well as Germanic pottery productions in Roman style and technique beyond the Rhine (e.g. the late Roman terra nigra foot-vessels).

By using a multiscalar model for mobility (e.g. Anthony 1990) in combination with distinctions based on concepts such as Peacock's (1982) modes of production and the chaîne opératoire (Leroi-Gourhan 1964, Lemonnier 1983), this paper provides an evidence-based application of archaeological theory to adjust our understanding of Germanic pottery in the late Roman world.

2 A ROAD LESS TRAVELLED? CERAMICS, SOCIALITY, AND THEORY IN ROMANO-BRITISH ARCHAEOLOGY AS CONSIDERED THROUGH THE WORK OF DAVID PEACOCK

Sutton, Adam (Aurelius Archaeology)

Romano-British pottery studies has recently attracted criticism for its uncritical adherence to the principles of economic formalism. The very structure of Romano-British pottery studies, centred as it is around the identification of categories of ceramic able to be provenanced (and A-to-B links between production and 'consumption' sites thereby elucidated) has arguably led to formalist approaches being hard-wired into the way that pottery is studied and interpreted. The uncritical ways in which formalist principles have been applied are arguably to the significant detriment of British ceramic analysis.

This need not have been the case. Romano-British pottery studies owes its chief debt to the University of Southampton, where between the 1960s and 2010s generations of the discipline's most successful specialists were trained under the eye of Professor David Peacock. Peacock's early work involved the fruitful application of provenance-based analysis and interpretation, and their enthusiastic adoption by his students, many of whom went on to become major figures in Roman pottery studies.

However, in the 1980s Peacock suffered perhaps his worst criticism. Peacock's Pottery in the Roman Economy: An Ethnoarchaeological Approach (1982) was a departure from much contemporary British scholarship in that it attempted to deal with the Roman economy in terms of the technological and social interactions of the (crafts)people who contributed to it. Response to Pottery in the Roman World was critical of its ethnoarchaeological methodology, and its influence within Romano-British pottery studies was limited as a result.

This paper will discuss the significance of Peacock's work and consider whether Pottery in the Roman World represents a 'road less travelled' in Romano-British pottery studies. The paper will also query the extent to which this is the case internationally, and propose that there is much to be gained by engaging with similar socially-oriented approaches which are current outside of British scholarship.

3 THE RATIONAL ROMANS OF BRITAIN: THE INTERSECTION OF NEOCLASSICAL ECONOMIC THEORY AND BRITISH IMPERIAL DISCOURSE

Hudak, Eniko (Newcastle University)

Roman pottery has long been regarded as one of the primary vehicles for discussions of the micro- and macroeconomic processes of Roman Britain. Traditional interpretations of every stage and aspect of Romano-British pottery production, exchange, and consumption are imbued with a focus on economic rationality: achieving the best possible returns, cost-reduction, and price value. While this seems to be mainly borrowed from neoclassical economic theory, it also reinforces the binary opposition of “Roman” and “native” as it was seen in the British imperial discourse of the Edwardian period. Post-colonial theory and globalisation in Roman archaeology have played a key role over the last four decades of research to de-centre and deconstruct these narratives – but are pottery studies late to catch up with these discussions? This paper explores the intersection of British imperial discourse and neoclassical economic theory and how this has shaped and continues to inform discussions of economic processes within the study of Romano-British pottery. It hopes to raise awareness of the perpetual nature of traditional reporting styles and open a discussion to widen the pottery perspective.

4 OF GAPS AND GEARS : ANALYZING DIVERGENCES IN METHODOLOGIES OF POTTERY STUDIES IN FRENCH PREVENTIVE ARCHAEOLOGY

Vincent, Vaiana (INRAP) - Willems, Sonja (Art and History Museum, Brussels)

French preventive archaeology has, since more than 20 years, recognized the necessity of appointing find specialist for the study of specific material categories such as metal and bone small finds or pottery, on which this lecture will particularly focus. Hereby, specialists were assigned to specific time periods, artificially dividing excavation data into Bronze and Iron age, Roman, Medieval and Modern periods. This division can lead to a segmentation of information and, by extension, to gaps in the overall interpretation of a site. In addition, Roman pottery has a long history of study, even beginning before the 19th century when Samian wares and amphorae began to get attention, thanks to sites such as Rome's Monte Testaccio. Methodology had time to evolve from simple typological observations to what is now called a more integrated approach including chronotypology, macroscopy, petrography, and distribution patterns. For a long time, the Medieval and Modern periods got less attention, with an interest in pottery only really developing from the 1970s onwards, and thus methodology-wise tagging along.

The lecture wants to focus on the how and why of these differences, partly institutional problems, but also resulting from historical processes, how archaeological periods are regarded leading to “colonial”-inspired interpretations of history. The study of hand-made pottery is thereby a good example, mainly thought of as an opposition of plain Gaulish wares with a less developed technical skill versus the cultural more important wheel-turned Roman wares, forgetting their persistence during Medieval and Modern times and leading to methodological problems for pottery specialists, as well as to differences in time-allocation and publication possibilities. We thus want to reveal the gaps between periods, where there should not be, and the different speeds at which the methodologies developed, hoping to encourage to adopt a more holistic approach of our specialization.

5 TIMES OF CHANGE FOR POTTERY TRADITIONS IN THE NORTHWEST OF THE IBERIAN PENINSULA. AN APPROACH TO ITS STUDY AND INTERPRETATION

Hernández-Tórtolas, Alicia (Institute of History - Spanish National Research Council (IH-CSIC))

I would like to present the first results of my research on the indigenous traditional pottery assemblages in the Iberian Peninsula NW, from the 2nd century BC onwards. The Iron Age communities (under an approach of agrarian and egalitarian as social forms), experienced dramatic changes after the Roman conquest. The organisation of the territory had a strong militar, administrative and jurisdictional presence from Augustus times and an intense gold-mining exploitation. This pottery manufactures will maintain Iron Age technological elements; handmade (with a gradual introduction of the potter's wheel), surface treatments (burnished, spatulated), decorations, functionalities... characteristic elements of the most abundant material founded in the villages.

My aim is to assess under what kind of social, identity, economic, cultural and territorial organisation are the indigenous pottery manufactures are being produced, consumed and distributed, considering the factors of change diachronically and widely. What changes can we identify through a contextualized research since first anti-hierarchization structures, that we propose only crumbled upon the presence of Rome. And then, after the conquest, how this wares under local and domestic spheres are being developed within an imperial-scale economy with macro-circulation of products, large-scale ceramic productions, and so on.

Therefore, I present an interpretative and methodological approach in which this artefacts studied in context (chronological and stratigraphical) with the rest of the material elements from the settlements (e.g. Roman common/luxury ware, glass, jewellery, architecture), may suggest the emerging forms of inequalities among the local people. Their

spatial distribution seems to be pointing different habitat areas inside the villages related to possible different purchasing power of the families/households, social status or bonds with the Roman hierarchies, for mention some examples. All this under the Landscape Archaeology's approach; understanding the territory as a dynamic thing result of the relationships between cultural groups and their interactions with the environment.

122 INDICATORS OF NONPRIVILEGED POPULATIONS FROM FUNERARY CONTEXTS: MULTIDISCIPLINARY APPROACHES TO ASSESSING DISPARITIES IN PAST POPULATIONS

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Gelabert, Pere (University of Vienna) - Marinato, Maurizio (Università degli Studi di Padova) - Zagorc, Brina (University of Vienna) - Novak, Mario (The Institute for Anthropological Research)

Session format: Regular session

The social status of past populations can be inferred from a wide range of archaeological indicators such as mortuary analysis (location and characteristics of the graves), diet (through archaeobotany and archaeozoology), health (linked to nutrition or malnutrition), and work patterns (deduced from osteological material). All these indicators show differentiated and unequal access to strategic resources between individuals, which creates different social statuses within a population. We therefore call ‘privileged’ those who hold the capacity to rule over the majority. In contrast, the large majority of the population. Commonly, burial complexes represent the most abundant source of information for the assessment of the social position and inequality of individuals in a society. The other main source of information comes from the bioarchaeological analysis of human remains. The study of human bones can inform us about the life patterns of the individuals (heavy physical work or equestrian practices among others), signs of physiological stress related to poor and deficient diets (e.g., caries, dental hypoplasia, cribra orbitalia, and cribra cranii, rachitis), signs of deficient hygiene levels, and even the causes of death. The analysis of dietary stable isotopes can also complement osteological analysis. In addition, the paleogenomics analysis can link the previous indicators to the origin of the individuals, and family connections or even depict the presence of hereditary diseases, representing a very effective connection between genetics and archeology. We invite contributions that cover topics about privileged and unprivileged societies using different bioarchaeological, genetic, and archaeological methods, such as funerary archaeology, genetic analyses, dietary stable isotope analyses ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$), and various osteological methods for assessing the life conditions the analyzed individuals have lived in. We are most interested in the contributions with a specific focus on the period from the 3rd to the 8th Century AD and post-classical times.

ABSTRACTS

1 SOCIOCULTURAL INEQUALITY AT THE LANGOBARD-AGE (6TH-7TH CENTURIES AD) SITE OF CORTE ROMANA (NE ITALY) REVEALED THROUGH STABLE ISOTOPE ANALYSIS

Martinoia, Valentina (Department of Archaeology, Simon Fraser University, Burnaby (BC), Canada) - Saccheri, Paola (Department of Medicine, University of Udine, Udine, Italy) - Borzacconi, Angela (National Archaeological Museum of Cividale, Cividale del Friuli, Italy) - Travan, Luciana (Department of Medicine, University of Udine, Udine, Italy) - Richards, Michael (Department of Archaeology, Simon Fraser University, Burnaby (BC), Canada)

The arrival of the Langobards (Lombards) in Italy significantly reshaped the territorial and socio-political landscape of Friuli-Venezia Giulia (FVG, NE Italy). Between the 6th and 7th centuries AD, both the local population and the ruling Langobards coexisted in Cividale del Friuli (FVG), which became the first capital of the new Langobard Duchy. Archaeologically, one of the most striking differences between the two groups in Cividale lies in their burial practices: the local population was buried within the city walls, while the Langobards were buried in organized necropolises situated outside the city. The local population buried within the residential area of Corte Romana in Cividale includes adult individuals (n=16) and an astonishing number of subadults (<18 years; n=24), including stillborn (n=12). In this study, we used bulk tissue stable isotope analysis ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, and $\delta^{34}\text{S}$) to investigate the dietary and mobility patterns of the local individuals from Corte Romana. Our results revealed that the local population of Corte Romana relied heavily on the consumption of C4 plants, with a notable inequality between adults and subadults in terms of access to protein-rich foods. Furthermore, the comparison of our results with previously published data for Langobard individuals of the same age recovered from nearby sites accentuates this dietary inequality, serving as a clear indicator of socio-cultural disparity in resource access between the rulers and the ruled in the area of Cividale in the Early Middle Ages.

2 BETWEEN CONTRASTS AND ANALOGIES: ARCHAEOLOGICAL AND ANTHROPOLOGICAL DATA WITHIN THE AVARICUM NECROPOLISES FROM 3RD TO 5TH CENTURY (BOURGES, FRANCE)

Durand, Raphaël (Service d'archéologie préventive Bourges Plus)

The definition of the social status of individuals remains a sea serpent that archaeology and biological anthropology regularly attempt to bring to the surface. In Antiquity societies, this status induces very distinct modes and qualities of life so that stratigraphy, typology and osteology could constitute effective reading tools if they were not limited by homogeneity of funerary rites and global health status.

If occasionally some burials clearly demonstrate a wish for ostentation and distinction on the part of the deceased, these are rare cases and therefore easily identifiable. In contrast, non-privileged individuals are more difficult to distinguish. Absence or overabundance of grave goods sometimes results more from a strict application of tradition, of rite, escaping any social consideration and respecting the rule of the group, *lato sensu*.

In Bourges (Avaricum), two large ancient funerary areas illustrate these methodological difficulties. Both used from the 3rd to the 5th century, one urban, the necropolis of Saint-Martin-des-Champs, houses buildings and funerary containers attesting to the wealth of their occupants; the other, the necropolis of Lazenay, dependent on a villa, mainly brings together individuals who worked within this important rural estate. Obviously, that population should bear the bone stigmata of a life of labor and its burials limited to the simplest expression of the funerary rite. A comparative study of the two necropolises strongly nuances this postulate, providing contrasting funerary and archaeo-anthropological evidences, only a few kilometers apart.

3 STRESS-MARKERS IN CHILDREN OF THE SCYTHIAN AND LATE SCYTHIAN CULTURE

Kotova, Nadiia (Institute of Archaeology of Ukrainian National Academy of Sciences, Kyiv, Ukraine) - Kozak, Oleksandra (Institute of Archaeology of Ukrainian National Academy of Sciences, Kyiv, Ukraine)

Stress-markers are a good identifier for precarious living conditions on skeletal material. When conducting a sample analysis, the most valuable data can be obtained by examining children's skeletons. However, to fully assess the impact of negative factors on the population's health, the research's results of only one sample may not be enough. This requires synchronous or chronologically close comparative samples, where the human habitat can be similar.

Our research concerns materials from Scythian cemeteries Vyschetarasivka, Medvin, Svitlovodsk, Skelki (VII-III c. BC) and Late Scythian cemetery Chervony Mayak (II c. BC- III c. AD), which are located in the steppe and forest-steppe zone of Ukraine. The following skeletal and odontological stress-markers are analyzed: porotic hyperostosis, cribra orbitalia, linear and pit enamel hypoplasia. The problem of the farming method's influence on physiological health is also discussed.

After a comparative analysis, it was found that the greatest number of stress markers and the highest child mortality were in the Scythian group of the late culture's period (cemeteries Vyschetarasivka, Svitlovodsk), which may indicate a significant deterioration in living conditions during this period. According to the results of anthropological research, we can also consider the possibility of different welfare's level among representatives of the Scythian and Late Scythian culture, since the number of stress markers in the forest-steppe population is much higher.

4 INDICATORS OF NONPRIVILEGED POPULATION FROM THE FUNERARY CONTEXT OF THE HIGH ROMAN RURAL SETTLEMENT IN CUTICCHI (ASSORO - ENNA)

nicoletti, rossella (ANA) - Pennisi, Ghiselda (ANA) - Draïà, Eleonora (Università telematica Internazionale UniNettuno, Roma) - Manenti, Marco (ANA) - Palazzolo, Grazia (ANA) - Frittitta, Riccardo (Sezione di Scienze Preistoriche e Antropologiche Dipartimento di Studi Umanistici. Università degli Studi di Ferrara (Italy)) - Galassi, Francesco (Department of Anthropology, Faculty of Biology and Environmental Protection, University of Lodz, Lodz, Poland) - Varotto, Elena (Archaeology, College of Humanities, Arts and Social Sciences, Flinders University, Adelaide, SA, Australia)

The archaeological exploration in Località Cuticchi, started in 2020 and still in progress as a phase of Preventive Archaeology for the Italferr project of the Palermo-Catania-Messina railway axis, led to the discovery of a rural settlement whose living spaces and a vast necropolis have been put into light. The Roman imperial settlement, dated to the 1st -3rd century A.D. and placed in the centre of Sicily on a hill dominating one of the most important rivers of the island, the Dittaino, is made up by a master residence surrounded by a series of service structures. On the top of the hill, beyond a buffer zone, a large necropolis characterised by different burial typologies, revealed a microsocial structure where few privileged individuals emerged whilst the majority of the residents were humble workers of the latifundium. The preliminary analysis of 168 burials is allowing us to outline different social statuses emerging not only from the very characteristics of the graves (simple pits, Cappuccina tombs, funerary urns), from the funerary rituals (just 3 cremations, 1 bustum and 165 inhumations) and from the diverse grave goods (many of the tombs were very poor, lacking any grave goods, others contained just a simple lamp, others rich sets of glasses or bone-made items,

few others even golden jewels), but also from the bioarchaeological analysis of human remains that is revealing us their activities during life (heavy physical work suggested by some patterns on their bones), poor dietary patterns suggested by dentoalveolar conditions, stress markers visible on cranial and post-cranial remains. The preliminary results show a high coherence between the archaeological and bioarchaeological data and the on-going excavation and systematic analysis of all the burials will eventually offer a comprehensive overview of this extremely significant Roman-era site.

5 'NON-PRIVILEGED' INDIVIDUALS FROM OSIJEK (COLONIA AELIA MURSA): BIOARCHAEOLOGY OF A ROMAN PERIOD MASS BURIAL

Novak, Mario (Institute for Anthropological Research) - Filipović, Slavica (Archaeological Museum Osijek) - Carić, Mario (Institute for Anthropological Research)

The paper presents the results of a comprehensive bioarchaeological analysis of a skeletal assemblage recovered from a Roman period mass burial in Osijek, eastern Croatia. Osijek was one of the most important settlements in the province of Pannonia and the Danube limes during the Roman period. Located on the southern bank of the river Drava, it was founded as a military outpost and elevated to the status of a colony (Colonia Aelia Mursa) in 133 CE.

Due to the construction of a new campus of the University of Osijek, recent salvage excavations revealed a number of "typical" inhumation burials. However, in 2011 a large pit was discovered containing complete skeletons of seven adult males found in various positions indicating that the bodies were thrown in without any care for the deceased. The recovered artefacts date the use of the pit to the 2nd/3rd century CE while a direct radiocarbon date places the burial between 240 and 340 CE. The main characteristic of the assemblage is the presence of active new periosteal bone formation on the pleural side of the ribs recorded in all skeletons suggesting these individuals suffered – and probably died – from some kind of pulmonary infection. The other notable feature is a high frequency of ante- and perimortem traumatic lesions associated with intentional violence. And finally, various indicators of intense physical activity were recorded in most of the skeletons. Based on the archaeological context as well as the biological characteristics of the studied remains, one may assume the individuals in question were either slaves or soldiers, physically very active during their lifetime. They died from infections or as a result of violence, and their bodies were unceremoniously disposed of in a used pit, thus strongly suggesting they can be considered as the 'non-privileged'.

6 BIOARCHAEOLOGICAL ANALYSIS OF THE HEALTH STATUS AND LIFESTYLE OF A LATE-ANTIQUITY HUMAN SAMPLE FROM THE NECROPOLIS OF PIAZZA CORRUBBIO (VERONA)

Bigo, Lorenzo (Università Ca' Foscari, Venezia, DSU, Italy) - Cottica, Daniela (Università Ca' Foscari Venezia, Italy) - Iacumin, Paola (Università di Parma, Italy) - Giacometti, Valentina (Università degli studi della Campania L. Vanvitelli, Italy) - Boaretto, Elisabetta (D-REAMS Weizmann Institute of Science, Israel) - Bertoldi, Francesca (Università Ca' Foscari, Venezia, Italy)

From the site located in the heart of the city of Verona 394 tombs have been excavated between 2009 and 2011 belonging to various typologies (cappuccina, brick coffins, lithic coffins, amphorae, burials in the ground) and spanning from IIIrd to VIIIth century AD as indicated by grave goods, coins and adornments. We present here the preliminary data of two burial typologies selected to be analysed up to date (cappuccina graves and brick coffins) and comprehending the archaeological and taphonomical contexts, paleobiological and paleopathological analysis of adults and juveniles, together with stable isotope data of nitrogen and carbon for dietary reconstruction and C14 datations to better understand the exploitation phases of this area. Experimental methods of age determination through dental radiographic analysis (the so called "Cameriere method") and new measurements for juveniles' health status evaluation (diameters and circumferences of long bones other than lengths) have been applied to the sample of this human population.

7 THE POOR AND THE DEAD: A NEW INSIGHT INTO THE MIGRATION PERIOD CEMETERY IN DRAVLJE (LJUBLJANA, SLOVENIA)

Karo, Špela (Zavod za varstvo kulturne dediščine Slovenije) - Županek, Bernarda (Museum and Galleries of Ljubljana) - Leskovar, Tamara (Department of Archaeology, Faculty of Arts, University of Ljubljana) - Koncz, István (Institute of Archaeological Sciences, Eötvös Loránd University) - Vyas, Deven (Department of Ecology and Evolution, Stony Brook University) - Veeramah, Krishna (Department of Ecology and Evolution, Stony Brook University) - Tian, Yijie (Department of Ecology and Evolution, Stony Brook University)

On the outskirts of Roman colony of Emona (Ljubljana/Slovenia), alongside the road to Carnium, lies a cemetery from the Migration Period. It is dated to the late 5th and early 6th century, when the Roman colony was either in decline or had already been abandoned. Rescue excavation of the cemetery in 1968 and 1969 yielded 49 inhumation graves.

Archaeological and anthropological research attributed the burials to the local population as well as to the Ostrogoths and revealed a rather high number of deformed skulls. 50 years later, new scientific approaches offer the opportu-

nity to gain a more comprehensive understanding of this apparently turbulent migration period. Initial revision of the skeletal remains has already provided new information on their state of health, intentional cranial deformations and non-metric variations, indicating anomalies for the time and place in question.

The preliminary results of the preserved bone material indicate that the group buried in this graveyard was in a relatively poor state of health. Signs of malnutrition, vitamin C deficiency, inflammation or metabolic diseases are frequently present. Furthermore, some show consequences of heavy physical labour or long periods of squatting. Both the women and the men are smaller on average compared to the late Roman inhabitants of Emona, but with quite some variability between individuals.

These discoveries will be further examined using isotope and aDNA analyses in conjunction with the archaeological context and material culture to identify differences in status and lifestyle.

8 **UNEARTHING SOCIAL DYNAMICS IN LATE ROMAN LIGURIA: INSIGHTS FROM THE WESTERN NECROPOLIS OF ALBINTIMILIUM**

Defant, Sarah (Freie Universität Berlin) - Carabia, Alessandro (University of Birmingham) - Sołtysiak, Arkadiusz (University of Warsaw)

The Western Necropolis of Albintimilium/Ventimiglia, Liguria, in use between the 3rd and late 5th centuries, offers a compelling case study for understanding social dynamics within an under-researched Italian region during a period of changing societal structures and power dynamics.

New insights into this Late Roman community have emerged from combining osteological assessment of the burials and isotopic analysis of human and faunal remains, with a reassessment of the archaeological documentation and materials, and an in-depth review of the available regional zooarchaeological and archaeobotanical literature.

The isotopic data ($\delta^{13}\text{C}$: -20.0‰ to -16.3‰, $\delta^{15}\text{N}$: 7.3‰ to 11.1‰) suggests that the community relied on a terrestrial diet, based primarily on C3 plants and terrestrial animal protein, which was likely supplemented by marine resources. However, we were able to identify a significant difference in both $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values between female and male individuals interred within the necropolis. This suggests a disparity in access to dietary resources, for example foodstuffs with higher $\delta^{15}\text{N}$ baseline values such as marine fish, which hints at systemic biases in resource distribution and access. This pattern echoes a traditional Graeco-Roman society, characterised by gender-based inequalities. One particular individual, exhibiting various pathologies and below-average dietary isotopic values, could hint at an additional possible differential treatment based on specific health conditions.

This necropolis serves as a comprehensive case study wherein various disparities may be observed through a diverse array of analytical methods, offering a more nuanced understanding of the multifaceted social dynamics present within this site and therefore contributing to a deeper understanding of this pivotal time period in a previously often overlooked part of the Roman Empire.

9 **BIOARCHAEOLOGICAL PERSPECTIVES ON LATE ANTIQUITY IN DALMATIA: PALEOGENETIC, DIETARY, AND POPULATION STUDIES OF THE HVAR RADOŠEVIĆ BURIAL SITE**

Zagorc, Brina (Department of Evolutionary Anthropology, University of Vienna, Austria; Human Evolution and Archaeological Sciences (HEAS), University of Vienna, Austria) - Blanz, Magdalena (Human Evolution and Archaeological Sciences (HEAS), University of Vienna, Austria; Vienna Institute of Archaeological Sciences (VIAS), University of Vienna, Austria) - Gelabert, Pere (Department of Evolutionary Anthropology, University of Vienna, Austria; Human Evolution and Archaeological Sciences (HEAS), University of Vienna, Austria) - Sawyer, Susanna (Department of Evolutionary Anthropology, University of Vienna, Austria; Human Evolution and Archaeological Sciences (HEAS), University of Vienna, Austria) - Carić, Mario (Centre for Applied Bioanthropology, Institute for Anthropological Research, Ljudevita Gaja 32, 1000 Zagreb, Croatia) - Visković, Eduard (Kantharos, d.o.o.) - Ivanova-Bieg, Maria (Vor- und Frühgeschichtliche Archäologie, Johannes Gutenberg-Universität Mainz, Mainz, Germany) - Novak, Mario (Centre for Applied Bioanthropology, Institute for Anthropological Research, Ljudevita Gaja 32, 1000 Zagreb, Croatia) - Reich, David (Department of Genetics, Harvard Medical School, Boston, MA, USA; Howard Hughes Medical Institute, Harvard Medical School, Boston, MA, USA; Broad Institute of MIT and Harvard, Cambridge, MA, USA) - Pinhasi, Ron (Department of Evolutionary Anthropology, University of Vienna, Austria; Human Evolution and Archaeological Sciences (HEAS), University of Vienna, Austria)

This research investigates a Late Antique burial site on the Croatian Dalmatian island of Hvar, spanning from the 3rd to the 5th centuries. Using paleogenomics and stable isotope ratio analyses ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$), a total of 33 individuals buried at the site were examined. Among them, 18 were buried within a confined grave tomb, while the remaining individuals were buried in separate burials within the tomb's proximity. Utilising this interdisciplinary approach, our objective was to address questions regarding the ancestry, dietary habits, and population structure, aiming to gain insights into the lives of the inhabitants of this island during this historical period.

Ancestral origins were assessed through the application of qpAdm, while genetic diversity was evaluated using Principal Component Analysis. Results indicated a diverse population, reflective of the genetic variability characteristic of the era. Genetic outliers were identified, suggesting affiliations with distinct regions of the Roman Empire, connected with the trade routes associated with the Late Antique port in ancient Hvar. Paleodietary analysis, involving bone collagen extraction from the ribs of 15 individuals, revealed a predominant consumption of C3 plants, with limited to potentially negligible intake of marine foods.

Exploration of kinship and dietary patterns revealed no discernible distinctions between individuals buried within the tomb and those buried outside, indicative of an absence of differential burial practices based on social status. The outcomes of this investigation contribute not only to a better understanding of the specific community analysed in this paper but also enrich our broader understanding of the lives of individuals in Dalmatia during the Late Antiquity within the Roman Empire.

10 **DOUBLY MARGINALISED? UNFREE, PARAHUMAN AND SOCIALLY DEAD 'BODY OBJECT' CHILDREN IN LATE IRON AGE SCANDINAVIA**

Marshall, Brad (University of Leicester (UK); BODY-POLITICS Project (ERC Funded))

As social stratification intensified during the Late Iron Age (c. AD450-1050) in Scandinavia, at the very bottom of the social ladder there emerged significant nonprivileged populations of individuals, unfree and denied social personhood. Significantly, children within these populations might be considered to represent doubly marginalised group(s), both through age and social status. However, to date there has been no focussed study of unfree children in Scandinavia. Nonetheless, extrapolating from archaeological, terminological and textual evidence, we can be confident unfree children were present in Late Iron Age Scandinavia and it is not implausible they represented a not insignificant fraction of the demographics of unfree and wider populations. To better enable identification of possible unfree individuals in the Late Iron Age mortuary record calls have been made for more multi-stranded investigations where burials and grave goods are assessed alongside bioarchaeological analyses such as of isotopes, aDNA and/or osteology. Such research has already begun to demonstrate intriguing, if contentious, results. And, moreover, this methodology could prove fruitful in explorations of children as 'bodied objects' – a recent reconceptualisation of potential non-personhood of infants and children, whose bodies were broken apart and/or deposited in settlements and wetlands.

This paper will combine bioarchaeologies with social theory and build on departures in the archaeologies of slavery and personhood and multi-stranded appraisals of the burial record, alongside taking inspiration from reconceptualisations emerging from the posthumanist and Ontological Turns which have reframed unfree individuals as a distinct kind of non-humans, that is parahumans, and application of a framework of 'The Archaeological Post-human (child)'. Through this it will explore a methodology for enabling identification of not only possible cases of unfree and 'body object' children encountered within normative, atypical, cemetery and non-cemetery burial contexts – but also opening a route to investigating such individuals' possible lifeways and deathscapes.

11 **UNLOCKING THE POTENTIAL OF BIOARCHEOLOGICAL ANALYSIS TO UNDERSTAND SOCIO-ECONOMIC STATUS DURING THE EARLY MIDDLE AGES IN NORTHERN ITALY**

Marinato, Maurizio (Dipartimento dei Beni Culturali Università degli Studi di Padova) - Chavarria Arnau, Alexandra (Dipartimento dei Beni Culturali Università degli Studi di Padova)

Recent research in bioarchaeology of early medieval populations in northern Italy has predominantly focused on sites such as churches and Lombard cemeteries. Consequently, the findings cannot be regarded as a comprehensive representation of medieval society. This paper aims to underscore the necessity of comparing diverse burial contexts of the early medieval population. It seeks to investigate whether factors such as diet, health, and occupation were predominantly influenced by the socio-economic status of the population and to what extent, while also exploring the impact of environmental factors on these parameters.

As a case study, this paper will examine the Veneto area where multidisciplinary studies have allowed for intriguing interpretations of urban and rural transformation phenomena. Despite limitations in available archaeological data, this study aims to shed light on these transformations in contexts where the social status of the deceased cannot be precisely determined.

Bioarchaeology offers a valuable opportunity to integrate historical and molecular research on diet and health. Additionally, it provides insights into the interplay between environment, diet, and health, and examines how migrating populations contributed to dietary habits during transitional periods.

135 ALL IN ONE BREATH: (BIO)ARCHAEOLOGICAL APPROACHES TO RESPIRATORY DISEASES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Casna, Maia (Leiden University) - Davies-Barrett, Anna (University of Leicester) - Magalhães, Bruno (University of Coimbra)

Session format: Regular session

According to the World Health Organization, respiratory disorders (e.g., sinus, ear, or pulmonary infections) are currently among the greatest contributors to the global burden of disease and constitute one of the most recurring causes of impairment and death. The aetiologies of these conditions vary greatly and range from environmental conditions (e.g., climate change, poor air quality) to cultural factors, such as tobacco and alcohol consumption, occupational hazards, diet, and more. Because of their prevalence today, many archaeological studies have recently begun to address the impact that respiratory infections may have had on the well-being of past populations. However, the intricate aetiology of most respiratory disorders often makes it difficult to interpret results in past populations and, to date, there are only few, limited guidelines on how to assess their prevalence.

The goal of this session is to provide valuable insights into the intricate nature of respiratory diseases and their study in archaeological and/or historical populations, utilizing diverse research methodologies and approaches produced from both bioarchaeological and clinical studies. By generating discussion on respiratory diseases and exploring the intricate connections between these diseases and human environments, our goal is to contribute to the current archaeological comprehension of respiratory infections and to create a platform for future research endeavours.

We welcome both papers and posters that:

- Analyse patterns of prevalence and distribution of respiratory diseases among ancient populations through different (bio)archaeological methods.
- Explore the methodologies employed in diagnosing respiratory diseases in archaeological remains, showcasing innovative techniques and/or technologies.

As we collectively investigate patterns of prevalence, distribution, and innovative diagnostic techniques, we not only enrich our understanding of the human past but also lay the foundation for more comprehensive research in the future.

ABSTRACTS

1 A SLOW DEATH: INVESTIGATING ENVIRONMENTAL POLLUTANT EXPOSURE AND ITS INFLUENCE ON HEALTH IN ROMANO-BRITISH TO POST-MEDIEVAL ENGLISH POPULATIONS

Falco, Paige (University of Reading) - Lewis, Mary (University of Reading)

Traditionally, research into past environmental health has relied on comparing the prevalence of skeletal pathologies between urban and rural populations. This project investigates how environmental pollutants impacted past health in England and explores whether toxic trace element concentrations are connected to the development of skeletal pathologies. The pathologies investigated were determined through assessing modern environmental toxicology literature relating to toxic elements and the development of bone diseases. This study focuses on the impacts of aluminium, antimony, arsenic, cadmium, lead, and tin. The sample population comprised of 649 individuals, 170 from one Roman (urban), 137 from two Early Medieval (111 rural and 26 suburban), 153 from three Late Medieval (94 suburban and 59 urban), and 189 from two Post-Medieval (99 suburban and 90 urban) sites in Southern England, dating from 300 to 1896 CE. Individuals were evaluated for macroscopic signs of maxillary sinusitis, visceral rib lesions, vitamin D deficiency, anaemia, osteoporosis, and neoplastic disease. A subsample of individuals from Post-Medieval Redhill, with and without these skeletal pathologies, were tested for the presence of toxic metals using portable-X-Ray Fluorescence (p-XrF) and Inductively Coupled Plasma Mass Spectrometer (ICP-MS). Preliminary results for the macroscopic assessment exhibited the highest rates of maxillary sinusitis during the Roman (28.0%) and Post-Medieval (27.0%) periods. Visceral rib lesions increased in prevalence from 2.0% in the Roman period, to 9.0% in the Post-Medieval period. Differences observed between periods are suspected to be due to changes in technology, housing, cultural practices, and the chemical makeup of fuel sources, material items, medicine, and cosmetics. Future trace element analysis results will be discussed in this session. This project is one of the few to allow for a more in-depth investigation as to whether there are direct impacts on disease development in the past through supplementing macroscopic evidence of disease with chemical data.

2 REEVALUATING MAXILLARY SINUSITIS DIAGNOSIS IN PALEOPATHOLOGY: INSIGHTS FROM SKELETONIZED INDIVIDUALS AND CLINICAL STUDIES

Magalhaes, Bruno M. (Department of Life Sciences, University of Coimbra, Portugal; CIAS – Research Centre for Anthropology and Health, University of Coimbra, Portugal) - Mays, Simon (Historic England; Department of Archaeology, University of Southampton; School of History, Classics & Archaeology, University of Edinburgh) - Santos, Ana (Department of Life Sciences, University of Coimbra, Portugal; CIAS – Research Centre for Anthropology and Health, University of Coimbra, Portugal)

Sinusitis is a common condition that results from the inflammation of the sinuses. Its symptoms can be disabling and lead to significant impairment of quality of life. Nevertheless, consensus is currently lacking in the criteria for diagnosing sinusitis in Paleopathology. The present study aims to (1) test if age at death is similar in skeletonized identified individuals who present 'bone depositions' and/or 'bone resorptions' (2) and which lesions usually recorded as evidence of sinusitis may or may not be considered pathognomonic of the disease. A sample of 2023 crania from the Medical Schools and International Exchange Skull collections (University of Coimbra) and from the Human Identified Skeletal collection (University of Lisbon) were used (19th-20th centuries). Individuals with at least one maxillary sinus were macroscopically inspected for bone depositions (spicule-type bone formations, remodeled spicules, lobules, and plaque) and bone resorptions (pitting and white pitted bone). Fifty-five point seven percent (486/873) of the individuals had evidence of bone depositions and resorptions. Mean age at death is higher in individuals showing isolated bone formations ($n=311$, $\bar{x}=48.44$, $s.d.=21.48$) compared with individuals with isolated bone resorptions ($n=47$, $\bar{x}=36.81$, $s.d.=25.70$), with significant differences (Mann-Whitney $U=5150.5$; $p=0.001$). Age at death of individuals with both types of lesions is 48.35 years old ($n=113$, $s.d.=25.17$). The present results reject our first hypothesis. These results show that a considerable number of individuals may exhibit pits either with physiological (e.g., posterior tooth eruption) and/or pathological (e.g., sinusitis, oral pathology) origin. Moreover, clinical imaging studies confirmed the identification of incidental mucosal sinus findings without the presence of clinical symptoms. These findings should also raise questions if paleopathologists should consider bone formations as pathognomonic of sinusitis since the clinical diagnosis of the disease does not imply its presence and there is still a lack of clinical studies concerning its etiology and symptomatology.

3 INVESTIGATING SINUSITIS PREVALENCE AMONG SEXES IN THREE SOCIOECONOMIC GROUPS IN THE POST-MEDIEVAL NETHERLANDS: A SEX-STRATIFIED ANALYSIS

Casna, Maia (Leiden University) - Schrader, Sarah (Leiden University)

Prevalence rates of chronic maxillary sinusitis (CMS) have long been associated with various causation factors, including exposure to indoor smoke and open fires. Prevailing archaeological narratives have often correlated a greater susceptibility to CMS with women, primarily based on the assumption that women occupied domestic spaces (e.g., cooking, tending to children and to household fires), resulting in increased indoor exposure. However, recent bioarchaeological studies have challenged this assumption by revealing no significant disparities between sexes in sinusitis prevalence among several populations, hinting at a more intricate narrative of women's role in past societies. To contribute to this body of knowledge, our research delves into CMS prevalence rates within three post-medieval Dutch populations of different socioeconomic status (i.e., low, middle-low, high). We hypothesize that variation in lifestyle among these socioeconomic groups might have differentially exposed both males and females to CMS.

A total of 341 individuals were analyzed macroscopically for CMS. Of these, 165 (48.4%) showed skeletal changes indicative of sinusitis (low status: 48.6%; middle-low status: 34.2%; high status: 54.2%). Interestingly, while females generally exhibited higher rates of CMS than males, differences were not statistically significant in any of the socioeconomic groups under study. Statistically significant differences were exclusively observed in males, between the low and middle-low socioeconomic groups ($X^2=4.672$, $p=0.04$), and in females, between the middle-low and high socioeconomic groups ($X^2=4.581$, $p=0.05$). Our results reflected the complicated relationship between socioeconomic status, sex, and sources of respiratory stress. Although people from different socioeconomic groups in post-medieval Netherlands lead extremely different lives, they seem to have faced similar health challenges. Factors such as working conditions, living environments, and cultural practices likely wielded significant influence over health outcomes of both males and females. Hence, our findings hold significant implications for gaining valuable insight into the complex interplay between socioeconomic disparities, gender, and health.

4 AN INVESTIGATION OF THE PREVALENCE OF RIB LESIONS IN SCOTLAND AND IRELAND THROUGH THE MEDIEVAL CLIMATE TRANSITION

Roshem, Irmine (University of Aberdeen) - Dittmar, Jenna (Edward Via College of Osteopathic Medicine; University of Aberdeen) - Carlsson, Stine (Queen's University Belfast) - Crozier, Rebecca (University of Aberdeen) - Oxenham, Marc (University of Aberdeen; Australian National University) - Murphy, Eileen (Queen's University Belfast)

Chronic inflammation of the lungs can be caused by a range of respiratory conditions (e.g., tuberculosis, pneumonia, lung cancer). In human skeletal remains from archaeological contexts, evidence of chronic pulmonary inflammation can be recognised by the formation of new bone on the visceral aspects of ribs. This research seeks to explore the prevalence rate of rib lesions in the medieval populations of Scotland and Ireland. In particular, the impact of the 14th-century climate transition from the Medieval Warm Period (MWP) to the Little Ice Age (LIA) is considered. The rib cages of adult individuals (>18 years of age) from two medieval Irish sites – Ballyhanna (n=408), Ranelagh (n=74) – and four Scottish sites – Aberdeen Carmelite Friary (n=46), Aberdeen Franciscan Friary (n=3), the Kirk of Saint Nicholas (n=155), and Tullilum Perth Carmelite Friary (n=24) – were analysed. The results show that the overall raw prevalence rate of rib lesions in Scotland (28%) was only slightly higher than in Ireland (22%). The odds ratio revealed that during the MWP, the odds of having chronic pulmonary inflammations in Ireland are twice that of Scotland (p=0.070). However, the opposite is seen during the LIA (p=0.000). In both regions, the prevalence of rib lesions is higher in biological male groups regardless of climate periods. The similarities between overall distribution patterns suggest genetic and sex-specific anatomical predispositions and/or consistencies in exposure to risk factors in Scotland and Ireland (e.g., gender-based activities). However, the regional disparities during the MWP and LIA highlight differences in everyday life experienced by the studied populations (e.g., environmental stress). The comparison between the Scottish and Irish groups living before and after the medieval climate transition is further investigated to understand the role of climate in the incidence of chronic pulmonary inflammation.

5 TUBERCULOSIS IN THE PAST - FROM SKELETAL DATA TO PALEOEPIDEMIOLOGICAL ANALYSIS

Pedersen, Dorthe (ADBOU - Unit of Anthropology, Department of Forensic Medicine, University of Southern Denmark)

Tuberculosis has caused the deaths of millions of people over the last several centuries, and it remains a major public health concern. Yet for most of human existence, the impact of tuberculosis on society is largely unknown. It is, indeed, unknowable without methods suitable for estimating disease prevalence in skeletal samples. Here a two-step approach is presented that associate skeletal indicators and disease diagnosis using a probabilistic approach and uses this method to model the prevalence of tuberculosis in Danish archaeological skeletons.

The skeletal lesions and disease diagnosis were associated in a case-control study including 480 skeletons from 20th century American collections. One-half of the skeletons were documented tuberculosis cases (Terry Collection). The remaining age and sex-matched skeletons were controls (Bass Collection). The association between 18 candidate skeletal lesions and tuberculosis was established by comparing lesion distributions in case and control groups. Bony indicators at six locations – visceral surface of ribs, ventral vertebral bodies, lateral part of ilium, acetabular fossa, iliac auricular surface, and ulna olecranon process – occurred significantly more often among cases than controls and were associated with one another.

These six indicators were recorded in 713 adult medieval and early modern Danish skeletons from the town of Ribe. A likelihood-based model using the sensitivity and specificity measures of the bony indicators were applied to data. The results showed that tuberculosis increased from 17% to 40% in the medieval to early modern periods in Ribe. Differences in the model's fit indicate the skeletal expression changed over time. Notably, rib lesions increased in frequency from the medieval to early modern periods.

The approach presented here can provide insights into the presence of tuberculosis in the distant past where no written sources are available and thus broadening our understanding of the impact of this disease.

6 A GLIMPSE INTO THE SPATIO-TEMPORAL DISTRIBUTION OF TUBERCULOSIS IN THE 1ST-5TH-CENTURY-CE CARPATHIAN BASIN - HOW DIAGNOSTICS DEVELOPMENT CAN EXPAND KNOWLEDGE

Spekker, Olga (Ancient and Modern Human Genomics Competence Centre, University of Szeged, Szeged, Hungary; Department of Biological Anthropology, University of Szeged, Szeged, Hungary; Institute of Archaeological Sciences, Eötvös Loránd University, Budapest, Hungary) - Kis, Luca (Department of Biological Anthropology, University of Szeged, Szeged, Hungary; Department of Archaeogenetics, Institute of Hungarian Research, Budapest, Hungary) - Madai, Ágota (Department of Biological Anthropology, University of Szeged, Szeged, Hungary; Department of Anthropology, Hungarian Natural History Museum, Budapest, Hungary) - De Andrés, Marcos (Department of Biological Anthropology, University of Szeged, Szeged, Hungary) - Szalontai, Csaba (National Institute of Archaeology, Hungarian National Museum, Budapest, Hungary) - Lukács, Nikolett (National Institute of Archaeology, Hungarian National Museum, Budapest, Hungary) - Patyi, Eszter (Kecskeméti Katona József Museum, Kecskemét, Hungary) - Varga, Sándor (Department of Archaeology, University of Szeged, Szeged, Hungary; Department of Archaeology, Móra Ferenc Museum, Szeged, Hungary) - Kiss P., Attila (Department of Early Hungarian and Migration Period Archaeology, Pázmány Péter Catholic University, Budapest, Hungary) - Tihanyi, Balázs (Department of Biological Anthropology, University of Szeged, Szeged, Hungary; Department of Archaeogenetics, Institute of Hungarian Research, Budapest, Hungary)

Diagnosing tuberculosis (TB) in past human populations is challenging, but the disease is well-known in the palaeopathological record. Reports of archaeological TB cases provide invaluable information about when and where the disease was present in the past. Although in Hungary, the palaeopathological research of TB was begun in the 1970s, little is known about the spatio-temporal distribution of the disease in the 1st–5th centuries CE. The aim of our paper is to present seven newly discovered archaeological TB cases – one (SPF19) from the Hun period and six (HK199, HK201, HK225, HK253, HK309, and KD429) from the Sarmatian period of the Carpathian Basin. Detailed macro-morphological evaluation of the skeletons focused on the detection of lesions likely related to different manifestations of TB, including endocranial alterations suggestive of TB meningitis (e.g., granular impressions/GIs). In all seven cases, it was the presence of TB-specific GIs on the inner skull surface based on which the diagnosis of TB could have been established. It should be emphasised that during the previous palaeopathological investigations, GIs have not been considered as their diagnostic value has been strengthened only recently. Thus, the presented cases highlight the paramount importance of diagnostics development. In addition, they expand our knowledge and understanding of TB in the 1st–5th-century-CE Carpathian Basin: 1) The identification of SPF15 proves the presence of the disease in the Hun period. And 2) thanks to the discovery of HK199, HK201, HK225, HK253, HK309, and KD429, the number of TB cases known from the Sarmatian period tripled, suggesting that the disease was likely more frequent in this period than previously thought. To get a more accurate picture about the burden that TB could have put on these past human populations, the systematic macromorphological (re-)evaluation of osteoarchaeological series from the 1st–5th-century-CE Carpathian Basin would be desirable.

7 METAL DETECTING: BIOMOLECULAR INVESTIGATIONS OF TRANSYLVANIAN CHILDREN WITH S(CU)RVY

Filipek, Kori (University of Derby)

The Jucu de Sus site (1070 – 1154 calAD) in Transylvania (Romania) is marked by numerous settlement sites and a large biritual cemetery (cremations and inhumations). To date, excavations have recovered the skeletal remains of 52 individuals, of which, 40% are children. Despite the high percentage of non-adults, age-at-death distributions lean towards a catastrophic mortality profile, potentially due to infectious disease, environmental pollution, food insecurity, or a combination of these factors.

Most grave goods are found in the non-adult burials (n=21), which are decorated with copper jewellery customarily associated with Slavic contexts spanning from Central Asia to Eastern Europe in the 11th – 13th centuries AD. Unusually, all non-adults with observable skeletal elements exhibit lesions consistent with scurvy. Currently, scorbutic lesions are attributed to dietary deficiencies, however, copper toxicity from elevated environmental exposure can inhibit collagen production thereby causing scurvy in affected populations. Given the presence of copper jewellery within children's graves, and the capacity for metal smelting practices to generate environmental plumes of copper dust, it is worth investigating the potential impact of these metallurgic traditions on community health.

This research aims to employ a novel approach combining measurements of copper and heavy metal concentrations from non-adults with scurvy to further explore whether the creation of their grave goods affected their lived health status. Trace element analyses using ICP-MS provide heavy metal concentrations reflect in vivo environmental pollution exposure, palaeopathological analyses demonstrate the ubiquity and distribution of metabolic lesions in non-adults, paired with carbon and nitrogen isotope analyses providing insight into lifelong dietary status, and amelogenin peptide analyses offers chromosomal sex to better understand children's burial customs. The results from

this research demonstrate both boys and girls buried with jewellery, and all show elevated heavy metal concentrations revealing the impact of environmental pollution on childhood metabolic health.

8 BREATHING TIME: A LONGUE-DURÉE MULTIDISCIPLINARY STUDY OF RESPIRATORY ILLNESSES AND AIRBORNE DISEASES (RIAD) IN SWITZERLAND (16TH - 21ST CENTURY CE)

Hofstetter, Tobias (University Center of Legal Medicine Lausanne-Geneva, Lausanne University Hospital and University of Lausanne, Geneva University Hospital and University of Geneva, Switzerland) - Fauvel, Aude (Institute of Humanities in Medicine (IHM), Lausanne University Hospital and University of Lausanne, Switzerland) - Grabherr, Silke (University Center of Legal Medicine Lausanne-Geneva, Lausanne University Hospital and University of Lausanne, Geneva University Hospital and University of Geneva, Switzerland) - Moghaddam, Negahnaz (University Center of Legal Medicine Lausanne-Geneva, Lausanne University Hospital and University of Lausanne, Geneva University Hospital and University of Geneva, Switzerland)

In 2017, close to 7% of the world population was affected by a form of RIAD; ranking them among the 3 leading causes of death worldwide (alongside cardiovascular diseases and neoplasms). This figure is on the rise according to recent studies, with substantial variations in regional and age-sex specific subgroups. To apprehend the local dynamics underlying the evolution of RIAD, this paper investigates their effect on Swiss mortality, from the 16th and the 21st century.

Historical, demographical, statistical, medical, and bioarchaeological data from archive material and previous studies were reviewed. An intersectional multidisciplinary approach was developed to organize and analyze data stemming from different disciplines. The following points were addressed: characterization of socioenvironmental factors guiding the risk of suffering from a RIAD, permanence of such factors through time and space, correlation of RIAD occurrence in regard to the history of a region and ways in which a better understanding of RIAD dynamics in the past allows to draw lessons for their future sustainable management.

These points were tackled by compiling available data into normalized crude mortality, natality, and respiratory disease mortality rates per thousand inhabitants and placing them within the demographic and epidemiological transition model. This model serves as reading grid to the observed pathological and demographic evolutions.

Our results underline the considerable impact of industrialization on the respiratory signature of perialpine populations. Further, they evidence the selective and versatile nature of the pressure exerted by RIAD on specific socio-economic and demographic classes. Albeit of uneven quality, the available sources provide a robust outlook on the longue-durée evolution of RIAD.

This paper's results might prove to be of interest to a wide array of scholars, clinicians, and policymakers, in search of a contextual basis while studying or managing respiratory diseases and their consequences.

9 EXPLORING THE HEALTH BURDEN OF SMOKING-RELATED RESPIRATORY DISEASE IN THE PAST

Davies-Barrett, Anna (University of Leicester) - Inskip, Sarah (University of Leicester)

It has long been recognised that respiratory disease was a common ailment in past populations. This can be identified in archaeological individuals by changes to the skeleton as a result of respiratory tract inflammation. Bioarchaeological studies of respiratory disease frequencies have found differences between groups according to biological sex, age, socioeconomic status, time period, and environment, which provide valuable information about the effects of different risk factors on respiratory health. However, little has been done to consider in-depth the impact that respiratory disease had on the quality and length of life of those who had it. Today, tobacco smoking is one of the major risk factors for respiratory disease, increasing susceptibility to developing conditions such as chronic obstructive pulmonary disease, asthma, bronchitis, pneumonia, rhinosinusitis, and tuberculosis. The introduction of the drug to Europe in the mid-sixteenth century is likely to have affected rates of respiratory disease, increasing health burdens. Using approaches stemming from bioarchaeology of care and modern methods for estimations of health burden, this paper will explore the possible lived experiences of smoking and non-smoking individuals who suffered from respiratory disease and the impacts this had on society as a whole. Using prevalence data for respiratory disease from post-medieval populations from Britain and the Netherlands, the paper seeks to marry palaeopathological data, historical context, and modern clinical knowledge to gain greater insight into the lived experiences of past individuals. This approach is applicable not only to respiratory diseases, but a range of palaeopathological conditions present in the past.

139 UNDERSTANDING THE BROADER PICTURE: MULTI-SITE AND LONGUE DURÉE APPROACHES TO THE STUDY OF RECYCLING, REPAIR, AND SECONDARY USE IN ANTIQUITY

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Intagliata, Emanuele (Università degli Studi di Milano) - Dobrev, Diana (Università degli Studi di Verona) - Barker, Simon (Ghent University)

Session format: Regular session

Circular economic models—based on reusing, repairing, refurbishing and recycling existing materials and products—have been the subject of much attention in the past decades by historians and archaeologists. However, most studies on the topic have been geographically or chronologically limited to single sites, periods, or archaeological contexts. Wider regional or suparegional perspectives have been hindered, for example, by the nature of the evidence and the costs of archaeometric analyses. Without multi-site or longue durée approaches, we lack the ability to delineate overarching patterns in the history of circular economies or the process, structures, and materials that made recycling and re-use important economic practices.

The scope of this panel is to go beyond the traditional approaches to circular economies in antiquity by exploring studies from broader temporal and geographic contexts that will attempt to answer the following questions:

- What are the challenges of studying circular economies in antiquity with multi-site and longue durée perspectives?
- What methodologies can be used to effectively and systematically collect and interpret existing datasets?
- What insights or results have broader studies of the circular economy shown? How do circular economies vary over time? How do circular economies differ across multi-sites?
- Are certain materials or products intrinsically more (or less) suited to circular economies?

Are successful circular economies organised around cost-saving—or profit-driven models? Does this vary according to the material or product?

- What is the circulation of high-quality compared to low-quality materials within circular economies? How does this change over time?

We welcome proposals for papers dedicated to circularity in antiquity with a specific focus on pottery, glass, metal, and building material from the Roman to the Medieval periods in the Mediterranean basin.

ABSTRACTS

1 WHAT'S NEXT? LONGUE DURÉE AND MULTI-SITE APPROACHES TO ECONOMIC CIRCULARITY IN ANTIQUITY

Intagliata, Emanuele (Università degli Studi di Milano)

Studies on economic circularity in antiquity have often been constrained by limited chronological boundaries or geographical scope. However, recent literature has advocated the necessity to go beyond this approach by investigating reuse, repair, and recycling over a long period. To what extent is this a feasible research approach? What are its benefits and disadvantages? How can we effectively implement a multi-site, longue durée methodology to study reuse, recycling, and repair in antiquity?

This paper aims to reflect on these and other questions by presenting some of the results of 'Project CircE: Drivers of change in ancient circular economies over the longue durée'. This PRIN 2022 PNRR-funded project aims to create a research protocol to explore qualitatively and quantitatively how circular economies changed and developed from the 1st century to the 6th century CE. The site case studies are in northern Italy and include Aquileia, Calvatone, Cremona, Verona, and Villa Bartolomea.

2 ENHANCING CONTINUITY: CASE STUDIES ON POTTERY ADHESIVES DURING THE QIN AND HAN DYNASTIES IN CHINA

Ge, Ruochen (School of Cultural Heritage, Northwest University) - Yang, Lu (School of Cultural Heritage, Northwest University) - Shen, Maosheng (Emperor Qin Shihuang's Mausoleum Site Museum) - Sun, Jie (Chengdu Cultural Relics and Archaeology Research Institute) - Zhou, Linlin (Qingzhou Museum)

During the Qin and Han dynasties in China (221 BC~220 AD), the utilization of pottery sculptures as burial artifacts in the tombs of emperors and nobles was prevalent. Residual adhesive materials were frequently discovered on unearthed pottery figurines and horses. In addition to restoring pottery products, these adhesives were often derived

from the recycling of other materials. This study conducted analyses of pottery adhesives unearthed from three sites: the No.1 burial pit of the Terracotta Warriors at the Mausoleum of Emperor Qin ShiHuang (S1), a Han Dynasty cliff tomb in southwestern China (S2), and a Han Dynasty burial pit in eastern China (S3). Various analytical methods, including microscopic observation, elemental analysis, phase analysis, chemical bond analysis, immunoassay, and proteomics, were conducted to explore the composition of these materials. The findings revealed that the adhesive from S1 comprised pottery powder (from grinding defective pottery figurines), animal glue, and eggs; the adhesive from S2 consisted of clay and protein binders, while the adhesive from S3 was composed of clay and bovine bone particles (possibly from grinding discarded animal bones). From the above results, it can be inferred that these adhesives on pottery products are usually a mixture of organic binder and inorganic mineral fillers. Organic adhesives, known for their high viscosity and longstanding historical use, contributed adhesion to the system. Fillers are often recycled waste materials such as defective pottery and useless bones, which can enhance the strength of the system. The practice of repairing damaged burial objects and employing waste materials as adhesives may seem incongruous with the grandiosity and luxury associated with the tombs of that period. However, it shows us the craftsmen's ingenuity in maximizing material usage, revealing how they applied their wisdom to construct magnificent burial sites during a period of low social productivity and scarce material resources.

3 **TABERNA 2 OF MIROBRIGA: CRAFT AND DOMESTIC ADAPTATIONS AND CERAMOLOGICAL EVOLUTION IN THE 5TH AND 6TH CENTURIES AD**

Quaresma, José Carlos (Universidade Nova de Lisboa)

This communication addresses three major issues.

The first is the architectural evolution of a commercial space from the Imperial Period to the Visigothic Period, a chronology of around five centuries during which it housed commercial, later craft and finally residential functions.

Secondly, the phasing of the stratigraphy from Taberna 2 have been made through the full quantification of the main typologies (terra sigillata, lamps, amphorae, glasses, and other minor typologies) calculating their degree of residuality and intrusiveness.

The third issue is the stratigraphic, technological and statistical analysis of the coarse ware (local or regional), particularly in a period that has not yet been investigated stratigraphically in what is now the Portuguese territory - the first half of the 6th century AD. This line of research follows other work carried out in Mirobriga, applying dating proposals by statistical comparison with stratigraphic data from other peninsular areas, such as Lisbon and Madrid.

4 **HOW THE REUSE AND MULTIPLE-USE OF AMPHORAE AFFECTED THE CIRCULAR ECONOMY IN ROMAN TIMES**

Dobrev, Diana (University of Verona)

Our ability to interpret trade networks and foodstuffs consumption and distribution in Roman times through using amphorae as proxy evidence is entirely affected by the assumption that an amphora type is linked to a particular foodstuff for single use. Nevertheless, recent developments, including chemical analysis, are increasingly offering the means to approach the reuse and multiple-use of containers as a valuable method for understanding how economic circularity evolved in ancient times. A particularly valuable perspective in this regard was driven by some sites in northern Italy where amphorae were first reused to contain different foodstuffs and then were recycled to drain and improve the soil's static capacity and dry building areas.

Starting from this point, we will analyse case studies in Verona and its territory to establish general trends in the consumption and trade of foodstuffs and how this would have affected the circular economy.

The organic residual analyses performed on some selected items have challenged the everyday type-prime use content relation. Thus, the results obtained confirm and better identify some hypotheses made on the typological basis and, on the other hand, illustrate a variety of food products that were stored and may be shipped in amphorae.

The possibility of reuse and multiple uses of transport containers made it possible to obtain a new overview of foodstuff consumption in Verona and its territory during Roman times. It significantly improved our knowledge of how the circular economy was affected by the range of foodstuffs and goods that can be traded in reused and multiple-used amphorae.

5 **STONE RECYCLING IN POTTERY PRODUCTION: EXAMPLES OF SUSTAINABLE PRACTICES IN NORTHERN ITALY AND BEYOND**

Riccato, Anna (Ministero della Cultura, Direzione Regionale Musei Veneto)

In the last few decades, several archaeological and archaeometric studies on Roman and Late Antique coarse wares have highlighted a peculiar phenomenon, i.e. the presence of fragments of marble, alabaster, and other ornamental

stones among the inclusions intentionally added to the fabric. This has been read as evidence for the use of stone-carving debris and recycled building materials for clay tempering.

Starting from some case studies of northern Italy and with a short glimpse at the neighbouring regions, the paper aims to discuss the possible technical and economic reasons for this particular artisans' choice. Moreover, an attempt will be made to reconstruct the supply chain of the recycled raw material and to hypothesise who could have been the main actors involved in its procurement. The topics will be addressed taking into account the economic context and the chronological frame of the production, following the development of the phenomenon from the end of the 1st century BCE to the 6th century CE.

6 **MAKING THE MOST OF WHAT YOU HAVE. LOOKING FOR ANALYTICAL EVIDENCE OF METAL RE- AND UPCYCLING DURING THE ROMAN AGE**

Grassi, Elisa (CRN-ISPC) - Anguilano, Lorna (ETC - Brunel University London)

In the past few years, researches on Roman metallurgy have been bringing to light increasing archaeological evidence of workshops devoted to bronze working. Analyses of debris showed that metalworkers engaged in different processes related to the creation of bronze artefacts, ranging from alloying and casting to "collateral activities" that can fall under the general definition of circular economy, such as recycling of scrap base metals and recovery of precious ones. The archaeological evidence suggests that these were carried out with varying, not always very effective methods. Several case studies from Northern Italy were investigated, in order to retrace the activities performed on each site, linking them with the historical and socio-economical context. Starting from them, it has been attempted to develop an analytical strategy aimed at the comparative reconstruction of the methodologies used, in order to shed light on the metallurgical knowledge underlying this practice, as well as on the transfer of technological know-hows throughout Europe during the Roman imperial age.

7 **REUSE OF STONE CONSOLE FROM THE ROMAN LEGIONARY CAMP BURNUM**

Jadic-Kucan, Ivana (University of Zadar) - Zaninovic, Josko (Burnum Archaeological Collection, Puljani)

A fascinating monument was discovered during the systematic archaeological research of the Roman legionary camp Burnum in 2017. It is an architectural console measuring 132.5 cm in height, 26 cm in length, and 19 cm in width. Initially, it was positioned horizontally and supported an essential part of the building, which may have been a balcony. The console had a decorative ornament of acanthus leaves and spirals, which were central and visible. Over time, the console was repurposed, the part under the acanthus leaves was carved over, and the thickness of the beam was reduced due to the addition of the Medusa relief. The console was given a new function as a fountain (lacus) by piercing a narrow spider's web-shaped opening on its back, through which a water pipe was inserted, which flowed out through the Medusa's mouth. The context of its discovery suggests that it dates back to the period from Emperor Tiberius to Claudius. It was made in Burnum, indicated by the material carved from local limestone. It is believed that the console was cut during the construction of the Burnum principle, with the arrival of XI along with legions of craftsmen, sculptors, and stonemasons who organized workshop production, producing sculptures in large quantities on the spot.

8 **QUALITY THROUGH QUANTITY: TRACING REGENERATIVE CONSTRUCTION PRACTICES ACROSS URBAN NETWORKS IN LYDIA, CARIA, AND PHRYGIA**

Kidd, Allison (Independent)

From the 3rd - 7th centuries AD, earthquakes rattled the densely populated regions of western Asia Minor. As destructive as these events were, recent excavations have demonstrated that this seismic activity was hardly cataclysmic for urban life. Often, it provided communities with an opportunity to update their cities in a manner that better reflected their contemporary lived experiences and expectations for the future. In cities like Laodicea, Hierapolis, Aphrodisias, and Tripolis, such construction works were so comprehensive that entire urban sectors were built anew, utilizing salvaged yet reprocessed building materials whenever possible and supplementing these with newly sourced materials.

At each of these sites, investigations to determine who undertook these efforts and how they were achieved are underway. One question that remains is whether the regenerative construction practices witnessed during later Roman periods in these cities reflect longer or broader historical patterns of urban renewal habits in Lydia, Caria, and Phrygia. The topic has not been systematically studied; most analyses are temporally or geographically isolated in purview. However, earthquakes and other instances of natural and human-derived destruction were nothing new to inhabitants in these areas. It therefore stands to reason that such widespread circular economic practices in later antiquity related to and probably derived from procedures established in earlier periods.

To advance this hypothesis, it is necessary to understand where and how circular patterns over the longue durée across multiple cities have been overlooked, even among proximate urban networks. This paper uses sculpted building

materials as key evidentiary entry points to the issue and proposes a potential methodological solution whereby existing datasets can be redeployed and new data can be generated more efficiently and effectively. It thus posits that a qualitative understanding of the phenomenon can be derived, but only through a more quantitative assessment of the evidence.

143 RESOURCECULTURES - SOCIO-CULTURAL DYNAMICS AND THE USE OF RESOURCES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Bartelheim, Martin (Universität Tübingen) - Della Casa, Philippe (Universität Zürich) - Scholten, Thomas (Universität Tübingen)

Session format: Session with keynote presentation and discussion

The question of what role do resources play in societies from early history to the present day in order to emerge, maintain and change is the focus of this session. Resources are understood as what moves societies and are thus the bases of social life. Beyond a naturalistic or economic perspective, resources represent much more. They are not only naturally given raw materials or economic means, but also specific foundations of the becoming and passing of societies. According to this view, all resources are culturally constructed and the results of historical developments. They can be both material and non-material, either in the form of soils, energy sources, materials, building materials or food, but also in the form of knowledge, speech or memories and related practices. The use of these resources gives rise to social relations and identities, which in turn have an impact on societies and on the things themselves. Resources are at the center of actions and processes, and specific ways of dealing with them can be identified.

This session focuses on the description and analysis of the multi-layered socio-cultural dynamics in dealing with resources. We invite contributions to the discussion of the role of resource use in historical processes, mirrored in the archaeological record and in artefacts with a special emphasis on a cultural perspective on resources. The resources in question can be of various kinds, the key element is that people attribute a cultural value to them for their form of living together. The aim is to make a contribution in archaeology and its neighboring disciplines to move away from an essentialist understanding of resources and to emphasize the importance of their manifold manifestations for social and political processes.

ABSTRACTS

1 RESOURCECULTURES - SOCIO-CULTURAL DYNAMICS AND THE USE OF RESOURCES. INTRODUCTION INTO THE TOPIC

Bartelheim, Martin (Universität Tübingen) - Della Casa, Philippe (Universität Zürich) - Scholten, Thomas (Universität Tübingen)

The question what resources are, stands at the beginning of understanding the handling of resources and their meaning for socio-cultural processes. This relates to one of the grand challenges in archaeological and anthropological research which is the question how societies emerge, maintain themselves and change. Here, relationships between resources, their networks and interconnections are of great importance, as well as the role of materiality, preservation and destruction, and knowledge resources.

Why do people of different societies choose very specific resources and why do they develop their own ways of dealing with them? This cultural dimension, it is thought, has an influence on the shaping of social order. It offers an evaluation of resources in relation to this order and provides guidelines for the appropriate use of resources. The associated cultural ideas and actions are not rigid and unchangeable. On the contrary, they are subject to continuous change, induced in particular by the way resources are handled. Thus, on the one hand, these resource dynamics are the product of specific social and cultural orders; on the other hand, they contribute to their change.

This presentation elucidates the theoretical basis of the concept of ResourceCultures and its applicability in archaeology. The possibilities to detect the role of resource use in historical processes and its implication for socio-cultural developments are discussed. This will be illustrated with examples from several disciplinary contexts.

2 TOPOGRAPHIC, CLIMATIC, AND DEMOGRAPHIC RESOURCES FROM A DIACHRONIC SOCIO-ENVIRONMENTAL SYSTEM PERSPECTIVE: THE CASE OF THE BERNESE SEELAND (CH)

Della Casa, Philippe (University of Zurich) - Blum, Jonas (University of Zurich) - Geitlinger, Timo (University of Zurich) - Griessen, Céline (University of Zurich) - Medarić, Igor (University of Zurich; University of Ljubljana)

Socio-environmental systems (SES) are defined as groups of humans, social factors, and environmental processes that interact with each other through time (Biggs et al. 2021). As such, they largely contribute to the shaping of landscapes by human impact, ecological responses, and socio-economic transformations.

The Bernese Seeland, part of the western Swiss Plateau, is a landscape with both an auspicious and challenging setting: mountain ranges, moraine ridges, fertile valleys, lakes, rivers and vast swamps form an ecotope constantly under morphological transformation by system dynamics, and not least also because of human activities such as the corrections of the Jura waters in the late 19th/20th century.

Human societies repeatedly established themselves in this environment, leaving a variety of traces and impacts comprehensible through archaeology, from seasonal hunting camps to lakeshore and rural settlements, strongholds, burial mounds, tracks, bridges, harbor facilities, and agricultural terraces.

In the long-term evolution, our focus is on the mid-2nd to mid-1st mill. calBC, a period of evident landscape transformations, pronounced climatic impacts, and rapid cultural changes, i.e. the rise and decline of practices embedded in a specific – temporal, spatial, and social – resource environment that we may term “cultural”.

The paper aims at investigating in particular aspects of topography, climate, and demography in our interpretation of the archaeological record and environmental history of the Seeland.

3 MORE THAN PILES - THE RESOURCE USE OF LATE BRONZE AGE SETTLEMENTS AT LAKE BIEL (SWITZERLAND) FROM A DENDROARCHAEOLOGICAL PERSPECTIVE

Blum, Jonas (University of Zurich; Archaeological Service of the Canton of Berne)

The numerous Late Bronze Age lakeside settlements in the “Seeland” (western Switzerland), encompassing Lake Biel, Lake Neuchâtel, and Lake Murten, have provided extensive wood inventories. They were subject to detailed dendroarchaeological studies. The high density of contemporary sites found in these contexts indicates a strong human presence, which inevitably corresponds with different social demands on the landscape and resources. In order to better understand such aspects, recent research has increasingly focused on human-environment relationships and chronological issues.

The fact that the management of forest stands and the use of wood in a densely populated area has a political and social component can be demonstrated using the example of the micro-region of the lower Lake Biel basin. The modelling of forest use patterns using the dendrotypological method not only reveals the joint management of forest stands by different settlements, but also provides information on the specific fostering of individual trees.

The aim of this paper is to present and discuss dendroarchaeological methods to identify the use of wood as a resource and to raise questions about its social and political implications.

4 THE USE AND AVOIDANCE OF RESOURCES DURING THE LATE BRONZE AND IRON AGES IN THE WESTERN MEDITERRANEAN

Díaz-Zorita Bonilla, Marta (University of Tübingen) - Marciales Daza, Mauricio (University of Tübingen) - Timm, Monice (University of Tübingen) - Baten, Jörg (University of Tübingen)

Human past lifestyles are shaped by choices and decisions regarding the use but also the non-use of certain resources. According to this, we are exploring at what extent resources were available and were used in the past in areas such as the western Mediterranean. The main goal of this paper is to explore past subsistence strategies in relation to mobility and therefore, explore isolation/connectivity, and colonization in island contexts using the RessourcenKulturen framework from Tübingen large-scale research group (SFB 1070). Throughout the archaeological case of the Biniadrís cave and their funerary practices, we are investigating how past populations are making use of their resources and how both tangible and cultural, were socially constructed and embedded within the Late Bronze and Iron Ages communities in Menorca. Therefore, through the application of scientific methods such as bioarchaeology, we could identify the use of some of them, but also the avoidance of others, particularly in Menorca, something that can be replicated to other islands in the western Mediterranean. The exploration of bioarchaeological methods such as stable isotope analyses, offers valuable insights into dietary patterns, allowing us to uncover the diet of this population and its relationship towards the sea. This analysis will contribute to the general understanding of the social and cultural structures of maritime and non-maritime populations. The resource use and avoidance in Menorca, specifically in the Biniadrís cave, during the Late Bronze and Iron Ages, has revealed intriguing patterns related to the avoidance of fish consumption due to established traditions, economic factors, and geographic determinants. It emphasises the

significance of environmental variables and cultural preferences in shaping dietary choices and, therefore, a unique cultural identity.

5 A STUDY ON WELLBEING IN THE WESTERN MEDITERRANEAN AREA BETWEEN THE NEOLITHIC AND THE BRONZE AGE

Tagini, Alessandra (University of Tuebingen)

This paper attempts to explore from different perspectives the diachronic development of wellbeing in the societies of the Western Mediterranean between the Neolithic and the Bronze Age.

The Western Mediterranean area sees a historical path distinct from the development of the Ancient Near East until the Bronze Age, but cultural and technological contaminations arrive in large part of the Western Mediterranean through continental Europe. Therefore, the Western Mediterranean area results as only relatively isolated, relatively to the institutional innovations of the Ancient Near East, but overall part of the complex exchange system of Eurasia.

It is interesting to notice elements of cultural persistence in the Western Mediterranean area since the Neolithic, which then enter in the framework of the whole Mediterranean Area in the preclassical period. I study the diachronic development of wellbeing in the Western Mediterranean area, in particular Iberia and Italy, and Greece, between the Neolithic and the Late Bronze Age, considering both bioarchaeological indicators of living standards and cultural expression. Interestingly, the trends of nutrition show very different patterns in the Western part of the Mediterranean area compared to the East, in accordance with different historical processes which affected these areas. In the study of cultural expression, written records are taken into account, with a statistical study, for example, of the most used keywords and themes in a determined period, distinguishing between prosperity periods and crisis periods. Representations are also used to study the subjects most frequently depicted in a determined society, inherently connected to key elements of the oral culture.

6 SOCIO-CULTURAL DYNAMICS IN THE MANAGEMENT OF BARTONIAN TERTIARY FLINT IN WESTERN ÎLE-DE-FRANCE

Brunet, Véronique (INRAP - National Institute for Preventive Archaeological Research)

I would like to present a paper on the role of Tertiary-Bartonian flint in historical processes. How this raw material influenced the organisation of lithic production on a territorial scale on a diachronic axis between 4200 and 2150 cal. BC. The study focuses on one flint extraction site, undoubtedly the most important in the northern half of France - Jablines in Seine et Marne (Bostyn and Lanchon, 1992). Based on twenty years of applied research on the flint knapping industry of the 5th to 3rd millennia BC, the aim is to study the coherences, complementarities and evolution of the technical subsystem associated with flint tools, in particular the emblematic polished stone axe, in the long term, from the cultural perspective of the resource.

I propose a territorial approach to the management of raw materials and the relationship between Neolithic communities and space. Based on an assessment of the technical and quantitative over-investment in the production of axes in particular, we try to understand how this object may have influenced territorial organisation and, secondly, its role in the establishment of social networks (dissemination of value-added products such as polished axes in the tertiary sector) in these societies, which see differentiated production and exchange as an alternative to conflict (Keeley, 1996).

My suggestion, therefore, is that there may have been a chronological shift in the organisation of axe workshops and their integration into Neolithic society. During the Middle Neolithic II they were highly integrated and relatively collectively managed, whereas during the Late Neolithic they seemed to dissociate and become a matter for specialists, gradually giving way to more remote forms of production in the Final Neolithic.

This model provides a dynamic and stimulating picture of agro-pastoral societies.

7 WATER DYNAMICS: EXPLORING A SOCIO-CULTURAL APPROACH TO WATER MANAGEMENT FOR LONG-TERM VIABILITY IN SOUTHERN JORDAN

Marsal, Roser (Departament de Ciències de l'Antiguitat i de l'Edat Mitjana, Universitat Autònoma de Barcelona) - Carpallo, Jesús (Independent researcher) - Graham, Angus (Department of Archaeology and Ancient History, Uppsala University)

Water, a dynamic force throughout history, profoundly shapes societies, embodying a unique agency pivotal between communities and their environment. Influenced by cultural, historical, and social factors, water transcends being a mere substance; it is a narrative woven into the fabric of communities, deeply rooted in humanity's historical experiences. This integral perspective recognises water's agency, actively shaping cultural practices, influencing societal structures, and forging connections between communities and their environment.

Our research delves into fundamental aspects of water conceptualization, distribution, and use in contexts of water scarcity, using a socio-cultural approach to analyse the archaeological record of water infrastructure. Focused on the site of Sela in southern Jordan, featuring a unique water supply system spanning the Bronze Age, our study employs innovative methods, including a 3D model and Digital Elevation Model, to enhance the analysis of Sela's hydrotechnological development, encompassing hydrological and spatial assessments of the site. The investigation reveals the technical expertise of local communities in managing water supply systems, ensuring long-term viability. Additionally, it emphasises varied social organization patterns among groups in Sela, specifically related to available water resources. The examination of water use spaces reveals group dynamics, ranging from private to collective areas. Through material culture analyses, we illustrate how water stimulates human agency, playing a crucial role in shaping socio-technical and political relationships. Highlighting the agency of water, our study contributes to a broader understanding of its importance beyond natural or economic value, recognising its dynamic role in shaping the human experience and influencing the cultural identity of communities.

8 THE ORIGINS OF THE CROPS COMMODIFICATION IN A SMALL COMMUNITY. THE CASE OF THE EBA KANI SHAIE IN IRAQI KURDISTAN

Joka, Karolina (Adam Mickiewicz University)

According to Jane Jacobs, (2000) (Algaze 2008) social differentiation results from economic differentiation, and both – social revolution and urban growth – depend on economic expansion. Therefore, it is possible to investigate how variety arises inside the system, how outside resources are integrated, and finally, how they contribute to the future development causing unpredictable results. During many years of intensive studies on past social and settlements development it become evident, that emergence and development of centrally administered exchange activities known from Bronze Age urban hubs of South – Western Asia are closely linked to profound transformations in social and economic organization. Domestication of plants and emergence of agriculture in the Neolithic era were one of the major factors that triggered a series of economic and social changes which ultimately made urbanization and complex societies possible. One of many outcomes of agriculture was the increase in population, which was associated with the emergence of non-agricultural specializations and extensive forms of distribution of goods and trade. Plants therefore played an important role both as one of the factors leading to the socioeconomic changes which underpinned commodification, but also became a subject of these processes. In the current study we aim to examine the new evidence for agricultural crops distribution within the small, non - urban community and discuss it within the wide context of early commodification and redistribution of natural resources/staple goods. The archaeobotanical and archaeological insights derived from Early Bronze Age Kani Shaie (Bazyan valley, Iraqi Kurdistan) will serve here as the subject of reflections on the nature of plants in the transformative state from staples to commodities.

151 THE BEASTS AMONG US: A CLOSER LOOK AT SYNANTHROPIC HUMAN-ANIMAL RELATIONS IN THE PAST

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Hornkjøl, Ingeborg (University of Stavanger) - Baumann, Chris (University of Tübingen) - Orton, David (University of York) - Feider, Michelle (University of York)

Session format: Regular session

Synanthropism, a concept closely related to commensalism, refers to a behaviour of free-ranging animals benefiting from their shared ecology with humans. Human activities provide food resources, such as food waste or stored agricultural products, and the human-modified environment provides security and homes for these animals. As consequences of synanthropic behaviour, the population density, reproductive rate, and survival advantage of synanthropes increase. Individual home ranges typically decrease as animals feed on spatially concentrated anthropogenic resources, yet species distributions may increase as anthropogenic environments (and human transport) permit dispersal to new regions. Synanthropes are an important aspect of the human experience of animals, often taking on particular cultural significance and encouraging unique human-animal relationships, ranging from pests to pets. At the same time, their archaeological presence may provide valuable information on the conditions of past human settlements and landscape modifications.

In this session we will take a closer look at synanthropic behaviour in the past, from the palaeo-synanthropic behaviour of small scavengers in the Pleistocene, through cultural successors and introduced species such as house mice and domestic cats from the Neolithic onwards, to rats and other taxa often associated with urban settlements. We welcome submissions on any animals that have benefited from a human-made environment through time – including birds, reptiles, and even invertebrates in addition to mammals – as well as broader reviews, theoretical perspectives, and methodological contributions. We hope the session will provide a fruitful discussion encompassing all aspects of

synanthropic research, from cultural studies to the natural sciences. Finally, we want to explore how the study of syn-anthropism can illuminate aspects of past societies and provide clues to future human-animal interactions.

ABSTRACTS

1 THE PALEO-SYNANTHROPIC NICHE: THE ADAPTATION OF SMALL CARNIVORES TO A HUMAN-MADE MICROENVIRONMENT DURING THE LATE PLEISTOCENE

Baumann, Chris (University of Tübingen)

The study of paleo-synanthropic behavior, i.e., behavior of wild animals that benefit from a shared ecology with humans during the Late Pleistocene, is a very new field in archaeological research. This talk will describe and discuss the concept paleo-synanthropic behavior and the associated paleo-synanthropic niche and present the current state of research. Key features of this new niche are anthropogenic food waste from mobile hunter-gatherers as a stable food base for small opportunistic scavengers and a human-near environment safe from large predators. By linking the niche to human behavior rather than to a specific location or structure, this niche was accessible for a long time, even in the Late Pleistocene. Like modern synanthropic animals, members of the paleo-synanthropic niche experienced an increase in population density and a decrease in home range. This, in turn, made it easier for humans to capture these animals and use them as resources for meat, fur, or feathers, as seen in the zooarchaeological record of many European Late Pleistocene sites. As a disadvantage, diseases such as zoonoses may have spread more easily.

2 MOVING HOUSE(MOUSE): A LOOK AT MICROFAUNAL ASSEMBLAGES AND THE ANTHRODEPENDANT NICHE IN ANATOLIA

Feider, Michelle (University of York) - Jenkins, Emma (Bournemouth University) - Clarkson, Paul (Bournemouth University) - Renaud, Sabrina (Université Lyon) - Papayiannis, Katerina (University of Athens) - Cucchi, Thomas (Muséum national d'Histoire naturelle - CNRS)

The transition to settled communities in Southwest Asia had a profound effect on microfaunal species and led to the development of the synanthropic or anthropogenic niche. One of the earliest species to take advantage of this new niche was the house mouse (*Mus musculus*) which became a global coloniser due to its association with people and its subsequent human mediated dispersal.

This paper examines the microfaunal assemblages from three early sites in Anatolia; Pınarbaşı, a transitory rock-shelter site (14150-11000 cal. BCE), with a settled early Neolithic settlement (9800-7800 cal. BCE), and a transitory late Neolithic phase (6500-6000 cal. BCE); Boncuklu Höyük, a small early Neolithic village (c9200-7800 cal. BCE); and Çatalhöyük, a large proto-urban settlement (c7100-5950 cal. BCE). It explores settlement structure and species diversity, including the impacts people had on both their surroundings, and the small creatures that lived amongst them. Were the inhabitants of these sites aware of the presence of small mammals that may have been eating and fouling their food? Is there any evidence of attempts at pest control in these early settlements? And what can the bones of these small animals tell us about trade and exchange networks at these early sites? A taxonomic, taphonomic, geometric morphometric, and CT scan analysis of these assemblages highlights the unique information that can be found in these often overlooked remains.

3 INSECT SYNANTHROPY AND PATHWAYS TO COSMOPOLITISATION

Panagiotakopulu, Eva (School of GeoSciences, University of Edinburgh)

The expansion of agriculture, crops and domestic animals, from the Neolithic onwards has led to biogeographic change, including the spread of various insect species which have hitched a hike during this process. This involved the distribution of distinct faunas of a range of insect pests and parasites associated with humans to new areas across Europe during the Neolithic and in subsequent periods. While ectoparasites travel on their hosts, other synanthropic insects spread via different pathways, often relying on transport on shipping vessels. The biogeography of insect synanthropic species, their spread from their original niches and their early distribution indicate different processes for these invasions. A comparison of new and existing data from shipwrecks with assemblages from ports, provides an understanding of the mechanisms of spread of synanthropic insects to and from these entry points. Most of the shipwreck data and relevant literature come from the medieval and post-medieval period. Together with early records of synanthropic insects, they map the specific timing of the expansion of the geographic ranges of particular species, from the granary weevil in the Neolithic to American cockroaches in the post-medieval period. In addition, records of synanthropic insects from islands, in particular from Britain, give detailed information regarding the timing of relevant biological invasions, and the consequences of the development and expansion of human environments as a driver for ecological change over time. The palaeoecological record of insect accidental travellers provides a different point of view on ecological imperialism and the homogenization of the biota.

4 BEE VS PEOPLE: RECONSTRUCTING ANCIENT BEEKEEPING THROUGH AN ANALYSIS OF APIARY SITES

Francis, Jane (Concordia University)

Ancient texts on agricultural themes include information about apiaries, their locations, their handling by people, and the responses of the bees to these interactions. A recent increase in attention to beekeeping remains, specifically beehives and related ceramic equipment, from excavation and archaeological survey contexts now has the possibility of augmenting these written testimonia, but also of honing details and correcting erroneous information.

This paper examines the Greek and Roman archaeological contexts for beekeeping and investigates the extent to which and how people were able to modify ancient landscapes to better suit their bees and maximize their output of honey and wax. This research focuses on how apiaries can be identified and assessed today, especially in reconstructions of ancient landscapes, the construction and use of ancient bee enclosures, the relationship between settlement and apiaries, and other animals, and people's conversions of the botanical environment to accommodate the work of bees. The success of such strategies will be assessed alongside the natural inclinations of bees and their adaptability to the desires of man.

5 REASSESSING THE DISPERSAL OF BLACK RATS THROUGH LATE IRON AGE AND MEDIEVAL NORTHERN EUROPE

Orton, David (University of York) - Feider, Michelle (University of York) - Presslee, Sam (University of York)

One of the most successful of synanthropic mammals, the black rat (*Rattus rattus*) dispersed worldwide from south Asian origins thanks to its association with humans. It is now well established that it spread into Europe north of the Mediterranean with Roman expansion, and that the break-up of the Roman Empire from the 5th C CE saw a marked decline or even extirpation of rats in the northern provinces. Recent archaeogenetic research confirms that medieval rats across central and northern Europe represent a distinct dispersal event with minimal admixture from Roman populations. The contours of this event remain obscure, however, as does the source population. While sporadic cases are reported as early as the Viking Age (9th-10th C CE), rat finds only become truly widespread in northern Europe from perhaps the 13th C – and it is from this latter horizon that existing aDNA data overwhelmingly derives.

This paper explores black rats' colonisation of northern Europe via a synthesis of reported Late Iron Age and medieval finds from around the North and Baltic Sea catchments, supported by new direct radiocarbon dates and ZooMS identifications. Does the distribution of finds suggest dispersal from the east, the west, or perhaps from the south via the central European rivers? Do the early finds represent the beginning of a gradual expansion and establishment, or isolated and short-lived populations linked to long-range trade? How does the presence of rats correlate with that of other synanthropic taxa, such as mice? Crucially, data on other micromammals allows us to control for research bias and isolate genuine trends in the distribution of rats. Finally, we consider what insights these patterns may provide into trade networks and evolving settlement ecology in the region.

6 THE BROWN RAT (RATTUS NORVEGICUS) IN BRITAIN

Albarella, Umberto (Dept of Archaeology, University of Sheffield)

Much of the discussion about rats in European archaeology has focused on the Black Rat (*Rattus rattus*) as this was the species that was introduced in antiquity and is associated with the debate regarding the spread of the plague. The Brown Rat (*Rattus norvegicus*) was introduced into Europe and Britain a lot later – in the 17th – 18th century and started stimulating the interest of archaeologists only when postmedieval archaeology became better established in our field. Yet the Brown Rat has a very important role in the understanding of our past societies, both in cultural and ecological terms. In Britain, it pushed the Black Rat towards marginal areas and, like in other parts of the world, soon became ubiquitous. Unlike the Black Rat, the Brown Rat is a burrowing and highly social animal, which is why it has ended up occupying sewages in very large numbers. In this paper, I will review the discussion about the introduction of the Brown Rat in Britain and will also mention how archaeological and historical evidence can help us to understand how this commensal species managed to become so prominent in a relatively short time.

7 DIVINE SYNANTHROPES? THE CASE OF CATS IN EGYPT, AND HOW THEY CLAWED THEIR WAY TO THE TOP

Hornkjøl, Ingeborg (University of Stavanger)

During the 7th century BC in Egypt – the beginning of the Late Dynastic Period – the domestic housecat received a prominent position in Egyptian religion, much more so than in the preceding centuries. While much popular and scholarly attention has been paid to the cat in Ancient Egypt, little systematic and theoretically explicit research has been done to clarify which factors contributed to this significant change in the cat-human relationship. Virtually no

attention has been paid to the animal itself and its practical engagements with people in Egypt. From the perspective of Human-animal studies, animals are imbued with agency - the ability to affect the world and human lives. Through their agency, animals can contribute to shaping human societies, including those societal aspects that are left for us to study as archaeologists. As such, a missing perspective on the research on cats in Egypt is that cats and their practical engagements with people have had a direct effect on its religious role. In this paper, I will present how the cat as an independent synanthrope may have affected the Ancient Egyptian life-world, and how the changing conditions for human-cat engagements consequently shaped its religious role.

8 HUMAN-CAT INTERACTIONS AT DIFFERENT TIMES AND GEOGRAPHIES: MODELLING DIETS AND HYDROGEN ISOTOPE ANALYSIS OF CATS FROM TURKEY, JORDAN, AND BELGIUM

Shev, Gene (University of Rome Tor Vergata, Department of Biology, Rome, Italy) - De Cupere, Bea (Royal Belgian Institute of Natural Sciences, Brussels, Belgium) - Brozou, Anastasia (University of Rome Tor Vergata, Department of Biology, Rome, Italy) - Fuller, Benjamin (Géosciences Environnement Toulouse, France) - Mannino, Marcello (Aarhus University, Department of Archaeology and Heritage Studies, Højbjerg, Denmark) - Peters, Joris (ArchaeoBioCenter and Institute of Palaeoanatomy, Domestication Research, and the History of Veterinary Medicine, Ludwig Maximilian University Munich, Munich, Germany; SNSB, State Collection of Palaeoanatomy Munich, Munich, Germany) - Bouillon, Steven (Department of Earth and Environmental Sciences, Soil and Water Management, University of Leuven, Belgium) - Van Neer, Wim (Royal Belgian Institute of Natural Sciences, Brussels, Belgium.) - Ottoni, Claudio (University of Rome Tor Vergata, Department of Biology, Rome, Italy)

A synanthropic relationship between domestic cats (*Felis catus*) and humans has been well established for more than 10 thousand years and has affected the close cohabitation between our species. As part of the ERC-funded FELIX project, collagen stable isotope ratios (nitrogen, carbon) of cats and of other animal taxa have been analysed from three geographically and temporally distinct sites: Late Roman - Early Byzantine Sagalassos in southwestern Turkey, 14-15th century Brussels, and Ottoman period Aqaba in southern Jordan. Our aim is to assess the similarities and differences expressed in cat diets and how these relate to human activities at these different sites. These isotopic data are examined using dietary mixing models (FRUITS), and isotopic niche space modelling (SIBER, nicheROVER), to facilitate more succinct interpretations of cat dietary inputs compared to traditional scatterplot visualizations. Additionally, the measurements of non-exchangeable hydrogen stable isotope ratios of collagen samples from cats and other key animals allow us to further investigate how this isotopic proxy may prove useful specifically in examining human-cat interactions. We also explore the possibility of determining water intake, mobility, or trophic level of the other species analysed.

9 ANCIENT DNA AND THE DISPERSAL OF THE DOMESTIC CAT IN ITALY

De Martino, Marco (University of Rome Tor Vergata, Department of Biology, Rome, Italy) - Rovelli, Valentina (University of Rome Tor Vergata, Department of Biology, Rome, Italy) - De Cupere, Bea (Royal Belgian Institute of Natural Sciences, Brussels, Belgium) - Alhague, Francesca (Museo delle Civiltà, Rome, Italy) - Minniti, Claudia (Sapienza University of Rome, Italy) - Wierer, Ursula (Soprintendenza Archeologia Belle Arti e Paesaggio per Firenze, Pistoia e Prato, Florence, Italy) - Wilkens, Barbara (Independent researcher Alghero, Italy) - Peters, Joris (ArchaeoBioCenter and Institute of Palaeoanatomy, Domestication Research, and the History of Veterinary Medicine, Ludwig Maximilian University Munich, Munich, Germany; SNSB, State Collection of Palaeoanatomy Munich, Munich, Germany) - Van Neer, Wim (Royal Belgian Institute of Natural Sciences, Brussels, Belgium) - Ottoni, Claudio (University of Rome Tor Vergata, Department of Biology, Rome, Italy.)

From wild animals to pest controllers and finally to pets, the evolutionary success of domestic cats is indisputable. However, cats are understudied, especially if compared with other domesticates and their wild relatives. Zooarchaeological and genetic evidence demonstrated that domestic cats originated from the North African and Near Eastern wildcat, *Felis silvestris lybica*. The interaction between humans and cats most likely started 11 thousand years ago in the Neolithic Levant. More recently, ancient mitochondrial DNA (mtDNA) evidence suggested that domestic cats spread to Southeast Europe as early as 4400 BC, however their dispersal to the rest of Europe is controversial due to the paucity of data. This is particularly true for the Italian peninsula and major islands (Sicily and Sardinia), notwithstanding their key role as crossroads for ancient trade routes in the Mediterranean basin.

We generated 17 low-coverage ancient genomes from Italian wild and domestic cats. In addition, to provide a broader view of wildcat present-day genetic variation so far largely unexplored, we produced modern high-coverage genomes of wildcats from Italy (n=10, including Sardinia) and Tunisia (n=1). Our genomic dataset shows that the earliest domestic cat in Italy dates back to the late Iron Age, in Sardinia. Interestingly, this specimen appears to be genetically distinct from later Italian domestic cats spreading since the Roman Imperial era, thus highlighting the complexity of the cat domestication process. Finally, we address questions around potential admixture patterns between Italian wild and domestic cat populations.

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MULTIDISCIPLINARY APPROACHES TO HUMAN BEHAVIOR AND ENVIRONMENTAL DYNAMICS OF LATE EARLY PLEISTOCENE AND MIDDLE PLEISTOCENE EUROPE

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Cucart-Mora, Carolina (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France) - Lombao Vázquez, Diego (GEPN-AAT, Dpto. Historia, Facultad de Xeografía e Historia, USC, Praza da Universidade 1, 15782, Santiago de Compostela, Spain.; Institut Català de Paleocologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; UMR7194 - HNHP, MNHN Musée de l'Homme, 17 Place du Trocadéro, 75116, Paris, France) - Pineda, Antonio (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France; Institut Català de Paleocologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.) - Mecozzi, Beniamino (Department of Earth Sciences (PaleoFactory Lab), Sapienza University of Rome, p.le Aldo Moro 5, 00185 Rome, Italy)

Session format: Regular session

The Early-Middle Pleistocene Transition (EMPT) (ca. 1.2 -0.5 ka) is marked by significant climatic, environmental, and cultural changes. They are transformations at different spheres that interplay with each other. It encompasses a faunal renewal with the extinction of the "Villafranchian" fauna and the diffusion of modern mammals. Culturally, it's marked by the appearance of the Acheulean culture in Western Europe, a milestone in the evolution of Homo genus' technological behavior.

The biocultural changes documented during this period seem to have been abrupt. Nevertheless, this impression may result from the paucity of data, as well as the way researchers have approached the study of this period. For example, the European record provides no evidence of a clear transition between the Oldowan and the Acheulean, suggesting that the latter arrived along with a population influx. However, the limited paleoanthropological record does not allow us to reconstruct population dynamics. Regarding the second matter, the characterization of the behaviors of these human groups has primarily centered on certain technological aspects, particularly the study of Large Cutting Tools, paleoeconomic questions, subsistence behavior, and prey acquisition strategies. In Paleontology, both limitations act together, when the different taxonomies used, and the doubtful chronology of key sites jeopardize the identification and contextualization of bioevents.

This session aims to bring together researchers from diverse disciplines to provide an interdisciplinary approach to characterize the EMPT faunal renewal, the changes in human behavior, and the interplay between the natural and cultural spheres. Both case-specific research (e.g., presentation of archaeological and paleontological sites) or broader syntheses from a geographic and temporal perspective will be valued. These approaches may involve one or multiple disciplines, including lithic technology, taphonomy, taxonomy, paleoenvironmental reconstructions, computational modeling, and spatial analysis, among others.

ABSTRACTS

1 UNDERSTANDING THE ENVIRONMENTAL CONTEXT OF THE FIRST HUMAN OCCUPATION OF WESTERN EUROPE DURING MIS 35-19 FROM MARINE POLLEN RECORD

Catrain, Maé (Muséum National d'Histoire Naturelle, UMR 7194, CNRS, Histoire Naturelle de l'Homme Préhistorique, Paris, France) - Combourieu-Nebout, Nathalie (Muséum National d'Histoire Naturelle, UMR 7194, CNRS, Histoire Naturelle de l'Homme Préhistorique, Paris, France) - Lebreton, Vincent (Muséum National d'Histoire Naturelle, UMR 7194, Histoire Naturelle de l'Homme Préhistorique, Paris, France) - Fauquette, Séverine (Institut des Sciences de l'Évolution de Montpellier, ISEM, Université de Montpellier, France) - Peyron, Odile (Institut des Sciences de l'Évolution de Montpellier, ISEM, Université de Montpellier, France) - Joannin, Sébastien (Institut des Sciences de l'Évolution de Montpellier, ISEM, Université de Montpellier, France) - Toti, Francesco (Dipartimento di Scienze della Terra, Università degli Studi di Firenze, Firenze, Italy) - Bertini, Adele (Dipartimento di Scienze della Terra, Università degli Studi di Firenze, Firenze, Italy) - Moncel, Marie-Hélène (Muséum National d'Histoire Naturelle, UMR 7194, CNRS, Histoire Naturelle de l'Homme Préhistorique, Paris, France)

Hominins are documented at the doorstep of Europe at around 1.78 Ma in Dmanisi (Georgia), and they were already present in Asia at around 2.1 Ma. However, in Western Europe, the first evidence of human occupations dates back to 1.4 - 1.2 Ma in Sima del Elefante and Fuente Nueva 3 (Spain) and Pirro Nord (Italy). This period is associated to the beginning of the Early-Middle Pleistocene Transition (1.4 - 0.4 Ma), a contrasted climate period characterized by important changes in the glacial-interglacial cyclicity. Glacial-interglacial climate cycles are assumed to have influenced human migrations. Nevertheless, to this day, the hominin environmental context (e.g., vegetation, climate) is poorly known. In the Mediterranean area, the Early Pleistocene vegetation is only documented by two continental key

sequences, Tenaghi Philippon (Greece) and Lake Ohrid (Albania). Our study provides the first results of vegetation changes in the western Mediterranean between Marine Isotope Stage (MIS) 35 to MIS 19 (1.141 - 0.761 Ma). These new data are retrieved from the palynological analysis of the marine sequence of Leg 161 ODP site 976 located in the Alboran Sea, south of the Iberian Peninsula. Here we complement previous palynological studies: MIS 30-23 (1.141 - 0.9 Ma) and MIS 20-19 (0.814 - 0.761 Ma) with analysis of MIS 35-31 (1.141 - 1.062 Ma) and MIS 22-21 (0.9 - 0.814 Ma). Our pollen analyses show rapid vegetation changes during transitions between glacial and interglacial periods with a resolution never reached before. Our results are compared with Tenaghi Philippon's and Lake Ohrid's pollen records to provide a precise environmental and climatic framework for human occupation in western Europe during this key time period.

2 CLIMATE CHANGES AND SETTLEMENTS DYNAMICS IN ITALY DURING MIDDLE AND LOWER PLEISTOCENE

Villa, Valentina (CNRS CEPAM UMR 7264) - Nicoud, Elisa (CNRS CEPAM UMR 7264) - Arzarello, Marta (Università degli studi di Ferrara) - Aureli, Daniele (ArScAn AnTET UMR 7041) - Pereira, Alison (Université Paris-Saclay, GEOPS UMR 8148) - Peresani, Marco (Università degli studi di Ferrara) - Rocca, Roxane (Université Paris 1 Panthéon-Sorbonne, TEMPS UMR 8068)

Over the last decade, the PALEO programme, led by the École française de Rome, focused on the environmental and chronostratigraphic contexts of Palaeolithic settlements in central and southern Italy. This includes the Valle Giumentina and Atella archaeological sites, as well as new surveys in the Marche, Abruzzi, and Sicily regions. Particular attention has been paid to the study of the sedimentary sequences of the archaeological sites. The use of a high-resolution stratigraphic, sedimentological, micromorphological, and geochronological approach enabled a detailed reconstruction of the environmental context and chronology of Palaeolithic occupations. Furthermore, it documented the impact of millennial climatic variability on the Mediterranean ecosystems. These new data allow for a discussion on the impact of these fluctuations on Palaeolithic human populations in terms of subsistence, adaptation, and mobility. Therefore, they make a significant contribution to the development of models of settlement and cultural evolution in southern European regions during the Pleistocene.

3 THE ITALIAN PENINSULA: A KEY ZONE TO UNDERSTAND THE ANCIENT PREHISTORY EVOLUTION IN THE MEDITERRANEAN AREA

Rocca, Roxane (Université Paris 1 Panthéon-Sorbonne, UMR 8068 TEMPS) - Arzarello, Marta (Università degli Studi di Ferrara) - Aureli, Daniele (Umr 7041 ArScAn AnTET) - Nicoud, Elisa (Cnrs, UMR 7264 CEPAM) - Pereira, Alison (Université Paris-Saclay, UMR 8148 GEOPS) - Peresani, Marco (Università degli Studi di Ferrara) - Villa, Valentina (UMR 7264 CEPAM)

Current research on the Lower and Middle Pleistocene indicates that Italy, constitutes an area characterized by significant technical innovations. Indeed, the peninsula includes among the oldest evidence of human settlement (c. 1.4 Ma), some of the first occurrences of handaxes (c. 0.7 Ma) and Levallois concept (c. 300 ka) found in Europe so far. Over the past 10 years, a substantial amount of research has focused on the environmental and chronostratigraphic contexts in central and southern Italy, making it possible to compare and discuss lithic assemblages with confidence.

We intend here to present the main results obtained during the PALEO Program funded by the École française de Rome since 2012. This project focuses on the interdisciplinary study of three main zones of Italy: Centre (Abruzzo, Marche), South (Basilicata) and Sicily. It contributes to the renewal of settlement patterns of Italy, Europe and the Mediterranean area by providing new and original primary data.

4 ZOOARCHAEOLOGICAL REVIEW OF THE LOWER PALEOLITHIC AND EARLY MIDDLE PALEOLITHIC IN BELGIUM

Dedrie, Tristan (ArcheOs: Research Laboratory for Biological Anthropology, Department of Archaeology, Ghent University; Research Foundation – Flanders) - Abrams, Grégory (ArcheOs: Research Laboratory for Biological Anthropology, Department of Archaeology, Ghent University; Scientific Department, Espace Muséal d'Andenne) - Di Modica, Kévin (Scientific Department, Espace Muséal d'Andenne) - De Groote, Isabelle (ArcheOs: Research Laboratory for Biological Anthropology, Department of Archaeology, Ghent University)

Although rare, several sites related to the Lower Paleolithic and Lower to Middle Paleolithic transition are present in Belgium (\pm MIS 14 - MIS 8) in different topographic environments. These include the alluvial terraces of the Haine Basin, the Loess sequences of the Lower Meuse valley, and possibly some karstic environments such as La Belle Roche Cave (Sprimont, BE). Faunal remains were sporadically unearthed in association with lithic artifacts and studied since the 19th century but extensive zooarchaeological research had not yet been applied on a larger scale.

This preliminary approach reviews zooarchaeological research conducted in the latter half of the 20th century and places it in a wider geographical context. More specifically, using recently published biochronological data from neighbouring sites, we question the dating and context of the Belgian sites. For example, at La Belle Roche Cave (Sprimont, BE), Villafranchian species such as *Pachycrocuta brevirostris* (Gervais, 1850) and *Stephanorhinus etruscus* (Falconer, 1868) were identified among fauna typical of the Upper Cromerian. At Mesvin IV (Mons, BE), preliminary review of previously published dental biometric data from *Mammuthus* sp. corresponds with the suggested dating of the site to MIS 8- MIS 7. In addition to the review, we also present the first results from the zooarchaeological analysis on Layer 6 and 7 (MIS 7 - MIS 8) at Scladina Cave, as a test-case for the biochronology that was used in the literature review.

5 THE MAMMAL FOSSILS FROM THE MIDDLE PLEISTOCENE SITE OF NOTARCHIRICO (VENOSA, SOUTHERN ITALY)

Mecozzi, Beniamino (Department of Earth Sciences (PaleoFactory), Sapienza University of Rome) - Iannucci, Alesio (Department of Geosciences, Section of Terrestrial Palaeoclimatology, Eberhard-Karls-University Tübingen) - Carpentieri, Marco (Dipartimento di Studi Umanistici, Università degli Studi di Ferrara) - Pineda, Antonio (UMR 7194 HNHP (MNHN-CNRS-UPVD), Département Homme et Environnement, Muséum National d'Histoire Naturelle; Institut Català de Paleocologia Humana i Evolució Social (IPHES-CERCA)) - Sardella, Raffaele (Department of Earth Sciences (PaleoFactory), Sapienza University of Rome) - Moncel, Marie-Hélène (UMR 7194 HNHP (MNHN-CNRS-UPVD), Département Homme et Environnement, Muséum National d'Histoire Naturelle)

Notarchirico is one of the most important sites for the human evolution in the Mediterranean Europe during the Middle Pleistocene and for paleoenvironmental reconstruction during the Early-Middle Pleistocene Transition. The first findings date back to 1950s, when Virginia Ginetta Chiappella opened the first trench along the hill of Notarchirico. About 30 years later started the first systematic excavations in 1979, coordinated by Marcello Piperno and with support of the Italian Institute of Human Paleontology (IslPU), which continued until 1995. Based on the extraordinary richness of the archaeological and paleontological material, a building was realized to protect and to keep the material in situ, thus arising the Paleolithic Park of Notarchirico. Since 2016, fieldwork activities restarted on this important site, coordinated by one of us (M.-H. M.).

Piperno reported 11 archeological levels in a seven-meter-deep sequence, from alpha (α), to G (named from top to bottom). New excavations focused on the lower part of the sequence, never systematically investigated, but only known as a result of boreholes outside the original building. Additional levels were carefully recognized and are being excavated, from H to J, allowing for the expansion of such a unique bone and lithic record. Piperno and colleagues described the fossil sample collected in the levels alpha and A, while the other remains were preliminary listed in tables.

Here, all fossils collected from the whole sequence of Notarchirico are presented, including the samples excavated by Chiappella, Piperno and the new findings, preserved at the Paleolithic Park of Notarchirico (Venosa), the National Archeological Museum of Venosa "Mario Torelli" and the Museum of Civilizations (Rome). The results remark the importance of the site in the study of terrestrial ecosystem of Mediterranean Europe during the Early-Middle Pleistocene Transition.

6 WHEN AN ELEPHANT DIES ALONG A STREAM: THE CASE STUDY OF THE MIDDLE PLEISTOCENE SITE OF CASAL LUMBROSO (CENTRAL ITALY)

Mercurio, Stefano (Dipartimento di Scienze delle Antichità, Sapienza Università di Roma) - Alhaique, Francesca (Museo delle Civiltà) - Spinapolice, Enza (Dipartimento di Scienze delle Antichità, Sapienza Università di Roma) - Argento, Alessia (Soprintendenza Speciale Archeologia Belle Arti e Paesaggio di Roma, Ministero della Cultura) - Fiore, Ivana (Museo delle Civiltà; Dipartimento di Biologia Ambientale, Sapienza Università di Roma) - Giaccio, Biagio (Consiglio Nazionale delle Ricerche (CNR), Istituto di Geologia Ambientale e Geoingegneria) - Giustini, Francesca (Consiglio Nazionale delle Ricerche (CNR), Istituto di Geologia Ambientale e Geoingegneria, Area della Ricerca di Roma 1, I-00015 Monterotondo, Rome, Italy) - Lemorini, Cristina (Dipartimento di Scienze delle Antichità, Sapienza Università di Roma) - Sardella, Raffaele (Dipartimento di Scienze della Terra (PaleoFactory), Sapienza Università di Roma) - Mecozzi, Beniamino (Dipartimento di Scienze della Terra (PaleoFactory), Sapienza Università di Roma)

During the construction work of a new building complex along via Casal Lumbroso, located in the north-west sector of Rome (central Italy), a rich archeological and paleontological deposit was found in 2017. After excavations in 2017-19 requested and scientifically directed by the Soprintendenza Speciale Archeologia, Belle Arti e Paesaggio di Roma, fieldwork resumed in 2023 coordinated by Sapienza University of Rome, with the collaboration of the Museo delle Civiltà (Rome) and the Istituto di Geologia Ambientale e Geoingegneria, Consiglio Nazionale delle Ricerche.

The discovery of the Casal Lumbroso deposit confirms the extraordinary importance of the Rome territory for the study of the Middle Pleistocene, especially the north-west sector of the city, where a remarkable number of largely

coeval localities, such as Castel di Guido and La Polledrara di Ceganibbio, have been already recovered and investigated.

The preliminary results of the geological, archeological, archeozoological and paleontological investigation are presented here. The archeological and paleontological horizon of Casal Lumbroso occurs at top of the Tiber River aggradational succession related to the MIS 11c sea level highstand, dated by 40 Ar/ 39 Ar geochronology at ca. 404 ka.

The research revealed the presence of scattered remains of an adult individual of straight-tusked elephant *Palaeoloxodon antiquus*, with sporadic bones referred to *Stephanorhinus* sp., *Bovinae*, *Cervinae*, *Dama* sp., *Canis* sp. and *Talpa* sp., *Lagomorpha*, *Testudines*. Two bird remains document the occurrence of *Anatidae* and *Strigiformes*.

The archeological sample includes lithic tools mainly made of flint, including two bifaces. The taphonomic analyses indicates that the *P. antiquus* carcass was exploited also as a source of raw materials as documented by the presence of several intentionally fractured elephant bones, some of them also with flake removals, with localized use wear traces.

7 TRACKING TECHNOLOGICAL INNOVATIONS DURING LATE-EARLY PLEISTOCENE: INSIGHTS FROM THE EARLY ACHEULEAN ASSEMBLAGE OF EL BARRANC DE LA BOELLA (TARRAGONA, SPAIN)

Lombao, Diego (GEPN-AAT, Dpto. Historia, Facultade de Xeografía e Historia, USC, Praza da Universidade 1, 15782, Santiago de Compostela, Spain.; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; UMR7194 Histoire naturelle de l'Homme préhistorique (HNHP), Museum National d'Histoire Naturelle (MNHN), CNRS, Université Perpignan Via Domitia, Alliance Sorbonne Université, - Musée de l'Homme, Place du Trocadéro 17, 75016 Paris, France) - Morales, Juan Ignacio (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.) - Mosquera, Marina (Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.) - Ollé, Andreu (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.) - Saladié, Palmira (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.; Unit Associated to CSIC, Departamento de Paleobiología, Museo Nacional de Ciencias Naturales (MNCN), Consejo Superior de Investigaciones Científicas (CSIC), Calle José Gutiérrez Abascal 2, 28006, Madrid, Spain) - Vallverdú, Josep (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.; Unit Associated to CSIC, Departamento de Paleobiología, Museo Nacional de Ciencias Naturales (MNCN), Consejo Superior de Investigaciones Científicas (CSIC), Calle José Gutiérrez Abascal 2, 28006, Madrid, Spain)

This study delves into technological behaviours in Unit II of the Pit 1, La Mina, and El Forn localities in El Barranc de la Boella (BB), Spain, dating back to approximately 0.99-0.78Ma ago. Recognized as the oldest Acheulean site in the European subcontinent, it provides a unique opportunity to explore technological features associated with the emergence of Large Cutting Tools (LCTs) in Europe.

The analysis focuses on five key aspects of technological behaviours: 1) raw material management and blank selection; 2) core knapping strategies; 3) length of reduction sequences through reduction intensity; 4) reduction sequences integrity; and 5) large-flake production.

Results indicate a differential raw material management in the three BB's localities: a) the exploitation and configuration of small-sized tools, linked to chert, and b) the configuration of LCTs and the production of large-sized flakes (>10cm), especially linked to schist. Additionally, c) spatiotemporal fragmentation of the reduction sequences of these LCTs and large flakes is observed.

Concerning core reduction strategies, some cores exhibit a more structured volumetric organization in the knapping strategies and a greater independence from raw materials characteristics due to a procedural template with sequentially organized actions, facilitating the production of more flakes, though not greater control over their morphology.

However, these structured strategies coexist with expedient and/or opportunistic types like those in Oldowan lithic assemblages, featuring partial management of core volume. This mixture of complex and expedient strategies is reflected in the variability of core reduction intensity and the degree of volumetric exhaustion exhibited by the cores.

Furthermore, the characteristics of LCTs and associated behaviours distinguish BB not only from earlier and contemporary Oldowan sites but also from European Middle Pleistocene Acheulean assemblages. This underscores the

uniqueness of BB and provides crucial insights into the evolutionary trajectory of hominin technological capabilities during the late Early Pleistocene.

8 UNRAVELING THE EARLIEST OCCUPATIONS OF WESTERN EUROPE: A BOTTOM-UP MODELING APPROACH

Cucart-Mora, Carolina (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France) - Reschke, Jan-Olaf (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France; Institute for Ecology, Evolution and Diversity, Goethe University, Frankfurt am Main, Germany.; ROCEEH Research Center, Senckenberg Research Institute, Senckenberganlage 25, 60325 Frankfurt am Main, Germany) - Hall, Harry (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France; Department of Archaeology, Classics and Egyptology, University of Liverpool, 8-14 Abercromby Square, Liverpool L69 7WZ, UK) - Longborg, Kamilla (CNRS UMR 5602 GEODE Géographie de l'Environnement, Maison de la Recherche, Université Toulouse 2 Jean Jaurès, 5, Allées Antonio Machado 31058 Toulouse, France) - Hertler, Christine (ROCEEH Research Center, Senckenberg Research Institute, Senckenberganlage 25, 60325 Frankfurt am Main, Germany) - Grove, Matt (Department of Archaeology, Classics and Egyptology, University of Liverpool, 8-14 Abercromby Square, Liverpool L69 7WZ, UK) - Saqalli, Mehdi (CNRS UMR 5602 GEODE Géographie de l'Environnement, Maison de la Recherche, Université Toulouse 2 Jean Jaurès, 5, Allées Antonio Machado 31058 Toulouse, France) - Moncel, Marie-Hélène (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France)

The spatiotemporal patterns of the first "Out of Africa" continue raising questions. Notable attention has been paid to understanding the delay in the occupation of Western Europe (i.e., dated Spain and Italy around 1.4 Ma) when compared with the arrival of the first hominins to the Levant and Asia (i.e., at around 2.1 and 2 Ma respectively). There is a wide list of dynamics and variables that could explain the aforementioned pattern. The geographic, climatic or environmental conditions could have prevented the population dispersion by closing suitable corridors or/and, the settlement of populations with enough entity to be archaeologically visible. Equally important could have been the role played by the hominins' cognitive capabilities which would have prevented or allowed them to adapt to new environments and climatic oscillations. The archaeological record from this period is sparse and has a very low temporal resolution. This poses a great challenge to archaeologists trying to understand the process of colonization of Western Europe. To overcome these limitations, we have designed a bottom-up modelling approach.

The Lateurope team approach consists of four different agent-based models. On the one hand, three sub-models are designed to understand different spheres of hominin-environment interactions that interplay at different temporal and spatial scales. On the other, the Central model. Here, we present the architecture of the latter, which integrates three different implementations that gradually increase its complexity. It starts as a model to test our null hypothesis, i.e., that the spatiotemporal pattern can be explained by distance and topology. Later, it will integrate the spheres of the three sub-models: climate and environment, subsistence and adaptability. After being validated against the archaeological record, the sequential build-up of the model will allow us to identify the relevant dynamics/variables that could explain the current spatiotemporal pattern of the occupation of Western Europe.

9 ENVIRONMENTAL DRIVERS OF HOMININ DISPERSAL PATTERNS DURING THE EARLY- MIDDLE PLEISTOCENE TRANSITION - A METHODOLOGICAL ENQUIRY

Lomborg, Kamilla (CNRS UMR 5602 GEODE Géographie de l'Environnement, Maison de la Recherche, Université Toulouse II Jean Jaurès) - Cucart-Mora, Carolina (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine) - Hall, Harry (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine; Department of Archaeology, Classics and Egyptology, University of Liverpool) - Reschke, Jan-Olaf (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine; Institute for Ecology, Evolution and Diversity, Goethe University; ROCEEH Research Center, Senckenberg Research Institute) - Grove, Matt (Department of Archaeology, Classics and Egyptology, University of Liverpool) - Hertler, Christine (ROCEEH Research Center, Senckenberg Research Institute) - Gaudou, Benoit (Institut de Recherche en Informatique de Toulouse, Université Toulouse I Capitole) - Saqalli, Mehdi (CNRS UMR 5602 GEODE Géographie de l'Environnement, Maison de la Recherche, Université Toulouse II Jean Jaurès) - Moncel, Marie-Hélène (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine)

Various drivers of the dispersal of past hominins and how these dynamics are approached have been debated in archaeology for decades. Especially the changing glacial- and interglacial stages of the Middle Pleistocene Transition (1.25-0.7 Ma) effects on the environment are interesting with their potential influence on the population dynamics in Western Europe. This presentation addresses a methodological approach to this topic:

- What data has been used to reconstruct the Early-Middle Pleistocene environments in Europe, and how is this data best integrated into this research?

- How are hominin dispersal patterns in this period addressed, and how can computational modelling support these investments?

Paleoenvironmental reconstructions are used to understand the environmental circumstances of past societies through an interdisciplinary approach. By reviewing the current use of climatic and environmental data in large spatial reconstructions, the foundation and strategies for mapping climatic and environmental conditions in the Early and Early Middle Pleistocene are evaluated. From this, an approach with biomes as building blocks for the reconstruction of Eurasia during the MPT is presented to enable large-scale analysis of hominin dispersal. The second part of the presentation presents agent-based modelling (ABM) as a method to test the relationship between environmental factors and hominin dispersal. A review of existing ABM analyses of dispersal scenarios will demonstrate the capacities and insights of ABM. To connect the previously presented reconstruction of Eurasia and hominin behaviour, we suggest constructing agent behaviour from niche models of the biomes. This method links the archaeological material to the simulation functions, which enables us to observe hominin agents directly in the paleoenvironment. From paleoenvironmental reconstructions to simulations of hominin dispersal, this presentation reflects the possibilities of applying computational methods to the archaeological record, and how the changing environment of the MPT could have affected the hominin dispersal dynamics.

10 THE GOOD, THE BAD AND THE HUNGRY: USING AGENT-BASED MODELS TO PREDICT HOMININ MOVEMENT AND SURVIVAL

Reschke, Jan-Olaf (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France.; ROCEEH Research Center, Senckenberg Research Institute, Senckenberganlage 25, 60325 Frankfurt am Main, Germany; Institute for Ecology, Evolution and Diversity, Goethe University, Frankfurt, Germany) - Cucart-Mora, Carolina (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France.) - Lomborg, Kamilla (CNRS UMR 5602 GEODE Géographie de l'Environnement, Maison de la Recherche, Université Toulouse 2 Jean Jaurès, 5, Allées Antonio Machado 31058 Toulouse, France.) - Hall, Harry (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France.; Department of Archaeology, Classics and Egyptology, University of Liverpool, 8-14 Abercromby Square, Liverpool L69 7WZ, UK.) - Saqalli, Mehdi (CNRS UMR 5602 GEODE Géographie de l'Environnement, Maison de la Recherche, Université Toulouse 2 Jean Jaurès, 5, Allées Antonio Machado 31058 Toulouse, France.) - Grove, Matt (Department of Archaeology, Classics and Egyptology, University of Liverpool, 8-14 Abercromby Square, Liverpool L69 7WZ, UK.) - Hertler, Christine (ROCEEH Research Center, Senckenberg Research Institute, Senckenberganlage 25, 60325 Frankfurt am Main, Germany; ROCEEH Research Center, Heidelberg Academy of Sciences and Humanities, Heidelberg, Germany) - Moncel, Marie-Hélène (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France.)

The behavior of early hominins, including their foraging strategies and which factors determine their survival, remains largely unknown. This is even more the case for Europe between 1.4 million and 700 thousand years ago, which seem to have been colonized much later than Asia and its northern regions most likely have only been occupied temporarily. In the Lateurope ERC project we plan to use an agent-based model to study the first hominin settlement in Europe to identify which factors may have allowed or prevented the initial colonization and later occupation by early hominins. As the incomplete archaeological record provides limited insight into their foraging behavior, we will use recent hunter-gatherer societies as reference models for early hominin behavior. These studies show that hominin foragers can survive in poor environments by moving frequently to find enough resources to eat, but this extensive movement can limit their ability to maintain social connections with other groups. We plan to modify an existing agent-based model, which simulates individual foragers leaving a central camp to gather plants or acquire meat through hunting or scavenging while moving similarly to recent hunter-gatherer societies living in comparable environments. This new implementation of the model will help us to identify the challenges early hominins would have faced in terms of finding enough food in Pleistocene Europe. We will recreate and test three different regions both during Glacial and Inter-Glacial periods: the more forested Mediterranean coast, central France, and north-west Europe, with the latter two regions becoming increasingly open during Glacial periods. A key goal of our study will be to establish threshold values that can be used to identify uninhabitable regions or periods based on the observable outputs as early hominins would not have been able to sustain a population for long under the given conditions.

160 MYSTERIOUS MUD: A TRANSVERSAL APPROACH TO INTERPRETING UNSOLVED EARTHEN REMAINS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Sánchez Polo, Alejandra (Universidad de Valladolid) - Mateu, Marta (Institut Català d'Arqueologia Clàssica) - Ruano Posada, Lucía (Universidad Complutense de Madrid) - Pastor Quiles, María (Universidad de Alicante) - Péfau, Pierre (École Française de Rome)

Session format: Session with presentation of 6 slides in 6 minutes

The fragility of the earthen remains found in the archaeological record entails some difficulties in identifying building and production processes, as well as related social practices. Our aim with this practical session is to analyze evidence collaboratively by sharing case studies from archaeological and ethnographic contexts, including experimental studies. By examining these materials, we want to discuss and share proposals and solutions that not only allow us to reflect on our interpretations of past societies, but also consider future and sustainability perspectives.

The mud remains preserved in museums or described in reports or publications are often true unsolved cases as they are insufficiently described. When confronted with these artefacts, some questions arise, such as whether these remains were part of the rooftops, other building sections, or some kind of furniture, who made them, and so on. With these concerns in mind, we are searching for case studies that address enigmatic fragments, undetermined earthen elements, to try to propose a function. Additionally, attending the different life stages of the buildings, we would like to discuss examples of repairing, rebuilding and abandonment processes.

How will we work at this special session? It aims to be a practical workshop where participants share archaeological materials and discuss them together. At this point, we refer to the identification of earthen materials (from a macroscopic view to a microscopic approach, including XRD, XRF, FTIR, petrology, etc.), paying attention to imprints, decoration and composition to understand the different construction techniques (wattle and daub, cob, mud brick, plasters, etc.), as well as earthen furniture (ovens, grills, benches, shelves, buckets, ornaments, etc.). We welcome papers from any era, as long as the material presented is raw earth. We aspire to collectively solve our cases, strengthening individual research and shedding light on this fundamental part of humanity's material past.

ABSTRACTS

1 UNICORNS AND LEAF IMPRESSIONS: INTERPRETING SHAPES OF BURNT DAUB PIECES FROM THE CARPATHIAN BASIN IN THE BRONZE AGE

Anvari, Jana (University of Cologne)

In this presentation, we will put forward for discussion difficult-to-interpret daub shapes from the sites of Toboliu and Borsodivánka, both tell sites located in the Carpathian Basin and dating to the Bronze Age. In the context of the project 'A Multimethod toolkit to study burnt daub' at the University of Cologne, our team employs an analysis approach that starts with sorting fragments by shape as a basis for – together with information on the excavation context – interpreting which part of a building they represent. This reconstruction spatial context represents the basis for further detailed macroscopic and microscopic analyses. After sorting several thousand fragments of burnt daub, we have identified several shape types for which we cannot securely identify what parts of the house construction they represent. Presenting these shapes and our preliminary thoughts on them, we hope to collect further insight into possible interpretations of these pieces through this practical workshop.

2 MUD AND POTTERY ALLIANCES IN ARCHAEOLOGICAL AND ETHNOGRAPHIC CONTEXTS. COMPARATIVE INSIGHTS FROM EGYPT TO THE IBERIAN PENINSULA

Correas-Amador, María (Independent researcher) - Pastor-Quiles, María (University of Alicante (Spain))

The role of earth goes far beyond being the raw material for pottery-making. Without earth there is no pot, but once the pot becomes a reality, there are many forms in which humans employ mud to complement fired by-products, such as providing physical support and insulating and protecting their walls. But it is a two-way relationship: pottery and pottery sherds also serve to compact, strengthen and fix mud walls and renders, and cover mud roofs, amongst other uses. The combination of mud and pottery both for artefacts and construction can even convey cultural meanings.

Using examples where mud and pottery combine (from past and present, and a variety of geographical locations), this presentation would like to bring up for discussion the relationship between earth as a raw material and its products. Is the circular relationship between both inherent to this material, and is earth a unique case where raw material and product continue to “help” each other throughout their useful life and beyond? More practically, it also aims to con-

tribute to the interpretation of pottery remains which have left imprints in mud, which are often found in different archaeological contexts.

3 INTERPRETING 4TH MILLENNIUM BCE DAUB FINDS FROM WESTERN VOLHYNIA (SE POLAND)

Szutenberg, Zofia (Maria Skłodowska Curie University)

The Sokal Ridge is a small part of the Volhynian Upland within the territory of present-day Poland, where Eastern - Pontic and Central European cultural elements have always meet. In the 4th millennium BC this region was inhabited by the communities of the Funnel Beaker culture. Connections with the Cucuteni-Tripilia culture which occupied the territory of today's Ukraine, are visible in the pottery and we can also expect some influences in the architecture, as daub is particularly abundant on FBC (Funnel beaker cultere) sites in this region.

Unlike the well-recognized architecture of dwelling houses in the CTC, it is not known exactly what the FBC houses looked like. Daub was neglected in the research, mostly only noted to be there. There are no studies, there are no standards for determining what parts of the house or clay installations in it represent the relevant patches of daub. The project that is presented here, is subject of my MA thesis, and it is pioneering in this field. My goal is to reconstruct building processes, based on the daub finds.

The presentation shows the most distinctive pieces of daub, with unusual shapes and containing macroscopic remains.

4 STRANGE MUD REMAINS FROM THE NORTH OF IBERIA BETWEEN THE LATE BRONZE AGE AND EARLY IRON AGE (C. XIV-VI BC)

Sánchez Polo, Alejandra (Universidad de Valladolid) - Ruano-Posada, Lucía (Universidad Complutense de Madrid)

Huts from the Bronze and Iron Age of Northern Iberia (c. XIV-VI BC) remain not well understood and characterised. Throughout the Bronze Age, communities in the Northern Plateau lived in heterogeneous and isolated earthen huts that were dismantled once the family left the territory, leaving small traces of their presence. However, in the Early Iron Age, there was a substantial change and villages came to be dominated by mudbrick buildings, leading to the emergence of authentic tells, true landmarks in the landscape. Upon studying the earthen remains of these different phases, we find fragments that can be attributed to the walls of the structures, both in wattle-and-daub and mud-bricks. However, other mud fragments are also found, whose identification is more difficult to infer.

This paper aims to showcase several "mysterious" earthen construction materials found in different settlements across time and territories. Our current challenges involve deciphering these shapeless remains marked with imprints of leaves, textiles or basketry. For this purpose, macro and microscopic analysis are significantly enhancing our comprehension of different technical building solutions, maintenance practices and other uses not previously considered, such as furnishings, ovens, containers or lids. As these settlements have not experienced a Pompeii-like event, it is challenging to reconstruct the appearance of these houses in the past. Therefore, this approach helps to build more accurate narratives about daily life within these settlements.

5 THE "BLOB": A VITRIFIED COLLAPSE OF A RAW EARTH STRUCTURE

Sgromo, Maria Teresa (Università di Pisa)

Since 2022, the University of Siena, in collaboration with the University of Oxford, has resumed excavation activities at the Acropolis of the ancient city of Populonia (LI). The new investigations have focused on the road and the large domus located at the foot of the monumental terracing of "Le Logge".

This contribution will focus on the particular stratigraphy found within the domus, a building constructed at the beginning of the 2nd century BC and destroyed in the second quarter of the 1st century BC by a fire, after which the house was no longer occupied. The walls of the building, found both standing and collapsed, were constructed both in stone and in earth, the latter in the form of incannucciata and mudbricks. The new investigations in the southern area have allowed for a detailed analysis of the sequence of collapses, which remained almost intact and better preserved than the rest of the dwelling.

Of particular interest was the excavation of room B1, a room under renovation at the time of the collapse and equipped with an upper floor used as a warehouse. The removal of the roof collapses revealed a mysterious layer formed by a large concretion of vitrified earth, extremely compact and up to 60 cm thick, which occupied the entire space, with a large amount of fused materials inside it. The layer appears to be related to the collapse of the upper floor, however, it does not seem comparable to any of the previously identified collapses of earth structures. The characteristics of this particular finding, the possible reconstruction of the peculiar circumstances that led to such a transformation and its probable interpretations will be presented, in search of a comparison that allows for an understanding of the original appearance of the structures of which it constitutes the decay.

6 REPORT OF THE EARLY ARCHAEOLOGICAL EXCAVATIONS AND NEW DATA IN THE SO-CALLED BOSCO LITTORIO AREA

Panvini, Rosalba (Università di Catania) - Ferrara, Bianca (Università degli studi di Napoli Federico II)

From 1996 to 2023 the archaeological research in the Bosco Littorio area allowed to discover a raw bricks architectural structure buried by the sand in the early 5th century BC.

Located near the sea, 800 meters west of the mouth of Gelas river, this area extends on the southern slopes of the Molino a Vento hill, the acropolis of the Greek Gela, founded by Rhodes and Cretans in 689-688 BC.

Archaeological data revealed that this architectural structure extraordinarily preserved was used between the second half of the 6th and the first quarter of the 5th century BC when it was destroyed by an earthquake or a tidal wave, which buried it under a layer of sand that prevented a later settlement.

The surviving structures are N/E-S/W oriented and aligned with those of the northern slope of the hill.

Based on the archaeological finds and the way they were arranged in the ground, the architectural structure can be interpreted as a residential area, while only one of its sectors can be considered as the marketplace of the archaic city. In fact, a large amount of black- and red-figure Attic pottery, local and indigenous pottery and transport containers were found.

Three clay altars stand out for their rarity: two of them are 1.19 and 1.20 meters high while the third smaller is 0.70 m. The scenes on the front faces are very particular: on the first altar a running Gorgon is depicted holding Pegasus and Chrysaor in her arms; on the second altar a divine female triad is represented (Demeter, Kore and Hecate) and finally, on the third altar, Eos is represented fleeing and holding in her arms the hunter Kephalos. These are significant and original artefacts, made in local workshops and found outside a room of the same structure.

7 FROM THE HEARTH: DIFFERENTIATING COMBUSTION SURFACES FROM OTHER HARDENED FLAT EARTHEN FRAGMENTS

Mateu, Marta (ICAC (Catalan Institute of Classical Archaeology)) - Belarte, Maria Carme (ICREA (Catalan Institution for Research and Advanced Studies); ICAC (Catalan Institute of Classical Archaeology)) - Pastor Quiles, María (University of Alicante) - Saorin, Carme (GRAP (Grup de Recerca en Arqueologia Protohistòrica), IAUB (Institut d'Arqueologia de la Universitat de Barcelona))

Regularised surfaces are common in archaeological mud remains and can be one of the key traits of their morphology to interpret their original nature and function. These materials are commonly parts of buildings, but they can also belong to domestic structures, such as the ones made for cooking, lighting and heating of spaces.

Hearths and ovens are central in protohistoric architecture, but their remains can be easily overlooked when found inside silos. In this paper we reflect on which characteristics, observed macro and microscopically, are indicative to identify fragments of combustion installations made with earth and found in secondary depositions. These traits can be, on the one hand, the above-mentioned flat surfaces, as well as certain imprints in these hardened materials, such as the ones resulting from cobbles or pottery added as part of preparation layers. On the other hand, presence or absence of components and effects of heating, detected with thin-section micromorphology and FTIR.

For this we focus on a series of well-preserved earthen materials coming from negative structures of different sites in coastal Catalonia, with a methodology adapted to making these remains less enigmatic.

8 THE MICROARCHAEOLOGY OF SUBMERGED EARTHEN MATERIALS: THE UNKNOWN REMAINS FROM LA MARMOTTA, ROME

Pejoan-Quiroga, Sofia (Institució Milà i Fontanals, Spanish National Research Council; University of Barcelona) - Mateu, Marta (Catalan Institute of Classical Archaeology) - Portillo, Marta (Institució Milà i Fontanals, Spanish National Research Council) - Ibáñez-Insa, Jordi (Geosciences Barcelona, Spanish National Research Council) - Quevedo-Semperena, Izaro (Institució Milà i Fontanals, Spanish National Research Council) - Cubas, Miriam (University of Alcalá) - Remolins, Gerard (ReGiraRocs S.L., Research, Conservation and dissemination. Cultural and Natural heritage of the Pyrenees.) - Mazzucco, Niccolò (Università di Pisa) - Mineo, Mario (Museo delle Civiltà, Museo Nazionale Preistorico Etnografico "L. Pigorini", Rome) - Gibaja, Juan (Institució Milà i Fontanals, Spanish National Research Council)

The current study deals with earthen remains (namely concotti) which have been traditionally considered building materials, from the early Neolithic site of La Marmotta. The settlement is located on the shore of a lake of volcanic origin on the present-day Lake Bracciano in the Lazio region, central Italy. It presents an extraordinary preservation of organic material by water-logging, with radiocarbon dates placed in the early 6th millennium BC. We conducted an integrated microarchaeological approach, including thin section micromorphology, X-Ray Diffraction (XRD), phytoliths and other biomicrofossil analyses, in order to investigate earthen constructive systems, as well as the range of raw

materials used. Phytolith results indicated the nature of the vegetal matter, composed mainly by the leaves and stems of Pooidae grasses, including cereal agricultural by-products such as barley and einkorn wheat, which dominate the macrobotanical records at the site. In addition, other siliceous biomicrofossils were noted within the phytolith slides, including both diatoms and sponge spicules, which are common in lacustrine environments, and found to be postdepositional and notably abundant in their external surfaces. Furthermore, micromorphological observations contribute to the contextualization of these remains, and the distinction of those original raw materials including local volcanic components, additionally supported with XRD, from those that are the result of postdepositional processes. The nature of plant components is supported to a greater extent in thin section within the voids displaying phytoliths, some anatomically connected. These results further point to the value of integrated geoarchaeological approaches and direct microfossil evidence for exploring the nature of earthen materials and constructive systems in early Neolithic built environments.

9 DIRTY PREHISTORIES: PHOSPHATE MAPPING AND MICROMORPHOLOGICAL ANALYSES OF A LA TÈNE PERIOD BUILDING IN BIRGITZ (TYROL, AUSTRIA)

Prackwieser, Isabella (University of Innsbruck) - Cereda, Susanna (University of Innsbruck) - Müller, Florian (University of Innsbruck) - Trebsche, Peter (University of Innsbruck)

The “Hohe Birga”, a late Iron Age hilltop settlement in Birgitz (Tyrol, Austria), was discovered in 1937 and extensively excavated in the following years. These initial excavations were primarily dedicated to the documentation and publication of archaeological finds. The context in which artefacts were found remained mostly overlooked and especially neglected were the imposing structures known as “Casa Retica” (a debated term) that characterize the settlement. New investigations, conducted between the years 2018 and 2022 by the University of Innsbruck, aimed to fill this gap by focusing on a more detailed examination of these still-debated archaeological structures.

In this talk, we present new research results of the La Tène period House II on the Hohe Birga. We collected three undisturbed sediment blocks and 141 loose sediment samples from the floor of the structure and subsequently analyzed them by means of micromorphology and phosphate spot-tests. The aim of the study was to gain a deeper understanding about the nature of the floor (e.g. formal/informal, plastered/rammed, covered/uncovered), to identify potential renovation phases and to trace post-depositional processes following the abandonment of the building.

Microarchaeological approaches proved crucial in obtaining microscopic information from features without a “Pompeii premise” and in identifying traces of activity. The new results offer valuable insights into the use of the building and enable its history to be reconstructed.

10 EXPLORING MUD BRICKS IN THE EARLY BRONZE AGE III AT TELL EŞ-ŞÂFI/GATH: A MULTIDISCIPLINARY STUDY OF DOMESTIC ARCHITECTURE

Wang, Jiamin (University of Manitoba, Department of Anthropology and Near Eastern and Biblical Archaeology Lab) - Greenfield, Haskel (University of Manitoba, Department of Anthropology and Near Eastern and Biblical Archaeology Lab) - Maeir, Aren (Bar-Ilan University, The Martin (Szusz) Department of Land of Israel Studies and Archaeology)

Mud brick, also known as unfired brick, is an air-dried brick, that is an understudied and unique building material generally composed of sand, clay, water, shell, and organic temper agents (such as straw) in the Near East. It contributes to the understanding of site architecture, social questions related to buildings, human behavior, labor structure, the organization of early urban societies, and the influence of these activities on Near Eastern social complications.

Although Levane is one of the most attractive regions for archaeologists, to the best of my knowledge, there were few English publications about the techniques and applications of mud brick in Tell eš-Şâfi/Gath. While archaeological research on mud brick has primarily focused on Egypt and Mesopotamia. This study represents the first investigation into mud brick production during the Early Bronze Age III (2850-2550 BCE) at Tell eš-Şâfi/Gath (Israel), with a focus on texture, coloration, and recipes. These aspects enable the identification of production techniques and chaîne opératoire. It is worth mentioning that all mud bricks in this study originate from domestic buildings and exhibit varying distances from the roof or bottom. The diverse locations may suggest potential variations in production methods and a more intricate division of labor, along with distinct functions for each type of mud brick.

We propose to investigate the recipes of mud brick production in an early urban setting, which especially focuses on the mineral and organic agent composition. This study was first put forward to try to use the Gas Chromatography-Mass Spectrometer (GC-MS) to analyze the main components of organic tempering agents. By combining results from geoarchaeology and mass spectrometry, it is possible to define the petrographic and chemical characteristics of the mud brick and investigate mudbrick's unique role in early urban planning and social labor arrangements during the EB III.

173 EARLY CAREERS ON THE ROMAN FRONTIERS ? CONNECTING PEOPLE, EXPLORING INNOVATIVE METHODS, ADVANCING INTERDISCIPLINARITY

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Alberti, Marta (Vindolanda Trust; Newcastle University) - Stevens, Saskia (Utrecht University) - Stemberger Flegar, Kaja (PJP d.o.o) - Hingley, Richard (Durham University)

Session format: Regular session

UNESCO's Frontiers of the Roman Empire World Heritage Property, originally designating Hadrian's Wall alone, has since been extended to embrace the Upper German-Raetian Limes, the Antonine Wall and, most recently, the Lower German Limes. Roman frontiers are researched by a multicultural group of scholars: Italian postgraduates examine finds from Cumbria, Canadian researchers study the Vindolanda Trust Leather collection, Turkish and Belgian post-graduates investigate the function and impact of the Limes in the Netherlands. An ever-increasing number of early career colleagues from different backgrounds seek introduction to the established northern European scholarship. The Frontiers of the Roman Empire ECR network and the Dutch research project 'Constructing the limes' both take steps in this direction, fostering international collaboration and transdisciplinary approaches. This session offers ECRs from various disciplinary backgrounds the opportunity to present their research in a welcoming international setting. The organizers welcome papers ranging from small finds to bulk data, papers on the application of bio-archaeological methods, the impact and significance of the Limes from antiquity until today, the development of knowledge of frontier infrastructure, frontiers as zones of interaction. The latter can be presented either through a theoretical lens, or through studies of standing remains and/or material culture. During the session, attendees will have a chance to anonymously vote for the most innovative paper, which will then feature in the ECR newsletter and website.

ABSTRACTS

1 BREATHING NEW LIFE INTO ROMAN FRONTIERS STUDIES: 'CONSTRUCTING THE LIMES' AND THE ECR NETWORK

Stevens, Saskia (Utrecht University) - Alberti, Marta (Vindolanda)

The archaeology of Roman frontiers boasts a rich scholarship, with roots as deep as the birth of the archaeological profession. Thanks to the abundance of archaeological evidence, and to the range of interpretations offered around it, one might feel like the field has been thoroughly explored. Yet new technologies and multidisciplinary approaches can still breathe new life into the topic. This paper discusses two projects aiming to do just that: the Constructing the Limes project (C-LIMES), spearheaded by Utrecht University with as many as 20 academic and societal partners, and the Roman Frontiers ECR Network. C-LIMES focuses on three main aspects of the study of the lower German Limes: the influence of the border on the dispersion of goods and people during the Roman period, how the Limes has become Heritage, and the way our understanding and perception of Roman frontiers has shaped the way we think about borders today. The project, set to continue until 2026, encourages multidisciplinary research by historians, art historians, bio-archaeologists, and political geographers, as well as fostering community participation through the involvement of non-academic society, such as metal detectorists. At the same time, with seed funding from the Roman Society, a new network for Early Career Researchers has been established. The network aims to connect researchers and their research across the whole of the Frontiers, and to offer a safe space for new researchers to discuss their ideas and contributions.

2 FIBULAE IN THE BORDERLANDS

Ruiter, Arjan (Vrije Universiteit Amsterdam; Constructing the Limes)

The idea that the distribution of artefacts in the limes borderlands along the Lower Germanic Limes is severely influenced by the presence of Rome's imperial border on the Rhine is not a new one. A familiar image is that of material culture displaying a concentration on the southern levee of the great river. It seems evident that the Romans placed restrictions on cross-border exchange of material culture. The limes is therefore often seen as a dividing line, a hard border for all actors.

Brooches, or fibulae, are no exception in regards to such clear distribution patterns. More problematic is that certain fibula types and forms are dated based on a historical narrative. Prime example is the 1st century spoonbow brooch. When emperor Claudius orders his general Corbulo in 47 CE to fall back to the Rhine, a number of new fortifications are erected in the Rhine delta and the regional infrastructure is greatly improved. A regional spoonbow brooch form is dated before the 40s of the 1st century CE, because the fibula had spread on either side of what would become the limes. Implicit in this assumption is the idea that the establishment of the limes in the 40s may have halted mobility from north to south.

To understand the effects of the establishment of the limes around 40 CE, distribution maps from both before and after that time must be studied. This paper presents a diachronic comparison of fibulae types that are dated using archaeological contexts and display clear distribution across the limes borderlands. Contemporary distribution patterns can however, differ wildly and show a far more complex and dynamic situation than a single mapped artefact type might suggest.

3 **GOOFY GRAVES: A CRITICAL LOOK AT THE DEVIANT BURIALS OF THE LOWER GERMANIC LIMES AREA**

van der Weij, Anna (Utrecht University)

Strangled bog bodies, children buried under the hearth, human bones chewed by dogs: all of these have been found in the archaeological contexts of the Lower Germanic limes area. Even though these are mentioned in several publications, they are hardly ever discussed as being meaningful finds. This is because they are labelled as “deviant” and therefore as less important than comparatively normative burial practices. But how atypical are these burials really? In this paper, I will discuss some of these and compare them to known examples from neighbouring areas to put them into a broader historical context. In line with the research aims of Constructing the limes, the geographical scope of this paper will not be limited to respectively the “Roman” south or the “Germanic” north, but analyse the borderland of the Lower Germanic limes as a whole. By compiling the available, scattered data, I hope to show the significance of burial practices that are generally considered trivial. Furthermore, with this paper, I wish to explore whether certain patterns can be discerned regarding the spread of these practices.

4 **LATE REPUBLICAN/EARLY IMPERIAL FRONTIERS: THE CASE STUDY OF GORNJI TRG 30 IN LJUBLJANA (SLOVENIA)**

Jenko, Matjaž (Skupina STIK) - Mitrova, Danica (University of Ljubljana, Faculty of Arts, Department of Archaeology) - Draksler, Matej (Skupina STIK)

This contribution presents the preliminary findings of the 2021 archaeological investigations at the site of Gornji trg 30 in present-day Ljubljana, Slovenia. Positioned on the right bank of the Ljubljanica River, beneath the Grajski grič hill, this site stands in contrast to the early Roman Imperial colony of Emona (Colonia Iulia Emona), which was located on the left bank of the river, occupying a large open terrain at the convergence of the roads leading from Aquileia to Pannonia and Siscia. The site in question is part of a wider area where several rescue excavations have been carried out in the past, leading to the conclusion that it was a Roman vicus, inhabited prior to the establishment of Emona. The chronology of the area ranges from the first half of the 1st century BC (Phase I) to the post-Claudian period (Phase IV), during which it became integrated into the eastern suburbs of Emona. Recent excavations in 2021 have provided new insights into previously unanswered questions, particularly regarding the earlier phases of settlement. The vicus was built on the sloping terrain of Grajski grič, with natural terraces extended and certain parts cut into the slope. The architecture of the earliest phase was relatively simple, characterised by wooden foundations and walls constructed from vertical wooden posts connected with branches and covered with clay. After a fire destroyed the buildings of this initial phase, reconstruction began with sturdier stone foundations, although still predominantly with wooden structures. With the establishment of Emona, the strategic importance of the vicus gradually declined.

5 **FEEDING THE ROMAN ARMY IN BRITAIN (FRAB): ROMAN ARMY SUPPLY NETWORKS AT THE BRITISH FRONTIER**

Reynolds, Leah (Cardiff University) - Mion, Leia (Cardiff University) - Ma, Hongjiao (Cardiff University) - Guest, Peter (Vianova Archaeology) - Lamb, Angela (BGS) - Madgwick, Richard (Cardiff University)

Maintaining provision was key to the success of Roman imperialism, but we still know remarkably little about how Roman soldiers on the frontiers were supplied and the impact this had on the provincial countryside and its population. ‘Feeding the Roman Army in Britain’ is a Leverhulme Trust funded project which seeks to address these issues using a multi-isotope approach applied to domestic fauna at sixteen sites in three frontier regions of the Roman province of Britannia: South Wales, Hadrian’s Wall and the Antonine Wall.

This paper will present the results of the project to explore the networks of supply and animal husbandry that supported the Roman army and the impact of these on the rural inhabitants of the frontier regions. It will situate these within their archaeological, historical, and environmental context to enrich our understanding of Roman military provisioning, animal husbandry, and supply strategies of the Roman frontier in Britain.

6 **A MOUNTAIN OF MOLEHILLS? SURVEYING EPIACUM ROMAN FORT**

Breen, Frances (Bournemouth University; Epiacum Heritage CIO)

The site of Epiacum in the North Pennines has a rich and varied history of over 5,000 years of occupation, most notably Epiacum Roman Fort. Unusually shaped and geographically isolated, the fort has numerous banks and ditches surrounding stone ramparts and is one of the most complex defensive earthworks of any fort known in the Roman Empire. This valuable landscape also provides a unique opportunity to further investigate the cultural material that lies beneath the surface of a Scheduled Ancient Monument by non-intrusive means: moles. An innovative approach, molehill surveys use a grid system to record material that has been deposited above ground level when moles have been active, carefully studying the molehills, recording their contents, and analysing the finds. From 2011 - 2015 molehill surveys were conducted on the site by archaeologists and volunteers. In 2023 a final fieldwork survey was carried out, collecting artefacts from more than 1,800 molehills located across the fort’s interior, bathhouse, and vicus, providing insights into the archaeology of this remarkable upland landscape. Bringing together five years of evidence with the final fieldwork survey this paper will explore the methodological approach, finds analysis and interpretation, and provide a comprehensive report of the findings.

7 **AN ANALYSIS OF INSECTS AT ROMAN VINDOLANDA**

Wyse Jackson, Katie (University College Dublin)

Archaeoentomology, or insect analysis, offers valuable insights into the living conditions of people in the past. Insects that have been preserved, often through anaerobic waterlogging, can inform on factors such as food sources, waste disposal, hygiene, storage, trade, and the surrounding environment. The Roman site of Vindolanda, just south of Hadrian’s Wall in northern England, is rich in anoxically preserved archaeological material. Despite this exceptional preservation, thorough insect analysis has not yet been conducted at the site.

This presentation outlines the initial findings from an archaeoentomological analysis undertaken at Vindolanda, offering a new angle from which to consider this well-known site. A small room within the Period III fort (AD 100 to 105) was extensively sampled for insect extraction, identification, and analysis to understand better the use of space within the early fort, and the living conditions under which people lived during this time. The talk will focus on key species recovered from the samples, including numerous grain pests, indicators of dung, and taxa that feed on mould, as well as very likely evidence of early bed bugs. Without archaeoentomological analysis, this easily overlooked form of biological evidence would be lost, along with the crucial insights the remains provide into the daily lives of Vindolanda’s inhabitants.

8 **APPLYING 3D STRUCTURED LIGHT SCANNING TO ROMAN LEATHER INSOLES FROM VINDOLANDA TO VISUALISE FOOTPRINT IMPRESSIONS: RESULTS, BENEFITS, AND CHALLENGES**

Glanfield, Maria (The University of Western Ontario)

This paper presents the results of MA thesis research completed in 2023, which tested the feasibility of a new interdisciplinary 3D imaging and digital enhancement methodology for capturing and digitally visualising indistinct footprint impression evidence left on the surfaces of Roman leather insoles from Vindolanda. The methodology adapts recent digital approaches from forensic podiatry, paleoichnology, and epigraphy to expand approaches to the collection of podiatric data from Roman footwear and refine the accuracy of data that can be extracted from Roman leather shoes. Traditionally, podiatric data gathered from Roman leather shoes (i.e., foot length, width, and relative size) has been manually measured from the total length and width of the insole of the shoe, resulting in inaccurate podiatric data and unclear divisions between categories of shoe sizes attributed to certain sex and age categories (i.e., children, female/adolescents, and adult males) (van Driel-Murray 2007, 360; Groenman-van Waateringe 1982). Thus, it has been difficult for researchers to assign accurate ownership to individual Roman leather shoes and thoroughly analyse the demographic variables, health, and disabilities of the local Roman populations to which the shoes belonged. The data analysed so far, including foot size, shape, placement, and pressure distribution, suggests the need for refined measurement practices for podiatric data collection, provides insight into several questions scholars have posed about certain Roman footwear practices, and indicates irregularities in the walking gait of some individuals.

In addition to presenting promising results, I evaluate some of the advantages and disadvantages of this new methodology, with particular focus on its applicability for researchers with Roman footwear collections and the next stage of development of this research in the future. Finally, I conclude with a discussion on the challenges surrounding the subjectivity and accuracy of 3D data visualisation.

9 CROSSING THE ISTHMUS: MODELLING OPPORTUNITIES FOR CONFLICT ON HADRIAN'S WALL

Clark, Matthew (University of Exeter)

The Roman frontiers are often considered as a system of fortifications encircling, defending, and controlling access to the Roman world. The frontiers consist of a complex interweaving of various structures which leads to researchers struggling to integrate their findings when tackling such a geographically large network. Additionally, there is evidence of military operation, civilian trade and the movement of material crossing the boundaries. The frontiers, therefore, are more zonal than linear and for research into the operation of a zonal landscape; a new approach focusing on spatiality and synthesising various data types is required.

My PhD focuses on developing a method to assess the landscapes of the Roman frontiers and compare them at a macro and micro level. The method I am developing adapts Harvey Starr's 'Opportunity and Willingness' (O/W) approach to study of the ancient world and uses ArcGIS to assess the ease of movement and the incentives to move across the frontier zones. By comparing these factors to the design of the frontier systems it is possible to detect patterns in Rome's approach to frontier zones.

At EAA 2024, I intend to present the results of applying this method to Hadrian's Wall. This innovative research will later be expanded to study sectors of the frontiers in Germany and Romania. Even at this early stage in the PhD, preliminary data collection indicates a relationship between locations of high north-south mobility and the prioritisation of Roman structures on Hadrian's Wall. This suggests that the Roman military did not approach landscapes uniformly but instead expended energy, manpower and resources to tighten control over potential weak points and high traffic areas. The ability to detect these patterns of Roman response to the landscape through the O/W approach makes it a vital new tool to study these large and complex Roman militarised landscapes.

10 MORPHOLOGICAL AND TOPOGRAPHICAL ANALYSIS OF THE VALLUM OF HADRIAN'S WALL USING LIDAR

Bithell, Sam (Durham University)

The use of LiDAR in archaeology is well established, especially in terms of prospection for new sites, and the Hadrianic frontier in Britain is no outlier. However, LiDAR derived data, such as relative elevation, slope, and aspect has been underutilised in the study of Hadrian's Wall. A recent paper (Breeze and Graafstal, 2022) used LiDAR data to gain new insights into the Vallum's interaction with Wall forts. However, this paper goes a step further, utilising a multitude of LiDAR derived datasets to better understand the morphology of the Vallum, and its interaction with localised and broadscale landscapes. Environment Agency LiDAR data was analysed for the full length of the Vallum, from Newcastle to Bowness-on-Solway. Initially, the best-preserved sections were identified, and topographic profiles extracted every 10m. Measurements such as (eroded) mound width or ditch depth could then be compared at a large scale, rather than just between excavated section situated miles apart. The course of the Vallum through its landscape is highlighted in a new way, thinking less about Roman military surveyors, and instead about how the course might have been informed by the intended function. The morphology and topography of the Vallum, along much of its length, are in this way defined and their interaction determined with broad implications for our understanding of its function.

182 INVISIBLE OR HARD TO SEE: NON-BURIAL TREATMENT OF THE DEAD IN THE ARCHAEOLOGICAL RECORD

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Klevnäs, Alison (Uppsala University) - Brownlee, Emma (University of Cambridge) - Bergerbrant, Sophie (Uppsala University)

Session format: Regular session

Mortuary remains provide key archaeological evidence not only for beliefs related to the treatment of the dead, but also for life courses and social existence. But in many periods and places, the full population is not represented in the burial record. In others, there is little archaeologically visible funerary activity at all, or evidence may be fragmented across the landscape.

Human remains are most readily recovered where active steps have been taken to make funerary depositions in graves or equivalent preserving spaces. However research now tries to go beyond immediate contexts to reconstruct the full stretch of mortuary processes, not only depositional acts. This can include alternative treatments of corpses, which may or may not end in whole or partial burial, or long-term preservation of bodily coherence, far exceeding the traditional dichotomy of cremation and inhumation. Further, graves may be complex features comprising several phases and post-burial actions, such as remodelling or retrieval of corporeal elements.

Moreover graves are far from the only destination: there is increasing recognition of the informational value of human remains and funerary acts in settlements or spaces otherwise considered non-mortuary. More attention is now given

to times and places, or social groups within them, for whom burial was never a question, but where the dead were disposed of in ways which were not intended to leave lasting traces.

This session aims to open up discussion of funerary pathways beyond burial to explore variety in how past people related to the remains of the dead. The potential of different methodological approaches to capture and reconstruct signs of non-burial corpse treatments is a central question. We invite papers from all over the world presenting a wide spectrum of deathways and their material correlates, including those which by their nature are difficult to pinpoint in the archaeological record.

ABSTRACTS

1 PRIMATE PERSPECTIVES: USING PRIMATOLOGY TO AID THE ARCHAEOLOGICAL RECORD IN UNDERSTANDING NON-BURIAL MORTUARY BEHAVIOR OF EARLY HOMINIDS

Ford, Jay (Durham University)

This paper adopts a cross-disciplinary methodology to examine early hominid mortuary behaviour, integrating insights from primatology and observations of contemporary primates. The primary aim is to enhance comprehension of the mortuary practices of early hominids, through establishing primate data as a valuable source of information. By comparing mortuary behaviours evident in both the archaeological record and primatological observations, this research aims to shed light on aspects less evident in the archaeological record. A focus on chimpanzees will be taken, as they are our closest living relative and there exists a plethora of relevant observational studies. The investigation delves into the influence of inter-group relations and kinship on individual engagement in mortuary activities. Additionally, the study considers the potential impact of the cause or nature of death on mortuary behaviour. This study proposes that in order to advance our understanding of pre-burial mortuary behaviours, that are challenging to observe archaeologically, the application of innovative interdisciplinary approaches and techniques is necessary. The field of primate thanatology is growing, and this research aims to aid in this advancement; further evidencing the benefits and importance of including primate (in particular chimpanzee) data in discussions of hominid mortuary behaviours.

2 REST IN PEACE OR RESTS IN PIECES? NEW DATA ON THE MORTUARY PRACTICES OF THE LAST HUNTER-GATHERERS IN BELGIUM

Glas, Clémence (Paris 1 Panthéon-Sorbonne University; UMR 8068 TEMPS) - Polet, Caroline (Operational Directorate Earth and History of Life; Royal Belgian Institute of Natural Sciences)

Until recently, the mortuary practices of the last hunter-gatherers in Belgium have been mostly described as successive deposits of fresh human cadavers in sepulchral caves. These bodies, dated to the Early Mesolithic, were then only disturbed by taphonomic processes. The scattered human remains discovered in the Autours rock-shelter (Province of Namur, Belgium) allow questioning this apparent homogeneity.

The site, excavated in 1992-1993, delivered, among others, an assemblage of several hundreds of disarticulated and dispersed bones of several adults and children (AA2; 9090 +/- 140 BP, OxA-5838). Early anthropological studies demonstrated that AA2 was a collective burial recovering the remains of at least six juveniles and five adults. However, the constant renewal of knowledge of Mesolithic mortuary practices through an increasing number of discoveries makes it possible to question some of these interpretations. A recent revival of the Autours rock-shelter anthropological collection has been realized. In addition to the "classical" archaeo-anthropological analyses (calculation of MNI, estimation of age at death and sex determination), less common protocols such as the study of the fragmentation of long bones, the analysis of the osseous surface modifications and an examination of the spatial distribution of the remains in order to determine the form of the initial deposit have been made. The results demonstrated that the human remains of AA2 would rather be the residual bones left after a selection which occurred after the decomposition of fresh human cadavers successively or simultaneously deposited in the cave.

The mortuary practices implemented at the Autours rock-shelter thus correspond to a complex mortuary "chaîne opératoire" still unheard in Belgium, involving a complementarity with the other Mesolithic sepulchral caves found in the Meuse Basin.

3 THE ARCHEOLOGY OF DEATH IN NEOLITHIC SICILY

Giannitrapani, Enrico (Arkeos - Servizi integrati per i beni culturali s.c.; Confederazione Italiana Archeologi - Sicilia; Dipartimento Culture e Società, Università di Palermo)

The funerary landscape characterising the Neolithic in Sicily is a field still ambiguous and ill-defined. Despite a long tradition of research, started at the end of the 19th century, the quantity and quality of the available evidence on the island is scanty, limited to a few isolated earth-pit graves, sometimes assuming a more consistent appearance because of the use of lithic cyst. Only in the late Neolithic did these take a proper necropolis configuration. For preceding pe-

riods, the Palaeolithic and Mesolithic, and for the later Metal Ages, data are relatively more abundant, with the latter phase characterised by substantial rock-cut graves. However, studies have focused so far mainly on the material and formal aspects of death, more easily detectable and analysable by archaeology, assigning greater importance to the analysis of funerary architecture and the associated material culture and much less on those issues that are instead central to the anthropology of death: what happens to bodies after death and before the deposition? What is the role of the community in this crucial phase or after the closing of the grave? How is the memory of the deceased created and empowered? In the contribution, after a synthetic overview of these issues as applied to the long prehistory of Sicily, the presence/absence of funerary evidence on the island during the Neolithic, ranging from the 6th to the 4th millennium BCE, is discussed. Furthermore, suggestions on the possible relation between this crucial issue and a more appropriate definition of the Sicilian Neolithic communities and their social, cultural, and economic structure are advanced to define a theoretical and methodological line of enquiry useful for future research.

4 **GONE AND FORGOTTEN? TOMBLESS DEAD IN THE LINEARBANDKERAMIK CULTURE IN THE ALSACE PLAIN (CA. 5300-4950 BC)**

WALDVOGEL, Laura (University of Strasbourg, UMR 7044)

In the context of the European Neolithic, the Linearbandkeramik (LBK) culture stands out for its numerous examples of unburnt human remains found mainly in graveyards, and sometimes in domestic settings. While the funerary nature of the human remains discovered in the first type of context can be firmly established, the same observation is harder to assert in the second one: this is evidenced by the dissensions between researchers, who sometimes equate them with burials (Sonderbestatungen), sometimes with deviant practices (Verlochung).

This communication focuses on the case of human remains unearthed in Alsace (France) to highlight the complexities involved in interpreting the dead found in domestic contexts. The comparison of practices identified in graveyards (eg. position and orientation of the bodies, presence of objects) with data from habitats suggests that some of the dead can be identified as funerary deposits, even though some are located in pits that were diverted from their original function. Conversely, other human remains stand out for their disordered positions: a fact that indicates a lack of care given to the body and which therefore pleads in favor of their non-funerary nature. In Alsace at least, this observation suggests the existence of three categories of individuals: those with access to the graveyard, those whose graves are located within the village, and those deprived of burial. While the latter group includes individuals of both sexes and all ages, ethnological references and historical sources open several avenues for reflection on the possible interpretations of these deposits (deprivation of burial, treatment of the body as waste, malemort, etc.).

5 **REVISITING "ANOMALOUS" BURIAL PRACTICES: A CROSS-CULTURAL PERSPECTIVE**

Cvecek, Sabina (Field Museum of Natural History; Austrian Academy of Sciences)

The prevailing literature on burials in the European Neolithic adopts Euro-American hegemonic perspectives, focusing on burying the dead in (nuclear) family graves and analyzing remains as individual entities. Utilizing advanced natural science techniques like ancient DNA extraction, scholars aim to decipher biological relatedness and construct kinship trees, often emphasizing the presence of nuclear families in central European Neolithic contexts. However, the prehistoric record from Neolithic southeastern Europe and western Asia challenges this individualistic narrative. Here, the dead are frequently interred beneath house floors, defying neat categorization based on biological kinship. This raises intriguing questions regarding death rituals, kinship structures, and social organization within these communities.

This paper proposes a shift in perspective by considering the dead and burials not merely as individuals but as persons embedded within broader social contexts. My analysis will be informed by extensive cross-cultural ethnographic evidence, which will be used to contextualize burial practices that may initially appear anomalous within Euro-American frameworks. By reexamining the funerary record through this lens, I seek to illuminate the diverse and nuanced death practices of Neolithic communities in southeastern Europe and western Asia, including the possibilities of non-burial treatment, and challenge prevailing Eurocentric interpretations of burials and kinship in the region. Lastly, I seek to highlight why considering non-European ethnographic examples remains crucial to better understand burial practices in prehistoric Europe.

6 **WHERE DO BURIAL PRACTICES BEGIN AND END? VARIABILITY IN THE TREATMENT OF THE DEAD AT AN EARLY BRONZE AGE SITE**

Verdianu, Domnika (Austrian Archaeological Institute, Austrian Academy of Sciences; Department of Prehistoric and Historical Archaeology, University of Vienna)

Placing bodies in settlement pits as well as in graves within cemeteries is a recurrent practice in the Early Bronze Age Únětice Culture – for instance at the site of Ulrichskirchen in Lower Austria. The case study includes 12 graves and 5 settlement pits with human remains. While the graves have the same orientation and the deceased were positioned

similarly, the depositions in the settlement pits do not have a specific orientation or body position. It is unclear whether these bodies were buried, stored for excarnation, or simply disposed of in the former storage pits. All 12 graves were reopened in antiquity and in almost half of the graves the skull was removed. It is unclear what happened to the skulls after they were excarnated. One grave contained no human remains, only grave goods. Was there never a body or was it excarnated? In the robbery funnel of that 'empty' grave the remains of an infant were found, commingled with animal bones. How should this feature be interpreted? It is interesting to note that remains of newborns are almost never visible in the archaeological record of the Únětice Culture. The issue is, what happened to their bodies? The variety and complexity of funerary rites and practices during this period are not yet fully understood. Many of these knowledge gaps are related to practices that are difficult to observe or even invisible in the archaeological record.

7 **HUMAN REMAINS OUTSIDE FUNERARY CONTEXTS IN BRONZE AGE CRETE**

Kiorpe, Sotiria (Aristotle University of Thessaloniki)

During the Bronze Age in Crete, the landscape was littered with burials made either in caves and rock shelters, or in isolated tombs and cemeteries. Despite regional differences in mortuary practices, burial places were always separated from those of the living. However, recent work has brought to light an increasing number of human skeletal remains excavated outside of funerary contexts in explicitly domestic and ritual spaces. These are not only found in a variety of forms, as isolated body parts, fragmentary and scattered bones and burials, but also in diverse contexts, generating many questions regarding their meaning. Over the years, the presence of skeletal remains in non-mortuary spaces has been interpreted as funerary paraphernalia which represented the ancestors, and were introduced in the realm of the living during rituals which aimed to shape a collective memory and promote the continuity of the community. While the latter hypothesis can possibly explain the presence of isolated body parts, it does not take into consideration the entire corpus of evidence and its contextual complexity. Therefore, the present talk aims to review the available evidence, provide a descriptive framework which separates between burials, post-funerary and non-funerary processes, and suggest a theoretical framework under which the presence of corporeal elements in non-mortuary spaces can be studied in a more fruitful way.

8 **A DATE WITH DESTINY: FORGOTTEN OR REMEMBERED HUMAN REMAINS IN SCANDINAVIAN WETLANDS**

Bergerbrant, Sophie (Uppsala University)

The study of human remains in wetlands has traditionally focused on bog mummies. Recent studies have also looked at human remains preserved as bones only – bog skeletons. The focus of much of this growing area of research has been on Iron Age remains. However, a recent study has shown that when skeletonized body parts are taken into account, the phenomenon of depositing human remains in wetlands can be seen to have a much longer history. Remains date both much further backwards in time and even into the modern period. Bodies were sometimes incomplete or partial at the time of deposition.

The influence of Tacitus on interpretative frameworks has been strong and lasting, but the possibilities raised are increasingly wide-ranging. Although sacrifice is often inferred, some finds have been seen as regular graves, and other cases are convincingly interpreted as remains from battlefields. The liminal nature of wetlands is often cited as a quality attracting mortuary use, although other aspects may have played in, including their preserving capacities. Taking this broader perspective on the nature of the remains, the variety of individuals involved, and the range of cultural contexts, this paper will ask: were individuals deposited in wetlands meant to be remembered or forgotten? The question will be discussed through a number of examples from Scandinavian wetlands.

9 **INVISIBLE DEAD – VISIBLE RITUALS. ANALYZING THE FUNERARY RITES AND RITUALS IN LATE IRON AGE TRANSYLVANIA (ROMANIA)**

Rustoiu, Aurel (Institute of Archaeology and History of Arts Romanian Academy Cluj-Napoca)

Transylvania has a well-defined geography, being part of a larger area known as the eastern Carpathian Basin.

The Late Iron Age in Transylvania covers two distinct cultural horizons: the "Celtic" horizon (ca. 350 – 200/175 BC), and the "Dacian" horizon (ca. 200/175 BC – AD 106).

The funerary practices are very different from one horizon to another. Unlike in the 4th – 3rd centuries BC, when dozens of cemeteries consisting of hundreds of cremation and inhumation graves are attested in Transylvania, during the Dacian horizon of the 2nd century BC – 1st century AD the cemeteries are almost non-existent, and when some do appear, they seem to belong exclusively to certain social groups (warriors, small children, ancestors, local and foreign individuals who were perhaps sacrificed for various purposes, individuals suffering an unusual death etc.). From the funerary perspective, the corpses of most members of the community were treated in an archaeologically "invis-

ible” manner. Perhaps they were cremated and the remains were then scattered in water bodies or other uninhabited places outside the settlements.

However, some rites and rituals of passage performed during the funerary ceremonies, which allowed the integration of the deceased into the other world and the reintegration of the mourners into the social body of the respective community, could be reconstructed on the basis of archaeological evidence, often with the support of other interdisciplinary analyses. The scope of this paper is to identify this kind of archaeological evidence in Late Iron Age Transylvania. On the other hand, some graves, from the beginning of this chronological/cultural period, which have traces of multiple manipulation, are giving suggestions about the mechanisms of ritual, ontological and physical transformations in the treatment of the deceased’s corpses from “visible” to “invisible”.

10 HEADS ON DISPLAY AND BODIES LOST

Wählin, Sidsel (Vesthimmerlands Museum)

In Vendsyssel (Denmark) skulls had a special place in the ritual practice in the 1st century BC-3rd century AD. They were carefully defleshed and eventually at times centuries later deposited in peat pits in the bogs among other ritual offerings. Signs of violence are absent from the skulls and the ritual setting. Thus, where were the skulls between the time of death and final deposit what afterlife did they have?

Also the sole focus on the skulls leave us with the question what happened to the post cranial body? There is a rich contemporary burial record in Vendsyssel that clearly demonstrates that the wetland skulls were part of a very different ritual practice, not only in the beheading but also in the placement in still water most likely visible as opposed to interment in graves underground and out of sight.

Through analysis of the skulls and their final ritual setting this paper will discuss the afterlife of the skulls what was their place in society and why were they eventually set on display in the clear water of the peat pits.

11 HUMAN REMAINS FROM “NON-BURIAL” CONTEXTS SUCH AS WETLANDS

Pantmann, Pernille (Museum of North Zealand, Denmark)

When working with bog bodies the discussion is often concerned whether they represent human sacrifices. In a few cases burials is also suggested as a possibility. However, in a study of pure skeleton bog bodies within a distinct area, new questions arise. Because on several of the sites within this area, Northeastern Denmark, there is only one or a few bones from a human being. Do these finds represent actual bog bodies then, or are bog bodies defined by being complete or near complete bodies? But returning to the finds of single human bones, then what is the implication of a single human bone in a wet environment? At the time of deposition, was it already a bone or was it covered with tissue and flesh? When one considers the impact of each possibility, then the questions which naturally follow is: what happened to the rest of the body? Should bog bodies be integrated in the broad understanding of the complexity of burial customs and other ritual activity with human remains?

Furthermore, bog bodies are generally considered to be human remains from wet contexts. But what if human bones are found amongst layers of household waste within a wetland environment, which context defines the impact of these bones? Can human bones be considered waste, or do they always represent burial customs or other ritual activities? Traditionally, we have had clear definitions of what constitutes a grave, but recent years discussions have questioned or broadened these definitions. But maybe we should also ask ourselves if ritual activities are the only explanation to human remains from “non-burial” contexts, whatever these may be?

12 ANCIENT REOPENING IS WIDESPREAD IN BOTH TIME AND SPACE: RITUALLY RE-ENTERED GRAVES IN SOUTHWEST DENMARK THROUGHOUT THE IRON AGE

Qvistgaard, Sarah (Museum Vest)

A broader time perspective of ritual re-entered graves from cremation to inhumation practice provide a new perspective on why graves were revisited in several periods of the Iron Age in Southwest Denmark.

The re-entering of graves is often a phenomenon associated with inhumation graves, but it is a tradition that goes way back to the Pre-Roman Iron Age (500-200 BC). Examples of use of cenotaphs and clear evidence of exhumations performed shortly after the initial burial reveal ‘pars-pro-toto’ burial rituals in an urnfield with urn graves from a period of the Iron Age, when the cremation grave custom dominated in Southwest Jutland. New excavations on the urnfield Korsvanggård exude evidence to the burial practice.

In 2023, in the vicinity of 7 km, at Tjæreborg Sønderby a section of an excavation trench went through a gravesite of iron age inhumation graves (300 AD) and 16 were excavated. A comparison to the more familiar context, namely the 2nd-4th century inhumation graves, where the re-entering is well known will be presented. All of the inhumations have been re-entered in the head and chest area not long after burial. The coffins appear to be degrading as well as

the metal objects, so was it indeed for the objects? What happened to the corpses? The south-west Jutland material does not have its strength in a well-preserved bone material but in clear traces of fill change.

Especially unique, is the adjacent, contemporary settlements to which the gravesites belong. Close by, two contemporary gravesites in Tjæreborg have been excavated and they show no sign of interference or re-entering. Can it shed new and clearer light on the question of who carried out the reopenings?

These examples show a representative pattern in the larger area.

13 CREMATED, CURATED, OR CAST ASIDE: EXPLORING THE COMPLEX MORTUARY PRACTICES OF IRON AGE BRITAIN

Legge, Michael (University of York)

The Iron Age in Britain (c.800 BC to AD 43) was a period of great diversity in the treatment of the dead. Cremated, buried, fragmented, or curated, the dead were simultaneously separated from, and integral to, the communities of the living. Disarticulated human remains are notably found across Iron Age Britain, from domestic spaces, to hillforts, and mortuary centres; they are interred within living spheres and deposited in liminal spaces. However, despite the variety of treatments afforded to Iron Age peoples, the majority of the population is still thought to have been disposed of in archaeologically ‘invisible’ ways.

Since at least the 1970’s, sub-aerial exposure has often been suggested as the explanation for the missing population, but more recently, developments in scientific methodologies, research into bone taphonomy, and large-scale study of the archaeological data has shown the reality to be much more complex.

This paper presents a holistic approach adopted to investigate Iron Age mortuary practices, utilising a dataset of over 5000 individuals from more than 600 sites compiled as part of the COMMIOS project. The research reveals evidence for the selection, curation, and transformation of skeletal elements as part of complex multi-stage funerary processes. The collated data also supports alternative deposition practices to sub-aerial exposure, including the deposition of the dead in watery contexts or their dispersal within the landscape; as well as allowing for the identification of new regional patterns of treatment and the quantitative support of existing ones.

14 SELECTIVE FUNERARY RITUAL IN SOUTH-EAST BRITANNIA: KINSHIP AND TRIBAL CONTINUITY IN AN IMPERIAL PERIPHERY?

Weekes, Jake (Canterbury Archaeological Trust)

Occupancy of particular cemetery plots in the late Iron Age and Romano British East Kent, UK, was clearly highly selective. Emphasising this selectivity is in itself an interpretive shift that moves the study of funerary traditions at this time forward, and raises important questions about all of the other dead who were apparently excluded, and remain (largely) archaeologically invisible. This paper looks at several urban and rural case studies from this region, within Durovernum Cantiacorum (Canterbury) and its wider hinterland, including examples of: the newly identified “Deal” inhumation rite from c 150BCE (named after the eponymous site in Kent), and its continuing influence well into the Roman period; latest Iron Age and early Romano-British cremation traditions; and Late Antique resurgences of inhumation, all often evidenced within the same small cemetery area. The paper moves on to consider a hypothesis for what may have been a particular driver of such funerary selectivity: localised and deep-set prehistoric kinship and tribal affiliations. These may have remained a significant facet of the selection of particular individuals for spatial emphasis through burial grouping, mediated through funerary features invoking broader identities: constructions of local late Iron Age affiliation, and eventually “Romanness”. Even these wider references were localised within the wider polity of the Roman north-west provinces, a regional palette of funerary choices shared with the Near Continent, leading to a specific and changeable funerary creole in the south-east peninsular of “Roman” Britannia. This overall framework is proposed as a more nuanced way of viewing structure/agent dialectics in a marginal province, as demonstrated by the selective treatments of the dead.

15 WHERE IS EVERYBODY? THE UNBURIED DEAD IN EARLY MEDIEVAL ENGLAND

Klevnäs, Alison (Uppsala University)

A scarcity of mortuary material from the fifth century AD, especially its first half, has long been noted in areas of eastern and southern England. Some regions, for example Kent and Essex, have very small numbers of cemeteries and graves datable to this phase. Inadequate artefact chronologies, or possibly a phase of unfurnished inhumation, probably contribute to this apparent absence. That said, this paper suggests that many of the dead are truly missing from the archaeological record.

Corpse disposal methods which leave little or no archaeological trace are well-established as a component of mortuary pathways in Iron Age Britain, but until recently were thought to come to an end with prehistory. This picture has changed: in the last few years, a comprehensive survey has shown that formal burial remained rare in the countryside

into and throughout the Roman period. We now know that the rural population under Roman rule never substantially adopted the urban custom of gathering the dead in cemeteries, but instead continued their earlier near-invisible funerary rites.

Here it is argued that the low levels of visible burial in the century after the collapse of Roman rule should be explained at least in part in the same way as the under-representation of Romano-British funerary remains. Local populations in all likelihood maintained their non-burial mortuary customs for some time, making their dead invisible or hard to see during the 'missing fifth century'. This has significant implications for understanding cultural transitions from the Roman period into the early middle ages, and especially for the representativity of the burial record during the continental migrations to southern and eastern England.

16 SOME OF THEM ARE HERE. THE ACCIDENTALLY PRESERVED DEAD IN EARLY MEDIEVAL ENGLAND

Brownlee, Emma (University of Cambridge)

The fifth to seventh centuries in England are usually seen as characterised by cremation and inhumation cemeteries in which the dead were buried in costume and with other artefacts. The dominance of formal cemeteries in this period means that archaeologists have rarely considered whether other methods of corpse disposal may have been practised. This paper presents a series of disarticulated human remains which have been radiocarbon-dated to the first millennium AD, all from contexts outside formal burial places, primarily caves and rivers.

These remains have mostly been identified by prehistorians, for whom caves and rivers are expected places to find corpse disposal. For them, the early medieval remains are little discussed late aberrations, and the significance of these finds has yet to be identified by early medieval archaeologists. Yet the dates point to a range of disposal practices taking place throughout the Roman and early medieval periods. These include exposure and water burial, neither of which would ordinarily be archaeologically visible. The unique preservation environments of caves in particular mean that these 'invisible' practices can be seen, even if only through indicative traces. The finds in exceptional environments also imply that these disposal practices may have been more widespread beyond the areas where environmental conditions enable their rare survival. If burial in cemeteries was part of a spectrum of practice, that opens up the possibility that truly archaeologically invisible practices also persisted into the early medieval period.

17 TEETH AS MATERIAL CULTURE: RITUAL DEPOSITION OF TEETH IN IRON AGE SCANDINAVIA

Tollefsen, Emma (University of Leicester; ERC StG 'Body-Politics') - Eriksen, Marianne (University of Leicester; ERC StG 'Body-Politics')

The BODY-POLITICS project (ERC StG) is the first large-scale effort to collate and analyse human remains deposited in settlement contexts in the Scandinavian Iron and Viking Ages. These remains are often fragmented — bodies broken apart — such as cranial fragments or long bones, or consist of fetuses and infants incorporated into floors, postholes, ditches and pits in and around people's homes. These depositional events cannot easily be slotted into the universalising category 'burial', and we question whether these practices necessarily reflect the commemoration of social individuals. We term the remains 'body-objects', on a continuum between subjects and objects.

While synthesising this material, a specific pattern emerged: the deposition of single teeth — both permanent and deciduous — deposited in domestic structures, especially concentrated to the turn to the first millennium CE in southern Scandinavia. Teeth are a particular kind of material object. They intersect with growing, ageing, and specific socio-cultural rites of passage. Teeth are intriguing because they are (like nails and hair) detachable parts of the body — they can be removed without danger to the living body. Tooth removal can be part of body modification practices as well as health interventions. Simultaneously they may be believed to contain some substance or essence of the body whole. This partible quality means that teeth are malleable and manipulable.

In periods where cremation was the norm, the distribution of human teeth in floors, pots, posts and floor layers raises intriguing questions such as: from whom were the teeth harvested? Were they taken from living or dead bodies? How does this practice reflect ideas of what the body is, its capacities, and how bodies should be treated in life and death? We present initial bioarchaeological analysis of several such teeth, and explore the theoretical provocation for the archaeology of bodies.

18 THE BODY IN PIECES: ATTITUDES TOWARDS THE DISPLAY AND RETENTION OF HISTORICAL FLUID PRESERVED SPECIMEN COLLECTIONS

Sutton-Butler, Aoife (University of Bradford)

Across Britain many institutions are home to historical fluid preserved anatomical and pathological collections, mainly dating from the 18-19th centuries. These collections consist of human remains obtained under dubious circumstances, often taken after lawful burial through bodysnatching, without familial permission at autopsy, or simply from op-

erations at which surgeons deemed the tissue appropriate to preserve. These human remains exist in a liminal space after death — on a spectrum between an educational object and the living person they once were. There has been a transformation of these bodies into a commodification or 'scientific object', taking on a social role in death as a 'thing' (Seale et al 2005). Many historical dissected bodies are present in the archaeological burial record, indicative of dissection techniques, the historical consideration of 'clinical waste' and of the tissue not selected for long term preservation. The dissected body has been 'broken' apart, now suspended in a glass jar preserved from decomposition using fluid such as alcohol or formalin — not disposed of or deposited in ways the dead body so often is. What are these body parts considered as today — object, person, or something in between? How do we consider these non buried remains? In recent decades there has been deterioration of such collections as they have become less relevant in teaching and research (Bocaege et al 2013), but there have been recent suggestions that these collections are still relevant in the fields of ethics, bodily display, personhood, archaeology, and the biomolecular sciences (Irving 2023, Sutton-Butler et al 2023). This paper will present data from the authors' PhD project exploring professional attitudes towards the display and upkeep of these collections, exploring public attitudes towards different tissue types displayed in museum spaces, and how they can open up conversations on death today.

184 ARCHAEOLOGY OF FOODWAYS: TOWARDS A CROSS-CULTURAL COMPARATIVE PERSPECTIVE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Wang, Jiajing (Dartmouth College) - Parque, Óscar (CASEs (Culture, Archaeology and Socio-Ecological Dynamics). Pompeu Fabra University, Barcelona) - di Matteo, Martina (Sapienza University of Rome) - Li, Weiya (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art; University of Science and Technology of China) - Jiménez-Arteaga, Carolina (CASEs (Culture, Archaeology and Socio-Ecological Dynamics). Pompeu Fabra University, Barcelona)

Session format: Regular session

Food serves as a fundamental link that unites people from diverse cultures and regions. Recent archaeological research on ancient foodways has undergone a remarkable expansion in both theoretical frameworks and methodological innovations. Departing from the traditional emphasis on "diet" and "subsistence," which primarily focuses on how ancient communities sourced and produced the essential sustenance for their cultural survival, recent research explores broader themes like "foodways" and "cuisine." This approach investigates how food-related practices intersect with social phenomena, including status, gender, religion, and cultural contact. The shift in theoretical perspective is supported by innovative scientific methods, particularly in fields of archaeobotany, zooarchaeology, and biomolecular archaeology.

This session provides a platform for disseminating recent methodological and theoretical innovations in the study of food and culinary practices in ancient societies. It aims to bring together archaeologists from diverse geographic regions to present case studies that hold comparative values for other specialists to incorporate into their own research projects. We especially welcome contributions that engage in cross-cultural comparisons of past foodways. Potential themes include, but not limited to, the domestication of plants and animals, the spread and adoption of food technologies, the role of food in both daily routines and ritual contexts, and the relationship between foodways and social organizations.

ABSTRACTS

1 MAGDALENIAN BUTCHERY TECHNIQUES BEYOND A NATURALISTIC PERSPECTIVE

Birouste, Clément (TRACES UMR 5608 Université Toulouse Jean Jaurès)

The study of the diets of nomadic hunter-gatherers of European Palaeolithic has largely developed around the idea of profitability. As a result, the large ungulates consumed by these populations (reindeer, bison, horse, ibex, saiga antelope, etc.) have often been considered by zooarchaeology as mere resources. However, food-related practices, beyond a naturalistic or economic perspective, can shed light on more complex human-animal relationships.

I present an archaeozoological study of animal bone remains from various sites attributed to the Middle Magdalenian in southwestern France (19000-16000 Cal BC), which reveals that certain butchery techniques are not limited to economic or nutritional factors. This is the case with the systematic disarticulation of the carpal and tarsal bones. This activity is directly associated with food practices, but has no obvious objectives. It doesn't fit in with a bone marrow recovery process, or with a desire to share carcasses within the group, for example. Archaeological experiments carried out on Cervus elaphus legs have helped me to understand more precisely these gestures, which were performed in the Middle Magdalenian period. Ethnoarchaeology describes the same type of practice in Siberia, notably among the Evenk, where it is explained by « animal ceremonialism ».

I propose to put this first observations into perspective with other particularities of carcass processing in the Middle Magdalenian that escape a logic of economic profitability, such as the systematic fracturing of ungulate phalanges to consume the marrow, or the tendency to introduce the skulls of hunted animals into the occupation sites. The ways in which animals are depicted in rock art and on numerous objects in the same context can also be mobilized, showing that various domains seem to be interconnected within an overall system that I interpret as an animism.

2 GLIMPING ETRUSCAN FOODWAYS: DAILY PRACTICES AND FOOD RITUALS IN PYRGI, PORT OF CAERE

Servoli, Sofia (Sapienza Università di Roma)

Ancient port of one of the most famous Etruscan cities in Southern Etruria, Pyrgi is a coastal site characterised by a residential area and two sanctuaries, places of deep spiritual significance for both Etruscans and foreign believers (such as Latins or Greeks). In such multicultural context, between the 6th and the middle of 3th century BC, food-related practices played a crucial role during rituals that took place in the so-called “Monumental Sanctuary” - with its two remarkable temples - and in the “Southern Sanctuary” where, by following a strict ritual procedure, liquid and solid offerings of food were poured from or presented in specific ceramic vessels in honour of the Chthonian gods. Ritual practices were carried out also in the residential area, where the main domestic structure is a large palatial building facing a street connected to the principal road system leading to the inland city of Cerveteri (the ancient Caere); inside this building, investigations have brought to light evident traces of ceremonies involving the consumption of meat: thanks to these remains, zooarchaeological studies have also contributed to the reconstruction of indigenous eating and ritual habits. Furthermore, clues regarding daily culinary practices are offered by the analysis of coarse and cooking wares collected from both the residential area and the sanctuaries: the study of the adoption of different types of vessels and tools used for example to process cereals or to boil food, such as mortars, basins, jars and cooking stands, certainly helps to add new interesting data concerning Etruscan foodways.

3 FOOD FOR HUMANS AND FOOD FOR GODS: CASE STUDIES FROM POMPEII (1ST CENTURY AD)

Corbino, Chiara Assunta (Pompeii Archaeological Park) - Comegna, Chiara (Pompeii Archaeological Park) - Amoretti, Valeria (Pompeii Archaeological Park) - Zuchtriegel, Gabriel (Pompeii Archaeological Park)

Animal and vegetal products were particularly important in human life. Differences in diet are linked to the social status of the people. However, in the past, foodstuffs provided not only the fundamental nutrition for life but also suitable offerings for Gods and Goddess.

Roman writers, such as Pliny the Elder and Columella, inform us about the use of some foodstuffs in diet and rituals but, with few exceptions, their actual use in Italian roman cities has not yet been archaeologically investigated.

The contexts from Pompeii are particularly suited to reflect the complex network of circumstances and behavior that characterized the past urban communities in the roman imperial period. Indeed, recent archaeological investigations at that site revealed a number of zooarchaeological and archaeobotanical remains associated with every day and ritual contexts.

Animal and vegetal products were recovered from both ritual and consumption contexts, even if with different proportions. The social status of the people played a considerable role in the selection of the foodstuffs employed in diet, while a general trend, linked with ritual activities, has been identified.

This study, based on three ritual and five everyday contexts, aims to identify similarities and differences in the animal and vegetal components included in diet and offerings at Pompeii in the 1st century AD. The obtained results highlight considerable insight about the everyday life of the city inhabitants at that time.

4 FOODWAYS THROUGH TIME. A ZOOARCHAEOLOGICAL PERSPECTIVE FROM SW LIBYA

Alhaique, Francesca (Museo delle Civiltà) - Di Matteo, Martina (The Archaeological Mission in the Sahara, Department of Ancient World Studies - Sapienza University of Rome) - Rotunno, Rocco (The Archaeological Mission in the Sahara, Department of Ancient World Studies - Sapienza University of Rome; McDonald Institute for Archaeological Research, University of Cambridge, UK) - di Lernia, Savino (The Archaeological Mission in the Sahara, Department of Ancient World Studies - Sapienza University of Rome; GAES, University of Witwatersrand, Johannesburg, South Africa)

Eating habits arise and consolidate in accordance with a wide range of cultural, ideological and interpersonal factors. Food is a powerful symbol of cultural identity and material expression of culturally defined behaviours. All food-related actions (e.g., procurement, cooking, waste management) are intimately linked to the ideological and cultural reality of a group.

Decades of research by Sapienza University of Rome in SW Libya (1955-2011) enabled the collection of a wide corpus of archaeological data that in turn allowed reconstructing the social and cultural dynamics of the human groups

that inhabited the region from the last hunter-gatherers to pastoralists and finally to the first caravan societies of the Garamantes (ca. 10,200 cal BP-600 CE).

Here we present a synthesis of the zooarchaeological and taphonomic data from Late Acacus, Pastoral and Garamantian contexts, both in a synchronic and diachronic perspective, also highlighting similarities and differences between more residential sites and ritual contexts. The analysis of the numerous archaeological contexts over an area of approximately 60,000 sq km allowed to detect trends and changes, as well as parallels, in the relationship with various animal taxa through time and space, evidencing how such relationship varies over this long time span, both in relation to the different social and cultural dynamics and to the changing climatic conditions, even extreme ones, that characterize this region.

5 POST DOMESTICATION BODY SIZE OF CATTLE FROM LATE NEOLITHIC TO LATE BRONZE AGE: COMPARATIVE STUDY BETWEEN CHINA AND EUROPE

Yu, Chong (Sun Yat-sen University)

The introduction and the later dispersal of domestic cattle in China had played an enormous part in food production, handicraft manufacture and ritual activities. However, we lack the details of pastoral economies, herding strategies and utilization patterns of cattle in ancient China. This paper uses biometrical assessments to investigate post domesticated cattle husbandry and how it changed over time. Biometric data from the Late Neolithic to the Late Bronze Age was evaluated using mixture analysis. Results indicated that the general body size of cattle first decrease than increase. By combining the estimated distribution of male and female individuals, we can see that sex ratios affect size variation during Bronze Age times. Although no breed improvement has been detected so far, the herding and slaughtering strategies over time is different. We also compare published parallel dataset from Europe. Preliminary results indicate that cattle from China is smaller than those from Europe.

6 THE LAST MEAL OF A SACRIFICED HORSE IN XINJIANG

Ge, Yong (Institute of Vertebrate Paleontology and Paleoanthropology (IVPP), Chinese Academy of Sciences (CAS))

Horse sacrifice was a common phenomenon across Eurasia in prehistory, however, what had happened to the sacrificed horse or the details of the sacrifice ritual largely remained unknown. The arid environment of Xinjiang allowed organic materials to be preserved in cemeteries, such as the Shengjindian site, a public cemetery 2000 years ago in the Hami basin. In a tomb of Shengjindian cemetery, a full skeleton of a horse has been unearthed and large stomach organic remains were preserved. The shape of the organic remains varies among different parts, which represents the gastric, intestinal, and dung remains. The remains in the gastric area contain a large number of undigested seeds from *Echinochloa* and *Panicum* (C4 plant), while in other remains no visible seeds have been found. Multiple methods have been applied to find out what the horse eats during its last one to two days, as digestion could last 24-48 hours. The result showed that the horse was fed with seed-rich forage before its death. And this behaviour is different from the common foraging strategy as the horse was fed with C3 plant forage in the last months as revealed by stable isotope analysis. Our research showed an intentional feeding ritual with better forage before sacrifice, which reflected the details of burial activities in prehistory Xinjiang.

7 FOOD RESIDUES FROM DENTAL CALCULUS REVEAL HUMAN-PIG COMMENSALISM 8000 YEARS AGO IN THE LOWER YANGTZE RIVER OF CHINA

Wang, Jiajing (Dartmouth College)

The beginning of pig management and subsequent domestication has brought profound social and ecological transformations within human communities. From symbols of the sacred to a mundane sustenance for urban populace, pigs have functioned as a form of social currency in gift exchanges, a pioneering species for human colonizing the New World, and hosts of various infectious diseases. Zooarchaeological and genetic analyses have shown that pigs were independently domesticated in at least two regions: Mesopotamia around 9000 cal. BP and China around 8000 cal. BP. However, the question of how pigs became domesticated, especially in ancient China, remains underexplored. This study presents a new method for investigating human-pig relationship by applying microfossil analysis to pig dental calculus from Kuahuqiao, a site that captures the initial phase of pig domestication in the Lower Yangtze River. Starch, phytolith, and parasite data demonstrate that pigs consumed human-prepared foods and possible human feces, providing the earliest known evidence for commensal relationships between people and pigs in south China. These results provide comparative data for archaeological studies on animal diets and domestication worldwide.

8 FLAVOURS OF URBANISM: EXPLORING THE INDUS CIVILIZATION CUISINE IN BRONZE AGE SOUTH ASIA

Madella, Marco (Universitat Pompeu Fabra; ICREA) - Suryanarayan, Akshyeta (University of Cambridge) - Jiménez-Arteaga, Carolina (Universitat Pompeu Fabra) - Parque, Óscar (Universitat Pompeu Fabra) - Lancelotti, Carla (Universitat Pompeu Fabra; ICREA) - Abro, Tasleem (Shah Abdul Latif University) - Chandio, Amin (Aror University of Art, Architecture, Design and Heritage)

This presentation delves into the culinary practices of the Indus Valley Civilization, offering a unique exploration of the diverse foodways that shaped the dining tables of the first urban civilization of Bronze Age South Asia. The Indus Valley Civilization, known for its advanced urban planning and complex socio-cultural systems, has left behind enticing clues about its food culture through a wealth of proxies spanning plant and animal remains as well as organic residues.

Drawing on recent excavations at two key sites (Bhandu Qubo and Taloor Jee Bhatt) as well as a regional comparison, and through an interdisciplinary approach, our exploration focuses on the types of food consumed by the Indus people and their culinary techniques. From agricultural practices to food preparation, we aim to reconstruct the ingredients and the practices of the ancient Indus cuisine.

The presentation will incorporate findings from residue analysis of pottery and food remains, plant macro- and micro-remains and faunal data. Additionally, we will explore the socio-economic implications of the food, shedding light on the way it was produced and consumed.

By unravelling the gastronomic mysteries of the Harappan civilization, this presentation contributes to a deeper understanding of the cultural richness and daily life of Bronze Age South Asia.

9 SCIENTIFIC INVESTIGATION OF ARCHAEOLOGICAL BREAD-LIKE OBJECTS DISCOVERED AT DACIAN SITES IN THE TRANSYLVANIAN REGION, ROMANIA

Beatrice, Ciuta („1 Decembrie 1918” University from Alba Iulia)

The aim of our research was to identify the nature of carbonized organic remains at Dacian sites, particularly determining whether they were remnants of ancient bread. We conducted extensive examinations, including microscopic analysis of cereal product microstructures, content analysis, and detailed photography. By utilizing advanced technologies such as a 3D digital Keyence microscope, SEM (Scanning Electron Microscopy), and XRF (X-Ray Fluorescence) spectroscopy, we gained new insights into the dietary and agricultural practices of ancient Dacia.

Our analysis of organic fragments from Sarmizegetusa Regia (Hunedoara County) and Simleul Silvaniei (Sălaj County) Dacian sites in Romania, indicated the use of cereals in porridge preparation and other food preparation techniques. A significant focus of our study was differentiating food fragments from charcoal and other organic materials, which was essential in isolating relevant remains for our research. We applied various techniques and technologies to categorize the samples based on visible particles and porosity, enhancing our understanding of the types of food preparation and their preservation states.

Special attention was paid to identifying inclusions such as grain fragments and bran, shedding light on the cereals and ingredients used in the Dacian diet. A crucial part of our analysis involved distinguishing between bread-like and porridge-like materials based on their texture, particle size, and structural characteristics observed under the microscope. This differentiation was instrumental in interpreting the culinary practices of the Dacians.

These scientific and methodological approaches provided a comprehensive understanding of ancient dietary habits and food preparation techniques. The integration of advanced technologies and detailed analytical methods in our investigation opened a window into the culinary world of the Dacians, significantly enriching our knowledge of their culture and lifestyle.

10 RITUAL FEASTING AND THE CONSTRUCTION OF CULTURAL IDENTITY: THE DISPERSAL OF PROTO SINO-TIBETAN POPULATIONS IN NEOLITHIC CHINA

Liu, Li (Stanford University, USA)

The Yangshao culture (c. 7000-5000 cal. BP) represents one of the most widespread archaeological material assemblages in Neolithic north China. Its extension towards the Tibetan Plateau, in westward and southwestward directions, is associated with the dispersal of Proto Sino-Tibetan populations. Noted for centripetal settlement layouts, sizable public structures, advanced painted pottery, and the utilization of amphorae for producing and consuming fermented alcoholic beverages, the Yangshao culture fostered communal ritual feasts. Particularly, fermentation methods involving rice and the red mold (*Monascus* spp.) qu starter compound might have driven the spread of rice cultivation to western and southwestern China. These communal feasts played a vital role in establishing diverse social relations and reinforcing cultural identity through the production, processing, and sharing of food and alcoholic

beverages. Emphasizing collaboration and connections among related groups, these practices occurred during the expansion of proto Sino-Tibetan populations into new territories, coinciding with a period of climatic fluctuations.

11 DRINKING WINE IN BEER COUNTRY: A LOOK INTO EARLY BRONZE AGE NORTHERN MESOPOTAMIAN ALCOHOL PRACTICES DURING SOCIO-POLITICAL COLLAPSE AND TRANSITION

Heale, Michaela (Independent Researcher; University of Edinburgh alumna)

Within the category of alimentary substances, alcohol holds a somewhat unique position. Though all food is embedded within the social and cultural framework within which it is prepared and consumed, due to alcohol's psychoactive effects, it is often more symbolically charged. Acting as a social lubricant, alcohol can allow new bonds to be formed and old ones to be strengthened. This is all the more relevant when looking at the Early Bronze Age of northern Mesopotamia, wherein alcohol seems to take on a more active role in the elaboration and reformation of political, economic and social life.

This study aims to highlight as well as to investigate the underlying reasons behind the changes in patterns of alcohol's production and consumption following the collapse of centralised urban and trade systems at the end of the 4th millennium BCE in northern Mesopotamia. Drawing insights from both the known literature as well as novel results from computational methodologies (such as space syntax and point pattern analyses for communal drinking venues and production locales) to investigate the contexts within which alcohol was being made and consumed, this exploration will reveal the role of alcohol as a powerful tool in the reconstruction and transformation of the social, political, and economic order at the beginning of the 3rd millennium BCE.

12 WHAT'S IN A RECIPE?: APPLYING LESSONS FROM HISTORICAL ARCHAEOLOGY TO THE STUDY OF PREHISTORIC CUISINES

Johnakin, Anne (University of Oxford)

One of the ultimate goals of methods like starch and phytolith residue analyses is to move ever closer towards reconstructing a recipe. With the field's increased focus on cuisine, the nuances of plant and animal preparation and uses become increasingly important. While our methods continue to advance, allowing for example, the identification of individualized baking and brewing processes, we are reminded again of their limits and the need for interpretive frameworks to fill in the gaps. This paper will discuss three case studies from historical archaeology in the Americas where written recipe books can inform archaeological study. These case studies cover a wide range of culinary traditions, geographic areas, and social pressures. Starting off first with San Jose's Market Street Chinatown, then discussing recorded recipes of the Tacuma and Taino peoples, and ending with enslaved Afro-American foodways across the mid-Atlantic. Through these case studies, we can see the broad range of uses and methods of preparation for a single ingredient, as well as the knowledge creation and distribution networks involved in making cookbooks. We can ask, more broadly: what makes a recipe? How can we better interpret archaeobotanical and zooarchaeological remains when there are recipes, and then, as is the case in many "old-world" contexts, what do we do without them?

13 BILMA- A MENU FOR THE CENTRAL SAHARA. PRESENT-DAY AND LATE PLEISTOCENE/ HOLOCENE FOOD RESOURCES AND FOOD STRATEGIES

Schulz, Erhard (Institut für Geographie und Geologi Universität Würzburg) - Adamou, Aboubacar (Département de Géographie UAM Niamey République du Niger)

This paper combines palynology/archaeobotany, investigations on present vegetation, and on traditional plant use in the Central Sahara. It allows an estimation of Late Pleistocene-Holocene food resources.

The Bilma-pollen record (NE-Niger)-reaching down to the Late Pleistocene- evidenced a mixed plant cover of the Central Sahara out of Acacia-savannas and some Sudanian vegetation units around lakes and along rivers - up to the 7th millennium BP. However, these Sudanian elements reached only to 20° N and disappeared around 5000 BP. The Acacia-Panicum -savannas - of various densities - dominated from that time on. Achabs (short time- grass and herb floras) could reach to large extensions and represented the aleatoric component of vegetation and resources.

People had two main food sources:

1. As hunter-gatherer they could base on various plant resources, fishing and game.

From surveys on the traditional plant use and alimentation in the desert of northern Niger we could estimate the collecting resources for the human population in the Late Pleistocene and Holocene. For grasses it was possible to quantify them. Wild millets and sorghos could provide up to 250 kg grains/ha. Panicum turgidum-stands gave chances of 70kg grains/ha, whereas Aristida- or Eragrostis- species might have reached to 40kg/ha. Trees represented an

important source of food especially from the Sudanian-typed river vegetation. Game and fish were additional sources. However, they were not to quantify.

2. A rising pastoralism from about 8000 BP on introduced food production and provided milk and milk products as a second base of nutrition.

14 A MEAL FOR THE DEAD AND FOR THE LIVING. REFLECTIONS ON FOOD IN FUNERAL AND SETTLEMENT CONTEXTS

Józefowska-Domanska, Anna (Institute of Archaeology and Ethnology Polish Academy of Sciences)

Consumption practices, particularly in the context of feasting, played a major role in early Iron Age societies. An opportunity to study various behaviors related to eating and drinking is provided by work on remarkable sites from the Hallstatt C-D period in southwestern Poland. Research on the cemetery in Domasław, with over 800 cremation burials, including 300 richly furnished chamber graves, and the settlement in Milejowice, partly fenced with palisade-like circular constructions, interpreted as the seat of the elite, allows to examine foodways and their connection with rituals, gender, social status and cultural contacts. The considerations are supported by a huge range of analyses, including an organic residue study of pottery for the presence of lipids. The analyses provide valuable information on what kinds of food may once have been cooked and consumed, as well as the kinds and functions of vessels used in everyday and ritual actions: in food preparation, cooking, storing and consumption. Combined with the analysis of botanical and faunal remains, these serve as a basis for investigating various interactions in culinary practices. This approach allows to determine the role of food activities in cemeteries and settlements, among social elites and non-elites, and further in cross-regional comparisons between Hallstatt communities.

15 PROTEOMICS OF ANCIENT SUBSISTENCE

Wilkin, Shevan (University of Zurich)

In archaeology, indirect proxy information that can be used to identify human-animal-plant interactions, are of paramount interest. As recovered amino acid sequences can reveal information about the taxonomic classification and tissues recovered proteins derived from, successful proteomic analyses can provide critical insights into the types of animal products people used that would otherwise remain invisible. While shotgun proteomics has been widely applied to human dental calculus to explore dietary intake through the recovery and identification of plant and animal proteins, it has rarely been applied to novel types of archaeological materials. Metaproteomic analysis can be used to investigate many types of ancient and historic artifacts, however, organic preservation is often a limiting factor. Identifying materials or contexts that function as preservational reservoirs has the potential to extend how far back into the past we can apply biomolecular methods to these questions in the past. This presentation will detail recent findings from three studies that investigate examples of archaeological residue proteomes via liquid chromatography, tandem mass spectrometry. From copper alloy cooking vessels from the eastern steppe, to bronze vessels from Mongolia, and residues from symbolic objects from southern Africa we identified unique animal products in each instance, demonstrating the diverse uses of animal products across time and space.

16 FOODS FOR AFTERLIFE FROM THE BURIALS OF DHANETI, GUJARAT, INDIA: NEW LIGHT ON THE HARAPPAN MORTUARY ARCHAEOLOGY OF SOUTH ASIA

Ghosh, Ahana (Indian Institute of Technology-Gandhinagar)

Harappan grave vessels have been subjected to several traditional ceramic studies, specifically under the typological lens covering forms, shapes, and designs. However, attempts to understand their utility are still limited to ethnographic parallels or vessels recovered from the habitational contexts. Research on the nature of mortuary food and vessels they were offered in using scientific techniques is in its infancy. This study goes a step beyond the above, and the twelve ceramic sherds from grave vessels of Dhaneti's excavated human burials (Kachchh, Gujarat, India) are assessed for their lipid content to evaluate the symbolic significance of food in the mortuary rituals. It examines the relationship between 'forms' and 'utility' by considering functional groups like 'cooking pots,' 'basins,' 'globular pots,' and 'Dish on stand' available within the sample set. The biomarkers, such as fatty acids derived from the matrices of the sherds, were characterized through lipid residue analyses and demonstrated the possible processing of animal-based products and plant oils inside them and the offerings to the deceased for safe passage to the other world. Methodologically, the quantity of preserved lipids and fewer contaminants from the studied vessels uphold the necessity of a planned sampling strategy specifically intended for residue analysis. Finally, this paper, from a broader perspective, makes an effort to contribute to the essentiality of considering the inclusion of the study of burial food practice within the corpus mortuary archaeology of South Asia.

17 ORGANIC RESIDUE ANALYSIS AT THE TRANSITION TO THE IRON AGE IN SOUTH IBERIA

Revert Francés, Elena (Eberhard Karls Universität Tübingen)

That the Phoenicians crossed the Mediterranean at the beginning of the first millennium, reaching the Atlantic coasts of the Iberian Peninsula is well documented archaeologically. Their feats as navigators and merchants are also famous. But what about agriculture, did they influence in any way the local agriculture and husbandry in the south of the Iberian Peninsula, which they inhabited three millennia ago? I am mainly trying to answer these questions in my postdoctoral project within the CRC 1070 ResourceCultures. Within this framework, I have carried out, among other things, organic residue analyses in pottery and sediments from various archaeological sites from the south of the Iberian Peninsula, in order to see, on the one hand, if any changes can be detected in the diet or the cooking before and after the arrival of the Phoenicians and, on the other hand, special interest has been placed on the location of any non-endemic elements that can be associated with the Phoenicians or with trade with the eastern Mediterranean.

18 A PALEOPROTEOMIC CASE-STUDY ON MEDIEVAL COOKING: THE "PIETRA OLLARE" VESSELS FROM NOGARA (VERONA, ITALY)

Monaco, Dario (University of Verona, Department of Cultures and Civilizations) - Brandi, Jessica (University of Verona, Department of Biotechnology) - Sorio, Daniela (University of Verona, Centro Piattaforme Tecnologiche) - Ceconi, Daniela (University of Verona, Department of Biotechnology) - Saggiaro, Fabio (University of Verona, Department of Cultures and Civilizations)

The study of food in past societies presents itself as an increasingly dynamic and innovative research field, combining archaeological methodologies with those of disciplines such as physics and chemistry. The fruitful encounter of this knowledge makes it possible to enrich our understanding of past habits with new data. Food allows us to observe every day-to-day and social behaviour from a privileged angle, which lies at the intersection of physiological needs, economy, society, and culture.

In this project, we have evaluated a case study regarding archaeological remains found inside and around two houses of the medieval settlement of Nogara (Veneto Region), dating to its 9th- 10th-century phases, centuries that are crucial for understanding a period of profound change in the Po Valley.

In particular, the analysis of incrustations adhered to fragments of "pietra ollare" vessels, soapstone vessels, has been performed. The "pietra ollare" vessels are a type of cooking pot produced during the Early and High Middle Ages on an industrial scale, mainly in the Alpine valleys of the current province of Sondrio (Lombardy Region), which met with enormous success and commercial diffusion, appearing in large quantities in many sites of that period in the Po Valley. Our research involved optimising a protocol for extracting and analysing proteins and/or polypeptides preserved within such encrustations. These carry specific information, i.e. the proteins to which they belonged and the animal or plant species from which they came.

Interestingly, the proteins identified belonged to *Bos taurus*, *Capra hircus*, and *Ovis aries* species, suggesting the preparation of meat obtained from those animals.

Even if preliminary, the results can contribute to an in-depth study of the dietary habits of the Nogara dwelling, giving us the possibility to look at the ordinary life of a country settlement during the Early Middle Ages in Northern Italy.

19 THE EASTWARD SPREAD OF GRAPE WINE AND ITS SINICIZATION -- ARCHAEOLOGICAL EVIDENCE FROM THE NORTHWEST REGION OF THE TANG DYNASTY

Li, Jingpu (Department of East Asian Languages and Cultures, Stanford University; Department of Archaeology and Anthropology, University of Chinese Academy of Sciences)

Grape wine, a product of mono-fermentation, found its way into Central China (the Central Plains) no later than the 2nd century BCE, coexisting with cereal-based alcohols, like Qu starter alcohol, a product undergoing a two-stage fermentation process. However, it wasn't until the 7th century CE that elites among Han Chinese mastered the natural fermentation method of grapes. Meanwhile, due to the cultural habitus in ancient China, a grape wine fermentation method initiated by Qu was invented, leading to a trend of localization of grape wine in the following centuries. This study employed a comprehensive multi-proxy approach to analyze a liquid sample unearthed at the tomb of Zhi Murong (649-691CE), who was the last prince of the Tuyuhun Kingdom (313-663 CE) and served as a Grand General in the Tang (618-690 CE & 705-907 CE) and Wuzhou Dynasties (690-705 CE), in today's Wuwei, Gansu, China. Through metabolomics, proteomics, and microfossil analysis, it was determined to be an alcoholic beverage crafted from a blend of grape juice, japonica rice, indica rice, barley, wheat, and millet, with artificially cultivated Qu serving as the fermenting agent. The method shared similarities with those used in huangjiu production in China. As grape juice was the primary fermentation substrate, the beverage is aptly designated as "grape-huangjiu. Thus, this study confirmed the distinct existence of a grape fermentation product in combination with the local method in the 7th century CE. This blend of wine and Qu alcohol, probably invented by Emperor Taizong of Tang (598-649

CE), symbolized the sinicization process within the Tuyuhun royal family, and represented a remarkable example of cross-cultural exchange and technological fusion along the Silk Road. Moreover, the identification of several novel substances underscores their potential as valuable biomarkers for the analysis of ancient grape wine for the study in the future.

20 LIFTING THE LID ON THE HEBRIDEAN NEOLITHIC: USING ORGANIC RESIDUE ANALYSIS TO RECONSTRUCT FOODWAYS IN THE OUTER HEBRIDEAN SOCIAL LANDSCAPE

Brown, Daniel (University of Bristol) - Cramp, Lucy (University of Bristol) - Garrow, Duncan (University of Reading)

This contribution will present preliminary results from the analysis of dietary practices of the early farming communities of the Early-Middle Neolithic of the Outer Hebrides, c. 3700-3200 BCE. This project uses cutting-edge organic residue analysis of pottery lipids from both water-logged islet-related contexts and dryland domestic settlements. My project utilises GCMS analysis to scan for specific trace biomarkers and stable isotope analysis to determine the origins of animal fats. These methods will uncover and allow for the interpretation of past foodways that were present at these different sites in this region at the northwestern edge of the European Neolithic.

Hebridean crannogs are artificial islets set within lochs. Underwater surveys have recovered archaeological material from the loch-beds surrounding some of these islets and the waterlogged conditions have enabled the recovery of elusive lipid biomarkers for cereals. It has been proposed that these sites were important centres for the formation of community identity via feasting activities. Therefore, by re-constructing the foodways of these sites, the functions and activities taking place at these centres can be explored. The dietary patterns on islets will also be compared to domestic settlements such as An Doirlinn and Screvan Quarry as well as tomb sites. This will allow me to compare and understand how foodways and specific foodstuffs were related to activities taking place at the islet sites, funerary monuments and in domestic contexts.

My work builds-on previous analyses of pottery residues from four Hebridean islets, bringing in additional islet, domestic and tomb sites for comparison and increasing the representation of key forms of pottery to test hypothesised differences in use. This will allow a greater understanding of how cuisine intersected with past ceramic forms. Overall, by reconstructing and comparing the foodways of these sites, a more detailed interpretation can be constructed of their social role.

21 THE USE OF APTAMERS IN THE ANALYSES OF FOOD RESIDUES ON ARCHAEOLOGICAL CERAMICS. INTERPRETING THE CUISINE OF EARLY MEDIEVAL PTUJ

Magdic, Andrej (Cultural Heritage Service, Institute for the Protection of Cultural Heritage of Slovenia) - Kosel, Janez (Research Institute, Institute for the Protection of Cultural Heritage of Slovenia)

The characteristics of food preparation, the cuisine, is an essential part of the cultural identity of individual societies. Analyses of food residues on archaeological ceramics can provide important information for the interpretation of ancient cuisine. An established method in the analysis of food residue analyses is the characterisation of proteins, which can provide information about the type of food that was prepared in the ceramic vessel in question. Immunological methods such as the enzyme-linked immunosorbent assay (ELISA) can be used to characterize protein residues. ELISA is antibody-dependent, which has many disadvantages, including antibody cross-reactivity and rapid denaturation.

The main goal of our research is to overcome these problems by replacing antibodies with aptamers. These are single-stranded oligonucleotides obtained by chemical synthesis with repeated selection cycles that bind with high affinity to selected target proteins in their secondary structure. Rigorous selection with a customised isolation procedure ensures their very high specificity for the target proteins. The performance of 16 different aptamers was tested on model samples using immunofluorescence microscopy. The model samples were prepared by boiling different suspensions (egg white suspension, trout, wheat flour, gelatin, beef, blood clots, hemoglobin, lysozyme from egg, raw milk, ovalbumin from egg) in modern replicas of ceramic finds from the Early Medieval site on the castle hill of Ptuj in north-eastern Slovenia.

The functional aptamers giving appropriate signals on the replica vessels were also tested on archaeological samples of ceramic finds excavated on the castle hill of Ptuj, which provided new insight into the cuisine of the Early Medieval inhabitants of Ptuj.

188 CULT PRACTICES IN THE ANCIENT MEDITERRANEAN: MOBILITY, CHANGES, AND PERSISTENCE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Angliker, Erica (British School at Athens) - Ustinova, Yulia (Ben Gurion University of the Negev)

Session format: Session with keynote presentation and discussion

In ancient Greece, some cults were commonly transferred from one locale to another with the appropriate adaptations to fit into the new context. Such transfers occurred from the Dark Age, when cults were moved from Balkan Greece to Asia Minor, during the Archaic period, when they were transplanted from metropoleis to apoikiai, and throughout Greek history, among communities engaged in synoecism. Even the cults of divinities worshipped under local epithets could undergo this process. When scholars examine these transferred cults, they tend to focus on the similarities between the new and the old sets of practices more than the changes that inevitably occurred. The modalities of cult transformations which occurred in different historical and cultural situations, in particular, the differences between changes in rituals and beliefs, resulting from population movements during the Dark Age, Greek colonization, and other historical periods, are to be put into focus. The aim of the present panel is to help fill this gap in the research by considering the impact of mobility on the transformation of cult practices in the Greek world from the Geometric to the Classical period, focusing on archaeological evidence.

The participants will address the following questions:

- 1) What types of changes occur when cults are transferred?
- 2) What kind of practices persisted in the locale to which a cult was transferred?
- 3) What material and epigraphical evidence are there for these changes?
- 4) What factors inspired and affected these changes?
- 5) How were cults adapted to the new territories that Greeks occupied in the Mediterranean?
- 6) How did the cults of divinities and heroes interact with the local pantheons when they were transferred to colonial communities?
- 7) Which elements of the original cults were retained, and what new elements did the local cultural and physical environment contribute?

ABSTRACTS

1 CULT AT THE CROSSROADS: SELINUNTE AND A MULTISCALAR FRAMEWORK FOR APPROACHING CULTIC TRANSFER

Ward, Andrew (Fairfield University) - Marconi, Clemente (Institute of Fine Arts - NYU; Università degli Studi di Milano Statale)

Selinunte, the site of ancient Selinus, a Greek apoikia founded jointly by settlers from Megara Hyblaea and Megara Nisea in the third quarter of the seventh century BCE, has featured prominently in debates concerning both the influence of mother cities on the cultic landscape of new foundations, as well as the influence of non-Greek ritual traditions on settlements deemed to be on the “peripheries” of the Greek world. Similarities in the sacred topographies of Selinunte and Megara Nisea, mythical allusions made in the public art of temples, as well as epigraphy are all evidence drawn on to demonstrate continuity between mother city and apoikia. Selinunte’s evident integration into the diverse multicultural milieu of Western Sicily, meanwhile, has been pointed to so as to explain a very different form of cultic transfer evidenced in contexts like Gaggera’s Campo di Stele.

New excavations exploring the sanctuaries of Selinunte’s acropolis, conducted jointly by the Institute of Fine Arts-NYU and Università degli Studi di Milano Statale under the directorship of Clemente Marconi suggests that a nuanced multiscalar approach to cultic adaptation allows for these competing narratives to meaningfully coexist in a place like Selinus. A continuous stratigraphic sequence from time of the city’s foundation survives within the southern portion of the city’s main urban sanctuary. These ritual assemblages, when contextualized in the broader historical and archaeological context of Selinunte, demonstrates an ability to balance cultic traditions consistent with the motherland and novel practices more in keeping with the indigenous practices of a not-insignificant proportion of Selinus’ early population. These rites persistence, change, or outright abandonment as the site’s sacred structures were expanded, renovated, or abandoned demonstrates the flexibility of Selinuntine cult to resonate with multiple scales of significance – local, regional, and Mediterranean-wide.

2 MAGNESIA ON THE MAEANDER: THREE MODES OF CULT TRANSFER

Ustinova, Yulia (Ben-Gurion University of the Negev)

Three cults performed in Magnesia on the Meander, a city founded by Magnesians from Thessaly, and the Meander valley, offer an intriguing opportunity to examine three different modes of cult transfer and adjustment to the new environment.

A cave of Apollo at Hylai bestowed strength for every endeavour, including uprooting big trees. At Hierakome, Apollo gave oracular responses. In the sixth century, King Darius referred to 'sacred gardeners of Apollo' in Magnesia as dear to his ancestors. The Aetolians probably combined their cults of Apollo, the cave-dweller and oracle-giver, with a local cave ritual.

The tradition of maenadism was established in Magnesia in the third century BCE, when the Pythia commanded the Magnesians to erect temples of Dionysus and bring maenads from Thebes. Maenadic celebrations in Magnesia were associated with the city and its surroundings, but fully complied with the Hellenic model.

Eastwards from Magnesia, at Acharaca, a sulphur cave was used for two types of initiations. Sick pilgrims were healed by means of oracular visions that were attained during their stay in the poisonous 'den', and instruction by the priests. The local youths who entered the cave underwent a rite of passage. A cave environment, initiations, and healing by physicians living near the sacred place, as well as the comparison of participants in the ritual to animals, are present in the cult performed in Cheiron's cave on Mount Pelion in Thessalian Magnesia.

Three main patterns of cult transfer are manifest in Magnesia: a unique amalgamation of a dominant local and a Greek tradition (Apollo); a ritual following the Greek pattern (the maenadic cult of Dionysus), and a cult which functioned in broad conformity with the Aeolian prototype, but with the addition of a significant enhancement conditioned by the local environment (Acharaca).

3 CULT CAVES IN ARCHAIC NORTHERN GREECE: A COLONIAL CULT-PRACTICE?

Georgiadis, Fotis (EPS (Ephorate of Palaeoanthropology - Speleology), Hellenic Ministry of Culture)

In the Greek metropolitan area, mainly at the archaic period, shrines of several deities were established (or re-established) in a number of caves. Some of these shrines acquired great fame and supra-regional significance. The present paper examines the transfer of a whole cult practice in North Aegean in the context of the second Greek colonisation. It is not so much about the transfer of cults from mainland Greece metropoleis to the apoikiai of the shores of North Aegean as it is about the transfer of a cult practice: the cult practice of veneration in caves.

Out of the numerous caves that hosted past human activity in northern Greece, only a few were used as cult caves during the archaic and classical period. In the 7th c. B.C., in the course of the Greek colonisation, Greek cities were founded in the coastal zone of northern Aegean. The territory of these colonies ("chora") was confined to the area surrounding them and did not extend inland (not until the expansion of the Macedonian kingdom in these areas). All of the archaic cult-caves discovered in the northern Greece territories, are located into this coastal zone and none further inland. Their establishment, is associated with the foundation of the Greek colonies. Indeed, the research carried out over the last 15 years has provided new evidence supporting the thesis that the establishment of these cult-caves took place within the first generations of the colonial settlement.

4 THE SPREAD OF DELIAN SANCTUARIES ACROSS THE MEDITERRANEAN

Angliker, Erica (University of London, Institute of Classical Studies, Research Associate)

Literary and epigraphic sources tell of Delian sanctuaries (branches of the sanctuary on Delos) across the Aegean in Paros, Chios, Amorgos, Calymnos, Cos, Nisyros, and Syme. As of now, twenty-two such sanctuaries have been identified, based mostly on epigraphic evidence and, in rare cases, on archaeological materials. Though a handful of scholars have studied these sites in terms of their geographical position in relation to Delos, none has considered their nature and function from the perspective of the transformation of the cult in various historical and cultural situations or, in particular, their differences in terms of changes in rituals and beliefs resulting from the transplantation of the cult from Delos to other parts of the Aegean.

The focus of this paper is on the function and cultic nature of the Delian sanctuaries indicated by the rich and distinctive epigraphic and archaeological evidence. In particular, the evolution of sanctuaries such as those on Paros and Kalymnos exemplifies the implantation of the cults and the differences and similarities among them.

5 APOLLO DELPHINIOS AND THE MOLPOI - FROM MILETOS TO OLBIA

Andreev, Sofia (Ben-Gurion University of the Negev)

The cult of Apollo Delphinios in Olbia, a Milesian colony on the Black Sea coast, was one of the most prominent. It was transferred by the Olbiopolitans from Miletos and until the late Hellenistic period it retained some archaic features: Apollo Delphinios was the protector of the state institutions, his sanctuary was situated in the centre of the city and

served as a city archive, the aisymnetai of the molpoi, and later the priests of Apollo Delphinios, were city eponyms. Many subjects concerning this cult remain disputable. The inscriptions of the molpoi suggest that, similarly to Miletos, the Olbian cult of Apollo Delphinios included singing and dancing processions, however instead of marching outside the city, from Miletos to Didyma, in Olbia the processions remained in the central part of the city, and all the ceremonies were performed in the central city temenos. This paper uses the case of Olbia in order to highlight the challenges of the colonial environment in the cultic sphere. In particular, it demonstrates that since sacred places could not be transferred, crucial elements of many rituals, including the main cults of the city, had to be modified and adjusted to the new surroundings.

6 KOUROTROPHIC DEITIES IN ARCHAIC CRETE: A BLACK FIGURE DEPICTION THE BIRTH OF ARTEMIS FOUND IN THE TEMPLE OF DEMETER, PHALASARNA

Zervoudakis, Panagiotis (iap1109@ia.uoc.gr) - Bendon, Michael (Independent Researcher, Sydney 2086, Australia) - Hadjidaki, Elpida (Director of the Phalasarna Excavations, 73400 Kisamos, Greece)

Ancient Phalasarna, a maritime city with a long prehistory that reached its peak during the 4th cen. B.C., is located in the NW corner of Crete, on and around Cape Koutri. The ancient geographer Skylax refers to the polis (city) of Phalasarna as a closed port, and Dionysius Kalliphontis mentioned the temple of Artemis. In 365 A.D., one of the largest earthquakes in recorded history raised Phalasarna 6.5 meters above the sea in a few seconds. This made its once-famous harbour useless while what remained of the city was flooded by subsequent tsunamis. Excavations have confirmed the impressive extent of the ancient port as well as fortifications and towers attesting to a once thriving city (Hadjidaki, 1988; Frost & Hadjidaki, 1990, Liestol & Hadjidaki, 2020). On top of the Koutri Cape, excavations in 2022 revealed a temple of Demeter. However, a plethora of figurines, fragmentary inscriptions and jewelry raise the possibility of an association of the sanctuary with more than one deity. Fragments of a black-figure vase were recovered from layers associated with ash, possibly from an altar east of the main temple. These depict at least four engraved figures and a floral pattern. The depiction has parallels with the birth of Artemis and Apollo by Leto in libation scenes on Attic vases of the 5th cen.B.C. (Foukara, 2017, 64) and the birth of Athena from Zeus' head (Penn Museum, Amphora MS3441). The fragments of the black figure painting provide us a unique find for Crete, a very rare example of Archaic black figure depiction related with Leto, Artemis, and Eileithyia, possibly attesting to a gradual transition from an earlier cult to the worship of Demeter as a childbirth goddess. These changes can be related to Phalasarna's function as a port, and the exchange of ideas with mainland Greece. The port was used as cultural center for exchanging ideas and connections with very ancient eastern cults such as Demeter whose cult reached from Crete to Athens, Sicily, and later to Egypt.

7 GODS AND HEROES IN CLASSICAL FOUNDATIONS AND SYNOECISMS

Montel, Sophie (Université de Franche-Comté, Institut des Sciences et Techniques de l'Antiquité) - Pollini, Airton (Université de Haute-Alsace, Mulhouse, UMR 7044 Archimède)

To shed light on Cult Practices in the Ancient Mediterranean: Mobility, Changes, and Persistence, we propose to look at Gods and heroes in Classical foundations and synoecisms.

We wish to highlight the archaeological markers of cult transfers, focusing on the changes in places and practices as well as their visibility. We intend to analyze the places where offerings of all types and sizes were presented, the display devices that enabled the population to assimilate new gods and heroes, but also new buildings and their typological or stylistic links with earlier ones. We concentrate our analysis on transfers linked to new foundations and synoecisms in the Classical period, drawing on examples in South Italy, Sicily, the Peloponnese and Northern Greece. Besides the transfers of the cult of the gods, we will also consider the transfer of bones in the case of hero cult (Orestes between Tegea and Sparta, Theseus between Skyros and Athens, Rhesus from Troy to Pangaion Hill, and Lamis, founder of Megara Hyblaea from Thapsos).

8 RETRACING SACRED ELECTRICITY IN THE ANCIENT SARONIC GULF - OUTLINES OF OLYMPIAN AND HERO CULT TRANSMISSION (650-350 BCE)

Delacruz, Michael (University of Oxford; Newcastle University; Blue Shield International)

This paper examines the phenomenon of cult transmission in the Saronic Gulf during classical antiquity through the employment of overlapping network analyses to identify linkages between cult, economic relations, and political instrumentality. Although certain instances affirm a solid correlation between cult transfer and prevailing conditions of economic exchange and political affiliation,* other examples of appropriation or migration of cult suggest modalities of influence less specifically determined. On the one hand, localised manifestations of deities or heroes evidently reinforce an insistent territorial consciousness; on the other, commonalities of practice and belief appear to activate synaptic 'bridges' which transgress political division or logical patterns of transportation and exchange. This overview of a multivalent network approach will highlight the interrelation between the instrumental use of the Aiakidai, as a

heroic cult complex, and broader signatures of Olympian residency within the emerging and competing polities of the Saronic from the late Archaic to the early Hellenistic. While current research strongly indicates that deterministic and highly data-centric approaches can provide insight into the environmental, economic, and political conditions that encouraged the transmission of cult, it likewise appears that the character of gods and of heroes themselves helped shape the dynamics of conductivity that sparked the transfer of cultic energy across land and water. It is hoped that a small world examination of this phenomenon may illuminate wider patterns of cult transfer throughout the ancient Greek maritime universe.

*The expansion of the cult of Asklepios from the Eastern Peloponnese to Western Attica in the sixth and fifth centuries BCE is a primary case in point.

9 MACEDONIAN MATERNALISM? THE CULT OF THE MOTHER OF THE GODS IN THESSALY

Fowler, Michael (East Tennessee State University)

With her migration from Anatolia to Greece in the Archaic period, Kybele/Mother of the Gods is a particularly instructive example of the mobility and adaptability of cults in the ancient Mediterranean world. The Mother of the Gods' cult grew particularly strong in Macedonia from the Late Classical through the Hellenistic period, as attested by Metroa in Aigai and Pella, among several other sites. The development of the Macedonian cult overlaps with the kingdom's annexation of Thessaly. In Thessaly, the worship of the goddess is documented epigraphically or archaeologically in seven distinct polities, from as early as the fourth century BCE. The most recently identified site, a roadside shrine at the western entry to the Tempe pass (Chani tis Kokkonas) persists until the early second century BCE—precisely when Macedonian influence is waning amidst conflict with Rome. Should these historical coincidences and the short-lived nature of the Mother of the Gods' pre-Roman cult in Thessaly be taken as evidence that the goddess was introduced from Macedonia? This paper shall review the available evidence for Thessalian cults of the goddess, with a particular interest in identifying their individual characteristics and comparing them to other known cults (esp. Macedonian).

10 TAURIS, LACONIA, ATTICA: ARTEMISIAN NETWORKS IN THE ANCIENT MEDITERRANEAN

Valletta, Lucio Maria (None)

The foundation of two among the main cults of Artemis in the Greek world (the one of the Tauropolos at Halae and/or at Brauron [1], and the one of the Orth(r)ia at Limnai) is directly linked to the events involving Agamemnon's two children, Iphigenia and Orestes, whose myths are differently developed and rooted both in Attica and in Laconia.

Each of the two cults finds its founding act in the importation – by Orestes and Iphigenia – of the cult statue of the goddess of Tauris in Attica or in Laconia [2]. Moreover – in both local contexts (the Athenian one and the Spartan one) – the cult of the Taurian goddess is integrated in a quite similar (but not identical) way in what J.-P. Vernant defined [3] the “structures du panthéon” of each community.

This is the case with respect both to other divinities (primarily Athena on the acropolis of the two cities) and to some cultural features characterizing each cult: the ritual of the sword at Halae and that of the diamastigōsis or bōmolochia at Limnai [4], or the function of kourotropos of the Orth(r)ia at Limnai – equally highlighted in order to define the main function of the cult of the goddess of Brauron.

Starting from various kinds of sources (archaeological, epigraphical, textual ones), the paper will describe the way in which the “barbarian”/forbidden practices linked with the Taurian cult have been adapted to the cultic system of the two Greek communities.

11 TRAVELLING FOR HEALING VISIONS: PERFORMANCE, INSULARITY AND THE SPREAD OF ASKLEPIOS' CULT AND RITUAL IN THE 4TH CENTURY BCE

Lafasciano, Luigi (The Diakron Institute; Università degli Studi di Salerno)

The widespread dissemination of the cult of Asklepios and its associated practices throughout the Greek Mediterranean, starting from the late 5th century BCE, has prompted numerous inquiries within the realm of religious studies. Scholars have sought comprehensive explanations for how this cult and its rituals propagated, and the key figures involved in this process. In addressing these questions, much attention has been given to the resemblances in the transferred ritual practices, with a particular focus on the distinctive feature of Asklepios' cult: incubation. This practice involved devotees entering a visionary state to seek healing or prophecies through dream visions.

This paper delves into the intricate interplay among dramatic performances, dream visions, and therapeutic practices in the diffusion of the Asklepios cult across the Mediterranean. Our analysis concentrates on the case studies of the Asklepieia in Lebena (Crete), Paros (Cyclades), and Akragas (Sicily), all of which were established in the 4th century BCE. By employing a theoretical framework that explores the nexus between healing visions and dramatic performances, we contend that it offers a more comprehensive understanding of both the similarities and differences in the adaptation of Asklepios' cult to diverse cultural contexts. This approach leverages a broad spectrum of sources, en-

compassing miracle tales conveyed through epigraphy and literary sources, material and immaterial votive practices, and the spatial organization of sanctuaries discerned from archaeological evidence.

192 FRONTIERS OF HERITAGE: CULTURAL LANDSCAPES, COMMUNITY INTERACTIONS, AND METHODOLOGICAL APPROACHES

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Gao, Qian (Durham University, Department of Archaeology) - Bonacchi, Chiara (University of Edinburgh, School of History, Classics and Archaeology) - Hanscam, Emily (Linnaeus University, Archaeology) - Cartwright, Rachel (Independent Researcher)

Session format: Regular session

In the complex tapestry of archaeology and heritage, frontiers emerge as dynamic and evolving zones of cultural interaction, negotiation, and identity construction. Our session encourages a rich dialogue surrounding the study of frontiers from a heritage lens, embarking on a multifaceted exploration of cross-cultural comparisons. By delving into the interplays between cultural landscapes of frontiers and the communities inhabiting or interacting with them, we aim to unearth the nuanced ways in which values and identities are shaped, negotiated, contested, and re-imagined. Furthermore, we intend to foster reflection on the methodologies employed in examining these dynamic interactions. Through a range of empirical and theoretical lenses, we aim to unravel the complex layers of frontier heritage, offering fresh perspectives on the entangled histories and futures of frontier landscapes and communities. Collectively, we will enhance our understanding of frontier heritage and its pivotal role in shaping broader discourses of cultural diversity, social cohesion, as well as inclusive and sustainable heritage practices.

We welcome contributions that explore:

1. The role of frontiers in shaping cultural landscapes and the ways in which they have been experienced, interpreted, and managed.
2. Cross-cultural comparisons of frontier heritage landscapes and their associated values and identities.
3. Methodological innovations and challenges in studying the dynamic interactions between cultural landscapes and communities within and across frontiers.
4. Case studies illustrating the interplay of local, national, and transnational narratives in shaping frontier heritage.
5. The implications of frontier heritage studies for contemporary heritage management and policy discourse.
6. Engaging communities in the discourse of frontier heritage: practices, challenges, and opportunities.

This session endeavours to contribute to the growing body of knowledge in critical frontier studies and chart new avenues for the interdisciplinary exploration and understanding of frontier heritages.

ABSTRACTS

1 THE UNSEEN HERITAGE OF THE EVERYDAY ENVIRONMENT; RE-BUILDING COMMUNITY COHESION OF AN ABANDONED RURALITY

Krag, Mo (Aarhus School of Architecture)

In contrast to classic restoration practices based on prolonging and upholding, this paper reports on a series of fulfilled, and on-going, temporary preservation attempts. These were developed and tested as radical preservation of abandoned buildings undertaken at full scale through a subtractive architectural practice.

At first, the practice was initiated in Danish rural villages, testing temporary preservation strategies for the challenged rural built environment with emphasis on engagement with the local village communities. The intention was to re-activate obsolete buildings as material anchorage points of place-specific collective memories and thus, contribute to the rebuilding of the community cohesion and local identity.

Since 2020, the preservation practice has engaged a larger scale. It now revolves around the on-going preservation of the entirety of a depopulating station town. By expanding the scale, the involvement of the local community has increased. The local residents play a crucial role by taking part in the preservation practice and at the same time contribute with personal place-specific memories triggered in the process. The paper reports on the latest preservation experiment (fulfilled spring 2024) that involves a former medical care centre located at the central square.

On the landscape scale, the preservation practice combines a governmental afforestation plan with redirected government funds for strategic demolitions. The afforestation takes place by expanding an existing forest south of the station town into depopulated areas. The forest emerges gradually into the abandoned gardens, in which the buildings are reduced to curated ruins through subtractive interventions.

The curated ruins maintain clearings in the emerging forest and will gradually interweave with a dynamic mesh of pathways made by the community itself. The clearings constitute culture-historical gathering points that catalyze exchange of memories among the local residents and hence, preserve the buildings immaterially as a strengthened collective memory while their physical presence diminishes.

2 BETWEEN KINGDOMS AND CULTURES, THROUGHOUT EPOCHS - FRONTIER, ETHNOGRAPHY AND CULTURAL LANDSCAPES OF THE THIRD CATARACT REGION (SUDAN)

Kurcz, Maciej (Jagiellonian University)

The paper examines the links between the processes of shaping cultural landscapes and the border/lands phenomena in the context of the Third Cataract – a region in historical Nubia with features of a centuries-old cultural and political borderland (Adams 1977). It also highlights the de/heritization processes in such areas. Frontier is understood as a kind of natural resource that local actors use to negotiate, question and reproduce identities and cultural values (“fertile frontier”) as well as the zone of continuity and conservatism (Igor Kopytoff 1987).

What is the role of the frontier in shaping cultural landscapes in the region of the Third Cataract? What opportunities and methodological challenges are associated with studying the heritage of cultural and historical borderlands in Sudan?

The paper relates to ongoing ethnographic research on “Miseeda Island,” a group of villages in the Third Cataract area (Sudan). The fieldwork is carried out as part of the archaeological project Miseeda (Masida) – Between Kingdoms, Throughout Epochs.

3 VIKING AGE HERITAGE IN A FLUCTUATING FRONTIER: CHANGING INTERPRETATIONS AND CONTESTED PERSPECTIVES IN THE GERMAN-DANISH BORDERLANDS

Cartwright, Rachel (Independent Researcher) - Bonacchi, Chiara (University of Edinburgh)

All borderlands are complex cultural landscapes, with multifaceted layers of interconnectedness and often also conflict. In this sense, frontier regions represent ideal case studies for analysing contesting views of past heritages and their fluctuating interpretations over time. Our paper will focus on the changing views of, and approaches to, the Viking Age heritage of the German-Danish borderland. In particular, we will explore how the remains of the Viking Age town of Hedeby/Haithabu and the Danevirke system of earthwork fortifications have been interpreted and valued over time by cultural management practitioners, researchers, and the public in relation to wider socio-political developments. While nowadays located in the German federal state of Schleswig-Holstein, in both cases the archaeological remains have experienced the turbulent history of changing borderlines between the two countries during the 19th and 20th centuries. Now with their inscription as UNESCO World Heritage sites in 2018, they are used to show a common cultural heritage in the German-Danish borderlands.

4 HERITAGE MANAGEMENT AND RURAL ATTACHMENTS: RE-VISIONING THE GREAT WALL OF CHINA AS DYNAMIC CULTURAL LANDSCAPES

Gao, Qian (Durham University) - Cheng, Fei (Chinese National Academy of Arts) - Xiao, Dong (Beijing University of Civil Engineering and Architecture)

This paper aims to reshape our understanding of the Great Wall of China, re-visioning it as dynamic cultural landscapes. The concept of “cultural landscape” signifies the interplay between nature and culture, where landscapes hold not only physical presence but also symbolic meanings, historical narratives, and social practices. As an iconic architectural marvel traversing northern China’s rugged terrains, mountains, and valleys, the Great Wall is mostly situated in rural and semi-rural areas, where the majority of the local populace are rural residents. These communities, sharing their landscapes with the Wall, have developed traditions, customs, and stories intricately linked to its presence. Proximity to the Wall has also made them deeply influenced by heritage management decisions, conservation endeavours, and tourism activities related to it. Nevertheless, the prevailing perception and management of the Wall predominantly emphasises its monumental and historical significance, often overlooking its cultural, social, economic, and emotional significance for local rural communities. To re-conceptualise the Great Wall as living cultural landscapes, understanding rural residents’ perspectives and attachments becomes pivotal. Their experiences and narratives are integral to unveiling the multifaceted meanings and values associated with the Wall.

Our investigation delves into the correlation between evolving heritage management interventions and the attachments and values that rural residents neighbouring the Wall attribute to this historic monument. Anchored in a case study of Tianxianyu Village, part of the “Great Wall International Cultural Villages” nestled beneath the Mutianyu and Jiankou sections of the Wall, we scrutinise the repercussions of heritage management decisions on villagers’ emotional bonds and perceived values of the Wall. Through this study, we propose a transformative shift in heritage management strategies for the Great Wall. By adopting the cultural landscape framework, we advocate a holistic approach

that transcends physical preservation to embrace the intricate relationships between the Wall and its adjacent rural communities.

5 MORE VOICES FOR EMANCIPATORY ARCHAEOLOGICAL AND HERITAGE PRACTICES

Jean, Joseph Sony (Leiden University)

This presentation is framed within the current trends of decolonization practices in archaeology and heritage studies by focusing on Haiti in its broader Caribbean context. People’s relationship with archaeological sites in postcolonial societies must be contextualized socially, politically, and historically, to provide a spatial and historical context for studying archaeology and heritage in parallel with studying distant past technologies and lifeways by examining the ongoing landscape renegotiation. By exploring the interlocking material and nonmaterial significances of places, one may wonder what critical methodologies or approaches can be used to address the ongoing re-imagining of archaeological and heritage sites. To formulate and theorize more cogent critical questions about heritage in society, this presentation takes a unique approach by combining ethnographic and anthropological research associated with archaeology to explore the significance of archaeological sites as historical elements, as well as their continuous re-interpretation in society. By sharing concrete information about research in Haiti and its outcomes, the presentation facilitates a discussion between actual research strategies and emancipatory archaeological and heritage practices and discourses.

207 DIVIDED BY ?FACTS?: RE-THINKING THE CHALLENGING RELATIONSHIP BETWEEN ANCIENT WRITTEN SOURCES AND THE ARCHAEOLOGICAL RECORD THROUGH TELLING CASE STUDIES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Saccoccio, Fabio (University of Nottingham, Department of Classics and Archaeology) - Collis, John (University of Sheffield, Department of Archaeology) - Karl, Raimund (University of Vienna, Institute for Prehistory and Historic Archaeology) - Ruiz Zapatero, Gonzalo (Universidad Complutense de Madrid, Departamento de Prehistoria, Historia Antigua y Arqueología)

Session format: Regular session

As suggested by Kristiansen (1998: 2), “[d]uring the 1st millennium BC [in Europe] we are for the first time confronted with literary evidence about prehistoric people, so we cannot and should not escape... the question of the meaning and maintenance of cultural traditions, of ethnicity and of cultural change...”. The ancient written sources seem to provide us with a plethora of potentially crucial information which archaeologists should use to get deeper insights into the past. It is, however, true that the link between historical data and archaeological record is at times very loose, ambiguous to say the least. A telling case is the c. 390 BC Gallic sack of Rome, still not supported by archaeological evidence. And the list goes on and on: e.g. the Galatian campaigns in Greece and Turkey and the plunder of Delphi, or the Roman warfare impacting Celtic sites – Numantia, Alesia, Gergovia and the battle sites of Orange and Bibracte – just to mention a few cases.

As suggested by Barker (1995: 2), ancient written sources are not unproblematic, as they are “written by the literate minority, frequently with a bias towards their own concerns”; it is, however, crucial to rely on them. In 1995 Barker suggested approaching both historical and archaeological data as material culture advocating for a unified theoretical framework. After nearly 30 years, where are we today?

This session particularly welcomes contributions (papers and posters) dealing with the complex relationship between ancient written sources and the archaeological record with no particular chronological and geographical boundaries. The main aim of the session is to compare theories and methodologies to understand whether Barker’s ‘unified’ approach is still supported by scholarship or a different path is preferred and why.

ABSTRACTS

1 A REAPPRAISAL OF THE WRITTEN SOURCES OF PYTHEAS’ VOYAGE TO BRITAIN WHICH INCLUDED HIS STONEHENGE VISIT ABOUT 325 BC

Meaden, Terence (Oxford University)

This case study uses archaeological and anthropological knowledge to check details dating from the time of the visit to southern England of Pytheas of Massalia who sailed to Britain in the fourth-century BC, as recorded in his travelogue *Peri tou Okeanou*. All copies of his book are lost, but some 40 fragments survive in the writings of 17 classical historians. Hecataeus of Abdera had read Pytheas’ volume and written about it, including a description of what Pytheas had

called a Temple of Apollo with a 'magnificent naos'. Fortunately, before that book got lost too, Diodorus Siculus (of the first century BC) read Hecataeus' account. Greek-language reanalysis of Diodorus' summary justifies the argument that Stonehenge was the monument in question, and that it was still in use. Some commentators preferred to overlook Stonehenge possibilities or deny them because of treating the text as if it meant there were two fine temples in proximity which is unlikely. The problem arose from confusing the meanings of temenos and naos which in the context of this case-study respectively refer to the precinct-with-temple and the presence of an inner sanctuary or naos that holds and safeguards the cult images. In fact, Stonehenge does have a splendid carved-stone phallus that stood 2.5 m high in the central zone, hitherto unrecognised because it has been knocked over and is awkward to view, but has been recently identified and photographed by the author.

2 LUERNIOS, VERGINGETORIX AND THE ARVERNIAN EMPIRE

Collis, John (University of Sheffield)

The Auvergne and the Arverni are frequently mentioned in Roman and Greek sources, and much research and writing has been devoted especially to the events and personalities of the 2nd–1st centuries BC: the wealth of Luernios, the defeat of his son Bituitos in 123 BC, and the defeat of Caesar by Vercingetorix at the battle of Gergovia. The Auvergne was also the home of the major Latin writer of the 5th century AD, Sidonius Apollinaris, the 'last of the Ancient Celts', and the location of his villa at Avitacum has also been a continuing topic of discussion. This obsession with locating historic sites for a long time distorted excavation and research on the Iron Age in the Auvergne and elsewhere in central France (e.g. Alesia) at the expense of wider social and economic questions (e.g. the development of urbanisation in the Late Iron Age), and led to distorted interpretations of the archaeological record in attempts to proving and interpretation rather than balanced questioning of the alternatives, e.g. attempts to relocate the Ancient Gergovia on the Côtés de Clermont. These history based questions can dominate popular discussions e.g. television presentations, and still have an impact on the narratives presented to the wider public, and affect the income from tourism at specific sites and museums. The concept of an 'Arvernian empire' was also a major narrative in French national history based on the writings of Strabo in the interpretations of historians such as Camille Jullian, but can it be identified archaeologically? On the other hand, locating these sites does awaken the imagination and our understanding of how ancient events like battles played out. How do we get the balance right?

3 STRABO VS STRATIGRAPHY : COMPARING TEXTUAL AND ARCHAEOLOGICAL INFORMATION NEAR MARSEILLE AROUND THE 2ND CENTURY BCE

Bernard, Loup (Université de Strasbourg; CNRS)

The excellent state of art, with dozens of excavated so-called oppida in the region, the numerous hillforts constructions and destructions during the late 3rd and 2nd centuries BCE (LTC/D1) in southern France give us an unique possibility to compare historical and archaeological contexts and the way archaeologists approach those. Numerous authors describe Provence for this time (from Strabo to Caesar), and lots of artefacts from sealed destruction layers – Mediterranean ceramics as well as Celtic weapons or clothing accessories – help us to approach very fine dating for the sites, sometimes under 25 years resolution. This presentation will concentrate on some of the best understood and excavated hillforts that suffered destructions around 200 BCE (Le Verduron, Teste-Nègre, but also later Entremont, Mouriès or La Cloche) and try to compare with textual narratives of these events, and how they are implanted deep in archaeologists' minds, even before interpreting their sites. The ups and downs of Celtic, Greek and Roman influence in the region and the concentration that archaeologists read is as a matter of fact different from the topoi the authors relate on southern Celts.

4 THE CELTIC CENOMANI BETWEEN ANCIENT WRITTEN SOURCES AND ARCHAEOLOGY: NORTHERN ITALY IN THE SECOND HALF OF THE 1ST MILLENNIUM BC

Saccoccio, Fabio (University of Nottingham, Department of Classics and Archaeology)

The Cenomani are one of the Celtic tribes recalled in the ancient written sources for having intruded into northern Italy around the mid-5th century BC; according to Livy (History of Rome 5.35.1-2), the Cenomani eventually settled at Brixia/Brescia and Verona. Livy (History of Rome 5.35.1-2) also provides us with the name of the Cenomanic oecist, i.e. Etitovius, and recalls that the Cenomani received Bellovesus' blessing to cross 'the Alps by the same pass'.

There are at least four issues linked to Livy's statement. First, chronology; scholarship is still debating on the 'long' and 'short' chronology of the Celtic migrations into Italy albeit the latter school of thought has more followers. Second, Ogilvie suggests that the name of the Cenomanic oecist, Etitovius, is not Celtic. Third, some of the manuscripts reporting Livy's passage provide the ethnic name Germani instead of Cenomani; and this pattern is also found in Cicero (Pro Balbo 14.32). Fourth, some of the manuscripts reporting Livy's passage also recall that Bellovesus and his companions crossed the 'Taurinos' and 'Juliae' Alpine passes to intrude into Italy; oddly enough the first has to be

located in the western Alps, the latter in the eastern Alps. Over time, scholarship decided to correct 'Germanorum' into 'Cenomanorum' and 'Juliae' into 'Durae', in the western Alps.

This paper aims to discuss the above issues by incorporating the available archaeological record. The date of the Cenomanic intrusion into Italy, the Cenomanic homeland, and the area they inhabited in northern Italy will be thoroughly examined highlighting how the scholarship is, in some cases, characterised by circular arguments and by Snodgrass' 'positivist fallacy', i.e. the misleading habit of equating what is archaeologically observable with significant events recalled by the ancient written sources and therefore create a biased reconstruction of the past.

5 EXPLORING CELTIC METROLOGY THROUGH ARCHAEOLOGICAL AND WRITTEN SOURCES

Poigt, Thibaud (Ausonius - University Bordeaux Montaigne) - Parachaud, Kevin (University of Limoges)

When investigating metrological studies, the ideal objective is to integrate written and archaeological references to achieve what is called "global metrology" (Alberti et al. 2006). Unfortunately, Late Prehistory Europe offers a limited dataset on ancient measuring practices, both in terms of textual and archaeological evidence. This scarcity is particularly pronounced in relation to Celtic societies. While sporadic works have explored the topic since the 19th century, the evidence remains limited, leaving us without a comprehensive understanding of their skill in using numbers and measurements.

This paper seeks to present a comprehensive overview and a fresh perspective on the subject, specifically by comparing insights collected from written sources and archaeological findings.

The grounds of this study rests on the examination of various Iron Age scale weights discovered across Europe, along with subsequent findings that attest to the continuity of ancient local units post-Roman conquest. The exploration of modular architecture and the quest for a Gallic foot will be also exposed. This data will be analysed from various perspectives, including statistics and comparisons.

These findings will be compared with information derived from scattered written sources that directly or indirectly reference the Celts' use of measures. Examples include Caesar's mention of the Britons using weighted iron for payment, Isidore of Seville's commentary on Gauls employing a vigesimal weighing system, the use of "fake weights" by Brennus, and evidence supporting the use of the Gallic league, among others.

The central aim of this paper is to gather the sources and offer a comprehensive research overview on this topic to propose a renewed perspective on the Celts and their relationship with measurements. This paper is intended to lay the groundwork for future research in this domain.

6 THE MARCOMANNI AND QUADI ELITES IN THE NORTH FROM THE MIDDLE DANUBE DURING THE EARLY ROMAN PERIOD

Droberjar, Eduard (Institute of Archaeology of the Slovak Academy of Sciences) - Elschek, Kristian (Institute of Archaeology of the Slovak Academy of Sciences)

At the turn of the era during the reign of Emperor Augustus, the first Germanic empire – a tribal union led by the Marcomannian king Maroboduus was founded. According to the presence of rich urned cremation and inhumation graves (e.g. Dobřichov-Piřhora, Prague-Bubeneč) and numerous Roman imports, the centre of Maroboduus' empire is to be located in Bohemia. Gradually, the Germanic tribes of the Marcomanni and Quadi moved to the territory north of the central Danube region, i.e. to southern Moravia, Lower Austria and south-western Slovakia. Here new ruling dynasties were formed which were represented after the turn of the 1st/2nd centuries AD by rich princely inhumation graves. One intact richly equipped princely grave has been excavated at Zohor in western Slovakia in 2010. The princely inhumation graves and the graves from the cemetery were equipped with numerous Roman imports. Relations between the Romans and Germans gradually changed from a client relationship to various military conflicts. These then culminated in the 2nd half of the 2nd century AD in the Marcomannic wars during the reign of Emperor Marcus Aurelius. Among the most active fighters were the tribes of the Marcomanni and the Quadi. Their elites are best documented by the richest tomb of a Marcomanni king excavated in southern Moravia near Mušov. The authors of this report will deal with the formation and significance of the elites of these Germanic tribes during the 1st and 2nd centuries AD and compare archaeological sources with written sources of ancient authors Velleius Paterculus, Tacitus, Cassius Dio and others.

7 THE CASSITERIDES ISLANDS (1586 - PRESENT): ARCHAEOLOGY AS A MEANS TO CONFRONT A LONG-TERM HISTORIOGRAPHICAL DEBATE

Herrera Delgado, José Ramón (Departamento de Prehistoria y Arqueología (Universidad de Sevilla); Centro de Estudios Globais (Universidade Aberta, Lisbon))

The location of the Cassiterides, the Tin Islands mentioned by authors such as Herodotus (3.115) and later Strabo (3.2.9; 3.5.11), could be an outstanding example of the complexity of matching historical evidence, as scarce and

vague as it might be, to the archaeological record. In 1586, William Camden published his *Britannia*, where the author proposed, for the first time, that the Cassiterides should be identified with an existing archipelago: the Scilly Islands. The discussion remained within the field of ancient literature until the late 19th century, meaning that no archaeological explorations had been undertaken to gather evidence regarding the matter. Between 1899 and 1902, George Bonsor Saint-Martin travelled to the Scilly Isles in search of the Tin Islands, trying to contrast William Camden's hypothesis by means of archaeological criteria. This contribution analyses the underlying factors to the prevalence of Camden's proposal for over 3 centuries in order to put Bonsor's archaeological exploration in context. Furthermore, a summary of Bonsor's method and use of ancient literature is presented as a case study on the tools used to make this complex match in the early 20th century, chiefly diffusionism and philological archaeology. Finally, an updated, critical reinterpretation on the matter is given, considering up-to-date evidence, and ultimately reflecting on the limits of applying a certain approach to this historiographical discussion.

8 **KHIRBAT ES-SAR: A PIECE OF PUZZLE IN THE HELLENISTIC HISTORY OF TRANSJORDAN**

Mlynarczyk, Jolanta (University of Warsaw)

Khirbat es-Sar (Khirbat Sarah) is situated on the western outskirts of modern Amman, corresponding to the western border of the ancient land of Ammonites. The site is noteworthy for an "Ammonite tower" combined with a Roman-period sanctuary and its strategic location on the ancient road linking Rabbat Ammon with Jordan Valley via Wadi es-Sir and Wadi el-Kufrein. The fieldwork conducted by the University of Warsaw since 2018 has demonstrated a lengthy lifetime of the site, ranging from apparently the late Iron Age to a thriving Medieval settlement. Surprisingly, there is very little data pertaining to the Hellenistic phase of the site, a turbulent period when Transjordan was changing hands from the Ptolemies to Seleucids and Hasmoneans before the advent of Romans in 63 BC. Among the available hints prominent are Hellenistic ceramics. They include examples of fine tableware comparable to those found in the citadel of Amman; this strongly suggests that Khirbat Sarah of that period was something more than just an outpost or farmstead. However, despite its presumed importance, the site remains anonymous. S. Merrill (1877) and C.R. Conder (1881) suggested its identification with biblical Jazer, a town subdued by Judah Maccabee at ca. 163 BC. Probably the same locality appears as the Azōr (lazer) village in Eusebius' *Onomastikon* in the 4th century AD. An exciting option is to consider the site's identity as "Birta of the Ammanitis", mentioned in a papyrus letter dated 259 BC.

This paper aims to discuss the ancient identity and role of Khirbat Sarah based on the results of the fieldwork combined with scanty written sources, focusing in particular on an ill-known Hellenistic phase of the site.

9 **UNVEILING THE HERITAGE OF KURTUVĖNAI MANOR IN LITHUANIA: INSIGHTS FROM ARCHAEOLOGICAL DISCOVERIES AND MANOR INVENTORIES**

Jonauskienė, Viktorija (Klaipėda University)

Kurtuvėnai Manor first appeared in historical records in 1498, when its owner, Mikalojus Jaugėlavičius, donated a village with six inhabitants to the Kurtuvėnai church and parish. By the mid-16th century, Stanislaw Skaszewski had acquired the estate, which by 1592 comprised over 20 wooden buildings. Throughout the 18th century, three generations of the Nagursky family managed the manor, overseeing its development. Under the stewardship of the final proprietors, the manor thrived, witnessing the construction of a complex of wooden Baroque-style buildings within its grounds. During the 19th century, Kurtuvėnai Manor was acquired by the Pliateriai family, who modernized it and established the largest fish farm in Lithuania. They also embarked on a project to replace the wooden farm structures with brick buildings. The first archaeological investigations of Kurtuvėnai Manor were initiated by Kurtuvėnai Regional Park in 1995. From 1995 to 2013, B. Salatkienė served as the primary archaeologist responsible for researching the site, with archaeological research continuing under V. Ostašėnkoviėnė in 2014.

In terms of zooarchaeological findings, a total of 256 domestic bone fragments (71.51 %) and 30 fragments of wild fauna (8.38 %) were gathered and analyzed from the archaeological layers of the manor, dating from the 16th to the 18th centuries. Due to the fragmentary condition of the bones, 16.20 % could not be identified, while 3.91 % of the analyzed zooarchaeological material pertained to birds. Despite the limited sample size, certain patterns in the manor's animal husbandry practices emerge, with domestic fauna predominating. Notably, among these findings was a complete bovine first phalanx with an additional joint surface, suggesting its use in draught work. Such instances align with records from the 1664 and 1674 inventories of Kurtuvėnai Manor, which stipulate that peasants were obliged to provide labor for the manor using their own horses or oxen.

10 **LOST IN TRANSLATION. CHINESE ACCOUNTS OF THE FOREIGNERS IN AN ARCHAEOLOGICAL CONTEXT**

Zuchowska, Marta (Faculty of Archaeology, University of Warsaw)

The popularity of the concept of the so-called Silk Road, revived by recent Chinese transboundary economic initiatives, causes ongoing interest in ancient and medieval Chinese sources, devoted to descriptions of distant lands and their inhabitants. While the earliest translations of the "Accounts of the West", included in most of the official histories, focused on historical and geographic explanations of the texts, more recent works refer often also to archaeological data, seeking confirmation for interpretative theories. Very rare are however reflections on the reasons for the factual inconsistencies and incoherencies of the original texts.

After over a century of scholarly debate on the meaning and explanation of these sources, it seems that a more theoretical approach is needed, contextualizing not only the texts but also the process of their translation and interpretation.

Based on a few examples of the Chinese accounts of foreigners, dated to the 1st millennium AD, this paper aims to discuss the potential of a complex analysis of Chinese written sources (including historical, geographic and linguistic approaches) and archaeological sources pointing to the risks and profits of such an approach.

209 **NOT ANOTHER SESSION ON ETHNICITY! REPLACING ETHNIC WITH OTHER TYPES OF GROUP IDENTITIES**

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Giamakis, Christos (York Museums Trust) - Franković, Filip (Archaeological Museum in Zagreb)

Session format: Regular session

Group identities are central to the organisation of human societies, both past and present. Numerous recent studies of group identities show that people can be simultaneously part of different social groups (e.g. ethnic, class, gender, age etc.), as well as that the expression of diverse social identities is context related. Yet, a large part of current archaeological research still considers ethnic identity as the primary basis for organisational patterns attested in the archaeological record. Such an approach has been a fundamental part of the discipline since its very beginnings until today, constituting the basis of both cultural-historical and colonial discourses.

Nevertheless, various ethnicity-focused studies conducted in the last 60 years have clearly shown that cultural differences, including those in material culture and practices, have to be made relevant in social interactions to create an expression of ethnic identity. Unfortunately, this level of intentionality is commonly imperceptible in the archaeological record, especially among oral societies. Interestingly enough, the archaeological record can instead provide us with lucid insights into other types of group identities. Therefore, the aim of this session is to provide a more nuanced approach to the emergence of different group identities by exploring alternatives to ethnicity-based approaches. Simultaneously, it questions the very importance of ethnic identities for the self-definition of past societies.

We would like to welcome studies focusing on, but not limited to:

1. Examples where expressions of different group identities (e.g. class, gender, age) were previously wrongly interpreted as an expression of ethnic identity
2. Use of same types of objects and practices in the expression of different group identities within the same socio-cultural context
3. Relationship between ethnic identities and social class
4. Reconciling social class and funerary data
5. Interactions between social class and gender.

ABSTRACTS

1 **DYING TO MAKE A DIFFERENCE. QUESTIONING FUNERARY PRACTICES AS MARKERS OF ETHNICITY**

Relaki, Maria (The Open University, UK)

Funerary practices have a long history of being treated as strong expressions of cultural identities. When specific funerary practices are thought to originate in particular geographical contexts they have also been treated as markers of ethnic identities, with the implication that, when these features occur outside of their presumed zone of geographical origin, they may be linked to population movements and migration events. In recent years, the advent of a-DNA studies has provided renewed impetus to 'pots equal people' interpretations of the archaeological record, particularly

in prehistoric periods where discursive articulations of ethnic identities are lacking. Using the mortuary landscape of Bronze Age Crete as a case study, this paper aims to critically assess the insights that funerary data may offer into the construction and performance of ethnic identities. The study will specifically examine how a series of diverse social identities were actively manipulated through mortuary behaviour to subvert narrowly perceived ethnic origins and instead create necro-topologies that accounted both for diversity and integration.

2 NOT ANOTHER PAPER ON MYCENAEANS! REPLACING ETHNIC WITH OTHER GROUP IDENTITIES IN THE 2ND MILLENNIUM BCE EAST AEGEAN-WEST ANATOLIAN REGION

Frankovic, Filip (Archaeological Museum in Zagreb)

Group identities are central to the organization of human societies. However, they are also crucial in creating scholarly interpretative narratives about societies from the past. In the process of creating such narratives, burial practices often play a central role. Unfortunately, the creation of interpretative narratives about burial practices in past societies is not devoid of the influence of cultural-historical discourse. More precisely, narratives about burial practices created within the framework of cultural-historical discourse commonly consider ethnic identity as the primary basis for the formation of patterns attested in the funerary record. The East Aegean–West Anatolian region in the 2nd millennium BCE is a good example of such practice.

The appearance of Mycenaean-type funerary forms in the region during the 14th and 13th centuries BCE was commonly interpreted as a sign of colonization and “foreign” settlers, impacting the ethnic composition of “local” communities. Aside from the obvious issue of equating people with material culture, a detailed re-examination of the available data sets suggests that the strong focus of previous research on ethnicity completely overlooked all other possible types of group identities that might have been expressed through similarities (and differences) in funerary culture. On the basis of 2nd millennium BCE burial practices in the East Aegean–West Anatolian region, this paper will: (a) demonstrate that expressions of class and age were previously mistaken for expressions of ethnic identities; (b) show that the same types of objects and practices were commonly used to express more than one type of group identity; (c) present how “foreign” forms of material culture were actively incorporated by “local” communities into already existing expressions of group identities.

3 BREAKING OUT OF THE ‘EGYPTIAN’ VS ‘NUBIAN’ DICHOTOMY: THE CASE OF A COMMUNITY IN NEW KINGDOM SAQQARA

Ayers, Natasha (Austrian Archaeological Institute / Austrian Academy of Sciences)

While excavating large Early Dynastic mastaba tombs at Saqqara in the 1950’s and 1960’s, Walter B. Emery unexpectedly uncovered intrusive burials of the early New Kingdom (ca. 1550–1450 BCE) displaying a complex combination of burial practices and material culture with connections to Egypt, Nubia, the Aegean, and the Levant. This group of burials presents the opportunity to investigate strong evidence for a ‘community of practice’ at Saqqara that, so far, seems to be unique in Egypt and unexplainable with the rigid ‘Egyptian’ and ‘Nubian’ ethnic labels. A wealth of diversity in material culture and social practice is often subsumed into this binary categorization in Egyptology, and in the process the visibility of complex communities and material culture with different chaînes opératoires and performance characteristics are erased. Only one of the Saqqara burials has been published in part by other scholars, with the existence of the other burials remaining mostly unknown until now. After a fresh appraisal of Emery’s excavation records and re-recording of objects from the burials now held in UK museums through the implementation of both well-established and new technologies (e.g. Reflectance Transformation Imaging), as well as a tailored combination of theoretical approaches (i.e. communities of practice, behavioral chain, and assemblage theory), these burials now can be viewed outside of the limited culture-historical lens. The larger aim of this research is to shed more light on the diverse identities and concepts of community that co-existed in ancient Egypt.

4 THE DEAD DESERVE A PROPER BURIAL: THE QUEST FOR THE ETHNICITY OF BRONZE AND IRON AGE BURIAL MOUNDS IN ALBANIA

Trinder, Ermelinda (Staffordshire University)

Between 1945 and 1991, Albania experienced a totalitarian communist regime. The systematic research of Bronze and Iron Age burial mounds in the country commenced in 1948 and was a byproduct of the communist ideology. One of the central tenets of the communist state was the glorious ancestry and ethnogenesis of Illyrians. The interpretation and narrative of burial mound findings were frequently exploited to illustrate the uniformity of ethnic Illyrians and their uninterrupted continuity to modern-day Albanians.

Additionally, burial rites were considered the final proof for illustrating, analysing and interpreting the ethnicity of the deceased in burial mounds. The burial rite of inhumation was interpreted as a direct reflection of the ethnicity of

Illyrians. Cremation, on the other hand, was associated with the presence of foreign ethnic groups. The ethnicity of Invisible graves (cenotaphs) was seldom analysed and considered of little importance.

Three decades after the fall of communism in 1991, this one-dimensional approach to the understanding of burial rites continues to be interpreted within the context of and primarily through the lenses of ethnicity.

In this paper, I present an alternative interpretation of the importance of burial rites. Through the analysis of 123 burial mounds excavated during the communist period, I explore how the choice of inhumation, cremation and invisible burials reflected the community’s perceptions of the treatment of the body and beliefs in the afterlife.

5 SOCIAL IDENTITIES IN ANCIENT MACEDONIA: A RE-EXAMINATION

Giamakis, Christos (York Museums Trust)

Ancient Macedonia is an area long associated with themes of identity and politics. Past narratives have been largely influenced by the current socio-political circumstances with archaeology more often than not functioning as a vehicle for different political agendas.

Archaeological discourse has primarily approached the material through a cultural-historical lens in its quest for similarities in the archaeological record which would in turn prove the existence of certain ethnic groups, acting as ancestors of the contemporary nation states. The aim of this paper is to move beyond such narratives and adopt a more nuanced approach strongly rooted in social theory. Material from the main source of information, that is cemeteries, in Ancient Macedonia, will be examined taking into account both the similarities but also the differences between sites across the region. The topography of the cemeteries, grave goods, tomb types and burial rites will all be studied concurrently as part of the same ontology as evident in the archaeological record. It will be argued that multifaceted groups identities, not necessarily tied to an innate list of ethnic criteria but to multiple cycles of stability and change, uniformity and variation, and conformity and individuality gradually emerged in early Macedonia. It is because of these social dynamics

that both shaped and were shaped by the lived social reality of the people across the region that what was ultimately created was a spectrum along which multiple identities coexisted and interacted with one another.

6 NEW PERSPECTIVES ON LATE ANTIQUE BURIALS: THE CASE OF CEMETERY LAJH IN KRANJ (SLOVENIA)

Pavletic, Kaja (Filozofska fakulteta, Univerza v Ljubljani)

The Late Antique cemetery Lajh in Kranj (Slovenia) was initially discovered and excavated in the late 19th and early 20th century. With more than 600 burials discovered so far, dating roughly to the 6th century AD, it is the largest Late Antique burial site in the region.

Despite its significance, the published literature on the cemetery, particularly the seminal work from 1980, has been plagued by inaccuracies and oversights. A comprehensive revision of all the excavation data from the Lajh cemetery was required to reevaluate the reliability of grave assemblages. This, in combination with new data from archaeological excavations from 2004-2010, has enabled a data-driven study of the cemetery as a whole and has led to new insights into the social structure of the Late Antique population who lived in the dynamic region between Italy, Pannonia and the Alps.

While existing scholarship predominantly inferred ethnic affiliations from the rich and geographically diverse grave goods of people buried at Lajh, this study focuses on other highly interconnected aspects of identity such as status, gender and age. This study will attempt to contribute to a more nuanced understanding of Late Antique society through a multidisciplinary approach encompassing examination of grave goods, osteological analysis and contextual interpretation. The presentation will mainly concentrate on women buried at Lajh, whose graves have previously been interpreted mainly through the lens of brooches and the assumed ethnic backgrounds they might have conveyed.

7 HOW DEEP THE ARCHAEOLOGICAL MATERIAL ALLOWS US TO DIG INTO IDENTITY OF INHABITANTS OF EARLY MEDIEVAL SOUTHERN PANNONIA AND DALMATIA?

Skrgulja, Jana (Department of Archaeology, Faculty of Humanities and Social Sciences University of Zagreb) - Niksic, Petra (Department of Archaeology, Faculty of Humanities and Social Sciences University of Zagreb)

In the works dealing with the identity of the Great Migration Period in the area of Southern Pannonia and Dalmatia, regarding the period from the 5th to the 7th century, the authors who published rare but valuable archaeological finds were mostly interested in determining the ethnic identity of the inhabitants of the early medieval Southern Pannonia and Dalmatia. Although we should consider the time and circumstances in which most authors published such findings, as well as the fact that most of such archaeological finds were found out of context, which adds to its problematic research, we want to explore other options that these finds offers. We will examine how justified the ethnic

determinations of material culture are based on accidental finds, whether the finds that were published together were really found together, and deal with other identities about which these objects may say more. Those finds could be the testimony of ethnicity in the unstable times of the beginnings of the creation of modern Europe but they could also be proof of other forms of identities, such as social identity, gender identity and religious identity.

8 FUNERARY VESSELS AND THEIR SIGNIFICANCE IN THE LATE ROW-GRAVE CEMETERIES OF TRANSYLVANIA

Beata, Barbocz (UBB)

The row grave cemeteries are a well-known archaeological phenomenon present from Gaul to the Eastern Carpathian Basin. The funeral inventory can be related to sex, age, and social status. Despite this fact, funeral vessels are present in both male and female graves, child graves, and the graves of the elderly. Considering aspects of the pottery manufacturing process, such as shaping the vessel from clay, burning it in an oxidative or a reductive environment, and employing various decoration techniques, different types can be observed. The funeral vessels can be cross-dated using objects from the funeral inventory and their analogies. The Band-Noslac group is the latest group of row-grave cemeteries related to the Gepids. Using case studies from different cemeteries from the aforementioned group can be of great use in the future to improve our understanding of the presence of different vessel types in funeral contexts, and their positioning in the graves, and they could offer more information about funeral rites.

9 THE HARAPPAN VENEER AND GROUP IDENTITY IN THE INDUS VALLEY REGION, C. 2600-1900 BCE, SOUTH ASIA

Miller, Heidi (Middlesex Community College)

The material culture of the Bronze Age Indus Valley Tradition, also known as the Harappan Culture, was described as homogeneous by many of the early excavators, and assumed to represent a single ethnic identity. Yet, as Barth (1970), Jones (1997) and others have demonstrated, ethnicity is emergent and contingent, affected by myriad socio-economic factors. Individuals within any culture have multiple ethnicities, and thus from an archaeological context, if we rely solely on material patterning, is ethnic identity the best interpretation of material homogeneity?

Today, most scholars of the Indus Valley Civilization, ascribe to the idea that a particular assemblage of artifacts, along with a number of shared technologies and building practices, is a veneer overlying many local identities within the greater Indus Valley region. Thus, it appears that many groups may have co-existed, not just a single ethnic group. This resonates with the work of Damm (2012) who describes how 'entangled identities' may exist in many cultures. She notes that identities are built from "numerous networks...[of] economic, social and cultural practices...these will provide a multitude of partly latent, partly active collective identities at many different levels and scales (2012:26). In turn, Damm's research resonates with the work of Anthony Cohen on the concept of community in human societies (1985). He notes that people use symbols to construct community and that these symbols may be interpreted quite differently by individuals, but the commonly shared form of the symbol "aggregates the various meanings into a singular community", and thus "...community' provides not so much a model, but more an expedient medium for the expression of very diverse interests and aspirations (1985: 108). Thus instead of an ethnic identity, the Harappan veneer could be such a tool.

10 BEYOND THE (ETHNICALLY) GREEK IN POMPEIAN SECOND-STYLE WALL-PAINTING

Schreuder, Nicky (Leiden University)

Republican Rome and its social-cultural landscape changed drastically following expansionist conquests and the subsequent influx of foreign objects – primarily spoils captured and taken back after successful campaigns. This included all sorts of things ranging from artworks or precious metals, to animals and human beings. Everything 'Greek', as scholars would recognize it, increased in presence, leading to what has been termed a 'cultural revolution' that was to have a lasting impact. Concurrently, the repertoire of frescoes that could decorate the domestic spaces of houses and villas changed. Famous for their depictions of perspectival illusionism and Hellenistic architectural features, the 1st century BCE paintings of the so-called Second-Style began to include a wide array of objects and styles that circulated in the Hellenistic oikouménē and were imported into Rome.

Whereas previous scholarship has generally interpreted these paintings as representations of social status and a desire for a private Greek (cultural-ethnic!) lifestyle, I would like to approach the frescoes from the angle of the impact of objects and style and their active role in the formation of changing (social-cultural) identities and knowledge during this era of increasing connectivity. To regard them as expressions of the desire for doing or being 'Greek' might, then, be reductive. Rather, by highlighting depicted (imported) objects in the paintings, I attempt to explore how these murals might have perceptually established a new social imaginary or self-consciousness beyond the ethnically 'Greek' by instead cognitively orienting the viewer into the longstanding (cultural) traditions of the Hellenistic world Rome became part of.

By putting aside the ethnic bias when interpreting objects, we might, then, explore new emerging group identities in Rome during the pivotal moment of global dynamics in the (Late) Republic.

11 "AS THEIR ANCESTORS DID": MEMORY, IDENTITY, AND FAMILY TRADITION IN THE CITIES OF CARIA

Tsolakis, Georgios (The University of Chicago)

This paper delves into the political and social significance of family traditions for the understanding of communal identity and memory in the cities of Hellenistic and Imperial Caria. While there is an abundance of literature on the historical and mythological ancestors of political communities and interstate entities, the role of family ancestors and familial tradition in constructing and transmitting collective cultural memory and identity remains largely understudied. Drawing primarily upon epigraphic sources such as honorific inscriptions and epitaphs, this study seeks to elucidate the role of familial traditions in affirming the social standing of families within their respective communities through the commemoration of the deeds of their ancestors. It further investigates how familial traditions served as a mechanism not only for asserting familial status but also for establishing political values, further enhancing social norms, and creating competition among the wealthy elites for dominion over the public sphere. Finally, this paper aims to provide fresh insights into the dynamics between families and the community and the construction of cultural memory conferred by ancestry in the ancient Mediterranean world, thus enriching our understanding of the institution of the polis in the Hellenistic and Imperial world.

210 BREAKING TRADITIONS: SUDDEN CHANGE AND ABANDONMENT IN ARCHAEOLOGICAL LANDSCAPES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Ljung, Cecilia (Uppsala University) - Klevnäs, Alison (Uppsala University) - Hattori, Marcia (Institute of Heritage Sciences (CSIC)) - Sallum, Marianne (Laboratório Interdisciplinar de Pesquisas em Evolução, Cultura e Meio Ambiente LEVOC (MAE-Universidade de São Paulo, Brasil)) - Lau-Ozawa, Koji (UCLA)

Session format: Session with keynote presentation and discussion

Archaeology is often a discipline of the long durée, tracing resistant frameworks of thought and action over lengthy periods. But there are points in the material record where we see rapid disruption and remodelling, or even abandonment, of ways of life. One of the most archaeologically visible forms of change is in the use of space. The distribution and spatial organisation of mortuary and dwelling sites, land-use, cultic devotion, artistic expression — all and any human traditions may be subject to abandonment or fundamental reshaping if their maintenance is no longer warranted or if active distancing from the past becomes desirable.

This session will explore sudden change or abandonment in the use of space at levels from landscape down to archaeological feature. Can we identify the trajectories, agencies and timescales of cataclysmic change? Under what circumstances do communities radically relocate their places for the living and the dead? Do spatial changes necessarily involve new practices and new ontologies? What are the implications of spatial change for community life? What becomes of those who cannot or will not adapt?

One approach to radical change in the archaeological record has been to show that stops are not as sudden as they may appear, with aspects of older practices continuing or adapted. Instead, in this session we ask what happens if archaeology recognises moments of total change? Can we study multiple forms of abandonment that traverse our societies? How do we understand time and material being if we look at the from the idea of their abandonment? And not least how do we deal with abandonment in situations of displacement by colonialism and wars?

We welcome papers which deal with aspects of the ending of spatial traditions in any chronological or geographical perspective, including both material memories and their loss.

ABSTRACTS

1 BOTTLENECKS OF CHANGE IN THE MEDIEVAL LANDSCAPE

Brookes, Stuart (UCL Institute of Archaeology)

Archaeologists have long wrestled with the confrontation between short-term events (typical of 'historical' descriptions), and long-term change ('processes'), with many advocating for the need to consider multi-scalar changes taking place at all times. Extending this argument, some have suggested we should recognize and describe fluctuating changes in the relationships between the human and non-human worlds. Such approaches, they argue, are a way to engage more fully with the complexity and messiness of a past that is constantly in flux. These ideas open up interesting debates about 'moments' of rapid upheaval, such as those produced by, for example, conflict, colonialism, mo-

dermy and environmental catastrophe. How can we describe such processes in terms that avoid monocausal, simple explanation? Can we provide interpretations of periods of rapid and emphatic transformation in ways that remain detailed, complex and human-centred? In the second half of this paper I will attempt to eschew determinism, describing instead how a series of heterogeneous processes converged at a 'bottleneck' to produce significant changes in the landscape of early medieval England.

2 THE REPETITION OF FORMS RETHINKING ARCHAEOLOGICAL ABANDONMENT AND SOCIAL CHANGE FROM PHENOMENOLOGY AND COGNITIVE SCIENCES

Millan-Pascual, Rafael (CSIC (Spanish National Research Council), Institute of Heritage Sciences.)

In this presentation I rethink the relationship between abandonment, in any of its archaeological forms and expressions, with the idea of social change. Generally, this association is more or less straightforward: the change of material forms is enough to prove the change of social and cultural forms. From this perspective, the archaeological record offers a wide range of "cultural crises" that have entailed the definitive loss of many and varied ways of life. However, the development of research in recent decades has complicated this archaeological premise. Broadly speaking, we could say that the timing of material change does not always coincide with social and cultural change. One example of this temporal disparity is the identification of ancient styles and forms in supposedly more recent materials. The archaeological record offers numerous examples of this repetition of forms, but, in our view, we need a theoretical elaboration of the social and anthropological dimension of this endurance of the past. In order to advance a possible answer, I will re-examine some archaeological examples based on the most recent contributions of phenomenology and cognitive sciences. As we shall see, this implies assuming a different idea of abandonment, social change, and time.

3 CULTURAL CHANGE AND CONTINUANCE - THE CASE OF THE PRZEWORSK AND WIELBARK CULTURES IN THE LUBLIN REGION, EASTERN POLAND

Cyran, Marta (Doctoral School of Humanities and Art, Maria Curie-Skłodowska University, Lublin, Poland; The National Museum in Lublin)

One of the most spectacular examples of sudden change and abandonment in archaeological landscapes in the Roman and early Migration periods in the Central European Barbaricum took place in the Polish lands at the end of the 2nd and the beginning of the 3rd century AD, when the Goths (identified as the Wielbark culture) arrived in the area settled by the Vandals (connected with the Przeworsk culture). The emergence of communities representing these cultures in particular areas, their development, mutual contacts and influences are, among the most intriguing cultural phenomena.

Especially the area of the Lublin region, due to its location between two rivers: Vistula and Bug – important for migration processes and trade in this part of Europe, is significant for the reconstruction of settlement organisation and the genesis of many cultural changes in the period between the Marcomannic Wars and the invasion of the Huns.

The presentation involves a characterization of the distribution and spatial organisation of burial and dwelling sites and the process of replacing the Przeworsk settlement with the Wielbark settlement, including the verification of the previously (in old research) demonstrated lack of chronological continuity in the use of bicultural sites. Reanalysis of the materials from old research and new finds, as well as the implementation of interdisciplinary studies will make it possible to determine whether there was a real cultural hiatus or an apparent one resulting from the outdated state of research and/or misinterpretation of source materials. The thesis of the paper is that cultural changes are not as sudden as they may appear and an attempt will be made to answer the question if the "exchange of population" from Przeworsk to Wielbark on the example of the Lublin region, was based mostly on armed conflicts, or there is some evidence of peaceful coexistence.

4 TERRITORIAL SOVEREIGNTY AND PERSISTENCE OF TRADITIONAL COMMUNITIES OF SÃO PAULO, BRAZIL: MATERIALITIES, SELF-DETERMINATION, AND LANGUAGE

Sallum, Marianne (University of São Paulo; UNIARQ – Centre for Archaeology. School of Arts and Humanities. University of Lisbon.) - Noelli, Francisco (UNIARQ – Centre for Archaeology. School of Arts and Humanities. University of Lisbon) - Casimiro, Tânia (Universidade Nova de Lisboa)

This paper shows the territoriality of traditional communities in São Paulo that have been erased by academic interest. This research collected information that contradicts the idea of demographic collapse, cultural loss, and European domination that transformed the Indigenous populations into a homogeneous mass and a blank slate for the Portuguese. It is the case of an extensive region occupied for 2,000 years by speakers of the Tupiniquim language. This population established alliances with some Portuguese in the 16th century, forming the largest colonial demographic in the state of São Paulo. This alliance proved to be more powerful than the attempts of other Portuguese to colonize the Tupiniquim territories and their occupants in the Tupiniquim-Portuguese kinship relationship. In this context, the

Portuguese coarse ware was appropriated and transformed in the sixteenth century by Tupiniquim women from the São Vicente area for use in colonial settlements, which their descendants and newcomers reproduced until the present day in the southeast region of São Paulo.

5 LIFE FINDS A WAY. SETTLEMENTS' ABANDONMENT AND REUTILIZATION IN THE HORN OF AFRICA

Llorente García, Mario (Incipit - Institute of Heritage Sciences)

In this paper, the abandonment dynamics of the settlements of a region of the Horn of Africa will be explored. During the period between the 13th and the 16th centuries, this region, covering both sites of the western borderline between Somaliland and Ethiopia, witnessed the emergence of a series of settlements that transformed the landscape. From nomadism to sedentarism, from tents to houses, from an exclusive herding economy to a mixed one incorporating agriculture. However, driven by the conflicting atmosphere that afflicted the region since the mid-16th century, all these settlements were abandoned. Nonetheless, no evidence of destruction has been recorded, though some fortified elements can be found throughout the territory, neither these settlements show signs of decline. Thereupon, the abandonment of the settlements from this region of the Horn of Africa must be analyzed from a different perspective, all the more so everything points to a reutilisation of some of these abandoned spaces by the nomads that inhabited the region when the sedentarism passed away. With this aim, the StateHorn project has been undertaking surveys and excavations at both sides of the borderline, in sites such as Qararu and Aiyanle in Ethiopia, as well as Abasa and Dameraqad in Somaliland. These new data can shed light on the dynamics that drove this phenomenon.

6 RADICAL CHANGE? SOCIAL ABANDONMENT AND THE ARCHAEOLOGICAL RECORD

Hattori, Márcia (Instituto de Ciencias del Patrimonio (INCIPIT-CSIC))

The study of abandonment is particularly important for understanding cultural change and continuity over time and is commonly understood to shed light on how and why certain communities thrived, declined, or relocated. Critical perspectives in postcolonial theory have challenged the focus on abandonment, suggesting that persistence and presence should be considered first (e.g. Laluk and Aguilar 2023). Abandonment can materialise not only in the practice of suddenly altering the archaeological record, but also in the deliberate process of making it disappear: structures from other groups and cultures, objects and even bodies. In contemporary contexts, the concept can manifest itself in exaggeration and three forms of waste – production waste, nature-as-waste, and the human-as-waste as expressions of the late capitalism. This paper explores twentieth-century abandonment, the last layer of a stratigraphy that shows sudden changes in the landscape, but some continuities over time, through two specific contexts: landfills and collective ossuaries. Using ethnography, archival research and archaeological data, this paper aims to show how social abandonment can materialise in a radical change of the landscape or in the normalisation of some practices.

7 'EMPTY' PLACES FILLED WITH MEMORIES: THE POLITICS OF ABANDONMENT AND JAPANESE AMERICAN INCARCERATION

Lau-Ozawa, Koji (UCLA)

The ideas of abandonment and empty landscapes permeate sites of WWII incarceration of Japanese Americans in the present day. Often far away from population centers, these sites are frequently considered open areas devoid of structures with only the ruins and foundations of the once populous incarceration camps. These conditions were integral to the design of incarceration camps, large temporary structures that could sustain populations of 10-20 thousand people for two to four years and then be promptly disassembled. However, the landscapes that the camps were constructed on were never empty to begin with. Indigenous tribes in particular saw land expropriated for the creation of camps, and the enduring legacies of tribal history and Japanese American incarceration has permanently marked these sites. Further, numerous heritage organizations and communities lay claim to the use and treatment of the sites, mobilizing frameworks of place-based memory. Consequently, in the present day, as land managers and multiple publics contest how to use these sites and what claims of the past have legitimacy in the present, the concepts of abandonment and emptiness create powerful avenues for mobilizing new projects and interactions with the landscape. This paper looks to multiple points of friction around sites of Japanese American incarceration, questioning what it means for a place to be abandoned and by whom?

217 MATERIALISING THE INVISIBLE. THE ANALYSIS OF RURAL SOCIETIES IN THE TRANSITION TO THE EARLY MIDDLE AGES IN THE IBERIAN PENINSULA

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Rodríguez-González, Celtia (Universidad de Santiago de Compostela) - Rolo, Monica (UNIRARQ - Centro de Arqueologia da Universidade de Lisboa) - Salinero-Sánchez, Irene (Universidad Rey Juan Carlos) - Tobalina-Pulido, Leticia (Instituto de Ciencias del Patrimonio, CSIC) - Martins, Ana (CHAIA - Universidade de Évora; Universidade de Granada; FCT – Fundação para a Ciência e Tecnologia (2021.06047.BD))

Session format: Regular session

The study of the period between Roman and Medieval times (4-9th centuries) has become increasingly relevant in recent years. In fact, in many parts of the Iberian Peninsula, there is a growing renewal of lines of research related to the period. This is mainly due to the involvement of commercial archaeology and the development of research programmes linked to the period comprising the transition to the medieval world. Nevertheless, the scarcity of known data about this territory during the post-classical period still results in a rather lacunar knowledge. The identification and recognition of Late Antique archaeological evidence is still complex, as is the dating of archaeological contexts and material culture from this period. In addition, the literary sources on the fields of Hispania, and particularly of ancient Lusitania, are insufficient when it comes to outlining a diachronic reading of the Late Antique/ Early Medieval landscape. This gap still exists today in some areas. The failure to associate habitation, cult and funerary sites has created a knowledge gap in terms of better understanding these population groups and the reasons for their establishment and/or continuity in each region. Focusing on the Iberian Peninsula, this session aims to open a debate on several questions such as the following: What difficulties do we have in the characterisation of the sites of this period, both chronologically and functionally? How can the lack of theoretical analysis affect the characterisation of the archaeological sites of this period? What data can we find from the settlements and necropolises of this period about the daily life of the period? How can we deal with the archaeological gaps we face in the study of this period?

ABSTRACTS

1 REDEFINING CAVE FREQUENCIES: THE PRESENCE OF ROMAN ARCHAEOLOGICAL REMAINS IN THE CAVES OF THE BASQUE COUNTRY (SPAIN)

Tobalina-Pulido, Leticia (Incipit - Institute of Heritage Sciences)

The study of human occupations in caves has been a prominent topic in the Basque Country since the early days of archaeology. While specialized literature has predominantly focused on the prehistoric period, relegating later periods such as the Roman or Late Antique to a secondary position, the presence of material remains from historical epochs in these caves is evident, yet it has not received adequate attention. Until the 1980s, the lack of data and scarcity of specialized research demonstrated the lack of interest and inherent difficulties in their study. However, progress has been made since then, with an increase in research on this topic. Although still considered quantitatively marginal, these new works have allowed for a reconsideration of cave occupation during the Roman period both in France and Spain. These contributions highlight the need to reassess the status of these sites, which appear to be more common than generally believed and defy reflections on the organization of mountainous territories. Caves do not seem to serve as places of permanent habitation but rather as spaces with a variety of functions, from funeral rituals to temporary shelters or areas for livestock activities. Nevertheless, further work is needed to determine the permanence of populations in these settlements during the Roman and Late Antique periods. Therefore, the objective of this work is to provide a comprehensive review of cave frequentation during the Roman and Late Antique periods in the Basque Country, through the revision of chronologies, the study of materials and the creation of a GIS to virtually highlight these sites. This approach will better characterize these poorly understood settlements for the Roman and Late Antique periods.

2 SPATIAL ANALYSIS OF MEDIEVAL FORTIFICATIONS IN THE RIAZA, DURATÓN, AND DUERO INTERFLUVE THROUGH GIS TOOLS

Polo-Romero, Alberto (Rey Juan Carlos University)

The area of the Rianza, Duratón and Duero interfluvium played a crucial role in the understanding of the conquest and subsequent Castilian defense of the southern part of the northern plateau during the medieval period. Despite the vital importance of the fortifications in this area for understanding its defensive network in the Middle Ages, only partial analyses have been carried out so far. This talk, based on data extracted from historical documentation and the archaeological record, addresses the problem of fortified spaces by applying a spatial analysis focused on first order factors related to the system of fortifications through GIS software. The main objective is to unravel the patterns of

visibility, distribution and intervisibility networks of the fortifications in this territory, thus providing a more complete view of their strategic function from a relational perspective. Therefore, the conference seeks to provide a more solid framework for understanding the strategic interconnectedness of the enclaves and their role in shaping the medieval defensive landscape in the region.

3 ANALYSIS OF EVERYDAY LIFE IN RURAL SETTLEMENTS DURING THE EARLY MIDDLE AGES IN THE NORTHWEST OF THE IBERIAN PENINSULA

Rodríguez-González, Celtia (Centro de Investigación Interuniversitario das Paisaxes Atlánticas Culturais (CISPAC), Universidade de Santiago de Compostela)

The analyses of everyday life in archaeology within the northwestern peninsula for the period of social transformations occurring between the 4th and 6th centuries AD, within rural societies, are scarce or nonexistent. In fact, the small contributions that exist are made solely from written sources, with a comparative perspective that barely covers the spatial levels of the everyday. Our study encompasses various aspects related to materializing experiences from the past from an inclusive perspective, involving people in historical processes, and discussing ways of life within rural settlements in the Northwest. The methodology used draws from different approaches, such as the archaeology of domestic spaces and gender archaeology. For this purpose, two settlements associated with this chronological period in the interior of Galicia, in Ourense, have been chosen as case studies. They will be examined for the scale of the everyday, highlighting different aspects that speak to the relationships between individuals, including gender dynamics.

4 TRENDS IN LANDSCAPE AND AGRICULTURE IN NW PORTUGAL IN THE LATE ANTIQUITY ACCORDING TO ARCHAEOBOTANICAL RESEARCH

Magalhães, Catarina (CITCEM – Center for Transdisciplinary Research Culture, Space and Memory. Faculty of Arts and Humanities of University of Porto) - Seabra, Luís (Faculty of Sciences, University of Porto; CIBIO-BIOPOLIS - Research Center In Biodiversity and Genetic Resources/University of Porto) - Oliveira, Cláudia (CIBIO-BIOPOLIS - Research Center In Biodiversity and Genetic Resources/University of Porto) - Arezes, Andreia (FLUP – Faculty of Arts and Humanities; CITCEM – Center for Transdisciplinary Research Culture, Space and Memory. Faculty of Arts and Humanities of University of Porto) - Filipe, Ana (APPA-VC – Association for Protection of Heritage, Archaeology and Museums of Vila do Conde) - Varela, José (Matosinhos City Municipality) - Almeida, Pedro (Vila do Conde City Municipality) - Tereso, João (CIBIO-BIOPOLIS - Research Center In Biodiversity and Genetic Resources/University of Porto; Centre of Interdisciplinary Studies, University of Coimbra; Centre for Archaeology. UNIRARQ. School of Arts and Humanities. University of Lisbon; MHNC - UP - Natural History and Science Museum of the University of Porto)

The transition between Late Antiquity and the Early Middle Ages represents one of the most significant gaps in historical knowledge in NW Iberia. There are few documentary sources for these chronologies, so Archaeology plays a unique role in their study.

However, the low number of excavations and studies focusing on that chronology prevents the configuration of a well-defined archaeological identity in chronological and material terms, even if recent archaeological investigations, especially of local and regional nature, have put forward new research lines. The inclusion of multidisciplinary teams in different projects has highlighted the role of the archaeological sciences, such as Archaeobotany, in broadening possible levels of interpretation.

However, archaeobotanical analyses addressing this transitional moment have been seldom conducted, contrasting with the high number of studies for previous periods, particularly from the Iron Age and the Early Empire. Earlier works suggest significant landscape changes occurred in this period, in articulation with broad climatic, socio-economic, and political trends. Nevertheless, this hypothesis needs further enquiry, with new and consistent data. In this presentation, these issues will be explored by addressing in detail the archaeobotanical record from two sites in NW Portugal, Castro de Guifões and Cividade de Bagunte, including unpublished data, and by integrating them in the historical and environmental dynamics of NW Iberia. The information obtained so far suggests some crops became increasingly disseminated in the region, which can eventually be related to changes in settlement and environment. These and other trends in agriculture and landscape will be examined in full articulation with the palaeoenvironmental and archaeological data available.

5 SHADOWS ON THE PEAKS: EXPLORING THE ELUSIVE REALMS OF MOUNTAIN COMMUNITIES DURING THE EARLY MIDDLE AGES

Medina Gordo, Sonia (University of Barcelona)

In the last forty years, we have witnessed a significant improvement in the knowledge of early medieval materiality in Spain. The recognition of this heritage as a public domain asset has driven a remarkable increase in the collection of

archaeological data in the country, providing a more complete vision of its past. However, despite these advances, mountain regions continue to lack a narrative of their own that reflects their historical and cultural uniqueness. This absence has contributed to crafting an elusive and ill-defined image of these environments. Paradoxically, progress in research has led to addressing these areas in two distinct ways: either they are considered marginal spaces with little historical significance, or they are interpreted through a lens that equates their historical evolution with that of valley spaces.

In this context, our contribution aims at highlighting the issues that have been sidelined in the agenda of medievalists. In this sense, our intention is twofold. On the one hand, we present an alternative proposal that allows us to examine and understand the gaps in the existing information on the Sierra de la Demanda (Spain). On the other hand, we create room for other forms of 'knowledge-making' that may shed light on these regions. By exploring these challenges, we aspire to foster a pluralistic approach that captures the complexity of these spaces and accommodates alternative perspectives on understanding landscapes, challenging prevailing perceptions.

6 DEATH IN TIMES OF CHANGE: FUNERARY PRACTICES IN LUSITANIA DURING LATE ANTIQUITY

Rolo, Mónica (Centre of Archaeology of University of Lisbon (UNIARQ))

One pretends to present a portrait of the funerary practices in Lusitania during Late Antiquity (4th – 9th c. CE). We will focus our attention on the countryside of this ancient Roman province in the West of the Roman Empire, taking as case-studies an assemblage of rural necropoleis located in the nowadays Portuguese territory. The analysis of the archaeological funerary record in rure shows us how local communities have adapted their attitudes towards death through the downfall of the ancient socio-political, economic and cultural frame, echoing a world of the living in profound change. The known evidences suggest the persistence of the classical legacy (e.g., the practice of the incineration rite until the 4th c. CE, or the maintenance of the epigraphic habit in late antique tombs), as well as a frequent stability of the funerary topography (i.e., the relevance of necropoleis in use since Late Iron Age or High Empire as places of memory for late antique communities). In parallel, the uprising importance of Christianity dictated a new cosmogony and new funerary practices (e.g., the preference for the inhumation rite and East-West oriented tombs, or the progressive diminution of grave offerings).

7 STUDY OF RURAL FUNERARY SPACES IN THE IBERIAN PENINSULA BETWEEN THE 5TH AND 7TH CENTURIES AD. A COMPARATIVE PERSPECTIVE

Sánchez, Irene (Universidad Rey Juan Carlos)

The aim of this paper is to present several case studies related to funerary spaces dated between the 5th and 7th centuries AD in the Iberian Peninsula. The traditional historiography of the 20th century assumed that these funerary spaces had a specific location according to different parameters, being or landscape, related to habitational or religious spaces. In this sense, based on several case studies, the aim is to observe whether this phenomenon is common to the necropolises of the Iberian Peninsula or whether it is an exclusive regional phenomenon. The working area will be defined on the basis of geographical factors such as river basins, and orographic and historical elements.

Likewise, the fossils used to date and characterise the funerary assemblages have generally been based on the objects found in these contexts. This fact has led to certain problems when we have subsequently faced the study of necropolises, for example, in the south of the Iberian Peninsula.

In order to better understand this transition period and the rural population groups themselves, this study will be based on historical, cultural and territorial aspects. However, we will not neglect the study on a micro-spatial scale, i.e. to understand the articulation of the enclaves themselves, the typology of the tombs and associated grave goods, whether ritual or personal, as well as anthropological studies -if any-.

From the perspective of funerary archaeology, we can approach the different rural population groups that inhabited the peninsular territory, as well as study the rural world in the transition between Antiquity and the Middle Ages.

8 THE METALLURGICAL WORKSHOP OF CERRO DE LOS ALMADENES. AN EXAMPLE OF LATE ANTIQUITY COPPER PRODUCTION IN IBERIAN PENINSULA

Álvarez García, Juan (Universidad Autónoma de Madrid) - Morato Marqués, Carlos (Asociación para la Difusión de la Arqueología y la Minería Antigua (DAMA)) - Ayarzagüena Sanz, Mariano (Sociedad Española de Historia de la Arqueología (SEHA))

Cerro de los Almadenes is located on the southwestern border of the province of Segovia (Spain), specifically in the municipality of Otero de Herreros, and in a geological context of extraordinary mineral wealth. This site was already identified as an important area of metallurgical production in antiquity by Professor C. Domergue in the 1970s, who studied several materials from two large slag heaps, now disappeared, located in front of the hill; two slag heaps that were the result of centuries and centuries of metallurgical production. Since 2009, a team of archaeologists belong-

ing to the Spanish Society for the History of Archaeology (SEHA) has brought to light the remains of a first-class mining-metallurgical settlement, judging by the findings. Within this settlement, there were important metallurgical production facilities that would correspond to an *officina metallorum*, which consists of different spaces in which the copper extraction process was carried out. One of these spaces is located on the western side of the complex and consists of two batteries of five furnaces each, dated to the Late Antique period (ca. 6th century AD), although research into the remains of previous smelters dates metallurgical production on the hill to the 1st century BC. These archaeological remains, together with the location of the mine entrances, have allowed us to reconstruct the entire production process: from the extraction of the ore, the crushing and washing of the ore, the first roasting process and the reduction of the ore to the extraction of molten copper.

9 CONSUMPTION PATTERNS OF TERRA SIGILLATA AROUND THE GUADIANA (SOUTHERN PORTUGAL) DURING LATE ANTIQUITY

Martins, Ana (CHAIA - Universidade de Évora; Universidad de Granada; FCT - Fundação para a Ciência e a Tecnologia)

The research of recent decades, which has focused on the Roman and Late Antique rural world in southern Lusitania, more specifically in the vicinity of the Guadiana river basin, allows us to understand the complexity of settlement dynamics in this region. The number of archaeological sites identified in this area reflects the existence of a dynamic and hierarchical landscape in the past, divided into different categories of sites, some of whose nomenclature still gives rise to debate and in which the *villae* are clearly the protagonists.

The aim of this communication is to present the current state of knowledge about the consumption patterns of *terra sigillata* in this rural world, particularly with regard to the period of transition to the Early Middle Ages. It also aims to analyse the redistribution of these imported fine ceramics based on existing data, identifying flows and patterns in import rhythms and attempting to understand some cultural contrasts across the region under study.

10 A VIEW OF THE MONETARY CIRCULATION IN NORTHEASTERN LUSITANIA DURING LATE ANTIQUITY, BASED ON THREE ROMAN COIN HOARDS

Ribeiro Machado Neto, Newton (Universidade de Évora)

The discovery of Roman coins in archaeological contexts occurs frequently in Portuguese territory and can provide relevant information about the economic life in Late Antiquity. This paper analyzes three large hoards from Northeast Lusitania, found in close proximity to each other and near other Roman archaeological remains. Such hoards were formed over a long period, either for their monetary value or for the subsequent smelting of the metal.

The chronological distribution shows a concentration of coins minted between 330 and 364. Contrary to what occurs in hoards from other regions of Lusitania, there is a predominance of bronze coins of lower denominations, issued in Gaul and Rome, possibly due to restricted access to maritime commerce and the greater use of land routes in local trade.

There are similarities in the composition of the hoards, resulting from the circumstances in which they were formed. The oldest coins are counterfeits from the late 3rd century, with no coins issued after the early 5th century. This reflects the interruption of the cash supply, which kept the existing coins in circulation even after the Visigothic invasion, as shown by their high degree of wear and tear. These common attributes indicate that the hoards are the result of similar political, economic and social contexts of Northeast Lusitania. They thus differ, in several aspects, from hoards from other regions of Hispania.

There are still large gaps in our knowledge about life in Northeastern Lusitania during Late Antiquity. What are the stories and motivations behind the hoards? When were they formed, and by whom? How much were the coins worth? For what purpose were they hidden? Why were they never recovered? And what can these hoards tell us about life in the later years of the Roman Empire in its westernmost province?

223 MONUMENTAL ISSUES: ARCHAEOLOGICAL APPROACHES TO THE PUBLIC MATERIALITIES OF CONTESTED PASTS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Munawar, Nour A. (Doha Institute for Graduate Studies) - Symonds, James (University of Amsterdam (UvA)) - Gonzalez Zarandona, José Antonio (Newcastle University)

Session format: Regular session

In recent years, the defacement and toppling of historic monuments by the BLM and other protest movements has filled the headlines and prompted public debates. Monuments are powerful and politicized physical structures that can endure for centuries in city centres.

As the passage of time obscures their original meaning, they can acquire a quality of benign anonymity. However, monuments often embody links to dark pasts and traumatic memory, particularly when statues commemorate one-sided narratives of war, colonization, and slavery.

In this session we will discuss the monument as a concept, using biographical and semiotic approaches to explore the changing lives, management practices, and embedded meanings that may be found in public monuments. Our starting point is the position that monuments are more than commemorative objects. Erected in ordinary and mundane locations, such as public squares and parks, monuments are integrated into the everyday lives of city and/or countryside dwellers. Monuments are sites of remembrance, although only if people recognize them as such. Often, their weathered stone facades and oxidized patina bestow a sense of historical time depth and continuity upon a place, creating ontological security. But as recent protests have shown, the latent powers associated with historic monuments can be re-exposed to kindle public outrage and dissent.

Our session invites contributions that investigate what a monument can be, reasons to build and/or remove them, and the meanings of its management acts. We welcome papers working on theories, methodologies, and case studies not only in Europe and North America, but also in the Global South. Our aim is study how the rise of voices that seek to decolonize urban space, as well as changes in global power dynamics and the efforts to promote multipolarity, may have the potential to transform the public perception of monuments to become potentially inclusive healing apparatus.

ABSTRACTS

1 MONUMENTS AND/AS RESTORATIVE JUSTICE IN AFRICA: THE CASE OF MEMORIALS DEDICATED TO THE MAU-MAU UPRISING IN NAIROBI (KENYA)

Labadi, Sophia (University of Kent; University of Bonn)

This paper aims to analyse whether monuments can serve as inclusive healing devices, focusing on their potential for facilitating restorative justice. Restorative justice is a concept that has been increasingly used in recent years by African states and groups, seeking to address the harms and injustices inflicted by colonisation and slavery. It seeks to empower victims, hold offenders accountable, and build stronger, more interconnected communities based on principles of respect, empathy, and mutual responsibility.

However, the significance of monuments in promoting restorative justice remains largely unexplored, particularly in the context of contentious histories. This paper aims to address this gap by critically analysing the often-overlooked monuments dedicated to the Mau-Mau uprising against European colonialists, notably the statue to Dedan Kimathi and the Mau-Mau memorial in Nairobi, Kenya.

Grounded in in-depth archival and ethnographic data collection, this paper also draws upon interdisciplinary perspectives from history, anthropology, and memory studies. More specifically, this paper will delineate the evolving nature of restorative justice and public memorial practices, using the selected cases of the statue of Dedan Kimathi and the Mau-Mau memorial in Nairobi. This section will particularly discuss why this memorial was included as part of a larger out-of-court financial settlement from the UK, marking one of the first financial compensation packages from a European country to Africans for abuses committed under colonial rule. The paper will then explore the limitations and oppositions to these monuments, as they are perceived as partial and inadequate in addressing certain key questions and aspects related to British colonialism and the Kenyan fight for freedom from British rule.

2 UNSETTLED MEMORIES TURNED TO STONE CONTENTIOUS COLONIAL HERITAGE IN BELGIUM AND CENTRAL AFRICA

Vande Keere, Nikolaas (UR architects (Belgium); Faculty of Architecture and Arts, Hasselt University (Belgium))

The current attention to contentious statues and monuments is an international phenomenon. In many countries, national symbols associated with colonialism or slavery pose a critical challenge to heritage policy and management. Their artistic or historical value is often overshadowed by the perception of a negative iconographic role in contemporary society. As symptoms of the historical construction of national identity, however, the sculptures are only the tip of the iceberg. As expressions of propaganda, many buildings, sites or other (tangible or intangible) heritage objects can equally be labelled as contentious.

This paper places the debate in a broader perspective, beyond the current media attention and its overly ideological focus. By analysing different international examples, it examines and compares the existing strategies of restoration, adaptation and removal of monuments. By studying specific sites of colonial heritage in Belgium and Central Africa, it extends these strategies into a museological and architectural context. The latter is further elaborated through the research-by-design of two historical sites of colonial encounter developed by International Master students of Adaptive Reuse at the Faculty of Architecture and Arts of the University of Hasselt (Belgium).

The aim is to challenge the binary nature of the public debate and to explore the potential of the architectural practice of adaptive reuse and its growing discourse to contribute in a constructive way. Beyond reprogramming or defining new functions, adaptive reuse is able to repair and decolonise contentious heritage by mitigating some of its negative characteristics. How can adaptation and reuse generate new meanings for existing buildings that were designed and constructed according to social or political views that are now being challenged? How can a design-led approach to the built environment contribute to the (re)construction of a (new) identity? How can the unsettled memories turned to stone be activated in a positive way?

3 THE MATTER (AND MEANING) OF MONUMENTS. TALES FROM SARDINIA, AN "ITALIAN INTERNAL COLONY.

Panetta, Alessandro (Institute of History of Mediterranean Europe (ISEM), National Research Council (CNR))

This paper aims to address the Sardinian decolonial debate topic, by comparatively analyzing some monuments located respectively in the two largest cities of the island: Sassari and Cagliari.

In recent years, Sardinia has seen a public debate, relaunched by the explosion of the Black Lives Matter movement, centred on the symbolic legacy of the House of Savoy domination exercised on the island from the 18th century and especially in the 19th century. This debate has fuelled the idea of Sardinia as an Italian Internal Colony which continues to this day, even later to the deposition of the Savoy monarchy, replaced by the Italian republic.

Here we will address this complex and slippery topic through the reconstruction of the individual biography of the monuments which in different historical periods have been at the centre of public debate and disposal projects, and which have lived trajectories with somewhat different meanings depending on the era and the social, political or gender perspective of those who entered into a relationship with them.

In this sense, we want first to explore the possibility of applying a the (post-)colonialist theme of Historical Archaeology to an internal European case. Therefore, through the cases discussed here, we want to propose a reflection on the processes of selection and stratification, both material and symbolic, which affects monuments in their historical evolution, highlighting their continuities and discontinuities with previous (and subsequent?) dominations.

But, starting from their materiality, we also want to investigate other themes, highlighting what the active role of these objects has been during the various historical and social contexts they have crossed (therefore not only in the contested present), or what are the substantial differences between the monuments themselves and the other results of the Savoy presence in Sardinia (primarily buildings, but also public spaces, urban topography, etc.).

4 CONCRETE MEMORIES AS HERITAGE OF INFRASTRUCTURAL VIOLENCE

Breithoff, Esther (Birkbeck, University of London)

From 1954 to 1989, Paraguay endured the longest military dictatorship in the history of 20th century South America. Indigenous people in particular suffered immensely under General Alfredo Stroessner's authoritarian regime, as they were considered a hindrance to progress and modernisation. In a push for economic growth and agricultural development, Stroessner invested heavily in the development of the country's concrete transportation infrastructure. This included the construction of the Ruta Transchaco, Paraguay's longest highway - referred to by Indigenous people through whose territories it cuts as 'the endless asphalt snake' that 'is the beginning of the dispossession of the lands of the indigenous peoples at the hands of the whites'(www.tierraviva.org.py/). On October 7, 1991, almost three years after the country's tentative return to democracy, the only existing statue of Alfredo Stroessner was toppled outside the capital city of Asunción. This was followed by several years of debates over what to do with the almost five me-

tre tall and over a thousand-kilogram heavy alloy metal statue, until in 1995 artist and writer Carlos Colombino was granted permission to recycle what had become an effigy of repression into a monument of resistance. Today, a dismembered and fragmented Stroessner remains himself cast between two concrete slabs held down with metal chains inside the city's Plaza de los Desaparecidos, remembering Paraguay's 'disappeared' victims of state violence. Following a material approach, this paper uses the reconfigured monument of Stroessner as a type of countermonument that challenges the notion of 'concrete' as both physically and symbolically cementing ideas of progress and modernity. By doing so, it will discuss authorised monuments as part of a network of concrete material memories that show the social and ecological impacts of 'infrastructural violence' on communities and the environment.

5 THE ARMED FORCES OF THE SOVIET UNION IN THE CONTENT OF MONUMENTS IN POLAND AFTER WWII. FROM AFFIRMATION TO CONDEMNATION

Lawryniewicz, Olgierd (Institute of Archaeology, University of Lodz) - Krupa-Ławryniewicz, Aleksandra (Institute of Ethnology and Cultural Anthropology, University of Lodz) - Latocha, Sebastian (Institute of Ethnology and Cultural Anthropology, University of Lodz)

Since 2022, the research project "Lexicon of Katyn Archaeology (1990–2015)" has been carried out, the aim of which is to collect, systematize, archive and widespread information on Polish archaeological research of traces of the Katyn Massacre – the 1940 Soviet crime against 22,000 Polish prisoners of war. The scope of the planned research also includes a broad historical and cognitive context in which these studies can be reinterpreted today and new research possibilities demonstrated.

An important aspect of the ongoing research is the commemoration of the victims of this crime. When Poland was an Eastern Bloc country, this was not possible. The communist Polish authorities opposed any narrative that might undermine the contribution of Soviet armed forces to the liberation of Poland from occupation by Nazi Germany. The symbols of 'brotherly assistance' were therefore numerous monuments, street and square names, affirming the Red Army. The struggle to remember the victims of Soviet crimes was one of the most important grassroots motivations, which resulted in the removal of these propagandistic commemorations from public space after 1989. In their place began to appear commemorations of the victims of Soviet and communist crimes, including above all the victims of the Katyn Massacre.

In the paper, the authors will focus on presenting the results of their research based primarily on ethnographic interviews conducted mainly with the descendants of the victims. They show what is recorded in individual experience, in family memory; they talk about the practiced and postulated forms of commemoration. Researchers assume that this is a way of reaching not only individual memory and experience, but also the supra-individual resources that make up the particular community of discourse. This approach enables a dual reading – at the level of historical truth and narrative truth, in the perspective of communicative and cultural memory.

6 INSCRIBING SECTARIANISM: RELIGIOUS MONUMENTAL ARCHITECTURE IN POST CONFLICT ENVIRONMENTS

Hourani, Najib (Michigan State University; Department of Anthropology)

Over the last thirty years, cultural heritage, once a marginal concern in processes of post-conflict and post catastrophe reconstruction, has become a central concern, especially in the work of the post-conflict reconstruction complex (PCRC). Today, the international, bilateral and non-governmental institutions that constitute the PCRC, take seriously the role of archaeological sites, heritage architectures and historic urban districts in efforts to support transitions from extended moments of violence and war toward a positive peace. Drawing upon personal interviews, planning documents and a range of other primary sources, this paper explores the place of monumental buildings and their urban environments in the reconstruction of two war-torn cities, Beirut and Mosul. Through an examination of restoration of religious buildings surrounding Nijmeh Square in the Beirut city center and the Al-Nouri Mosque in Mosul, this paper asks how both the physical structures and the meanings they are meant to convey are transformed within operant discourses of heritage preservation. The final section of the paper draws out implications of dominant approaches to such heritage structures in other post conflict contexts in the region, with specific attention to ongoing planning processes in Syria.

7 A MONUMENTAL PARADOX. THE LIVORNO 'FOUR MOORS' BETWEEN LOCAL IDENTITY AND MEDITERRANEAN MIGRATIONS

Paolillo, Costanza (Bibliotheca Hertziana-Max Planck Institute for Art History; New York University)

My paper investigates the interplay between heritage preservation policies, local identity, and political discourse in contemporary Italy, focusing on the case of the 'Four Moors' monument in Livorno. The Tuscan free port city has been known as a space for the pluralistic cohabitation of peoples and religions thanks to special laws enacted by Ferdinando

I de' Medici soon after its foundation. However, the city's most iconic monument, dedicated to the Grand Duke, is a Renaissance symbol of Christian supremacy over Muslim and Black peoples, with four black enslaved male figures, writhing in a humiliating pose and manacled to the plinth. Nonetheless, the sculptural group soon became a landmark and thus the city's emblem, exposing a blatant paradox between the shared values underpinning local identity and its representation on public space.

I examine the contradictions surrounding Livorno's icon, surfaced during the global wave of Black Lives Matter protests in 2020. The monument square became the gathering point for several peaceful rallies of the Italian BLM movement, meant to raise awareness around the migration crisis in the Mediterranean. A large portion of the local community reacted by vehemently expressing concern about the preservation of the statue, drawing more attention to the monument than the protest itself. As a response, unlike what happened all around the world, the Four Moors underwent complete restoration thanks to a grassroots initiative, showing a unique collective attachment to the artwork.

Drawing on the analysis of media coverage and social media, I argue that the conservative responses towards the BLM protests that brought the community together were only possible because of a selective memory process. By obliterating any references to colonialism and the slave trade, Livorno's case demonstrates, on a local level, why Italy is failing to address racism effectively in public discourse on heritage.

226 MARITIME HETEROTOPIAS: NOVEL INSIGHTS INTO THE ARCHAEOLOGY OF MARITIME CULTURAL LANDSCAPES IN THE MEDITERRANEAN AND BEYOND

Session theme: 6. The Mediterranean from Within

Session organisers: Nakas, Ioannis (Centre of Hellenic Studies, Harvard University) - Krieger, Anja (Independent researcher)

Session format: Regular session

Heterotopia as a term was initially coined by Michel Foucault in the 1960s. According to his definition, a heterotopia is an "other space", an "enacted utopia", a place differing from its surroundings and serving a particular or possibly deviant purpose in society. Analyzing a space as such can prove to be a useful approach to examine and establish the context of places, while gaining a deeper insight into their purpose and role. The concept of heterotopias offers an ideal theoretical framework to study space and place in maritime cultural landscapes. Foucault describes ships as the perfect example of a heterotopia, since they houses a distinct society voyaging between coasts. Similarly, harbours can form specific spaces within maritime cultural landscapes, delineating the boundary between hinterland and foreland, the familiar and the unknown. These areas can be interpreted as distinctive meeting places for individuals from diverse backgrounds and origins. The entire maritime cultural landscape constitutes a border heterotopia, acting as a pathway bridging land and sea.

This session seeks to critically assess various notions of space and place in maritime cultural landscapes and invites case studies drawn from the Mediterranean and other regions, not limited to specific time periods. We invite contributions that explore heterotopias through a range of sources, including but not limited to archaeology, history, material analysis, textual sources, and art that address other places in maritime landscapes and seascapes: the sacred, the forbidden, the floating, the real, the imaginary, the in-between, and the ephemeral.

ABSTRACTS

1 IRRESISTIBLE ANALOGIES AND UNIVERSAL ADAPTORS: NEGOTIATING UNFAMILIAR LANDSCAPES AND MARITIME INTERCULTURAL CONTACT IN THE BRONZE AND IRON AGE MEDITERRANEAN

Yasur-Landau, Assaf (University of Haifa)

This paper will examine the creation of Mediterranean heterotopias as an adaptive process, facilitating human existence in conditions of uncertainty. It will present two interrelated phenomena in maritime adaptation in the Bronze and Iron Age Mediterranean, both connected with place making and both of which can be used to explore the boundaries between topos and heterotopia.

The first phenomenon is the adaptive urge to find familiar patterns in unfamiliar landscapes, reducing the dread of the unknown. Terrain and ecology similarities between areas of the Mediterranean often create an irresistible analogy, resulting in the superposition of well-known landscapes on the new ones, including transferring of place names, typology of landscape features and even mythology related to landscapes. An example of such a process is the spatial distribution during both the Bronze and Iron Ages of the iconography of the god with the fenestrated axe, standing on top of two sacred mountains overlooking the sea.

The second phenomenon is the role of maritime interface installations, among them harbour structures, storehouses and coastal shrines, serving as universal adaptors. These devices facilitate intercultural commercial contact and mobility and are read here as an architecture of inclusion, providing services and spaces for interaction. Examples of such architecture are the coastal shrines of Nahariya and Phylakopi, as well as ashlar architecture of the Phoenician homeland and its vast diaspora.

2 DESOLATE SHORES: LATE BRONZE AGE AEGEAN HARBOURS AS HETEROTOPIAS

Fuller, Elliott (University of Toronto)

Foucault's concept of the heterotopia as an "other space"—associated with marginality, crisis, and transition—offers a compelling framework for thinking about interaction in maritime spaces. Harbours, intuitively, represent quintessentially liminal areas and can thus provide fruitful ground for empirically investigating the concept of maritime heterotopias. I ground my analysis within the historical context of the Late Bronze Age Aegean, ca. 1700-1200 BCE, a period which achieved a high degree of economic and cultural connectivity enabled in part by a constellation of coastal anchorages along key trade routes that facilitated the movement of goods, people, and ideas. Through three case studies, I explore how harbours embody tension and contradiction in ways which make them distinctly "other." Firstly, they incorporated several economic activities which were central to the functioning of the Eastern Mediterranean world-system but whose operation was displaced onto marginalized maritime agents because of the risk, disrepute, and unpleasantness associated with them. These include metalworking, barter, and murex dye production. Secondly, harbours existed within several distinct temporalities—Foucault's "heterochronias." They were often imbued with permanent, monumental architecture, and yet they existed within a shifting, dynamic coastal landscape. This dynamism could alter the historical trajectory of these places dramatically, thus undercutting the very idea of continuity in an inherently unstable and liminal environment. Finally, harbours were transitional spaces, areas of encounter between maritime agents and their settled, land-based counterparts. These encounters brought with them the risk of delay, harm, and marginalization—therefore, they required mediation through acts of commensality and exchange. As spaces of encounter and mediation, harbours have produced distinctive lifeways and material culture. This study thus demonstrates the power of maritime heterotopias to challenge traditional notions of political economy, monumentality, and cultural purity.

3 THE HARBOURS OF THE GRECO-ROMAN ANTIQUITY AS HETEROTOPIAS. A NEW APPROACH ON THE HARBOUR REALITIES OF ANTIQUITY

Nakas, Ioannis (Centre of Hellenic Studies, Harvard University)

In 1967 Michel Foucault introduced the idea of heterotopia in a lecture he gave in Paris to a group of architects. He defined the heterotopia as an "other space", an "enacted utopia", and a place where "the other real sites that can be found within the culture are simultaneously represented, contested, and inverted". Various human spaces such as prisons, brothels, cemeteries and ships, were identified by Foucault as heterotopias. This rather sketchy account has thereafter provoked a 'disproportionately' large but equally fruitful discussion in humanities, particularly in urban studies, geography and anthropology and has included a long list of other spaces that can be considered heterotopias. It has promoted and is still promoting interdisciplinary approaches, disrupting established thought and eventually the construction of new relationships and approaches.

One space, which has not yet been discussed, however, as a heterotopia, is the harbour. Despite a series of characteristics of harbours that could place them well within the realm of a heterotopic analysis (centres of commerce and human interaction, meeting points, interfaces between the different worlds of land and sea etc.), harbours of antiquity have never been studied as heterotopias, neither by Foucault nor by any other scholar. This paper uses the harbours of the Classical Mediterranean as its main case study and explores the possibility of them being in any way heterotopias by suggesting a new approach to their realities, an approach based on their special and unique nature as human spaces and following the principles set by Foucault.

4 SETTLEMENT DEVELOPMENT AND LAKE-LEVEL CHANGES OF THE LAKE OF TIBERIAS, ISRAEL: PRELIMINARY RESULTS OF THE SOUTH TIBERIAS LAKE AREA PROJECT

Nantet, Emmanuel (University of Haifa)

On the shore of the Sea of Galilee and to the south of the city of Tiberias is a site comprising three structures. At its northern end is a remnant of a Byzantine city wall built on a W-E axis continued by a pier built of concrete extending eastward into the lake. This structure that extends beyond the city wall of Tiberias has been interpreted as either the most important and the largest preserved harbor of the Sea of Galilee or as a mere seawall. Although long neglected, it deserves closer attention since the concrete pier seems to have been built in an innovative construction technique that utilized wooden caissons. This construction method has been documented only in early Roman imperial maritime harbors and never in a lacustrine context, nor for the Late Byzantine and Umayyad periods. The excavation on the

inner and outer sides of the southern city wall contributes to a better understanding of the environmental challenges this half-submerged extension faced due to lake-level fluctuations. The presentation offers an overview of preliminary results from the first three years of this ongoing project that began in 2019, which combines land and underwater excavations. Also considered are future research perspectives on the relationship between the city of Tiberias and the lake.

5 UNITY AND DIVERSITY IN THE MARITIME CULTURAL WORLD OF THE LATE BRONZE AND EARLY IRON AGE EASTERN MEDITERRANEAN

Hulin, Linda (University of Oxford)

Harbours are acknowledged as powerful nodes within maritime cultural worlds: they bridge the gap between land and sea and act as both social, economic, and cultural petrie dishes and filters. They provide spaces where diverse agents, objects and ideas react to and with one another, while at the same time they act as filters, selecting and transferring innovations into and out of the hinterland. However, the very diversity that harbours represent has resulted in fuzzy thinking within the literature. Simple binaries are applied—maritime vs terrestrial, institutional vs individual, foreign vs local—and in so doing, real differences in maritime worlds are obscured. While increasing attention is being paid to the archaeology of fishing and its relation to trade, in practice the terms are often used interchangeably, as both occupy the same watery space.

How much then, is the shared experience of acting in the same waters, a justifiably unifying factor? Sailors who fish are surely not the same as fishermen who may occasionally trade and their relation to merchants is equally difficult to distinguish. There are common pragmatic requirements of sailing, but these are manifested in institutional and subaltern social networks that overlap in sailor's quarters in harbours and at interstitial points in between, where local relations with fishing villages may be significant.

This paper will consider the criteria for navigating the intersecting archaeologies of fishing, sailing and trade to be applied by project NISAME (Navigating Intersecting Social and Maritime Ecosystems in the Bronze and Iron Age Mediterranean), a large-scale mapping and data-gathering project (2024-2027).

6 MARITIMITY AND THE EMOTIONS OF THE SEA IN MYCENAEAN GREECE

MacDonald, Max (University of Southampton)

The maritime cultural landscape of the Mycenaeans has not been explored to the same extent as in other regions in the Late Bronze Age. Much of this is due to the lack of any major hallmarks of maritime cultures in mainland Greece, such as harbour infrastructure, evidence for fishing, or shipwrecks. This paper argues that a connection to the sea can still be understood in Mycenaean Messenia by thinking about the emotional and sensory impact the sea stimulates through its presence in the landscape, and its effect on material culture. Tuddenham's (2010) critique of maritime cultural landscapes questions where maritime culture stops, and suggests that rather than a dividing line between maritime and terrestrial culture, people's relationship to the sea might better be understood through the concept of maritimity. Maritimity can be conceived of as a gradient, the degree of the sea's impact on individuals and communities. By identifying the markers of Mycenaean maritimity, and exploring how these markers can highlight the emotional and affective relationships between people and the sea, this paper intends to refocus the discussion towards the phenomenological experience of the sea from the land. This paper explores the maritime world of Late Bronze Age Messenia by assessing the evidence for Messenia's maritime material culture for direct and indirect evidence of a relationship with the sea and the maritime world from across the region. It then undertakes computational, spatial, and visibility analyses to establish the presence of the sea in the landscape while reflecting on what the lived experience of the sea was like for the people living in Messenia during the Late Bronze Age.

7 SINOPE AND SISTER COLONIES NEXUS: EXPLORING MARITIME HETEROTOPIAS AND CULTURAL INTERCONNECTEDNESS IN THE BLACK SEA THROUGH COMMON COIN TYPES

Mentesidou, Eleni (International Hellenic University)

Sinope, known as the inaugural Greek settlement on the southern coast of the Black Sea, occupies a pivotal geo-strategic position. The Milesian apoikoi strategically selected a site on a narrow isthmus, flanked by natural harbors, positioned at the heart of the Black Sea, equidistant from Bosphorus and Colchis, and directly opposite the Crimean Peninsula. The city's unique geographical and morphological features dictated its maritime orientation, propelling it to become the foremost trade center in the region. Consequently, Sinope owes its birth and existence to the sea.

Istria and Olbia, Miletus' other notable Black Sea colonies, exhibit parallels with Sinope in terms of foundation, maritime character, and cultural tradition. Despite these similarities, the extent of interconnectedness among the three colonies remains insufficiently explored. An intriguing avenue for investigation emerges through the shared use of a

significant symbol on their main coin types: the eagle with the dolphin, reflecting the centrality of the Zeus cult in the colonies' religious life.

The three Milesian colonies, Sinope, Isthria, and Olbia, existed as distinct enclaves within diverse population. This paper aims to delineate the heterotopic nature of these colonies. The exploration of the Zeus cult, particularly the Zeus Ourios cult, proves crucial in understanding the shared cultural landscape of the Milesian colonies. Furthermore, the study explores the role of the Hieron of Zeus Ourios on the Bosphorus, serving as a landmark for those entering the Black Sea, and its contribution to shaping the heterotopia of the three Milesian maritime-oriented colonies.

8 HETEROPOIAS OF THE COASTLINE: DYNAMICS OF TRANSFORMATION IN THE MEDITERRANEAN COASTAL LANDSCAPE THROUGH A RESEARCH PROJECT ON ROMAN MARITIME VILLAS

Cataldo, Concetta (Università di Catania)

"Roman Villas Shaped Nature" (M. Zarmakoupi 2018, 85 - Landscape at the "Villa of Poppaea" (Villa A) at Torre Annunziata, in A. Marzano, G.P.R. Métraux (eds.), *The Roman Villa in the Mediterranean Basin: Late Republic to Late Antiquity*, Cambridge, New York 2018, 85-96) demonstrates how Romans transformed coastal landscapes by constructing maritime villas from the late 1st century BC through late antiquity. This methodological approach combines archaeological analysis with Foucault's heterotopia theory to interpret maritime villas as spaces of alterity that mirror the internal tensions and contradictions of Roman society. Contrary to their depiction in literary sources as inutiles, these villas housed productive spaces and sources of income, depicting scenes of activity tied to marine resource exploitation. In some instances, these activities overlapped with descriptions of traditional rustic villas, esteemed in Roman agricultural literature.

Roman engineering prowess managed to tame the ruggedness of cliffs and coastlines, allowing villa owners to harness a new kind of fundus comprised of water and sea. This study on the microcosm of Mediterranean maritime villas is part of a doctoral research project in Sciences for Heritage and Cultural Production at the University of Catania, funded by CHANGES - Cultural Heritage Active Innovation for Sustainable Society - SPOKE 6 (supervised by Prof. Daniele Malfitana), aiming to define one or more architectural typologies of Mediterranean Roman maritime villas. The research will explore these constructions' role in creating "other spaces" beyond traditional urban and rural settings, through an interdisciplinary approach that integrates archaeology, architectural history, literary sources, and economic studies. The management of the digitized data from this research will be incorporated into an interoperable platform for the scientific community. Maritime villas serve as interfaces between land and sea, daily productive life and spaces for contemplation and otium, embodying Foucault's concept of heterotopic qualities.

9 DIGITAL ECOSYSTEM FOR MARITIME CULTURAL LANDSCAPE RECONSTRUCTION IN SOUTH-EASTERN SICILY

Martinez, Gianluca (Università degli studi di Bari Aldo Moro)

The Mediterranean sea has always represented an ideal context for development of complex cultural systems. Societies of all eras that have sailed its waters have left material traces of their ways of living the sea. What we find today are the scattered signs of a maritime cultural landscape that has stratified over the centuries. Since ancient times the south-eastern Sicily's sea and shore are characterized by the presence of numerous port call, natural and artificial harbor as well as for the numerous presences of wrecks from all eras, which testify an uninterrupted use from the classical era to the present day. Different studies have suggested the presence of a coastal landscape, characterized by a scattered settlement and various little landings, that highlights a widespread attendance of the maritime space. This paper proposes an in-depth investigation of the maritime cultural landscape along the south-eastern coast of Sicily, focusing on the area between the ancient Greek settlement of Kamarina and the modern tourist destination of Marina di Ragusa. Employing modern technologies and a holistic GIS-based approach, the objective is to analyze and narrate the evolution of this landscape. Utilizing geographical, archaeological, and historical data, along with new photogrammetric and survey records, the intention is to model maritime activity areas and analyze the relationships between submerged and coastal sites. The methodology involves creating a digital ecosystem, integrating data from various sources for a global, comprehensive understanding of the maritime landscape. The project aims to move beyond the traditional approach of considering the sea as a two-dimensional space with isolated findings, proposing instead a perspective of the sea as an inhabited place.

10 PIRATE SHIPS AS HETEROTOPIC SPACES: TRANSFORMING DYSTOPIAN -SCAPES IN THE 12TH CENTURY BCE

Hitchcock, Louise (Independent Researcher)

At the recent international Aegean conference on the theme of water resources, I discussed the role of maritime activity in creating a Late Bronze Age agoracracy. An agoracracy is made up of trading systems competing with others, and incentivized by market forces. Composed of ships, harbors, and centers these locations can be regarded as heterotopias, that is other spaces bringing the Mediterranean together through globalized trade in indispensable commodities and technology transfers. With the developing wealth of this era, sea lanes were protected and political tensions were ameliorated by diplomacy and royal gift giving known through the Amarna letters, with occasional instances of piracy as recorded in Ugaritic texts.

By the 12th century BCE, this system was on the brink of collapse. It was a period where ruling elites shared more in common with each other than with the populations they ruled over. Elite power was maintained through the provision of imported goods and feasts, and the manipulation of symbols. Propaganda formed a visual language within these societies and information was guarded by the scribal classes in each. They became dystopias through their political decay. The alienated populace eventually found refuge through populist revolt, turning to the heterotopic spaces of pirate ships. Their growing numbers are illustrated through mixed tribal groups collectively known as the "Sea Peoples." This paper will discuss how through the pillaging of many Bronze Age island and coastal centers, globalization was reversed, resulting in new Mediterranean societies that characterized the Iron Age.

11 THE HETEROTOPIA OF DOLIA CERAMIC VESSELS: A REASSESSMENT OF THEIR MARITIME ROUTES AND HISTORY

Iossifidis, Thomas (University of Thessaly)

The dolia were the largest known storage clay containers in antiquity. They first appeared in the 4th c. BC in Gaul, although it is proposed that their provenance is the Caucasus region. Between the 2nd half of the 1st c. BC and until the middle of the 3rd c. AD they were used as tanks in the cistern-boats, the first merchant ships to transport bulk wine in the western Mediterranean. It is confirmed that the Roman tankers transferred inexpensive wine of average quality from the Tyrrhenian Sea to the Hispania Tarraconnensis province. These unique and innovating vessels became surrounded by legend due to their obscurity, since our only sources of knowledge are the, limited in numbers, wrecks. The key finding of identifying a wreck as "cistern-boat" are the preserved submerged dolia. However, it is difficult to clarify whether the dolia found underwater were indeed contained in a specialized cistern-boat or just belonged to a merchant ship transferring them as cargo. The finding of submerged dolia in several sites of the Adriatic Sea and the rumours of immersed dolia in the waters of Magnesia region in Greece have raised expectations about new alternative maritime routes of the ceramic vessels. The development of the dolia was interwoven with the boats that carried them. The intention of the author is to try to provide a new perspective on the dolia heterotopia by unravelling their evolution as a result of being a boat cargo in a relentless progression to maritime spaces.

12 MARITIME CULTURAL LANDSCAPE OF THE BAY OF KOTOR CASE STUDY: SHIP GRAFFITI FROM ST. TRYPHON'S CHURCH

Celebic, Jelena (Koc University)

Ship graffiti are an international phenomenon and these engravings depict a vast variety of vessels from a vast chronological range. Ships have clear connections to ecclesiastical sites in which these representations are often found. As Foucault argued, there is a strong dichotomy between sacred and profane places. His term "heterotopia" describes at the same time the place of real and unreal existence that is usually not freely accessible, the entry is compulsory, or the individual needs to submit to rites and purifications. This notion could explain the location of ship graffiti in churches, i.e. in places with a strong sacred connotation. In addition, his definition of a ship as "floating piece of space, a place without a place", makes it heterotopic place par excellence.

As part of my research on the maritime cultural landscape of the Bay of Kotor (Montenegro), I will present ship graffiti in the church St. Tryphon in Moringj, so far the only examples known from the region. I recorded these engravings (made photogrammetry models, and traced the features from the photographs in Rhino software) and consulted data from the Historical Archive of Kotor to compare them with ship types used in the area in the 17th and 18th centuries.

Considering the development of the maritime trade in the Bay of Kotor between the 15th and the 18th centuries, it is indisputable that ships were of vital importance for this entire region and its hinterland. By studying these ship graffiti and other ship representations from churches from the Bay (e. g. ex voto tablets with ship representations from the church of the Our Lady of the Rocks), I will try to answer a challenging question: can we identify any particular ship type from these representations? And what did these representations mean to those who made them?

THE MULTIPLE HETEROTOPIAS OF A SHIPWRECK SITE: THE CASE OF THE NISSIA SHIPWRECK, CYPRUS

Demetriou-Patsalidou, Anna (Cyprus Marine and Maritime Institute (CMMI)) - Demesticha, Stella (University of Cyprus)

The Nissia shipwreck, site is located at -28m, less than a mile off the coast of Paralimni, Cyprus. Two excavation seasons have provided evidence for a preliminary assessment of the site: a) the ship's function remains uncertain, as no cargo has been preserved; b) the artifacts that have been recovered provide glimpses on life on board: a considerable amount of wooden poles and firewood, four cannons and very few pottery vessels, that probably belonged to the crew; c) the ship must have been of considerable size (possibly longer than 30m) and operated in the eastern Mediterranean, at least before it sank. Still, the wood species analysis indicate associations with north Europe; d) The wreck has been dated to the 18th century based on the type of the pottery, as well as dendrochronological and C14 analysis of organic remains.

Given its easy accessibility, the shipwreck has been engaged for decades into interactions and constant negotiations with contemporary society (i.e. divers and fishermen). In order to investigate further its social links, an ethnographic survey was conducted along with the excavation, aiming to explore the distinct engagements and practices developed around the Nissia shipwreck by the maritime-oriented communities active in the area.

This paper discusses the particular character of the Nissia shipwreck site not merely as a static site that preserves the tangible remains of the ship, but also as a place of the present. We are going to unfold the diverse and often competitive pursuits developed around the site, which often develop independently from their cultural and historical importance. Our aim is to address the multi-levelled, relational, and fluid qualities of the socio-cultural heterotopic space of ancient shipwrecks, where established relations are characterised by their own social dynamics, rules, and processes.

TALES OF DISCOVERY: DEVELOPING NEW NARRATIVES THROUGH DIGITAL TWINS AND OPEN LINKED DATA

Pink, Jack (Centre for Maritime Archaeology, University of Southampton) - Pedrotti, Felix (Southampton Marine and Maritime Institute, University of Southampton) - Hammant, Henrietta (Department of Archaeology, University of Reading) - Grant, Michael (Ocean and Earth Science, National Oceanography Centre, University of Southampton)

RRS Discovery holds a significant place in the annals of Antarctic exploration. Led by Commander Robert Falcon Scott the ship's inaugural expedition (1901-1904), including notable figures such as Ernest Shackleton and Edward Wilson, provides invaluable resources for environmental, biological, physical, and archaeological research. However, over time the stories and materials of the ship have been dispersed among various UK institutions including Dundee Heritage Trust (DHT), National Oceanography Centre Southampton (NOCS), and Scott Polar Research Institute (SPRI). The result is a fragmented scientific narrative, which is difficult for the public to access due to issues of limited public knowledge of the collections, restricted geographic spread, mobility, and financial constraints.

To address this disarticulation, the University of Southampton has embarked on a project in collaboration with the DHT, NOC, and SPRI. This project presents a refined understanding of one of the United Kingdom's most significant scientific research vessels, documenting its changing life and purpose over more than a century. By combining 3D recording tools, cutting-edge processing techniques, and the latest approaches to linked-open data, our research reunites a significant collection spread across three organizations and develops a multi-disciplinary approach driven by archaeological, historical, and scientific understanding. Our multi-layered approach illuminates complex fragmented collections and highlights how objects, documents, and people are related, engaging the public with new archaeological narratives.

While this project spans a wide array of disciplines, this paper will focus on the novel approach to creating Linked Data of a research vessel, its objects, people, and stories, and their integration with Mixed Reality media. This combination will demonstrate how RRS Discovery's collection has been unlocked, explored, and presented, deploying new archaeological narratives from the ship and its material culture, contributing to ongoing debates in the field and having practical implications for STEM education.

MEGALITHS AND THE COMMUNITY: OPPORTUNITIES AND CHALLENGES OF COMMUNITY ENGAGEMENT IN THE MANAGEMENT, PUBLIC PRESENTATION, AND PROTECTION OF NEOLITHIC LANDSCAPES

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Jameson, John H (ICOMOS ICIP/ ICAHM; U.S. National Park Service, Retired) - Sebire, Heather (English Heritage)

Session format: Regular session

UNESCO's updated Operational Guidelines on managing World Heritage sites are useful as an advisory guide for interpretation and community engagement across many types of sites and landscapes. The objectives are to: a) enhance capacity building and research; b) raise general public awareness, understanding, and appreciation of the need to preserve cultural and natural heritage; c) enhance the function of World Heritage in the life of the community; and d) increase equitable, inclusive, and effective participation of local and national populations, including indigenous peoples, in the protection and presentation of heritage. An important element in any interpretation scheme for long-term sustainability is the effectiveness of its community engagement programmes. Our proposed session aims to augment our EAA 2023 session that focused on the public interpretation and presentation of Megaliths with case studies that address the broader landscape with attention to community involvement in both private and public spheres. The goal is to provide a wide geographic scope of exemplary case studies as a basis for developing an ICOMOS-endorsed best practices document. We also plan to use these best practice examples to create an edited volume that will be informative and useful for both professional and public audiences.

Papers will address topics such as:

- 1) Roles that Megaliths and Neolithic landscapes play in shaping the identity of local communities, recognizing public values of the resource, and supporting the local economy as a driver for tourism;
- 2) Examples of community engagement in developing effective management strategies for public interpretation, conservation, and protection;
- 3) Examples of enhanced stakeholder involvement in cooperative relationships among special interest groups, local government, and non-profit organizations in fostering effective protection of natural and cultural features of the landscape;
- 4) Case studies on the interpretation of Megaliths in their landscapes, not just in World Heritage sites, but in any context.

ABSTRACTS

1 THE ESSENTIAL ROLE OF COMMUNITY ENGAGEMENT IN THE MANAGEMENT AND PUBLIC PRESENTATION OF NEOLITHIC LANDSCAPES

Jameson, John H (ICOMOS) - Sebire, Heather (English Heritage)

In keeping with UNESCO's updated Operational Guidelines on managing World Heritage sites, the effectiveness of community engagement programmes plays a key and indispensable role in developing long-term sustainability for effective public interpretation schemes. The papers from this session will augment our EAA 2023 session that focused on public interpretation and presentation of Megaliths and broader Neolithic landscapes with a focus on community involvement in both private and public spheres. The goal is to provide a wide geographic scope of exemplary case studies as a basis for developing an ICOMOS-endorsed best practices document, as well as to provide best practice examples for an edited publication that will be useful for both professional and public audiences. These examples demonstrate differing approaches to public audience and stakeholder interactions in defining and promoting the protection, appreciation, and public use and enjoyment of Neolithic landscapes that have global application to a great variety of heritage sites.

2 WORLD HERITAGE FOR ALL? ASSESSING ACCESSIBILITY AMBITIONS IN WH NOMINATIONS

van den Dries, Monique (Faculty of Archaeology, Leiden University)

UNESCO strongly encourages community engagement and social inclusion in its policies. It states in its thematic factsheet on social inclusion 'Access to and participation in cultural life have long been appreciated as crucial elements in enhancing well-being and creating a sense of belonging and shared identity' (UNESCO, n.d.)¹. No exception is being made for heritage sites which are acknowledged as locations of outstanding universal value. No exceptions are being made for any of us. It endorses the United Nations mission to 'leave no one behind' (United Nations 2017) and considers it 'crucial to create an environment that favours the inclusion and empowerment of persons with disabilities

so that they can live to their full potential and make a meaningful contribution to society' (UNESCO, n.d.)². What does this mean for World Heritage listings? In this paper, we will look at the degree to which the theme of social inclusion and 'accessibility for all' plays a role in contemporary nominations for World Heritage sites.

¹ <https://en.unesco.org/culture-development/transversal-approaches/social-inclusion>

² <https://en.unesco.org/themes/access-persons-disabilities>.

3 THE MAYOR, MEGALITHS AND ME: CHANNELLING MASS ECO-TOURISM AND PRESERVATION IN A UNESCO GLOBAL GEOPARK BY CREATING SHARED OWNERSHIP

de Roest, Karla (Hunebedcentrum, Head of Education; Groningen Institute of Archaeology, University of Groningen)

Every year around 250.000 people have their photos taken next to the largest dolmen (Dutch: hunebed) of the Netherlands. The adjacent scientific archaeological museum (the Hunebedcentrum, Borger) hosts around 85.000 paying visitors, including many pupils as megaliths represent prehistoric farmers in the Dutch curriculum.

The museum is a non-profit organisation with a clear mission: raising awareness and activating the public in protecting all prehistoric monuments in the province of Drenthe, where most of the megaliths are situated. The majority are located in nature preservation areas on the Hondsrug, which is a unique landscape formed by the Ice Ages and therefore a UNESCO global Geopark. Many megaliths are indeed themselves mini-ecosystems hosting unique species of lichens.

The challenge the museum faces, is to channel interests of national and regional political stakeholders, local residents and entrepreneurs, nature conservation groups - and the mass public attracted by the promotion slogan of the province that invites people to come experience prehistoric times. The aim is thus not only to raise awareness, but striving to create ownership for this unique geological and prehistoric cultural landscape in groups and individuals.

I showcase how the Hunebedcentrum achieves this while adhering to fair practice governance in a sustainable way. The message is addressed through, amongst others, heritage education and hands-on workshops for varied backgrounds; living history (EXARC-member) in a re-enactment park; a permanent archaeological excavation; and a native tiny forest. Hereby, the museum works closely together with stakeholders and maintains an expanding national and international network of partnerships. To effectuate its goals, the Hunebedcentrum relies on its approximately 160 volunteers.

The museum invites the public according to the FARO-treaty, giving you and me the change to actively participate in heritage from a bottom-up approach from a young age. And fortunately, the mayor loves megaliths.

4 COMMUNITY ENGAGEMENT WITH MEGALITHIC MONUMENTS: THE IRISH EXPERIENCE

Gleeson, Pauline (National Monuments Service; Department of Housing, Local Government and Heritage) - Breen, Claire (National Monuments Service; Department of Housing, Local Government and Heritage)

Megalithic tombs are Ireland's oldest surviving monumental stone structures and provide a tangible link to our ancestors. There are four distinct types of megalithic tombs in Ireland: portal tombs, court tombs, passage tombs and wedge tombs. Some of the most spectacular examples of megalithic tombs are classified as passage tombs and these tend to be found in concentrations known as cemeteries. There are four large passage tomb cemeteries in Ireland, Loughcrew and the Boyne Valley in Meath and Carrowmore and Carrowkeel in Sligo.

Some of the more well-known megalithic monuments, such as the passage tombs at Newgrange, Knowth and Dowth, within the UNESCO World Heritage Property of Brú na Bóinne, are managed by the State and are visited and enjoyed by the public. Other megalithic monuments are located in private ownership on farmland and in many cases these are also very visible within the landscape. Whether in private or public ownership, megalithic monuments play a significant role in our shared identity and for local communities they are part of their daily life and sense of place. Often there is a wide range of stakeholders for whom the monuments hold particular meaning and value. This paper examines how, when and why the public and communities engage with megalithic monuments and Neolithic landscapes in Ireland. What can we learn in terms of how this heritage is valued among the various communities and stakeholders and importantly what are the steps that need to be taken to ensure meaningful engagement with those communities in the management, public presentation and protection of these monuments.

5 A TIMBER CIRCLE AND HENGE IN A MODERN LANDSCAPE: COMMUNITY ARCHAEOLOGY AT ARMINGHALL HENGE, NORWICH, NORFOLK, UK

Hutcheson, Andrew (University of East Anglia)

Wing Commander Gilbert Insall unexpectedly discovered and photographed Arminghall Timber Circle and Henge on the edge of Norwich in 1929 while out flying, looking for crop marks. Soon after, in 1935, Graham Clark recognised

that the monument and its associated landscape was threatened by the development of infrastructure serving the growing city. We returned to undertake fieldwork at the site in 2022 with a group of volunteers and professional archaeologists. Clark's work acted as a template and an inspiration. During the work the participants formed a community focused on adding to Clark's work and understanding the monument in its landscape. Archaeological research, art, well-being and public involvement led to wider re-engagement with this much altered ancient landscape. Such work is necessary to foster attitudes of stewardship and create the conditions for people to value and enjoy ancient landscapes. There is no doubting the fascination that these places engender, but without archaeological information, projects of investigation and appropriate public engagement work they remain inaccessible.

6 WHAT ARE WE LOOKING AT? THE CHALLENGES OF ENGAGING WITH, PRESENTING AND PROTECTING NEOLITHIC ASTRONOMICAL SITES IN THE STONEHENGE LANDSCAPE

Chadburn, Amanda (Bournemouth University, University of Oxford, EAA Executive Board (2020-23))

Many people will be aware of the annual summer solstice celebrations at Stonehenge, but will be less aware that there are a number of other archaeological sites in and around the Stonehenge World Heritage Site which were apparently designed in relation to the heavens*.

Although the astronomical importance of the World Heritage Site is recognised as one of its "attributes" of Outstanding Universal Value by UNESCO, skyscape archaeology - the relationships between material culture, the sky and society - is often poorly understood. Even less thought has been given as to how the astronomical importance of these sites can be interpreted and protected in a landscape setting, despite its importance to UNESCO.

8 or 9 sightlines for observing the sun and moon have been identified in and around the Stonehenge World Heritage Site* some, but not all of them, relating to megaliths. Essentially, these are precise, narrow views out from the Neolithic sites to particular points in the landscape. This paper will explore these views and how they might be protected and interpreted, with especial reference to Woodhenge where the sightlines are particularly well preserved. The challenges of engaging communities in this will be explored.

Finally, 2024 and 2025 are major lunar standstill years - those years where the moon will rise/set in its most northerly and southerly positions in the landscape around Stonehenge, due to the 18.6-year cycle of the Moon. At Stonehenge, sightlines to view the moon at these rare celestial events may have been designed into the megalithic architecture of the monument. I will briefly discuss community engagement at Stonehenge in relation to these lunar sightlines and the major standstill events in 2024.

*RugglesandChadburninpress2024. <https://www.liverpooluniversitypress.co.uk/doi/book/10.3828/9781802074673>

7 FORMATIVE MONUMENTAL LANDSCAPES IN THE ATACAMA DESERT THROUGH MOVABLE AND NON-MOVABLE THINGS (TARAPACÁ, SOUTH-CENTRAL ANDES)

Uribe, Mauricio (Universidad de Chile)

The dynamics of complexity in human societies inhabiting the Atacama Desert during prehistoric times have traditionally been addressed through a Neolithic model applied to local instances (Formative Period). These approaches have relied on progressist and linear conceptualizations, framing the Formative as an outcome of economic "achievements," such as agricultural development and the adoption of a village way of life. However, current archaeological research has challenged these conventional narratives. Not only have new interpretive perspectives come to the fore, but the material evidence itself bears witness to heterogeneous historical trajectories, enabling critical understandings of these local social complexities.

To further contribute, we present an archaeological study of a Monumental Landscape actively constructed from the Formative Period onward (3000 - 400 AP) in the Pampa del Tamarugal, South-Central Andes. Specifically, we focus on a Formative Monumental Complex situated in the driest desert in the world, named Iluga Túmulos. This is an archaeological assembly of hundreds of tumuli set in thousand hectares of raised fields, representing the establishment of social spaces that diverged from those of Archaic periods and extended to Inca times. This complex comprises formative villages and an exceptional cemetery, accompanied by ancestral and novel technologies and materialities. Within these frameworks, we detail our results in examining the movable and immovable materials characterizing these social expressions over time.

Alongside the Longue Durée exploration of this case, we delve into the micro-historical trajectories undergone by these societies. Our findings indicate that the transformations emerging from the Formative period onward are not solely ecological and economic. This allows us to address global processes of social change while acknowledging the existence of subjective and heterogeneous stories shaped by locally established sociopolitical relationships. Instead, people signified and re-signified the novel ways of experiencing the world, serving as the foundation for formative and subsequent transformations.

8 BENEFITS AND CHALLENGES TO MULTISCALAR PUBLIC ENGAGEMENT SURROUNDING THE CALLACPUMA MEGALITHIC PLAZA IN THE NORTHERN PERUVIAN ANDES

Toohey, Jason (University of Wyoming) - Murphy, Melissa S. (University of Wyoming) - Chirinos Ogata, Patricia (University of California-Santa Barbara)

The Callacpuma archaeological complex in the Cajamarca Valley of northern Peru has been the subject of investigation since 2015. Recent publication of preliminary dates and analyses of a 3750-year-old megalithic circular plaza on the summit of the site has brought this plaza and its surrounding archaeological landscape rapidly increasing attention by multiple stakeholding groups at varying scales in the local and national communities. Although the monumental plaza has probably always been known to some members of the nearby community, its recent local, national, and international press has created both new opportunities for community engagement, and new potential threats from increased visitation and by potential looters. The recent uptick in attention paid to the site is illuminating the wide range of public perceptions and interests related to the importance of the site culturally, symbolically, and perhaps economically at various scales. Concomitant with these developments is an increase in awareness and action on the part of the archaeological project in terms of community engagement, education, and collaboration on several fronts, balancing an increase in public engagement with an increased focus on site preservation.

247 ESSENTIAL OR ESSENTIALIST: SEX AND GENDER CATEGORIES IN ARCHAEOLOGICAL INTERPRETATION

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Arnold, Bettina (University of Wisconsin Milwaukee) - Rebay Salisbury, Katharina (University of Vienna)

Session format: Round table (without formal abstracts)

In Europe, gender archaeology has tended to operate by differentiating between the concepts of biological sex – male/female as the basis of our reproductive system, and gender – the cultural elaboration of sex-based differences between men and women. It has long been recognized that neither sex nor gender are strictly binary, and archaeological evidence has demonstrated decisively that non-binary gender variation was present in many past human societies. However, an emerging trend to negate the existence of biological sex and conflate it with gender has called archaeological and bioanthropological practice into question. In a recent case two major professional organizations in the US and Canada have argued that archaeologically recovered bodies should not be assigned a biological sex based on morphological or genetic characteristics, and studies of past identity that distinguish between sex and gender should no longer be undertaken or presented in academic conference settings. In this roundtable, we would like to discuss methodological, theoretical and societal shifts in the meaning(s) of sex and gender, and debate how we can constructively advance gender archaeology under these complex and often contentious conditions.

248 LITHICS, FAUNA: LET THEM REFIT!

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Lamotte, Agnes (University of Lille France) - Wenban-Smith, Francis (University of Southampton) - Mathias, Cyrielle (Institute of Archaeology, Tel Aviv University)

Session format: Regular session

In the study of Palaeolithic sites, use of refitting as part of lithic and faunal analysis remains patchy, although has a long history and is becoming more widespread. Practical difficulties may affect its application such as time, resourcing and space, but it is an important technique for studying lithic and faunal remains, both during and after excavation. For site integrity, refitting can clarify the extent to which the material from different stratigraphic units can be treated separately, or should be grouped together. And then from a taphonomic perspective, the degree and patterning/length of refit connections can lead to understanding of site formation processes, and the degree to which intra-site distributions of material may relate to depositional and/or post-depositional disturbance or behaviour. After allowance for taphonomy, faunal and lithic refitting can help identify site function and specific intra-site activity areas, providing insight into specific activities of the past and details such as the number of hunted animals, the movement of faunal remains or lithic tools within a site and the relationship between different site areas. Refitting also has a vital role to play in technological and typological analysis, providing a more complete understanding of knapping strategy, typological profile and the chaîne opératoire than can be achieved from studying artefacts separately. For sites with varying raw materials, refitting can help demonstrate how raw material characteristics influenced the knapping chaîne opératoire, and show choices made by the knappers to overcome problems. This session will cover all periods of the Palaeolithic, with the aim of highlighting the importance of refitting as a specific archaeological method, that contributes to understanding past societies, depositional and post-depositional processes, unlocking on-site behaviour and

complementing technological and typological analysis. We welcome papers that highlight applications of lithic and/or faunal refitting, or provide discussion of its potential or pitfalls.

ABSTRACTS

1 CONTRIBUTION OF LITHIC AND BONE REFITS TO THE COMPREHENSION OF OCCUPATIONAL LEVELS AT LA CAUNE DE L'ARAGO (TAUTAVEL, FRANCE)

Capellari, Félicien (Muséum National d'Histoire Naturelle, HNHP, UMR 7194) - Giuliani, Carla (Aix Marseille Université, CNRS, Ministère de la Culture, LAMPEA, UMR 7269) - Grégoire, Sophie (Muséum National d'Histoire Naturelle, HNHP, UMR 7194; Université de Perpignan Via Domitia) - Magniez, Pierre (Aix Marseille Université, CNRS, Ministère de la Culture, LAMPEA, UMR 7269) - Moigne, Anne-Marie (Muséum National d'Histoire Naturelle, HNHP, UMR 7194) - de Lumley, Henry (Institut de Paléontologie Humaine)

Faunal and lithic refitting provides a better understanding of site formation processes and the disturbances affecting them, thus improving interpretations of Palaeolithic assemblages. At La Caune de l'Arago cave (Middle Pleistocene, Lower Palaeolithic, Tautavel, France), joint analyses of fauna and lithic artifacts have been conducted, along with systematic attempts of refits. These analyses focus on three archaeo-stratigraphic units corresponding to glacial and interglacial periods, each exhibiting distinct lithological characteristics that facilitated their individualization during excavation: levels L, K (MIS 14) and J (MIS 13). Levels L and J include the majority of the material and reflect different occupations modalities by human groups alternating with carnivore occupations. During MIS 14, reindeer (*Rangifer tarandus*) exploitation predominated. In contrast, during MIS 13, red deer (*Cervus elaphus*) and fallow deer (*Dama roberti*) were the primary prey of human groups. Depending on raw materials, knapping activities either took place on-site or were carried out from elsewhere and tools were directly brought into the cave.

Our study is based on 158 bones refits and 83 lithic refits and allow us to confirm the validity of these archaeo-stratigraphic units as well as perceive the post-depositional processes that might have disrupted them. The spatial analysis enables the documentation of lithic production activities and in-situ carcass processing, including dismemberment, disarticulation, and bone fracturing. Thus, the comparison of intra- and inter-level refits enhances our understanding of cave occupation patterns by Hominins and Carnivores in changing climatic contexts during Middle Pleistocene.

2 BETWEEN FLINT AND MAMMAL BONE REFITS: A DOUBLE SPATIAL MIKADO GAME AT CAGNY-L'ÉPINETTE

Peudon, Floriane (Aix Marseille University, CNRS, LAMPEA, UMR 7269, Aix-en-Provence, France) - Lamotte, Agnès (University of Lille, CNRS, HALMA, UMR 8164, Villeneuve d'Ascq, France)

It is acknowledged that bone and lithic refits constitute suitable complementary tools to address site archaeostratigraphy and site formation processes. However, there are few sites – especially Lower Paleolithic ones – where both lithic artifacts and faunal remains have been refitted, making detailed combined spatial analyses of the two even rarer.

Therefore, possessing both flint and mammal bone refits, the Acheulean open-air site of Cagny-l'Épinette (Somme Valley, France) has provided a rare opportunity for their simultaneous spatial analysis. The refits have been included in the first site-wide multidisciplinary analysis of the assemblages embedded in fluvial deposits (MIS 9), rich in thousands of flint artifacts and faunal remains. Several criteria were assessed for both lithic artifacts and faunal remains, as individuals and as part of refittings: grain-size, orientation patterns, surface alterations, breakage patterns, anthropogenic marks and skeletal part representation.

Our analysis has brought new conclusions to the decades-long debate on the archaeostratigraphic division of the Acheulean assemblages and their taphonomic status. This paper presents the contribution of refits that helped to demonstrate the presence of a single, primary context archaeostratigraphic level. We discuss how, when combined with multidisciplinary data, refits have proved to be a determining tool for identifying the different agents, natural and anthropogenic, involved in the site formation and in assessing their role in any movements. Our research highlights the informative potential of refits, essential in any Pleistocene site formation analysis, thus encouraging us to engage more in the, unfortunately time-consuming, task of refitting.

3 BEYOND LAYERS: UNDERSTANDING DEPOSITIONAL AND POST-DEPOSITIONAL PROCESSES IN MAS DES CAVES (MIDDLE PLEISTOCENE, FRANCE) THROUGH BONE AND LITHIC REFITS

Giuliani, Carla (Aix-Marseille Université, CNRS, Minist. Culture, LAMPEA, UMR 7269) - Mathias, Cyrielle (Centre de Recherche Français à Jérusalem (CRFJ), USR 3132; Muséum national d'Histoire naturelle (MNHN), CNRS, HNHP, UMR 7194) - Magniez, Pierre (Aix-Marseille Université, CNRS, Minist. Culture, LAMPEA, UMR 7269) - Brugal, Jean-Philip (Aix-Marseille Université, CNRS, Minist. Culture, LAMPEA, UMR 7269)

The Mas des Caves (Lunel-Viel, France) deposits (cave 1 or LV I) have yielded abundant and diversified faunal assemblages, with characteristic late Middle Pleistocene taxa – Hyaena, Canis, Haploidoceros, ... (Brugal et al., 2021) – in association with an early Middle Palaeolithic lithic assemblage. Prior studies showed that mammal bones were primarily accumulated by hyaenas. Moreover, first bone and lithic refits had called into question the validity of previously established layers. In fact, several origins and modifying agents are suspected – natural, non-human and human predators – resulting in mixtures (amalgam/palimpsests) that need to be distinguished and dissociated to better understand the role of human groups within the cave.

Our revision of lithics and faunal remains from excavations undertaken at the end of the 20th century, combined with data from a new research program initiated in 2019, allowed to increase the number of bone and lithic refits and to carry out a multi-factorial spatial analysis based on more than 10,000 coordinated remains. The integration of paleobiological and taphonomic information into an intra-site GIS enables a comprehensive understanding of deposits formation as well as the post-depositional processes involved. Thus, this multi-disciplinary approach helps to specify the nature of occupations and their temporalities in a redefined stratigraphic framework.

Brugal J.P., Giuliani C., Fosse P., Fourvel J.B., Magniez P., Pelletier M., Uzunidis A., 2021. Preliminary data on the middle Pleistocene site of Lunel-Viel I (Hérault, France). *Alpine and Mediterranean Quaternary*, 34 (1): 1-13, doi.org/10.26382/AMQ.2021.08

4 RECONSTRUCTING NEANDERTHAL LEARNING PROCESSES OF QUINA LITHIC EXPLOITATION THROUGH REFITTED EXPERIMENTAL ASSEMBLAGES AND ARCHAEOLOGICAL REMAINS FROM DE NADALE CAVE, ITALY

Cattabriga, Gloria (IPHES, Institut Català de Paleoecologia Humana i Evolució Social, Tarragona, Spain; Universitat Rovira i Virgili, Tarragona, Spain) - Bargallo Ferrerons, Amelia (IPHES, Institut Català de Paleoecologia Humana i Evolució Social, Tarragona, Spain; Universitat Rovira i Virgili, Tarragona, Spain) - Delpiano, Davide (University of Ferrara, Ferrara, Italy) - Livraghi, Alessandra (TRACES UMR5608, Université Jean Jaures, Toulouse, France) - Palomo, Antoni (Universitat Autònoma de Barcelona, Barcelona, Spain) - Peresani, Marco (University of Ferrara, Ferrara, Italy)

Lithic refits provide us with a broader understanding of our ancestors' technological strategies, exploitation methods, social dynamics, spatial distribution, and site organization of activities. Another fascinating aspect of refits is their ability to focus on individuals. Interested by these potential insights, we decided to use lithic refits to investigate knapping learning, specially comparing archaeological refits with lithic assemblages produced by modern humans.

The first instance comes from Middle and Upper Palaeolithic lithic assemblages, mainly produced with Levallois, Quina and Laminar exploitation. In particular, we will present the results of the study of a Quina-oriented lithic assemblage found at De Nadale Cave (northern Italy, 70200 ± 1000/900 cal BP).

The second evidence arise from experimental knapping sessions, where participants with different knapping background were tasked with obtaining the same lithic blanks found in the archaeological record, either through imitation or by following direct instructions given by an expert knapper. After analysing archaeological and experimental lithic assemblages by selecting common technological attributes to identify knapping skills levels, we used refits to get a closer look into learning behaviours.

In our situation, experimental lithic refits proved particularly useful because they allowed us with an almost complete understanding of knappers' choices and reduction sequences. Overall, thanks to refits, we were able to dissect the sequences of core reduction actions to determine knapping abilities. We identified differences at the level of knappers' choices and problem-solving and, more interestingly, recognized patterns of exploitation and how these evolved throughout knapping sessions. Therefore, we would like to emphasize the crucial role of refits in this type of analysis focusing on knapping skills determination and the investigation of learning behaviours.

5 MULTISCALE REFITTING TO ASSESS LARGE OPEN-AIR SITES DURING THE MIDDLE PALAEO-LITHIC: THE EXAMPLE OF ROUTE DE BRIAL - LIOUNET (FRANCE)

Viallet, Cyril (Paléotime / HNHP) - Mathias, Cyrielle (HNHP / CRFJ) - Vaissié, Erwan (Paléotime / ArScAn-An-TeT) - Fernandes, Paul (Paléotime / TEMPS) - Rué, Mathieu (Paléotime / ASM)

An excavation conducted recently as part of rescue archaeology yielded more than 15,000 lithic artifacts at the Route de Brial – Liounet site in Southern France. Archaeological material was found within four sedimentary units covering an area of over 30,000 m². The archaeological material uncovered can be attributed to the Middle Palaeolithic, and the sedimentary deposits date back to the Upper Pleistocene. Raw materials are diverse and include different types of quartz, quartzites and silicites. Field data and the overall spatial analysis of the remains reveal a wide disparity in distribution both in plan and in vertical profiles, showing significant lateral variations.

Understanding the dynamics of sedimentary deposits and post-depositional processes is fundamental and raises questions about the notion of the archaeological site itself. What does the archaeological record of the Route de Brial - Liounet represent? In order to specify the stratigraphic distribution of the artifacts and to examine the impact of human activity on their distribution in plan, a vast campaign of refitting was carried out.

Given the archaeological context (artifacts more or less concentrated, extensive excavated area) and the time constraints of rescue archaeology, methodological choices had to be made for both excavation methods and post-excavation processing. For this study, it involved varying the scales of analysis, depending on the initial field data quality and research questions (manual excavation, mechanical excavation). We selected specific units excavated manually to conduct exhaustive refitting and more precise tests on specific raw materials within the material excavated with mechanical excavators.

In this paper, we present our protocol, the results of our analysis, and their impact on geoarchaeological and spatial interpretations for this extensive Middle Palaeolithic occupations.

6 UNEXPECTED REFITTINGS IN THE LEVALLOIS WORKSHOP OF SAINS-EN-AMIÉNOIS (HAUTS-DE-FRANCE)

Tuffreau, Alain (University of Lille, UMR 8164 HALMA, CNRS) - LAMOTTE, Agnès (University of Lille, UMR 8164 HALMA, CNRS) - MARCY, Jean-Luc (Maison de l'Archéologie, Dainville (France))

The Sains-en-Amiénois Middle Palaeolithic site is located 8 kilometres south of Amiens. 834 artefacts (Levallois, non-Levallois cores, numerous flakes from these two types of cores and a large amount of retouched tools) were recovered from surface collections and archaeological surveys dating from 1979 (Series B at the top of the slope) and 1981 (Series A at the bottom of the slope), 50 metres apart. Senonian chalk is present throughout, yielding numerous flints, and Levallois and non-Levallois chaînes opératoires can be observed. In 1996, a new, enlarged test pit at the bottom of the slope, close to that of 1981, enabled the stratigraphy of an asymmetrical valley and a Levallois workshop near the banks of « the carrière watercourse » to be confirmed. Here, the archaeological level consists of silty-chalky formation underlying a complex of humus-bearing silts attributed to the early glacial period (Warneton complex). These, in turn, underlie the soft, bedded silts and limestones of pleniglacial phases. Series A contains 331 artefacts, series B 537 artefacts and the 1996 excavation 493. The expanded 1996 survey yielded a large number of lithic refittings that illustrate all stages of exploitation of very large blocks of flint. The refittings help us to describe the precise content of a knapping Levallois workshop including the variability of several Levallois and non-Levallois production. Some cores are mainly exploited by the production of natural back-knives. Preferential Levallois flakes are missing and are certainly exported outside of the site as they are also missing from the refittings. The spatial distribution of the lithic and faunal remains tends to show that the highest densities of remains belong to the workshop and the lowest (lithic) are associated with the exploitation of the bison. Although rare, they nevertheless illustrate a connexion in activities between the two parts of the site.

7 IUP BOHUNICIAN TECHNOLOGY AND REFITTING OF ITS LITHIC ELEMENTS

Škrdla, Petr (Institute of Archaeology of the CAS, Brno)

The refitting of individual lithic elements back into its original chert nodule provides an invaluable contribution to technological studies. When successful, it allows a detailed reconstruction of the whole chaîne opératoire and allows comparisons between individual sites. The refitting approach has been utilised in the Czech Republic by the author since the 1990s. Lithic material excavated from the IUP workshop sites located directly at the Stránská skála raw material outcrop have been successfully refitted into sequences with a high degree of completion. Fourteen nodules or blocks of raw material were almost completely reconstructed. Usually only one or several constituent pieces were missing (they were probably removed from the site). In addition, a series of less complete sequences allowed a detailed study of each step of the knapping process, contributing to the development of a theoretical model for Bohunician technology. In contrast to the workshop sites at the raw material outcrop, the completeness of refitted sequences

tends to be significantly lower with increasing distance from the outcrop, in contexts of more intensive consumption of blanks or tools, and more intensive off-site transport.

In order to express the differences between individual assemblages in a more standardized form, two indices were defined – an index of conjoinability (ic) and an index of size (in).

At a broader scale, the refitted assemblages also allowed extra-regional comparisons, in our case between Bohunician technology from Stránská skála and Emiran technology from Boker Tachtit, levels 1-3.

In addition, if we assume that knapping of every individual core represents a single chronological event, the spatial analysis of refitted artifacts then provides invaluable information about site formation processes, integrity of the artifact bearing horizon, as well as the internal organization of the site.

8 **REFITTINGS IN THE EPONYMOUS OPEN-AIR SITE OF SAJÓBÁBONY (BÁBONYIAN) (HUNGARY) : A KEY TECHNIQUE TO RESOLVE ARCHAEOLOGICAL PROBLEMATICS**

Lamotte, Agnes (University of Lille, UMR 8164 HALMA, CNRS) - Mester, Zsolt (University of Budapest, UMR 7194 HNHP, Paris)

In the Northeastern part of Hungary, in the town of Sajóbáony is located the eponymous site of Mész-tető (Babonyan). This Middle Palaeolithic open-air site is attributed to last glacial cycle. The cultural facies is characterised by leafpoints, Micoquian bifacial tools, Bábonyian knives and very rare core. The raw material used for both shaped tools and flake production is mainly quartz-porphyre.

Since 2019, the international programme of excavations led by A. Lamotte and Zs. Mester, started at the site with many aims. Among them, the new programme wish to provide a clear typo-technological characterisation of the industry, get radiometric dating, explore and resolve the problem of one or several recurrent occupations, explain the function site. For that, many refittings have been done recently with 63 group of refitting integrating quartz-porphyre and limno-silicite. Refitting decline many possibilities such like flake on flake, flake on leafpoint, leafpoint tip on base, distal with proximal part of the flake etc... To define the activities yielded on the site and to clarify the site function become realizable since refittings are done. Two excavation of 12 and 6 m2 distant from 14 meters are now on connexion thanks to them, helping us to show large places of activities. Also, refittings help us to think about one main occupation instead of several short one. The 63 refittings finally help us, as a key technique for investigation in taphonomy, site formation and its integrity, human behaviour by the prism and help of spatial analysis.

9 **USING REFIT STUDIES TO IDENTIFY SITE FORMATION PROCESSES AND LITHIC PRODUCTION CONCEPTS IN THE AURIGNACIAN OF GEISSENKLÖSTERLE CAVE**

Schray, Svenja (University of Tübingen) - Conard, Nicholas (University of Tübingen; Senckenberg Centre for Human Evolution and Palaeoenvironment)

Geißenklösterle Cave plays an important role in assessing the beginning of the Upper Paleolithic in Europe and in contextualizing Aurignacian technological innovations and symbolic artifacts including personal ornaments, figurative art and music. The site was excavated between 1974 and 2002 revealing deposits rich in finds from the Mesolithic to the Middle Paleolithic. The Aurignacian is comprised by archaeological horizons (AH) II and III. These layers date to between 42,500 and 35,000 cal. BP representing a pivotal phase in the spread of anatomically modern humans in Europe.

In 1988, Hahn presented first results on the study of lithic refits in the Aurignacian assemblage of Geißenklösterle highlighting its use as a crucial tool for understanding site formation processes and reconstructing lithic production concepts. In this contribution, we present an updated record of refits from decades of research. Additionally, we combine our data with spatial analysis to assess the stratigraphic integrity of the deposits and to determine areas of activity. This approach allows us to identify two different patterns of find accumulation corresponding to AHs II and III. Within these find concentrations, lithic refits allow to reconstruct technological production concepts of blades and bladelets. From the artifacts missing from the chaîne opératoire we can infer about their transport for use outside the cave indicating a dynamic settlement system of Aurignacian people in the Swabian Jura.

10 **FROM LAUREL TO SPLINTERS: THE DETAILED BIOGRAPHY OF A LARGE-SIZED LAUREL LEAF PREFORM**

Gomes de Almeida, Miguel (Morph / Grupo Dryas; Uniarq - Centro de Arqueologia da Universidade de Lisboa; SERAP Claise – Société d'Études et Recherches sur le Paléolithique de la Vallée de la Claise) - Aubry, Thierry (FCP - Fundação Côa Parque; Uniarq - Centro de Arqueologia da Universidade de Lisboa; SERAP Claise – Société d'Études et Recherches sur le Paléolithique de la Vallée de la Claise) - Walter, Bertrand (SERAP Claise – Société d'Études et Recherches sur le Paléolithique de la Vallée de la Claise)

Located in central France, close to an exceptional flint source, the Maîtreaux site is characterized by the abundant lithic remains of the successive passages of a small Solutrean group. Though knapping activities were clearly the focus of the group, the archaeological remains and excellent preservation of spatial information demonstrate the presence of non-experienced knappers and other activities unrelated to flint during the group's short stays at Les Maîtreaux.

Two main contributions result from the analysis of the site:

1. The thorough description of the microhistory of every activity that left behind mineral remains;
2. A dynamic view of the group's economic strategy, as evidenced by (1) incoming objects and raw materials, (2) on-site activities, and (3) exported lithic tools and blanks.

Intensive refitting of the lithic remains provided a detailed technological characterization of the group's knapping activities, directed towards the production and exportation of laurel leaf preforms, backed bladelets, and reserves of blade blanks for later modification into shouldered points.

Alongside this primary knapping production, the technological and spatial analysis of the large refitted sequences yielded crucial insights into the group's daily life and unusually detailed evidence of technical and social processes.

In this presentation, we examine a single large laurel leaf preform: a first accidental fracture, during bifacial shaping, is followed by two intentional impacts on the flat surface of the broken preform, causing the fracture of the piece.

This intentional fracture of accidentally broken preforms or laurel leaves has been documented in other Solutrean sites and interpreted as evidence of either an instant rage attack of the unfortunate knapper or a demonstration of the symbolic value of these pieces.

The site's abundant technological information and exceptional preservation of spatial data allows us to delve into this matter, as we trace the broken piece's trajectory throughout the site.

11 **CONNECTIONS IN TWO SHORES: LITHIC TAPHONOMY OF MAGDALENIAN ASSEMBLAGES FROM THE ATLANTIC AND MEDITERRANEAN FAÇADES OF IBERIA**

Bel, Miguel Ángel (PREMEDOC-GIUV2015-213, Departament de Prehistòria, Arqueologia i Historia Antiga, Universitat de València; UNIARQ-Centro de Arqueologia da Universidade de Lisboa, Faculdade de Letras de Lisboa, Universidade de Lisboa) - Zilhão, João (UNIARQ-Centro de Arqueologia da Universidade de Lisboa, Faculdade de Letras de Lisboa, Universidade de Lisboa) - Villaverde, Valentín (PREMEDOC-GIUV2015-213, Departament de Prehistòria, Arqueologia i Historia Antiga, Universitat de València)

Knowledge about Palaeolithic societies depends highly on the integrity of the material record preserved at archaeological sites. For this reason, it is necessary to assess the role played by formation processes in the configuration of the archaeological assemblages. In that sense, one of the most powerful tools for the taphonomic study of Palaeolithic sequences is refitting. We present the lithic refitting analysis of two open-air sites, Bairrada and Olival da Carneira (Santarém, Portugal), and a cave site, Cova de les Cendres (Alicante, Spain), with Magdalenian occupations from different moments. The quantification and spatial analysis of refits allow us to assess the degree of integrity of these deposits. We interpret the different results considering each site's specific geoarchaeological characteristics, especially regarding the influence of their open-air or karstic character. Some questions arise when we analyse the data: Do the refits found relate mainly to the formation processes of each site? How could methodological factors influence the detected patterns? Are the studied assemblages well-suited to reconstruct cultural evolution through the Magdalenian? Our work underscores the need to develop these taphonomic analyses as a previous step to behavioural or paleoenvironmental studies and demonstrates the critical requirement that such approaches be underpinned by stone tool refitting studies. The final objective is to place on a more solid ground our understanding of the Magdalenian of the Atlantic and Mediterranean façades of the Iberian Peninsula.

12 INVESTIGATING TECHNICAL BEHAVIOUR AND SITE FORMATION PROCESSES THROUGH LITHIC REFITTINGS FROM COVA GRAN DE SANTA LINYA (NORTHEASTERN IBERIA)

Sánchez Martínez, Javier (CEPAP-UAB - Centre d'Estudis del Patrimoni Arqueològic de la Prehistòria, Universitat Autònoma de Barcelona; ICArEHB - Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour, Universidade do Algarve; IPHES-CERCA, Institut Català de Paleocologia Humana i Evolució Social) - Martínez Moreno, Jorge (CEPAP-UAB - Centre d'Estudis del Patrimoni Arqueològic de la Prehistòria, Universitat Autònoma de Barcelona) - Mora, Rafael (CEPAP-UAB - Centre d'Estudis del Patrimoni Arqueològic de la Prehistòria, Universitat Autònoma de Barcelona)

The study of human behaviour in prehistoric societies constitutes a primary objective of archaeological and anthropological research. One avenue to observe behavioural aspects within past populations involves analysing their technical organization. This analysis can be conducted in greater detail, depending on how the formation of sedimentary deposits influenced the preservation of the archaeological record. To solve this, lithic refittings have emerged as a valuable method to enhance the contextual resolution of Palaeolithic sites. However, this method is not uniformly applied for explaining site formation in archaeological research.

The site of Cova Gran de Santa Linya (NE, Iberia) hosts numerous archaeological contexts that allow evaluating the impact of post-depositional events on the preservation of human occupations, especially in the Platform Sector. This is exemplified by unit 7P (20505-18294 calBP), which has been partially affected by intra-site erosive processes, resulting in complex vertical and horizontal stratigraphical relationships during the Last Glacial Maximum sequence of the site.

To assess whether the impact of natural and anthropic disturbances affected the resolution of unit 7P, we conducted lithic refittings and technological analysis, combined with spatial data. Refittings indicated the lithic assemblage remained unaffected by erosive events at the site, reinforcing the in-situ preservation of the occupation. The spatial distribution revealed a cluster of core-blank and dorso-ventral refittings in 2m². This cluster may correspond with a specialised area associated to knapping activities that supports the integrity of the assemblage. Further examination of the main cluster, in conjunction with a hearth, facilitates visualizing site organizational patterns characterised by low-distance intra-site mobility.

All in all, we underscore the necessity of conducting refittings as an indispensable and holistic method to enhance the contextual resolution in archaeological assemblages, thereby precisising the natural and human factors involved in the formation of Palaeolithic sites.

13 HOW TO MAKE A BIG BLADE? A CONTRIBUTION FROM MIDDLE MAGDALENIAN REFITS AT VILLAZETTE (CREYSSE, DORDOGNE)

Bocquel, Manon (CNRS UMR 5199 PACEA, Université de Bordeaux) - Beauvais, Pierre-Antoine (Fyssen Post-doctoral Fellow University of Cape Town; UMR 5608 TRACES, Université Toulouse Jean-Jaurès) - Dijkstra, Lukas (UMR 5608 TRACES, Université Toulouse Jean-Jaurès) - Dachary, Morgane (SRA Nouvelle-Aquitaine; UMR 5608 TRACES) - Delvigne, Vincent (CNRS, UMR 8068 TEMPS, Université Paris Nanterre; Service de Préhistoire, Université de Liège) - Langlais, Mathieu (CNRS UMR 5199 PACEA, Université de Bordeaux)

Around 17,000 cal BP, the Magdalenian in south-western France was marked by the presence of blades in 'Bergeracois' flint, whose exceptional quality questions the socio-economic status of the men and women who created them. These blades are almost exclusively discovered in the form of batches of finished objects. However, the methods used to produce them have yet to be described and discussed in relation to what is currently known about 'standard' blade production.

Located in the Aquitaine Basin, the Villazette site (Creysse, Dordogne) is settled on the low terraces of the Dordogne river, whose immediate environment harbours many high-quality 'Bergeracois' flint resources. Excavations have revealed a series of open-air occupations, including two layers relating to the recent Middle Magdalenian and Early Upper Magdalenian phases. As one of the few deposits to have yielded an abundant and well-contextualized flint industry for this period, this site provides a unique opportunity to understand the technical and spatial organization of the different types of blade production.

Refitting is a fundamental tool for a detailed description of blade production chains, particularly in early stages, as yet undocumented for the Magdalenian of the Southwest. By employing this method of analysis in our study, we can not only appreciate the technical variability of the products, as seen through the management of different knapped volumes, but also investigate various degrees of expertise, especially in relation to the production of large supports.

14 REFINING CULTURAL FRAMEWORKS THROUGH DEMONSTRATION OF TYPOLOGICAL AND TECHNOLOGICAL ASSOCIATIONS BY REFITTING: A LATE LAST GLACIAL CASE-STUDY FROM SOUTHEAST BRITAIN

Wenban-Smith, Francis (University of Southampton)

Despite substantial historical critique, the attribution of material cultural remains within a culture-historical framework remains a fundamental aspect of archaeological practice. For the Palaeolithic, this is focused upon the recognition of lithic industrial traditions based on distinctive tool-types and technological practices. Based on stratigraphy and dating, the Palaeolithic material cultural record has been structured into cultural frameworks that reflect perceived trajectories of the continuity and dispersal of populations, or at least of cultural practices. The late Last Glacial of the North European plain - and in particular its western part: the northeast Paris Basin, the southern North Sea area and southeast Britain - is one arena with a reasonably well-established framework for the spread and subsequent development of Final Magdalenian populations in conjunction with climatic oscillations at the end of the Last Glacial. However, there are various problems integrating the frequent open-air sites of this period into this framework. These typically lack well-dated layers of occupational evidence with high stratigraphic integrity, and represent unknown durations of occupation. Thus, there is uncertainty over the contemporaneity of the accumulation of tool-types and knapping waste products that might be present at a site. Here, refitting is applied to a late Last Glacial flint scatter, and used to demonstrate the associations of various flint tool-types (a) with each other, and (b) with distinctive knapping strategies for blade production. Confirming these associations provides a more robust basis for the cultural attribution of sites within the late Last Glacial framework. In the context of southeast Britain, and the northeast Paris Basin, this work suggests that some (or many) Long-Blade, Belloisian and epi-Ahrensburgian sites may not represent a Terminal phase of the Late Upper Palaeolithic. Rather, they may represent (or at least substantially include) occupation contemporary with (presumed older) Federmessengruppen sites.

15 LITHICS & FAUNA REMAINS OF PIT 6, MEZHYRICH SITE: WHAT DO THE PALAEOLITHIC HOUSEHOLD PITS TELL US ABOUT?

Dudnyk, Diana (The Institute of Archaeology of the National Academy of Science of Ukraine; Centre for Paleoethnological Research) - Chymyrys, Marharyta (Taras Shevchenko National University of Kyiv; Centre for Paleoethnological Research) - Shydlovskiy, Pavlo (Taras Shevchenko National University of Kyiv; Centre for Paleoethnological Research) - Alekseienco, Daria (Taras Shevchenko National University of Kyiv; Centre for Paleoethnological Research)

The Upper Palaeolithic record of Eastern Europe is rich with spectacular mammoth-bone dwellings and numerous features, comprising at least 13 sites, with Mezhyrich being one of them. Radiocarbon dating places the Mezhyrich site at 15-14.3 kyr BP.

One of the main features of the Mezhyrich is the remains of four dwellings constructed with mammoth bones, each surrounded by several household pits. Pit 6 is associated with the structure of the Dwelling 2. The investigation of this pit occurred over a span of more than 20 years, with several episodes. The Palaeolithic cultural layers of the site lie 2.5-3 m below the modern surface. Stratigraphic studies indicate three episodes of sediment accumulation in the pit, potentially corresponding to different human activities on the site.

Typically, flint artefacts might be found in the pit due to garbage falling. Analysis of the lithic assemblage revealed a continuous core reduction strategy conducted directly on the site. Flintknapping aimed to produce blanks for tool manufacturing such as bladelets, micro-blades for distant weapons insets and blades, bladelets for domestic toolkits.

Analysis of the faunal remains reveals several patterns of human activities, including the use of bones for cooking, fuel, raw materials for tools, and adornment making. The zooarchaeological analysis identified several main categories of materials, including blanks of mammoth ribs, bone tools crafted from long bones of small/medium-sized mammals, and ornaments made from teeth.

The discovery of products within a single enclosed assemblage and in a clearly defined stratigraphic position enables us to comprehend the technological processes characteristic of the Mezhyrichian variant of the Eastern European Epigravettian, thereby deepening our understanding of the household and everyday life of Upper Palaeolithic hunter-gatherers at the settlement. Studying the collection further expands the description of this site and provides insights into the lives of its inhabitants.

16 REVISITING THE ANALYSIS OF LITHIC REFITTED ARTEFACTS AT THE UPPER PALAEOOLITHIC SITES IN JAPAN: ITS POTENTIAL AND CHALLENGES

Takakura, Jun (Archaeological Research Centre, Hokkaido University)

Research at the Upper Palaeolithic sites in Japan has yielded a large number of lithic refitted pieces since the late 1960s and early 1970s. The importance of the analysis of lithic refitted artefacts has been emphasised as they provide essential insights into the study of lithic production technology and site formation process, leading to the reconstruction of human behaviours conducted at the sites. Such studies appeared at about the same time that the studies of Palaeolithic sites using lithic refitted artefacts began in western Europe. In this paper, I will review the history of the study of lithic refitted artefacts in the Palaeolithic sites of Japan and investigate what problems have been identified as challenges and what methods of analysis have been chosen to deal with these challenges. Through this review of research trend, the possibilities and problems of analysing the lithic refitted artefacts at the Upper Palaeolithic sites will be discussed.

17 RE-COMPOSING TIME AND SPACE: INTEGRATING LITHIC AND INTRA-SITE SPATIAL ANALYSIS WITH REFITTINGS. THE OPEN-AIR SITE OF MALGA STAULANZA (BELLUNO, ITALY)

Cecchetti, Marzio (Dipartimento di Studi Umanistici, Sezione di Scienze Preistoriche e Antropologiche, Università degli Studi di Ferrara, Ferrara, Italy) - Visentin, Davide (Dipartimento di Studi Umanistici, Sezione di Scienze Preistoriche e Antropologiche, Università degli Studi di Ferrara, Ferrara, Italy) - Bertola, Stefano (Dipartimento di Studi Umanistici, Sezione di Scienze Preistoriche e Antropologiche, Università degli Studi di Ferrara, Ferrara, Italy) - Fontana, Federica (Dipartimento di Studi Umanistici, Sezione di Scienze Preistoriche e Antropologiche, Università degli Studi di Ferrara, Ferrara, Italy)

The study and interpretation of open-air Palaeo-Mesolithic sites is often challenging, even when a solid excavation methodology is applied. Multidisciplinary analysis (e.g. geoarchaeology) may contribute to the identification of the post-depositional dynamics that occurred at the site. However, circumstances such as bioturbation can still limit the interpretation of the stratigraphic record. This is particularly true when dealing with "persistent places", sites in which multiple occupations occurred over time. In these cases, the potential of refittings is even more evident as a tool to prove the consistency of the single assemblages within the total record.

In this communication, we present the case-study of Malga Staulanza (Belluno Dolomites, Italy), an open-air high-altitude site occupied during the Late Upper Palaeolithic (Late Epigravettian) and the Early Mesolithic (Sauveterrian). Considering the weak stratigraphic reliability due to soil formation processes and the low depositional rate of mountain environments, the high frequency of refittings was pivotal for a) the accurate identification of the exploited raw materials and b) the study of the lithic reduction sequences. The spatial information provided by the refitting assemblages also allowed us to confirm c) two spatially distinct areas of dispersion of the lithic artefacts, broadly corresponding to the two occupations and d) a major post-depositional disturbance (i.e. treefall) occurring between the two. Refittings strongly contributed to the general discussion of distinct chrono-cultural phases of the site, as well as the spatial organisation and taphonomy of the occupations. In conclusion, the analysis highlights the potential of refittings as a powerful tool for complementing traditional techno-economical and intra-site analysis for the reconstruction of the occupational and post-depositional dynamics of prehistoric sites.

18 RECONSTRUCTING SITE FORMATION PROCESSES THROUGH FAUNAL ANALYSIS AND REFITTING AT THE UPPER PALEOLITHIC AND MESOLITHIC SITE OF KOHLHAU-ABRI, SOUTHWESTERN GERMANY

Toniato, Giulia (State Office for Cultural Heritage of Baden-Württemberg, Germany) - Tafelmaier, Yvonne (State Office for Cultural Heritage of Baden-Württemberg, Germany)

Kohlhau-Abri is a rock shelter site located close to the Lone Valley, in Southwestern Germany. It was excavated between 2015 and 2018 yielding a thick stratigraphy spanning the Late Pleistocene to the Holocene. Preliminary analyses of the lithic remains have identified the presence of two cultural complexes pertaining to the Magdalenian and Mesolithic, with the Mesolithic assemblage displaying both Early and Late Mesolithic technological components. However, the study of the faunal assemblage provides a more nuanced picture around the history of the depositional and post-depositional processes that affected the distribution of the archaeological remains. Bone refitting allowed us to recognize the vertical and horizontal movement of some of the finds, and the presence of conjoined elements attributable to a large cervid species whose AMS 14C dates pertain to the Late Palaeolithic. Some of the bones also display anthropogenic marks providing possible evidence of human occupation during the Late Palaeolithic that is not clearly recognizable from the lithic artefacts. Our study highlights the importance of bone refitting as a valuable tool for disentangling the impacts of human activities from taphonomic processes, especially at sites with a high degree of post-depositional alteration.

19 CAN WE DO MORE WITH REFITS? SOME EXAMPLES FROM THE PLEISTOCENE/HOLOCENE TRANSITION IN BELGIUM

Vandendriessche, Hans (University of Ghent)

The benefits of refitting for our understanding of the lithic technological aspects of a specific industry or a time period are well known. Refitting first and foremost provides highly detailed information on the knapping methods used by prehistoric artisans. Besides that, by combining artefacts that were differently distributed across a site, vertically or horizontally, refitting also has the potential to provide information on the spatial aspects of lithic technology and on site taphonomy.

In this contribution, we use refit data from several Belgian sites situated at the Pleistocene/Holocene traditions (e.g. Ruien, Remouchamps, Kerkhove; Vandendriessche, 2022; Vandendriessche et al., 2023) to explore two main research topics: (1) How refitting can be used as an epistemological tool to increase our understanding of knapping methods at these sites, but also of the limitations of other types of technological analyses (quantitative attribute-based analyses, as well as schémas de lecture diacritique) with regards to the reconstruction of these methods; (2) How we can gain a better understanding of the systemic and post-depositional processes that impacted the spatial organization of the sites, by making use of refit line lengths and orientations, as well as refit dispersal rates and for example, movements of burned and non-burned lithic artefacts.

Vandendriessche, H. (2022) – Flintknapping from the Lateglacial to the Early Holocene. The Belgian Scheldt valley sites of Ruien and Kerkhove. Sidestone Press, Leiden.

Vandendriessche H., Vanmaldegem E., Crombé P. (2023) – Catching a glimpse of Mesolithic settlement patterns and site re-occupation through lithic refitting, raw material characterizations and absolute dating. *Journal of Archaeological Method and Theory*, 30 (1), p. 239-267.

20 UNLOCKING THE STRUCTURE OF A MESOLITHIC OPEN-AIR SITE THROUGH REFITTING: A CASE FROM GAILIŪNAI 2, SE LITHUANIA

Gaižauskas, Lukas (Lithuanian Institute of History)

Refitting of lithic finds, while very common in research of Palaeolithic contexts, is not as often applied in the studies of Mesolithic sites. The usefulness of refitting is especially limited in the research of Stone Age sites in the South Eastern Baltic, where unstratified archaeological layers formed as a result of multiple occupation episodes are usually found and where lithics from just one raw material type predominate. One recently excavated site Gailiūnai 2, located in SE Lithuania and dated to the mid 7th millennium BC, departs from this stereotype as it was found to represent the remains of a single-period hunter gatherer camp. The site contains a shallow archaeological layer that was not significantly disturbed by later post-depositional processes. Despite scant knapping activities carried out on the site and the minute nature of debitage, the application of refitting has allowed to reconstruct many links between flint artefacts found within debitage clusters. In particular, refitting results have been useful as an indication of the intensity and frequency of activities carried out on the site that would be difficult to assess using a different approach. The predominantly small refit sets indicate limited, possibly task-oriented knapping at the site. It seems that knapping products – blades and their fragments were carried away from the site as well as brought from outside and discarded. Data from refitting was complemented by findings of spatial analysis and use-wear analyses on lithic remains found at the site. From these multiple lines of evidence a case could be made for Gailiūnai 2 to have been a short-term, occasionally revisited campsite. The approach used in the case of this particular site sheds more light on the residential mobility patterns of local small Mesolithic hunter-gatherer communities and would be much more difficult at many contemporary sites.

301 WHAT IS A VILLAGE? COLLECTIVE ACTION, SETTLEMENT PATTERNS AND RURAL COMMUNITIES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Quirós Castillo, Juan Antonio (University of the Basque Country; University College London) - Eva Svensson, Eva (Karlstad University)

Session format: Regular session

The study of settlement patterns has been one of the major topics of rural archaeological studies from the beginning of the discipline. As a result, the definition of different categories based on the shapes of the sites, the study of creations, transformations and desertions of villages, hamlets, farms and other domestic spaces, or the analysis of the social and political impact of these trends have played a relevant role in the comprehension of rural landscapes. What is more, villages and other rural settlements have provided the bases for macroscale (landscapes studies) and microscale analysis (household studies, church archaeology, funerary archaeology), etc.

However, in the last few decades new approaches focusing the agrarian and outlying productive landscapes, and how peasants have organized their land use, have opened new avenues for revisiting site-center studies and, in general, the settlement-patterned paradigms. Within social archaeologies definition of communities and collective action, despite the morphology of their settlements, have been forwarded. New methodological and theoretical approaches to rural landscapes have added to the possibilities of studying peasant action beyond the settlement areas.

The goal of this session is to promote a collective reflection and discussion about rural settlements in Europe beyond the morphological and descriptive approaches, promoting long-term analysis and comparative perspective. In order to deal with the topic, theoretical informed papers and holistic landscape studies are welcomed.

The aim of the session should be to publish a collective book gathering different experiences all around Europe.

ABSTRACTS

1 WHAT IS A FARM? WHAT IS A HAMLET? COLLECTIVE PRACTICES AND CO-OPERATION IN THE RURAL LANDSCAPE

Svensson, Eva (Risk- and environmental Studies, ISK-department) - Johansson, Annie (County administrative Board (Värmland)) - Pettersson, Susanne (Independent)

Whereas regulated villages dominated champion agriculture southern Scandinavia, boreal Scandinavia has been depicted by historians as “single farmstead land” during medieval and early modern times due to single farms being listed in the cadastres. However, both more detailed investigations by historians and archaeological excavations have shown that the “single farmstead” was a construction, most likely for tax evasion, and that instead small hamlets were common. The hamlets appear to have been far less regulated than the villages in southern Scandinavia, but still included a high degree of co-operative and collective, and labour division, elements. Many of which went beyond the hamlet as organisational unit. Such strategies allowed the exploitation of many resources in the forested outlands, including transhumance practices. Instead, work co-operatives could include several hamlets or mix farmsteads from different hamlets. Also, labour division and specialisation in certain trades were organised within the hamlets as well as in between hamlets, and even on parish levels.

In this paper we will present several examples of such collaborative practices and labour divisions pursued by the peasants in boreal Scandinavia within livestock rearing, different handicrafts and exploitation of outland resources.

2 WHAT IS A VILLAGE FROM AN ARCHAEO-GEOGRAPHICAL POINT OF VIEW? ANSWERS FROM FRENCH EXPERIENCES

Watteaux, Magali (University of Rennes 2, research unit “Tempora”; Association française d’archéogéographie; UMR 7041 ArScAn, team “Archéologies environnementales”)

A lot is now known or well established about the history of rural settlement thanks to historical and archaeological research, concerning communities of people embedded in legal, political and economic networks; the socio-economic functions of hamlets and villages; the ‘origins’ of villages; the role of elites and political decisions in the creation of villages; the spatial organisation of villages; the organisation of relations between villagers and agrarian territories, etc.

The aim of this paper is to show what an archaeogeographic approach to rural settlement (villages, hamlets, etc.) - in the sense that it has been deployed in France since the 2000s - can add to our knowledge of them. The use of planimetric documentation, multiscale work and morphological analysis offer tools that can complement and even shed new light on the results of historical and archaeological studies of villages. This means starting with the planimetric forms rather than the texts or the excavations, and then moving back and forth between the different documents and the different scales of analysis.

Lastly, this archaeogeographic approach provides a multi-scalar, long-term spatialisation of the archaeological data, which helps to tell the story of our villages and their territories. In this sense, the results of archaeogeographic surveys can be useful both for historical knowledge and for spatial planning.

In the end, the intention is not to oppose the contributions of other specialists, but rather to show the value of an alternative methodology, which works at several spatial scales and diachronically, over the long term, and which is based on a morphological analysis that has been profoundly renewed over the last thirty years in France. The examples presented are intended to highlight the various contributions of this archaeogeographical approach and offer a comparative perspective.

3 WHAT CAN A VILLAGE BE? A FUTURE-FIT VILLAGE PERSPECTIVE

Schepers, Mans (University of Groningen, Faculty of Arts, Centre of Landscape Studies) - De Haas, Tymon (University of Groningen, Faculty of Arts, Groningen Institute of Archaeology) - Haartsen, Tialda (University of Groningen, Faculty of Spatial Sciences, Rural Geography) - Pelgrom, Jeremia (University of Groningen, Faculty of Arts, History) - Salemink, Koen (University of Groningen, Faculty of Spatial Sciences, Rural Geography) - Six, Clemens (University of Groningen, Faculty of Arts, History) - Zwiers, Maarten (University of Groningen, Faculty of Arts, History; University of Groningen, Faculty of Arts, American Studies; University of Groningen, Faculty of Arts, Low Saxon Language & Culture)

Interdisciplinarity, and transdisciplinarity, have been buzzwords for so long that they seem to have lost some of their meaning. Within archaeology, interdisciplinarity is arguably related, but not synonymous, to multiproxy analyses. Multiproxy analyses are generally associated with (sciency) analyses of artefacts and ecofacts, sometimes carried out by specialists from various disciplines. Interdisciplinarity should ideally reach beyond materiality, generating conceptual and theoretical perspectives from scholars with various backgrounds. In many, although clearly not all cases, this still generally includes people directly or indirectly intensively involved in archaeology. This facilitates a certain basic degree of mutual understanding.

The societal challenges we are currently facing, however, sometimes demand an even broader perspective. At the University of Groningen, we have recently initiated the Future-fit villages research group, as part of the Rudolf Agricola school for Sustainable Development. The group, currently still small, includes historians, geographers, and archaeologists, working on very diverse time periods (including ‘now’ and the ‘future’) and regions. This generates diverse perspectives in itself, which is further strengthened by the diverse research themes addressed, ranging from Roman agricultural landscapes, the impact of European countries on the countryside in their (former) colonies, both domestic and abroad, to the development of digital entrepreneurship in the ‘remote’ Scottish Highlands and Islands.

In our paper, we will not address any of these studies in great detail, but rather highlight some of the more overarching observations made in our group so far, ranging from very concrete and applicable cases of inter-scholarly inspiration to examples in which we were seemingly speaking different languages. We are curious to learn about similar initiatives from other research institutes, but are also most interested in extending our group beyond the University of Groningen.

4 VARIANCE AND VARIETY OF NEOLITHIC VILLAGES IN NE SERBIA – SOME EXAMPLES FROM SERBIAN BANAT

Mirkovic-Maric, Neda (Medjuopštinski zavod za zaštitu spomenika kulture Subotica) - Marić, Miroslav (Balknološki institut SANU)

The Neolithic period in NE Serbia, although well documented in its intensity is still rather poorly researched systematically. Neolithic villages, whilst numerous, are often only fragmentary examined, with few and far between excavated structures, seldom with just a single or only a few trenches. Larger scale excavations engulfing multiple structures or areas of Neolithic settlements is still missing.

However, the larger availability of magnetometry surveys in the area over the last decade has made it possible to some degree to better overview the size and structure of villages in the area with many

landscape and environment constrictions present during the Neolithic period. The surprising variety of settlement sizes, appearances and organisation indicates multiple approaches, most likely influenced by local landscape requirements and constrictions to settlement construction and organisation. It also indicates that the creation of regional centres was well underway towards the end of the Neolithic, with larger centres covering dozens of hectares and consisting of several hundred wattle and daub structures, appearing in the first half of the 5th millennium BC. The formation of the regional centres may have led to the gradual abandonment of smaller villages over the course of several hundred years and contributed to the aggregation of the population noticeable

towards the end of the Neolithic. In the presentation we present several examples of Neolithic villages from the Serbian Banat region predominantly recorded using magnetometry surveys.

5 GRADED VILLAGES SINCE THE 2ND CENTURY BC; RECORDING PERSISTENCE AND CHANGE IN THE DISTRICT HALFAMBT (GRONINGEN, THE NETHERLANDS)

Nijboer, Albert (University of Groningen)

The paper examines the settlement hierarchy that emerged during the Middle Ages in the present province of Groningen (The Netherlands). Before seawalls were constructed as low dikes during the 13th century, the region was prone to flooding resulting in highly fertile, alluvial deposits. The flooding, furthermore, led to artificial, settlement mounds of which there were hundreds, most of them small, a few hectares or less. Some of these minor mounds developed into villages during the early Middle Ages. A district of the city-state Groningen, is known as the Halfambt

with its main centre Baflo. Next to Baflo lies another man-made, settlement mound of ten hectares, Rasquert, that since the 2nd century BC never seems to have housed more than a couple of hundred people. Nonetheless, it developed into a separate jurisdiction due to a noble family that resided here during the 15th century. Both artificial mounds Baflo and Rasquert, roughly 15 kilometres to the North of the town Groningen, are separated by a waterway that connects the Wadden Sea with the inland. Both had their own focus; Baflo being more a medieval, ecclesiastical centre for the district Halfambt and Rasquert the home of some rising, noble families. This development can be explored well by examining an array of environmental, archaeological and historical data. In this paper, I describe the endurance of this landscape with small villages, grounded in the highly fertile, marine soils, which still accounts for its agricultural disposition. Nonetheless many changes occurred during its past 2000 years, becoming nowadays more like commuter villages. This account is a result of the “Project Rasquert”. Eventually, we intend to issue source publications of the archaeological and historical data available for the reconstruction of the ongoing adjustments occurring on the twin settlement mounds Baflo – Rasquert from onwards the 3rd/2nd century BC.

6 VETERANS AND SETTLEMENT PATTERNS ALONG THE LOWER DANUBE LIMES: INSIGHTS INTO THE ROMAN FRONTIER

Andreeva, Petya (National Archaeological Institute with Museum/Bulgarian Academy of Sciences)

The Roman army not only served as a pivotal force in organizing the administrative framework of the Lower Danube Limes but also played a central role in establishing and maintaining supply networks for the forts and the satellite settlements. After the incorporation of Moesia Inferior into the Roman Empire, the defensive frontier line experienced significant reinforcement. This marked the beginning of economic consolidation throughout the region, distinguished by fertile lands suitable for agriculture and abundant raw materials, including marble quarries and mines.

The constant need to deploy soldiers along the Lower Danube resulted in the discharge of a large number of veterans over time, many of whom likely settled in the region. Numerous veterans of Thracian origin, as evidenced by their diplomas and tombstones, often returned to their homelands. Moreover, the number of documented settlements at the frontier has notably expanded over time, hinting at a potential correlation with veteran settlements, for which evidence is steadily accumulating. Many of the preceding conclusions about the development patterns of the rural areas along the limes have traditionally relied heavily on epigraphic and literary sources. However, they often lack precision in representing the development and distribution of landholdings and domains.

In recent years, archaeological excavations and field studies have provided valuable insights into the structure and chronology of several villages associated with veterans along the Lower Danube. New evidence prompts inquiries into the development of settlement patterns and their interrelationships with both the frontier and the hinterland within the province. Field research of the rural landscape has also confirmed a sustained density of settlements and villae rusticae, some enduring into Late Antiquity. The accumulation of archaeological data has enriched our understanding of its economic viability within the broader context of regional and supra-regional trade and cultural networks.

7 SARCOPHAGI WITH RURAL LIFE THEME IN FARM NECROPOLISES BETWEEN ÇANDIR AND GÖKDERE VALLEYS

Akkaya, Ecem (Akdeniz University)

Bey Dağları Surveys, which took place within the borders of Antalya province, started in 1997 with a limited team. Since 2001, it has been conducted annually with a large team of 35–40 students and scientists. Within the scope of these researches, the exact locations of some settlements mentioned in the Stadiasmus Patavensis were determined and introduced to the scientific world, starting with major settlements. Not only major settlements but also their rural areas and farms were extensively examined. Through these studies, numerous sarcophagi predominantly dated to the 3rd century AD associated with farming were identified in Domuzağılı, Kartınpınarı, Hurma, and Hisançandır between Çandır and Gökdere. These sarcophagi, predominantly made of local limestone, exhibit similar decorative patterns. These include agricultural tools such as plows and scythes, as well as locally important animals such as oxen, deer and lions. At the same time, spears are depicted with tabula ansata, considering that they were influenced by Pisidia Termessos. The study focuses on rural life through sarcophagi scattered across a wide region, providing clues about rural life. There was a significant increase in sarcophagi production in the region between AD 170 and 250. Sarcophagi related to farms and farming suddenly increased in the 3rd century AD and lasted for only two generations. The common fabric of rural life is evident through the depictions on the sarcophagi. The study aims to decipher the identity of the rural areas through the significantly increased sarcophagi production, focusing on the rural identity through sarcophagi.

8 EARLY MEDIEVAL VILLAGES AND HAMLETS IN THE BASQUE COUNTRY: CONSIDERATIONS AT THE LIGHT OF A COMPLEX AND DIVERSIFIED ARCHAEOLOGICAL RECORD

Narbarte Hernández, Josu (University of the Basque Country) - Campos López, Teresa (University of the Basque Country)

In the last two decades, the Archaeology of early medieval villages and hamlets has experienced a considerable transformation in the Basque Country, due to the combination of different factors. First, the development of new theoretical frameworks has permitted to overcome the limits of the notion of ‘archaeological site’ and adopt a wider, landscape-based perspective. Second, the normalisation of preventive archaeological interventions has resulted in a notable increase -and diversification- of the archaeological data available. Third, the contribution of the archaeological sciences has added new possibilities to the informative possibilities of such records. Fourth, the chronological horizon of medieval villages has also experienced a shift, with an evidence for relevant changes occurring in the 6th–7th centuries, which eventually led to the establishment of the ‘classical’ hamlet network from the 8th century onwards. Because of these developments, the formation and evolution of early medieval villages appears to be a much more nuanced reality than it was previously thought, which means a need to re-think the concept of village communities itself in more contextual and holistically terms, based on the notion of collective action rather than in the definition of morphological typologies. In this communication, we present a revision of the state of archaeological records related to early medieval villages (6th–7th centuries) in the Basque Country, with the purpose of defining the main groups of elements of research, and their implications for the understanding of village formation.

9 NUCLEATED VS DISPERSED SETTLEMENT, PLANNING VS. SELF-ORGANIZATION OF THE SETTLEMENT SYSTEM IN THE MEDIEVAL LANDSCAPE OF SOUTHWESTERN FRANCE

Poirier, Nicolas (CNRS)

Macroscale models of rural settlement valid for France, identifying the emergence of agglomerated settlements between the 8th and 12th centuries, are mainly documented and operative for the northern half of the country. In the south (west), rural settlements remained largely dispersed, with “villages” playing only a marginal role in the management of populations and the organization of rural areas.

For reasons that remain to be clarified, the spontaneous “encellulement” of the early Middle Ages remained unfulfilled and gave rise to various initiatives throughout the Middle Ages driven by local elites (bastides, castelnaus, etc.). In the light of recent work involving pedestrian surveys and Lidar remote sensing, we will examine the relationship between grouped and dispersed settlements and their role in the management of agrarian and forest areas.

Indeed, systematic fieldwalking surveys carried out in the Garonne valley permitted to reconstruct the long-term dynamics of the settlement network and associated agrarian spaces, through the systematic collection of off-site material interpreted as the remains of agrarian manuring. This approach makes it possible to put forward hypotheses on the origin of present-day villages that are inaccessible to more invasive archaeological approaches. The use of Lidar technology enabled us to complete the map by revealing archaeological remains testifying to phases of occupation prior to forest settlement (motte-and-bailey castles, churches, plots of land). Lidar can also reveal forest management strategies that have ensured the sustainability of wood resources and the place of wooded areas in ancient agrosystems.

10 COLLECTIVE ACTION, COMMON RESOURCES AND RURAL COMMUNITIES IN THE EARLY MEDIEVAL PO VALLEY RIVERSCAPES (NORTHERN ITALY)

Panato, Marco (University of Nottingham)

Collective action, exploitation of common resources (comunalia) and rural communities in northern Italy have been recently re-examined by the historical and archaeological literature (Saggioro 2020, Santos Salazar 2020, Rao and Santos Salazar 2019). Case studies have been made regarding especially riverscape areas, such as the communities of Flexo (an unprecise area in the northern Emilian plain) or Lizzano, and their struggle to preserve their rights over a portion of woodland and wetland against the growing power of the abbey of Nonantola. While discussions and reconstructions of these communities have been extensive, limited efforts have been made to connect them with existing archaeological sites like the ninth- and tenth-century villages uncovered at Nogara and Sant’Agata Bolognese. Nor has there been an analysis of the ecological footprint of these archaeological sites and how their communities exploited the surrounding environments. This paper aims to describe these riverscape villages, delineating their social composition and ecological impact, while drawing comparisons between them. By integrating surveys from the early 2000s with a synthesis of written and archaeological sources, the research seeks to provide a more comprehensive understanding of early medieval villages, shedding light on settlement and social patterns in the post-Roman world. Eventually, for publication within an edited volume, the comparison would be extended to other northern Italian wetlands including new archaeological sites from Tuscany (Grosseto plain, Pecora Valley) and Romagna (Ravenna

hinterland); the aim of the chapter would be to define more precisely the nature of rural communities and villages in northern Italian wetlands between the sixth and the twelfth century CE.

11 **MEDIEVAL HAMLETS AT THE EDGE OF LAKE NEUSIEDLER RURAL SETTLEMENT DEVELOPMENT IN THE AREA BETWEEN PRESENT-DAY AUSTRIA AND HUNGARY**

Özyurt, Jasmin (Austrian Academy of Sciences) - Tobias, Bendeguz (Austrian Academy of Sciences) - Perstling, Claudia (Stadtarchäologie Wien) - Saliari, Konstantina (Natural History Museum Vienna) - Draganits, Erich (University of Vienna)

While high-medieval village-like structures are largely known, hamlets have hardly been investigated so far. In recent years, several hamlets have been archaeologically recorded south of the present municipality of Podersdorf am See (present day Austria), dating from the 10th to the 13th century CE. Characteristic of these hamlets is a small number of sunken featured buildings in a greater distance, most of them with ovens or fireplaces in one of the corners. The presentation discusses the structure and chronological development of these hamlets as well as their material remains. Questions will be raised as to the relationship of these settlements to larger surrounding villages, which are usually only known from historical documents. Their economic basis will be examined predominantly by animal-based food supply and animal husbandry. Further it will be investigated what material resources were available to them and how far the possible contacts went. Finally, the processes of landscape change during the Middle Ages will also be considered.

12 **OBSERVING THE MOVEMENT OF THINGS AND PEOPLE: SETTLEMENT PATTERNS IN A MICROAREA OF INLAND SICILY**

Lo Monaco, Viviana (University of São Paulo)

Sicily has always been a region with an agricultural and pastoral vocation. During Roman rule, it was known as the granary of Rome, and its feudal society structure persisted until the 19th century. Since the Neolithic period, human groups have occupied the island's inland areas, initiating a settlement pattern that adapted to the morphology and resources of the territory. During classical antiquity, before the significant expansion of the Roman Empire, both urban and rural organization in this area reveals that even the most inland territories were bustling with activities and people.

Between the late 5th century AD and the 17th century, it appears that many inland areas had transformed into semi-deserted regions, or at least, that's what can be inferred from written documentary sources. However, archaeology can tell a different story.

In this presentation, I will demonstrate how the approach of Collaborative Archaeology, utilizing Landscape Archaeology field methodologies, can unveil a part of the landscape's history that written sources remain silent about, and archaeological research has not adequately addressed. This collaborative effort, a three-way partnership between archaeologists and local residents interested in discovering and valorizing the territory, aims to observe the movement of people and things in the territory of a small inland town, San Cataldo (Caltanissetta), and its settlement patterns.

The ultimate goal is to try to understand how the needs of exploiting the territory and the necessity of adapting to its physical conditions may have influenced the development of society in this micro-region over the centuries.

13 **PRODUCTION IN THE VILLA FORENSIS „STARE MESTO“ NEAR ZDAR NAD SAZAVOU FROM THE PERSPECTIVE ENVIRONMENTAL ANALYSES**

Václavíková, Dominika (Charles University in Prag)

„Stare Mesto“ near Zdar nad Sazavou is a unique site for Czech archaeology, being the only village with a market right that was excavated completely. Its history is connected with the Cistercian Order, thanks to which there are also written sources about the development of the village and its market right; thus, the site provides an opportunity to compare written and archaeological sources, and a unique opportunity to investigate a village type well-known by written sources but scarcely investigated by archaeologists.

The paper introduces the results of various environmental analyses aimed at more detailed knowledge of iron production at the site. The study focused on the production chain of iron at the site, including special pottery types, by-products and carbons from the heating device. Finally, results of the analyses were contextualised into the results of the spatial analyses of the site. In second part paper is focused on other production for example pottery, stonework and limestone.

302 **LUXURY - STANDARD - POVERTY: ARCHAEOLOGY OF QUALITY OF LIFE IN MEDIEVAL AND EARLY MODERN TOWNS**

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Sawicki, Jakub (Institute of Archaeology, Czech Academy of Sciences in Prague) - Piekalski, Jerzy (Institute of Archaeology, University of Wrocław) - Cembrzyński, Paweł (Cluster of Excellence ROOTS, CAU Kiel)

Session format: Regular session

The term quality of life describes the overall well-being, i.e. how the needs of individuals and societies are satisfied. Well-being consists of economic variables like material wealth and non-economic ones like social capital, human health, physical condition, and knowledge. Economists, as well as sociologists dealing with these problems based on contemporary approaches, mostly agree that the most critical determinants of broadly understood well-being concern good nutrition, the lack of diseases, the presence of personal freedom and dignity, respect for other group members, safety from aggression, economic security, a stable and just law. Many of these concepts are relative, depending on local cultural practices, perceptions, and financial capacities, which makes them challenging to study in past societies. Nevertheless, in the case of medieval and post-medieval towns, approaching the quality of life from an archaeological perspective can bring new insight. Contrary to written records, which often register the social position and wealth of the upper part of urban society, the material remains of past activities bring us information on household possessions, quality of materials, dietary practices, and actual physical condition of individuals. To measure the quality of life based on archaeological sources, one needs to put them into the relational framework: understand what people considered as luxury, what was a standard, and what was poverty in a given time and space.

This session aims to discuss various approaches to luxury, standards and poverty as indicators of quality of life and inequalities in later medieval and post-medieval urban environments. We are particularly interested in papers relating to urban studies concerning:

- Theoretical approaches
- Dietary practices
- Population status based on bioarchaeological research
- Architectural research
- Material culture.

ABSTRACTS

1 **EXPLORING QUALITY OF LIFE IN MEDIEVAL AND POST-MEDIEVAL URBAN ENVIRONMENT: AN ARCHAEOLOGICAL PERSPECTIVE**

Piekalski, Jerzy (University of Wrocław) - sawicki, Jakub (Institute of Archaeology of the Academy of Sciences of the Czech Republic)

Issues related to “Quality of Life” or standards of living have been extensively discussed by economists and sociologists. They typically involve challenging aspects for archaeological discernment, such as access to medicine, balanced diet, or economic stability. Nonetheless, some available data to archaeologists allow for a direct examination of certain issues. Anthropological studies on diet, migrations, and diseases provide insights into the medieval population. Moreover, recent studies in the economic sphere propose new, more holistic approaches to the analysis of material culture, which traditionally was divided into elite and non-elite categories. However, recently proposed approaches—based, among others, on consumption strategies; diversity of available object types, which may indicate wealth; or distinguished finds known as Barometer Objects—serve as indicators of status. Yet, all these issues rely on subjective attempts to assign specific archaeological finds, usually from very challenging urban archaeological contexts, to pre-defined categories. Indeed, within a highly diverse archaeological material, we are able to recognize luxury based on raw materials, craftsmanship quality, or origin. But how can we archaeologically define poverty? In this introductory text, we aim to examine how various archaeological sources allow for the exploration of luxury, standards, and poverty in medieval and early modern cities.

2 THE POTENTIAL OF ARCHAEOLOGICAL METHODS FOR IDENTIFYING POVERTY IN PRE-INDUSTRIAL CITIES: A WROCLAW CASE STUDY

Duma, Pawel (Institute of Archaeology, University of Wrocław, Poland) - Legut-Pintal, Maria (Institute of Archaeology, University of Wrocław, Poland) - Piekalski, Jerzy (Institute of Archaeology, University of Wrocław, Poland)

This paper explores the methodological challenges of using archaeological evidence to study poverty in medieval cities. Our primary focus lies on identifying the fundamental difficulties in defining poverty-related criteria. We acknowledge the relative nature of such criteria and recognize that referencing contemporary city standards would lead to inaccurate inferences.

The proposed method for identifying poverty involves comparing the living conditions of various urban population groups and highlighting the identified differences. Our assessment is based on two key factors: diversity of consumption models and its levels and quality of housing conditions with architectural and artistic standard and location of the house in the city.

Our analysis is mainly based on the results of archaeological research, architectural and spatial analysis supplemented by information obtained from written sources. We are aware of their specificity and limitations. Only exceptionally do we have the possibility of attributing discovered material culture objects to an exact person. However, most findings represent collective deposits accumulated by groups inhabiting a shared plot of land with a house and its infrastructure. We cannot distinguish the owner of the house from the servants and tenants. Differentiating gender and age of artifacts owners can be challenging. Due to these limitations, our findings represent general trends rather than conclusive individual assessments. They reflect the combined activities of multiple individuals occupying diverse positions within households and the urban community.

3 ARCHAEOLOGICAL GLASS AS AN INDICATOR OF CONSUMPTION STRATEGIES AND SOCIAL STATUS IN LATE MEDIEVAL AND EARLY MODERN WROCLAW (POLAND)

Kunicki-Goldfinger, Jerzy (Institute of Nuclear Chemistry and Technology, Warsaw, Poland) - Duma, Pawel (Institute of Archaeology, University of Wrocław, Poland) - Miazga, Beata (Institute of Archaeology, University of Wrocław, Poland)

Almost thirty thousand glass fragments excavated in the Old Town in Wrocław, dating from around 1400 to around 1800 C.E., were examined using a modified approach based upon that proposed by Haase and Whatley (2020). Statistical evaluation of the results of typological studies as well as chemical analyses of selected items allowed the distinction between various categories of conspicuous artefacts and the “standard setters” (the inconspicuous objects representing the baseline of consumption). The results show the proportions of different categories of glass in succeeding centuries and for individual quarters of the city. The distinction between different chemical types of glass turns out to be very important, especially when individual glass fragments do not show any diagnostic typological characteristics. For example, among others trends, it was observed that although the share of ostentatious glass objects increased over time, the proportion of imported soda-lime-silica glasses among them decreased. This tendency of a decreasing share of sodium glass in the period from about 1400 to about 1800 in Wrocław is fully consistent with the general trend that we observe throughout Central Europe in this period.

Haase K., Whatley S. (2020). Consumption Strategies and Social Implications in Two Danish Towns in the 13th–16th Centuries. *Medieval Archaeology* 64(1):116-44.

4 LUXURY OR STANDARD? RINGS AS GRAVE GOODS IN URBAN CHURCHYARD CEMETERIES

Szocs, Peter Levente (County Museum Satu Mare)

Rings are quite frequently in the inventory of graves discovered at churchyard cemeteries, and their number is steadily growing due to the extensive archaeological rescue researches. The discovered rings present a high variation of materials (from common metals to noble ones, and their combination), dimensions, forms and decoration: from the simplest ones, to those with realized with high artistry and decorated with precious stones. Some of the items are even personalized as they bear coat-of-arms, or names (or just initials). The relatively great number of discovered rings and their variety permit to analyze their contexts and possible role.

In this paper, I will present several examples of rings discovered at urban sites from medieval and early modern Hungary and Transylvania, and I will discuss their significance as indicator of social status of their bearers and to assess whether they are or not luxury items. In this sense, a special focus will be given on techniques of production, possible workshops and commercial contacts.

5 A STUDY OF FOOTWEAR IN LATE MEDIEVAL AND EARLY MODERN WROCLAW AS A MARKER OF SOCIAL STATUS AND WEALTH

Konczewska, Magdalena (University of Wrocław, Institute of Archaeology)

In late medieval and early modern Europe, footwear not only served a utilitarian function, but also satisfied the aesthetic and aspirational needs of its owners and determined their prestige and social status. From the Middle Ages onwards, guild statutes, sumptuary laws and other ordinances interfered with the way the population dressed and prescribed what they should wear. Certain styles of footwear (with extremely long or wide toes) and the raw materials (silk, gold, saffiano) from which they were made were reserved for the privileged classes. As a commodity, shoes and boots were part of the consumption strategies of different social groups. Consumer choices were undoubtedly influenced by a number of factors, including cultural factors and the imitation by the lower classes of the consumption patterns of the upper classes. Imitation often took the form of the use of cheaper substitutes.

The presentation aims to draw attention to the symbolic and social role of footwear and its significance as a positional good. It can be successfully used to study the wealth and social differentiation of earlier populations and is considered one of the criteria for distinguishing luxury goods. A multifaceted analysis of footwear found in the Old Town of Wrocław in Poland, based on archaeological, written and iconographic sources, as well as zoological, botanical and spectral (XRF) analyses, allowed conclusions to be drawn about the wealth of the inhabitants of individual plots and the city.

It should be emphasised that distinguishing between footwear worn by representatives of different social classes, and between everyday and festive footwear, without knowledge of the archaeological context and the connection with other accompanying objects, may lead to erroneous conclusions.

6 LUXURY IN THE CESSPIT! IN SEARCH FOR INDICATORS OF SOCIAL STATUS FROM THE CESSPITS IN TARTU, ESTONIA (14TH-16TH CENTURY)

Haak, Arvi (Tallinn University, Archaeological Research Collection; Tartu City Museum) - Johanson, Kristiina (University of Tartu, Institute of History and Archaeology)

The medieval town as a microcosm included a number of social groups, hierarchical in their organisation. There was a facade of relative uniformity, expressed in stone houses of largely similar construction (Diele-houses), yet this standardisation is clearly indicative of the upper middle classes. Turning to the household level, the representation of both luxury and (relative) poverty can be reached. For this aim, we investigate the cesspit material from Tartu. The context allows linking the finds to certain property/properties, and analysing consumption on the household level. Moreover, the cesspits include items of material culture rarely collected from yard and street deposits.

In analysing the cesspit material, we discuss the items indicative of conspicuous consumption and luxury (e.g., glass vessels), but also food remains, especially plant remains that have rarely been analysed from other contexts. Just as with objects, the archaeobotanical material allows making a distinction between species found in many of the households indicating conspicuous consumption, and isolating those that appear in a very limited number of cases (e.g., pepper and rice in the 15th and 16th c). We also present the species uncommon in the medieval urban households (e.g., buckwheat) and discuss their social significance.

The Tartu finds lack highly expensive materials, nevertheless, the single items that certainly were of great material value have been collected from a number of cesspits. Although the long deposition period of the cesspit material makes it difficult to assess how available certain items were at the time of their disposal, as some sumptuous items may quickly become indicators of above-average consumption, these stand out among the overall consumption pattern. We may thus interpret the finds as indicative of personal choices of communicating luxury, rather than an agreed standard of excessive consumption.

7 CONSUMPTION AND QUALITY OF LIFE IN MEDIEVAL MINING TOWNS IN CENTRAL EUROPE

Cembrzynski, Pawel (Cluster of Excellence ROOTS, Kiel University)

Mining towns emerged in Europe during the 12th and 13th centuries at a crossroads between urbanisation and the mining industry. They were hubs for technological, economic and social change. Meanwhile, the spatial relationship with ore extraction and processing zones created a specific mining-urban landscape. The question remains: How did the interaction between society and mining affect the quality of life?

This talk explores whether mining towns had specific consumption patterns visible in the built environment. To answer this question, I look at architectural features in a town, both private and public, as well as on material culture. For this talk, I use examples from towns in Central Europe like Kutná Hora, Freiberg, Banská Štiavnica, and several smaller mining settlements.

Mining towns and settlements were inhabited by workers, miners, subcontractors, mining entrepreneurs, and people providing services (artisans and merchants). Their living conditions varied, but standards seemed high. In mining settlements, it manifested in large houses and good-quality material culture. In towns, high-quality houses were built

quite early. It is not a very high level of conspicuous consumption. Much money was invested in sacral buildings. Meanwhile, they all lived within mines and smelters. Over time, urban fabric developed into much more coherent and representative. Much more conspicuous consumption can be registered in the 15th century with a new wave of mining investments and new ways of showing might and power.

8 HUMAN AND ENVIRONMENT IN PRE-INDUSTRIAL CITY. CASE-STUDY OF PRAGUE AND WROCLAW

Lech, Sylwia (University of Wrocław)

The relationship between societies and environment has its consequences. Some are predictable, but not all of them. In my research, I try to find patterns of adaptation developed by pre-industrial burghers to maintain safety and life comfort inside the city walls, as well as the side effects of anthropogenic impact on the environment. My specific interest concerns evolution of public space and urban infrastructure regarding scientific development and changes of mentality mirrored in material culture of the past. The state of research of Prague and Wrocław is advanced. Besides archaeological and historical sources, the scientists collected plenty of geological and botanical data which helps us recreate past environments and brings new possibilities of investigation. Archaeologists of both cities are cooperating with representatives of various fields. Thanks to multidisciplinary research we can raise questions about the relationship between social topography and quality of life as well as the evolution of townspeople preferences regarding hygiene, health or safety. The purpose of my research is making these cities comparable. I wonder how to answer similar questions using the variety of available data. To achieve it, I try to follow the concept of cities as socio-natural sites which is a useful approach for analyzing long-term processes.

9 DIFFERENCES BETWEEN THE MANIFESTATION OF SOCIO-ECONOMIC STATUS IN ARCHITECTURE AND THROUGH CONSUMPTION

Obrink, Mattias (National Historical Museums, Sweden) - Forsblom Ljungdahl, Veronica (National Historical Museums, Sweden)

The city Nya Lödöse was founded in 1473 on the Swedish west coast, about 5 km east of modern Gothenburg. The area was a war struck border region between Denmark and Sweden during that period, until 1658.

The city was founded on royal initiative with the intention to create a hub for trade and commerce. Nya Lödöse was only one of many attempts by Sweden to establish a town in the area in the period from mid-15th century to the beginning of the 17th century. In the 16th century, the city was considered one of the Swedish kingdom's most prominent ports and the kingdom's only access to the North Sea.

The city was built following a planned grid system in which the spatial organization and plot size implies a socio-economic stratification. The buildings, however, were simple with a lack of basements and masonry buildings. Most houses were uniform in shape and materials, with similarities between them and rural buildings. This differs with several other contemporary Scandinavian cities (for example Kalmar) where the urban landscape changed during the 15-16th century when members of the bourgeoisie erected prominent buildings and masonry basements.

Nevertheless, in Nya Lödöse there was a material culture and consumption that shows a high economic and social differentiation. The material culture also shows that the city belonged to a shared northern European urban culture.

This paper will try to understand this contradictory situation in terms of the regional conditions and variations in a borderland including a mistrust of the future intentions of the crown.

10 A TALE OF TWO CITIES. TOWNS WITHOUT MONEY?

Risvaag, Jon (Norwegian University of Science and Technology)

Money is one of the great measures of prosperity and poverty. Both as a means of payment and standardisation, money i.e., coins, seem to have become well established, both in Norwegian towns and rural areas during the thirteenth century. In the term of the sociologist Anthony Giddens, the general populace became knowledgeable agents concerning coin use. In the wake of the Black Death (1349) the Norwegian monetary system started rapidly to decline, and eventually broke down. By the end of 1380s all coin production in Norway stopped completely and was not resumed until c 1483. In this paper I will ask the question 'how did this affect the towns in terms of growing poverty and social dissolution?', with an analysis of the two major Norwegian towns Bergen and Trondheim.

Written records are very limited and the archaeological records i.e., coin finds, are challenging. Still, combined with written records some of the finds may give us an indication which coins circulated in the towns and in which social strata, helping us to assess the material and social standards in the late medieval and post-medieval Bergen and Trondheim.

11 IMAGES AS INDICATORS OF IDENTITY OF WROCLAW BURGHERS DURING THE ICONOGRAPHIC TURN

Macionczyk, Agata (Museum of Archaeology in Wrocław; University of Wrocław)

The presentation will concern iconographic motifs that were placed on everyday objects in the early modern period Wrocław, their functions and social context. Decorated objects that have been discovered during various archaeological excavations in city (stove tiles, cutlery, pottery and glassware), will be discussed as means of expressing and probably also shaping the aspirations, taste and identity of the citizens. The occurrence of such artefacts can be linked to the specific of the urban folklore of Wrocław, which remained an important component of the folk imaginary realm characteristic of the southern zone of Central Europe (southern Germany, Austria, Bohemia, Moravia) in the late Middle Ages and early modern period. There are noticeable symptoms of the opening up of creators operating within the local symbolic and artistic tradition which was strongly rooted in the Middle Ages, to the global iconosphere, penetrating to this part of Europe, primarily through the dissemination of prints. Especially, carnival motifs were playing an important role in urban culture, as a way of channeling social tensions and signs of society structuring. The objects became hybrids bearing features of global symbolism, but shaped for the specific needs of local citizens, for example serving by corporate rituals. Decorated objects can be considered symptoms of the formation of bourgeoisie self-awareness and a sense of separateness, through critically commenting on customs characteristic of other social states. They could be signs of realization of burghers social position, the advantages and disadvantages of their everyday life, a response to religious concerns, a warning against rebellion and trespassing social norms. The favoured iconography shows urban dweller's aspirations, being emanation of absorption of fashionable trends and education.

12 THE UNIQUE EXAMPLE OF THE PALATAL OBTURATOR PROSTHESIS FROM 18TH-CENTURY CRACOW (POLAND)

Spinek, Anna (Department of Anthropology, Hirsfeld Institute of Immunology and Experimental Therapy, Polish Academy of Sciences, Wrocław, Poland) - Kurek, Marta (Department of Anthropology, Faculty of Biology and Environmental Protection, University of Lodz, Lodz, Poland) - Drązkowska, Anna (Department of Archaeology of Late Middle Ages and Early Modern Period, Faculty of History, Nicolaus Copernicus University in Torun, Torun, Poland)

People have always tried to create objects that make everyday life easier, especially when it is difficult due to illness or disability. Some of them are palatal obturator prostheses, which, by separating the nasal cavity from the oral cavity, improve the quality of life of people suffering from hard palate dysfunctions.

The first attempts to replace missing parts of the palate date back to antiquity however, the first documentary information about such procedures comes from modern times (16th century).

The research aims to present the case of an adult male from 18th-century Poland with a large defect in the hard palate to which a well-preserved palatal obturator prosthesis was fitted. This is the first case of an object of this type that can be associated directly with human remains that came from archaeological research in Poland and probably also in Europe.

The sex and age-at-death of the individual were estimated according to the methodology used in anthropological research. The skull was subjected to a detailed macroscopic assessment. Imaging tests were also performed using computed tomography. The obturator's elemental composition measurements were carried out using SEM-EDX. The analyses of the structure and elemental composition of the found prosthesis and comparisons to the other obturators known from written sources were made.

The differential diagnosis indicates the most probable cause of the defect to be an isolated bilateral cleft palate. In the prosthesis, the following are distinguished: an elliptical-shaped metal diaphragm and a textile "tampon" entering nasal cavity. The metal part of the prosthesis was made of copper covered with a layer of silver and gold which suggests the high social status of the owner of the prosthesis. The comparison of the analysed obturator with examples from the literature demonstrates its great similarity to those used in the 16th and 18th century.

306 PHOENICIAN AND PUNIC ARCHAEOLOGY IN EUROPE (AND BEYOND): RECEPTIONS, HERITAGE, AND PROJECTS

Session theme: 6. The Mediterranean from Within

Session organisers: Gomes, Francisco (UNIARQ - Centre for Archaeology of the University of Lisbon; School of Arts and Humanities of the University of Lisbon) - Machuca Prieto, Francisco (University of Málaga) - Álvarez Martí-Aguilar, Manuel (University of Málaga) - Suárez Padilla, José (University of Málaga)

Session format: Regular session

Phoenician-Punic Studies have developed considerably since their emergence as an autonomous field of research in the 1960's. Phoenician-Punic Archaeology, in Southern Europe as well as in North Africa and the Levant, has played a major part in that development. The multiplication of fieldwork projects, as well as the consistent study of archaeological materials related to Phoenician and Punic societies and their interactions with other groups across the Mediterranean, have been key in fostering discussions about the nature of the Phoenician diaspora itself and its impact in the wider development of the Ancient Mediterranean.

This being said, the impact of Phoenician-Punic Archaeology in the broader panorama of European Archaeology remains to be explored. For decades, the field has been at the forefront of theoretical debates – e.g., on issues of identity/ ethnicity, or the applicability of post-/ decolonial approaches to Antiquity –, as well as methodological discussions – e.g., on dating techniques, environmental approaches, or the ongoing impact of the so-called “Third Science Revolution” in Archaeology. Nonetheless, its connections with the broader conceptual and methodological panorama in Europe and beyond remain unanalysed, and its contributions to the global archaeological panorama unacknowledged.

This session aims to address this issue by taking a triple-prong approach, combining: 1) an historiographic view of the development of the discipline and its reception beyond academic circles; 2) critical approaches to the (re)presentation of Phoenician-Punic cultural heritage; 3) case studies on the current state of research in the field, showcasing ongoing projects, with a special focus on the public outreach, academic dissemination and heritage management outlooks of those projects. Within these broad thematical axes, we welcome contributions exploring the broader impact of Phoenician-Punic Archaeology, and the way it is embedded in the wider theoretical, conceptual, and methodological panorama of regional or European Archaeology.

ABSTRACTS

1 PHOENICIAN POSTCOLONIALISM

Muñoz Sogas, Judith (University of Barcelona; Universitat Pompeu Fabra)

Traditionally, contacts between communities have taken for granted the indispensable role of the colonizers, as well as their superiority over the colonized. Dominant, colonizing groups acquire an active role, while the dominated societies are presented as passive and dependant. At the same time, the Phoenicians, many times identified with the dominant colonialist agents, have been seen as an obstacle to Greek expansion and, hence, an obstacle to civilization. They have, therefore, been conceived as a group that prevented the arrival of real culture, the Hellenic one, on the Central and Western Mediterranean.

Both in the case of Greek and Phoenician colonization, the indigenous groups have been ignored, and not considered when assessing the different processes of colonization that have taken place throughout the Mediterranean. In this paper, an attempt to conceal different views with regards to Phoenician colonization is made. Postcolonial theories are taken into account in order to build a more accurate history of colonial situations in the Mediterranean. Evidence from the Iberian Peninsula, the Central Mediterranean and the Aegean Sea can help us comprehend how Phoenician colonization should be understood, and how indigenous societies had a key role in the development of the so-called “colonial” interactions.

2 LANDSCAPES OF DEATH AND COMMEMORATION: WHAT CAN BURIAL PLACES TELL US ABOUT THE PHOENICIAN AND PUNIC CENTRE OF MALTA?

Cardona, David (Heritage Malta)

Malta's underground burials are the result of a thousand years of funerary practices that evolved between the Phoenician and Byzantine periods. These have long attracted the interest of scholars but none of these have looked at the data from tombs of different periods in a holistic manner, meaning that these sites have remained spatially and temporally isolated from each other.

This paper will present the results of Doctoral thesis submitted to the University of Leicester, the aim of which was to investigate the sizeable corpus of funerary data available from Malta's main ancient city of Melite in an attempt to

recognise clusters and cemeteries in order to identify regional and chronological developments in form, design, content, décor and placement. This includes relationships with the immediate environments of the tombs as a potentially important part in the burial rituals, such as access and visibility. It also includes the study of related features, such as quarries, roads and cart-ruts.

Focusing on the Phoenician and Punic material, these analyses aim at getting to know the people involved in creating and being buried in these sites. Primarily, were these sacred places within carefully selected landscape features or were utilitarian motives prevalent? Moreover, what is the information that such burial spaces can provide us on settlement formation and landscape use?

My material is studied through numerous steps, starting with the detailed cataloguing and analysis of tombs (many of which only partially published or reported, if at all) to integrate all the typologies previously identified. This forms the basis onto which differences and similarities in the form and placement of tombs and the landscape will be assessed. These relationships will be investigated both spatially and temporally, identifying links (or a lack of) between burial grounds and surrounding landscapes and settlements.

3 EXCAVATING AND EXHIBITING THE PUNIC SANCTUARY AT THE LAGO DI VENERE, PANTELLERIA

Murray, Carrie (Brock University)

This paper presents the current work at the Lago di Venere sanctuary site on Pantelleria. Several years of excavations have revealed the presence of a sanctuary lasting from the sixth century BCE to the second century CE with phases combining influence from indigenous, Punic, and Roman communities. This extra-urban sanctuary site is positioned within a volcanic crater on the shore of a thermal lake and located at some distance from the ancient acropoleis and navigable harbors. The recovered ceramics and votive figures demonstrate proveniences from many locations across the central, Punic Mediterranean. One of the main aims of this project is to communicate its findings to the local community on Pantelleria and the many visitors to the island. We are working with the government system, including the Parco Archeologico di Selinunte, the Parco Nazionale, and the Comune di Pantelleria, and well as with local interested groups and schools. Our organization of school visits, public open days, and local talks have served the needs of communicating recent discoveries on an annual basis. The project is now in the works of determining the long-term strategy of site conservation, presentation of on-site information, and an exhibition of materials in a local setting.

The Lago di Venere can serve as a valuable case study in developing strategies for public outreach and heritage management of a Punic site in the central Mediterranean.

4 THE STAGNONE (MARSALA, ITALY): HISTORY, NEW PERSPECTIVE OF RESEARCH WITH APPLIED APPROACHES AND TECHNOLOGIES

Zucchi, Tecla (Università La Sapienza di Roma)

The Stagnone, or Marsala Lagoon, has been frequented by human groups since the 4th millennium B.C for its strategic geographical position.

The Stagnone has been the scene of numerous investigations that have focused mainly on the island of San Pantaleo, the ancient Punic colony of Motya, along with the surrounding waters.

Nevertheless, entire area is assumed to be rich in artefacts of archaeological interest, as evidenced by the fact that some of the major discoveries in the Stagnone are located far away from Mozia. For instance, Honor Frost's Punic Warship Shipwreck was near the Isola Lunga, one of the islands that enclose the lagoon, not as archaeologically explored as the central San Pantaleo.

The complex geomorphology of the Stagnone, of its coastline and the island's coastlines, is influenced by a perpetual erosion process created by the constant movement of currents, sediments, tides, and winds, that has made extensive archaeological investigations difficult.

From the 19th century onwards, the area was subject to the first significant studies, including the research of underwater archaeology pioneer Honor Frost, who excavated the previously cited the Punic ship of Marsala.

Over time, entities such as the Soprintendenza del Mare - Regione Siciliana, the Honor Frost Foundation and more recently the Bayerische Gesellschaft für Unterwasserarchäologie (BGFU), among others, investigated its waters providing interesting additional data.

However, the advent of new technologies and methodologies promises to overcome the obstacles put on by the nature of the Lagoon in surveying the area, paving the way for a deeper understanding of its underwater heritage.

This paper aims to discuss the potential of these new approaches in relation to the Stagnone, forward looking new investigations that could take place next summer.

5 NEW APPROACHES TO GLOCALISATION IN THE PHOENICIAN PERSPECTIVE: RESEARCH ACTIVITIES AT THE CNR-ISPC

Lancia, Sara (CNR-ISPC Roma; Università di Bari) - Botto, Massimo (CNR-ISPC Roma) - Oggiano, Ida (CNR-ISPC Roma) - Garbati, Giuseppe (CNR-ISPC Roma) - Pedrazzi, Tatiana (CNR-ISPC Milano) - Porzia, Fabio (CNR-ISPC Roma) - Castiglione, Marianna (Università della Calabria) - Soldi, Sebastiano (Università di Firenze) - Tirabassi, Livia (Universiteit Gent)

The Phoenician and Punic Research Group of the National Research Council of Italy (CNR), Institute of Heritage Science (ISPC), aims to investigate, in a multidisciplinary way, the documentary evidence related to the Phoenician and Punic world, between eastern and western Mediterranean. The research group, with a dynamic approach, observes, examines, and analyses the archaeological and textual sources related to the ancient Phoenician space, in perpetual change and transformation, both geographically and chronologically. These phenomena are investigated in a specific “glocal” perspective that is, starting from the study of local cultural patterns, in order to understand global dynamics at the Mediterranean level. The group carries out many excavations, studies, and safeguarding activities, in Italy, North Africa, and along the Levantine coast, as occasions of research but also of interaction, thanks to the close collaboration with public and private institutions in the different areas of interest. The activities of the research group aim to recreate in the present the Mediterranean connections between East and West, of which the Phoenicians were protagonists in the past.

6 PHOENICIAN MARITIME TRADE IN THE CENTRAL AND WESTERN MEDITERRANEAN. HISTORIOGRAPHY, PROBLEMS AND RESEARCH PERSPECTIVES

Jacinto-González, Jesús (University of Almería, Departamento de Geografía, Historia y Humanidades)

The understanding of the economy and trade in antiquity remains contingent on constant theoretical development and empirical research on the economic, commercial and market institutions of pre-capitalist societies. Since the advances of Adam Smith, Karl Polanyi and more recently, efforts have focused on the empirical testing of these immaterial realities (Polanyi, Arensberg & Pearson, 1973; Chic García, 2009).

In the case of Phoenician and Punic studies in the Central and Western Mediterranean, one hundred and thirty years of historical and archaeological research have passed since the nineteenth-century times of the Belgian Louis Siret (Siret, 1908). In this time, theoretical and methodological debates have focused on the political and economic significance (Bisi, 1991) of the Western Phoenician cities, solving old problems and opening up new questions (Aubet, 2002). Thus, the high concentration of Phoenician settlements in the West and the numerous archaeological finds related to productive and commercial maritime activities invite us to examine the evidence, search for new data, apply new methodologies and reflect on the role of Phoenician maritime trade in Western Phoenician cities and its impact on the Central and Western Mediterranean.

For this reason, we propose an in-depth review of Phoenician maritime trade in the Central and Western Mediterranean. A review that chronologically covers both the increasingly less diffuse phase of initial commercial contacts, as well as the periods we call the Early Colonial Period (850-800 BC), the Archaic Colonial Period (800-600 BC) and the Urban Period (600-241 BC) (López Castro, 2010). And, above all, placing special emphasis on the historiographical development of the discipline; on the theoretical, methodological and empirical problems of the object of study; and on the multiple research perspectives that are opening up as new challenges.

7 FOOD PRACTICES IN PHOENICIAN-PUNIC RITUAL CONTEXTS: NEW PERSPECTIVES

Giardino, Sara (École des hautes études hispaniques et ibériques - Casa de Velázquez de Madrid)

The purpose of this contribution is to present a project on food preparation and consumption practices in western Mediterranean ritual contexts between the 7th and 2nd centuries BCE. The project is underway at the École des hautes études hispaniques et ibériques - Casa de Velázquez in Madrid. It combines archaeological data with the results of archaeometrical and bioarchaeological analyses, the latter widely developed in recent years in the Phoenician-Punic field. The information already published is supplemented by unreleased data. The study focuses not only on the religious connotations of dietary practices, but also on the social and economic aspects that such practices allow to investigate.

The contribution will be divided into two parts. The first part will be devoted to the archaeometric analyses that are being carried out within the project to identify organic residues on artefacts from some significant contexts. The second part will address the implications of the project in the context of Phoenician-Punic studies. Some reflections will be proposed on the collaboration of various European and non-European research institutes involved in the project, but also on the state of the research in the supporting country, i.e. France: on the one hand, for various reasons, it has been a key player in the birth of the discipline; on the other hand, it has played a leading role in the progressive affirmation of the archaeology of ritual and of bioarchaeological and archaeometric studies.

8 EGGXPLORING IDENTITY: PHOENICIAN-PUNIC OSTRICH EGGSHELLS IN VILLARICOS BEYOND AESTHETICS

Moreno Megias, Violeta (University of Sevilla) - Luciañez-Triviño, Miriam (University of Sevilla) - Rodero Riaza, Alicia (Museo Arqueológico Nacional - Ministry of Culture of Spain) - Montgomery, Janet (Durham University) - Morell Rovira, Berta (Institució Milà i Fontanals - Consejo Superior de Investigaciones Científicas)

The Punic necropolis of Villaricos (Almería, SE Spain), with almost two thousand tombs, has been the subject of archaeological research since the beginning of the twentieth century. Yet, its outstanding archaeological record is still largely unexplored and offers a great deal of scientific potential. It includes a vast collection of ostrich eggshells (hereafter OES). OES were traded and exchanged as luxury items, often with a symbolic value. During the Iron Age, their use and commercialisation boomed throughout the Mediterranean, with an important centre of production and consumption in the Iberian Peninsula and the Balearic Islands.

The Villaricos collection is the largest closed archaeological assemblage in the Mediterranean to date, with more than 700 documented OES. Phoenician-Punic OES have been intensively studied from an artistic point of view since the work of M. Astruc in 1951, thanks to exhaustive classifications based on their decoration. However, this material and this site still offer great potential for a techno-typological, stylistic and contextual analysis of the OES in terms of identity representation, trade and contacts. The project ‘Eggxotic and vital’ approaches how these groups defined their religious identity through specific technical and decorative choices from a multi-methodological perspective. Scanning electron microscopy, x-ray microdiffraction and x-ray microfluorescence are used to analyse traces of work or painting techniques and pigments, together with radiocarbon dating and provenance analysis to establish the geographical origin of the eggs. This project represents a step forward in the study of the technology of sacred craftsmanship, allowing us to see these materials beyond their aesthetic aspect and contributing to the study of the Phoenician-Punic world through the information provided by this extraordinary necropolis.

9 CERRO DEL VILLAR PROJECT (2022-2025): FIRST RESULTS ON THE ARCHAIC SETTLEMENT AND ITS ENVIRONMENTAL VULNERABILITY

Machuca Prieto, Francisco (University of Malaga) - Suárez Padilla, José (University of Malaga) - Álvarez-Martí-Aguliar, Manuel (University of Malaga)

The Phoenician settlement of Cerro del Villar (Malaga), southern Spain, was built around the second quarter of the 8th century BCE on a small island in the wide estuary of the Guadalhorce River. The excavation campaigns carried out in the site since 2021 have not only confirmed the importance of Cerro del Villar for the understanding of the Phoenician diaspora in the West, but also for the knowledge of the paleoenvironmental evolution of the Mediterranean coast.

The site of Cerro del Villar itself, with its coastal location and its setting on a river island, presents the typical characteristics associated with the Phoenician colonial strategy in Iberia. However, at the same time, these make the place highly vulnerable to both fluvial and marine extreme inundation events. In this sense, evidence of two extreme flooding events that affected the community settled at the Cerro del Villar during the 7th century BCE have been recorded.

The first results of the archaeological research (geophysical surveys and extensive excavations) begin to provide data on the various strategies developed in the settlement to mitigate the impact of these extreme events and increase societal resilience.

Assessing these strategies and the consequences that these catastrophes had on the dynamics of the Phoenician presence in the Bay of Málaga is one of the main objectives of the current Research General Project (2022-2025).

10 THE TEATRO COMICO PHOENICIAN SITE: PAST AND FUTURE

Torres Ortiz, Mariano (Universidad Complutense de Madrid) - Gener Basallote, José (Ayuntamiento de Cádiz) - López Rosendo, Ester (Equipo de Investigación Teatro Cómico; Centro de Estudios Fenicios y Púnicos) - Navarro García, María (Equipo de Investigación Teatro Cómico) - Pajuelo Sáez, Juan (Equipo de Investigación Teatro Cómico)

The archaeological excavations carried out under the former Teatro Cómico of Cadiz have attested the earliest Phoenician urban layout of the ancient Phoenician city of Gadir. It is placed in the former island of Erytheia and the Phoenician occupation has a chronological framework between circa 800 BC until the mid-6th century BC., although the site lingers until Late Roman times.

Excavations have provided a great number of archaeological materials such as pottery, metal objects, ivory and bone items, clay seals, faunal and plant remains and evidence of pottery making and metallurgical practices. Thus, this site is one of the more interesting Phoenician sites not only in the Bay of Cadiz but also in Southern Iberia.

Besides, the site is now open to the public, so it is an excellent example of the management of the Phoenician Archaeological heritage given the high number of visitors it receives, and it has become in one of the cultural resources of the city.

11 PHOENICIAN PRESENCE IN THE PORTUGUESE TERRITORY: NEW INSIGHTS FROM ARCHAEOLOGICAL RESEARCH DURING THE LAST DECADE

Sousa, Elisa (UNIARQ - Centro de Arqueologia da Universidade de Lisboa) - Gomes, Francisco (UNIARQ - Centro de Arqueologia da Universidade de Lisboa)

Research on the Phoenician presence in present-day Portugal has significantly advanced over the past two decades, primarily due to the increased implementation of preventive archaeological works in urban and rural areas. Additionally, noteworthy contributions have arisen from various research projects conducted to date.

The data obtained has enabled the recognition of a considerable diversity in models of cultural interaction that occurred during the Early Iron Age between different indigenous communities and Phoenician groups in the central and southern regions of the country. This diversity is evident in both coastal areas (Lower Mondego, Lower Tagus, Lower Sado, and Algarve) and in the interior regions (Central and Lower Alentejo).

In coastal spaces, a more intense Phoenician cultural matrix is clearly observed, sometimes even displaying characteristics related to a genuine colonization. Recent research has improved the understanding of this Phoenician presence, but also the dynamics of the local responses to that presence and the impact of the new geopolitical scenario in the development of local groups.

In contrast and following unsuccessful attempts by local groups to establish direct contact with the Southern Iberian Phoenician settlements, interactions in more interior regions appear to be indirect and to manifest in more specific spheres, particularly in the funerary context. This highlights the autonomy of pre-existing groups, which selectively adopt and adapt certain cultural and material features as part of their own sociopolitical practices and agendas.

This presentation aims to provide an overview of the current state of knowledge on this complex panorama, emphasizing specific case studies that have yielded unique insights into the early Iron Age in southern Portugal.

12 PHOENICIANS IN NORTHWEST AFRICA

Blaschta, Dirk (German Archaeological Institute)

Phoenician seafarers had already passed the Pillars of Hercules in the 9th century BC and subsequently founded new trading stations and established necropolises. The range of finds, especially in cemeteries, is very rich and documents the Phoenician trade network in a special way. In Morocco, two larger necropolises (Djebila and Ain Dalhia Kebira) from the Phoenician-Punic period (7th-5th century BCE) are known, which were discovered in 1965, finally excavated and published in 1967 by Michel Ponsich. Both necropolises are located in the Tangier region on the north-western tip of Africa at the edge of the ancient world. As part of a new project by the DAI, Madrid Department, in collaboration with the Fondation Nationale des Musées (FNM) in Morocco, the finds are to be reinvestigated and analyzed. The initial aim is to record, categorize and catalog the existing finds. In the past, Phoenician research has focused on interpreting the necropolis as a burial site of a predominantly indigenous population group with Phoenician-Punic finds. However, a closer look at the findings reveals a more differentiated picture. In Phoenician-Punic times, the Tangier area was an important centre for far-reaching long-distance trade relations. One example of this is the discovery of Baltic amber in this region, which can currently be regarded as the oldest evidence of Baltic amber in whole North Africa. Bronze and silver finds indicate that there were contacts with Carthage as well as the western Greek region.

The mapping of the sites in comparison with digital elevation models and hydrological modeling has also made it clear that the coastline north of the Atlas Mountains has changed considerably. The necropolis of Ain Dalhia Kebira is now located approx. 12 km inland and in Phoenician-Punic times was probably located at the eastern end of a bay that extended far inland.

13 LAST BUT NOT LEAST. PHOENICIAN-PUNIC INFLUENCES IN INLAND IBERIAN PENINSULA

Sánchez de Oro, Pablo (Universidad Autónoma de Madrid)

Iron Age in central Iberian Peninsula (i.e. the territory referred in the classical sources as Carpetania) is a period of changes and contrasts which has not been well characterized following biased research. Some imported Phoenician materials have been discovered in this territory belonging to Early Iron Age chronologies. However, the possible relations with Phoenician-Punic elements have been barely considered for the Late Iron Age. Classical sources have had a great influence over the archaeologists, conditioning the study and leading it into a dead end which distinguishes this area in terms of diffusionism, acculturation, and imitation. But what is the agency of these populations and what happened before Rome?

Recently, new critical perspectives have been applied, achieving some major knowledge of this territory. Nonetheless, a further step is required. This necessarily need to challenge former assumptions and to consider other realities. The revision of materials and classical works shows the wide bounds of this space not only with the rest of Iberian Peninsula, but also with the Mediterranean framework. Its inhabitants —mainly the elites following the preserved archaeological

record— were not petty elements of a bigger network, but active actors which demanded Mediterranean goods and adopted and adapted them into their inner social mechanisms. All of these, before the arrival of Rome.

We believe that the reviewing of this context following the optic of Phoenician-Punic archaeology could be helpful to fill the existing void of knowledge. In this process, questioning previous assumption through Postcolonial and non-mainstream perspectives is essential. Central Iberian Peninsula during Iron Age reaches as a fitting scenario to explore the impact Phoenician-Punic archaeology can have both on the Past and the Present.

14 BUILDING RELATIONS AT THE EDGE OF THE WORLD. THE BUILDING OF THE BAETYLS OF ELVIÑA (A CORUÑA, SPAIN)(3RD-1ST CENTURIES BC)

Niñón-Álvarez, Samuel (INCIPIIT (Instituto de ciencias del patrimonio), CSIC (Consejo superior de invest) - Castro González, María Guadalupe (Universidade de Santiago de Compostela)

The present study offers a brief portrait of the “Building of the Baetyls”, a cultic structure located on the archaeological site of Castro de Elviña (A Coruña, Galicia, Spain). The Building of the Baetyls not only reflects a religious expression but also embodies the relevance of the connections between Northwestern and Southern Iberian communities. This presentation aims to define the archaeological characteristics of the building, describing its chronologies, occupation, and functional organisation. These features will provide a solid depiction of the symbolic dimension of the structure and its value as a central element for sanctioning and legitimising long-distance cross-cultural relations. Finally, some reflections on Elviña’s relation with Gades and Rome will also be presented. The influence of Punic relations on the social dynamics of Elviña will be explored, focusing on the value of religion and feast as catalysts of social inequality. In addition, the effects of Roman interactions and its possible influence on the abandonment of Elviña also be assessed.

15 TOWARDS THE CHARACTERIZATION OF TARTESSOS AND EARLY ORIENTALIZING: RADIOCARBON CHRONOLOGY AND CERAMIC ANALYSIS OF LATE BRONZE AGE IN LOWER GUADALQUIVIR

Vicente Gálvez, Rafael (Universidad Autónoma de Madrid)

The archaeological investigation around Tartessos and the Early Orientalizing Period in southwestern Iberia has encountered significant challenges, particularly following the excavations of the El Carambolo site in 2002. These excavations yielded new radiocarbon chronology that contradicted the previously accepted assumptions surrounding the material culture established by relative dating methods and consequently called into question the identification and description of the irresolute concept of “Tartessos..

Prior to and following the revelation of this new radiocarbon data, there has been a lack of consensus and a clear understanding of the term “Tartessos” and its implications. This paper contends that any comprehensive effort aimed at elucidating and reconstructing the context of Tartessos and its material culture, requires a foundation based on meticulously executed and methodologically sound absolute chronology.

Building upon this premise, this paper seeks to help redefine the concept of Tartessos by exploring the feasibility of identifying “index fossils” that could serve as diagnostic markers for this historical period and culture. Drawing lessons from past archaeological endeavors in this field, it is emphasized that these index fossils can only be sought within sites and contexts that have been subjected to absolute chronology.

In this study, radiocarbon dating emerges as the most accessible option for establishing absolute chronology, given its widespread usage in contemporary archaeological practice. Concurrently, ceramic styles are proposed as potential index fossils, given their prominent role as primary material artifacts previously employed in the identification of Tartessos within the archaeological record.

This objective is integral and may serve as a foundation for future studies aimed at analyzing and defining complex aspects of this culture, including its social and political organization, economic system, and, of course, the impact of Phoenician contacts on these dynamics.

16 HORSES AND BULLS ON A BRONZE BOWL FROM GELA: CULTURAL HYBRIDISM AND ORIENTALISING MOTIFS IN ARCHAIC GREEK SICILY

Russo, Laura

The present work should be included in the tradition of studies dedicated to the contacts between Greek colonies in Sicily and the indigenous world in the archaic age, as well as to the relationship that they always kept alive with the motherland and the Levant. Indeed in the material culture, their iconography and style constitute an unmistakable indication of this.

Specifically, my contribution will focus on the results of a new examination of a bronze patera found in a Gela archaic cemetery, during Paolo Orsi’s excavation at the beginning of the XXth century.

First thought of as an imported Phoenician-Cypriot vessel of Phoenician craftsmanship, currently new facts suggests for this patera a local production, imbued with a significant artistic culture of Aegean origin. Moreover this aegean connection is widely attested in the archaeological record of the Geloan colony in the Orientalizing period.

The main decoration of this vessel consists of a frieze of faced bulls and horses arranged around a central floral motif. This iconography would recalls some features of the Orientalising Cretan Rhodian world and the style of horses and bulls recalls a cultural hybridism. Thus the bowl is dominated by heterogeneous marks, produced by artisans greeted by surroundings steeped in broad phenomena of people and goods mobility.

This is possible because both the iconography, the shape and the style of the phiale belong to the hybrid Geloan community, willing to appear as a society in construction and to show the setting of the young colonial community in social groups.

327 HUMAN INFLUENCE ON COASTAL PALEOENVIRONMENTS: A GEOARCHAEOLOGICAL PERSPECTIVE OF HUMAN-ENVIRONMENTAL INTERACTIONS FROM THE QUATERNARY TO THE ANTHROPOCENE

Session theme: 6. The Mediterranean from Within

Session organisers: Bulian, Francesca (University of Groningen, Groningen institute of Archaeology, Groningen, the Netherlands.) - Jiménez-Espejo, Francisco J. (Instituto Andaluz de Ciencias de la Tierra (CSIC-UGR), Armilla, Spain.; Research Institute for Marine Resources Utilization (Biogeochemistry Program), JAMSTEC, Yokosuka, Japan.) - Alessandri, Luca (Sapienza University of Rome, Department of Science of Antiquity, Rome, Italy.)

Session format: Regular session

Humans have been populating coastal areas for thousands of years. By exploiting the available resources, they have been deeply modifying such settings, becoming protagonists of global environmental and climatic changes since the late Quaternary. The development of infrastructures related to salt production, fisheries and mollusk harvesting together with the landscape modification linked with the expansion of harbors in bays, deltas and lagoons is visible both in the geological and archaeological record documenting the high level of human-environmental interaction. In parallel, inhabiting and manipulating dynamic coastal areas subject to floods, storms, changes in sediment supply, and variation in relative sea-level made infrastructures and environmental control indispensable. Consequently, it is crucial to get a better understanding of the changes of human-environmental interactions at different time scales. Such unique areas represent an exceptional chance to learn about landscape, ecosystem changes but also technological development of the past. To achieve these goals, multidisciplinary geoarchaeological studies offer a one-of-a-kind approach towards understanding the complex interaction between nature and humans. In this session, we welcome cross-disciplinary geoarchaeological studies where the exploitation of coastal areas is studied from a palaeoenvironmental evolution and human activity perspective. Contributions showcasing specific case studies in which human-environment interactions in coastal areas are reconstructed including both the developing infrastructures and resilient adaptation to the natural pressure are welcomed.

ABSTRACTS

1 THE PROCESSES OF PALEO-ENVIRONMENTAL CHANGES, THEIR IMPACTS ON THE MARMARA REGION, AND ITS EFFECTS ON THE EARLY NEOLITHIC SETTLEMENTS

Emre, Bedel (Istanbul Technical University, Eurasian Earth Sciences Institute) - Arıkan, Bülent (Istanbul Technical University, Eurasian Earth Sciences Institute)

The strategic location of the Marmara Region, serving as a bridge between Anatolia, the Near East, and south-eastern Europe, plays a crucial role in understanding early endemic movements. With its two elongated straits, the Dardanelles and the Bosphorus, the Sea of Marmara delineates the boundary between Europe and Asia, facilitating continent-spanning travel despite its modest size. Despite its historical significance for ties between Anatolia and the Balkans, the region has only recently become a focus of archaeological exploration, dispelling unfounded speculative interpretations.

Having served as a settlement area since ancient times, the Marmara Region bears archaeological traces of a continuous developmental process. Prehistoric evidence, found in caves like Ağaçalı, Gümüşdere, Domalı, and Yarımurgaz, İbonun Rampası, reveals the presence of hunter-gatherer communities. The transition to settled life marked a primitive form of environmental impact, later amplified by the Neolithic revolution. Settled communities built lasting structures and cultivated agricultural areas, ushering in a more profound environmental impact. The expansion of agricultural areas led to changes in the density and distribution of natural species.

2 HUMAN INTERACTION AND LANDSCAPE TRANSFORMATION AT IRON AGE SALT PRODUCTION SITE PISCINA TORTA NEAR OSTIA (ROME, ITALY)

Bulian, Francesca (Groningen Institute of Archaeology, University of Groningen) - Alessandri, Luca (Department of Science of Antiquity, Sapienza University of Rome) - Attema, Peter (Groningen Institute of Archaeology, University of Groningen) - Guarnieri, Alberto (Department of Land, Environment, Agriculture and Forestry, University of Padova) - Baiocchi, Valerio (Department of Civil, Constructional and Environmental Engineering, Sapienza University of Rome) - Sevink, Jan (Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam)

In antiquity, coastal and deltaic areas were crucial for food production and trade, with salt emerging as a vital commodity for preserving food in the late Bronze and early Iron Age. The control of salt resources became pivotal for early city-states in central Italy, leading to the transformation of Mediterranean deltaic lagoons into production areas.

The archaeological site of Piscina Torta (Ostia), currently under excavation, reveals a complex ancient landscape comprising a shallow coastal lagoon, beach ridges, and a sea inlet. Through archaeological excavation and coring, it became evident that it engaged in exploitation and processing of marine resources. Relative chronology based on pottery, indicates that a massive production began around the middle VII century BCE. This occurred when the inactive sea inlet and lagoon featured peat deposition in the centre and evaporitic facies at the margins. We suggest that the sediment was leached and used in the briquetage salt production process, consisting in boiling brine in locally produced ceramic containers to obtain salt cakes through evaporation. Subsequently the inlet was reactivated and the lagoon filled with marine sediments. The inlet would have been deliberately kept open by dredging to upkeep the site's functioning. So far the excavations have uncovered massive pottery shard heaps at the canal's edge, hinting at its role as a trade hub and possible mooring site. At the end of the VI century BCE, environmental shifts may have led to the site's abandonment, as conditions became unsuitable for these activities.

This paper highlights intentional landscape modifications (dredging the channel, artificial potsherd heaps) undertaken to sustain favourable environmental conditions for their "industrial" activities. Sedimentological, geochemical, and grain size analyses on samples from the channel and heap suggest seasonal dredging for navigability. Landscape changes are evident in recent LIDAR images while chronological constraints are provided through radiocarbon dating.

3 CLIMATIC AND HYDROLOGIC CHANGES VS. HUMAN RESILIENCE IN THE SYBARIS PLAIN (ITALY)

Cavasinni, Chiara (Sapienza University of Rome) - Forti, Luca (University of Milan) - Giaccio, Biagio (Institute of Environmental Geology and Geoengineering of the National Research Council) - Izdebski, Adam (Palaeo-Science and History (PS&H) Independent Research Group, Max Planck Institute of Geoanthropology) - Macrì, Patrizia (National Institute of Geophysics and Volcanology) - Masi, Alessia (Sapienza University of Rome; Palaeo-Science and History (PS&H) Independent Research Group, Max Planck Institute of Geoanthropology) - Vanzetti, Alessandro (Sapienza University of Rome) - Sadori, Laura (Sapienza University of Rome)

Coastal environments in the Mediterranean basin are defined "sensitive areas" to climatic changes and human influence during the Holocene. The Sybaris Plain is a coastal deltaic plain in Calabria (Italy) and is a perfect area to detect environmental changes and resilient strategies adopted by past populations during the last millennia. The active migrating shoreline, related to the Crati Delta eastward-seaward depositional system, caused an important accumulation of sediment in the area during the Holocene. The compaction of Crati and Coscile river sediments, in combination with the land low morphology, determines the high rate of subsidence. The human presence in the plain has been attested since the Neolithic time. The continuous construction-destruction-abandonment-reconstruction cycles attest different resilience strategies adopted by ancient civilizations. In order to produce a new and improved paleoenvironment reconstruction of the area, a 40 m sediment core was drilled in the centre of the plain (39°73'N; 16°40'E, at 13 m a.s.l.), thanks to the collaboration with ITALFERR group and studied using pollen analysis coupled with sedimentological and magnetic properties determinations. The complexity of the study area, characterized by changes in the water table, has been reconstructed for the late Holocene. Changes in the vegetation cover are recognizable in the pollen record, mainly drove by the alternation of dry open environments, lowland swamp, and alluvial forests, and in the trend of non-Pollen Palynomorphs indicators as well as in the lithology. The land-use for agriculture and grazing is also evidenced through the sequence by the occurrence of cultivated and synanthropic taxa together

with NPPs and charcoals. This data has been compared with the archaeological data in order to reconstruct the land use in the plain. The combination of palynological and sedimentological data describes an environment modelled by the fluctuations of groundwater and climatic variability as well as by the human pressure.

4 PRILE PROJECT: EXPLORING A CHANGING COASTAL LANDSCAPE IN ETRURIA

Colombi, Camilla (Deutsches Archäologisches Institut, Abteilung Rom) - Hoelzmann, Philipp (Freie Universität Berlin, Fachbereich Geowissenschaften, Physische Geographie)

Since 2016, the 'Prile Project' has been investigating the relationship between the Etruscan settlement of Vetulonia and the ancient lagoon known as Prile, located on the Tyrrhenian coast in southern Tuscany (Italy). Combining archaeology and geosciences, the project aims to understand the changes in the landscape caused by the lagoon's silting up in the past and the subsequent changes in the use of the shores. So far, two drilling campaigns and four excavation campaigns have been carried out by the German Archaeological Institute (Rome) in collaboration with the Institute of Geographical Sciences of the FU Berlin. The fieldwork and subsequent sedimentological and geochemical characterisation of the sediments have provided significant new insights into the extent and evolution of the lagoon: for the first time, the presence of navigable ancient waters in the immediate vicinity of Vetulonia has been documented, changing our understanding of the ancient landscape. Not far from the reconstructed shores of the lagoon, a monumental Etruscan terrace complex has been discovered and partially excavated. Although the currently available data does not allow an interpretation of the complex as a harbour, it is evidence of the use of the shores by the population of Vetulonia between the 6th and 1st centuries BC. The paper will present the results of the project so far and the possible interpretations in terms of human-environment interaction in a dynamic area such as the Prile lagoon.

5 LIVING COASTSCAPES: LANDSCAPES, RESOURCES, AND POLITICAL STRATEGIES IN THE NORTHERN TYRRHENIAN SEA (PECORA RIVER VALLEY, CENTRAL ITALY)

Buonincontri, Mauro (Department of History and Cultural Heritage, University of Siena, Italy) - Volpi, Vanessa (Department of History and Cultural Heritage, University of Siena, Italy) - Clò, Eleonora (Department of Life Science, University of Modena and Reggio Emilia, Italy) - Furia, Elisa (Department of Life Science, University of Modena and Reggio Emilia, Italy; Department of Biology, Tor Vergata University of Rome, Italy) - Florenzano, Assunta (Department of Life Science, University of Modena and Reggio Emilia, Italy) - Poggi, Giulio (Department of History and Cultural Heritage, University of Siena, Italy) - Dallai, Luisa (Department of History and Cultural Heritage, University of Siena, Italy) - Di Pasquale, Gaetano (Department of Agricultural Sciences, University of Naples Federico II, Italy) - Mercuri, Anna Maria (Department of Life Science, University of Modena and Reggio Emilia, Italy) - Bianchi, Giovanna (Department of History and Cultural Heritage, University of Siena, Italy)

In the Central Mediterranean basin, fluvial and alluvial dynamics played a central role for the evolution of coastal plains between sea and higher ground, producing variety of wetland areas. The Pecora river valley, in the Maremma region (south-western Tuscany, central Italy), was focus of multidisciplinary research connecting ecological processes and archaeological sources in a Mediterranean wetland to determine how humans and environment interacted. Off-site geo- and biostratigraphic records involved different "biodiverse" proxies, to detect climatic fluctuations and anthropogenic activities: sedimentary, bio-stratigraphic (pollen and micro-charcoal) and geochemical investigations on sediment cores; facies and sediment charcoal analysis from Pecora river palaeochannel; geomorphological and stratigraphical analysis of the river catchment. Excavated sites, fieldwork surveys, and bioarchaeological study, were considered on-site records of local human activities. Upstream valley marshy environments and small lagoon on the coast influenced range of settlement, land management, and resilience strategies in the last 3200 years. The river Pecora was characterized by natural gravel-sand meandering course at ca 2500 years BP. Q. cerris forest, much larger and extended, covered slopes and floodplain, while the distal valley reach had mostly open landscape, exploited for grazing resources into territory with specific vocation (salt and iron). Human-induced fires and land use driven changes in tree biodiversity, ensuring agricultural exploitation. From ca 1300 years BP (Early Middle Ages), hydraulic works and fire episodes contributed to upstream wetland reclamation and to vegetation clearing of swamplands, inducing braided gravel-bed fluvial phase and new arable lands. The resulting landscape depended on political strategies of the Medieval authorities and represented considerable impulse for new land usage determining permanent change in physical and biological environment, with definitive success of local cultural landscape until the modern era.

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6 RISE AND DEMISE OF SALT PRODUCTION BY IGNITION DURING THE LATE PREHISTORY IN COASTAL SITES AT THE IBERIAN PENINSULA

Jimenez-Espejo, Francisco (Instituto Andaluz Ciencias de la Tierra (CSIC), Granada, Spain.) - López-Sáez, José (Environmental Archaeology Research Group, Institute of History, CCHS CSIC, Madrid, Spain.) - Bulian, Francesca (Groningen Institute of Archaeology, University of Groningen, Groningen, The Netherlands) - Valiente, Santiago (SEHA (Sociedad Española de Historia de la Arqueología) y CEDHAS) - Garrido-Pena, Rafael (Departamento de Prehistoria y Arqueología, Universidad Autónoma de Madrid, Madrid, Spain) - Ayarzagüena Sanz, Mariano (SEHA (Sociedad Española de Historia de la Arqueología) y CEDHAS) - Gonzalez-Ramón, Antonio (Instituto Geológico y Minero de España (IGME-CSIC), Spain) - Giles, Francisco (Museo Arqueológico Puerto de Santa María, Cádiz, Spain) - Camuera, Jon (Instituto Andaluz de Ciencias de la Tierra (IACT), CSIC-UGR, Armilla, Spain.)

Salt is an irreplaceable resource obtained in coastal settings among other locations. In the Iberian Peninsula coastal evaporite saltworks using ceramic vessels, known as briquetage, for the artificial evaporation of salt water has been described from Late Neolithic. Nevertheless, briquetage sites along the Atlantic Iberian coast are not active during the Late Chalcolithic/Early Bronze Age when they were abandoned. In this study, we discuss the climatic, social and cultural changes occurred along the entire Iberian Peninsula when these coastal production sites were not active. The comparison between the distribution of the archeological sites with Atlantic halberds and the copper mines, evaporites outcrops and salt interior briquetage sites point to a distribution network between Iberian interior and the Atlantic estuaries like Douro, Tagus, Sado, and Guadalquivir rivers. We also link the relevance of salt consumption with the extreme arid conditions established in certain areas of Western and Central Europe during the so called "4.2 kyr event", that in Iberia appears as two differentiate pulses at 4.5 and ~4.2 kyr cal BP (2.500 and 2.200 yrs BCE) in climatic stacked records.

7 HUMAN ADAPTIONS TO AN UPLIFTING COAST (BORRE ROYAL BURIAL SITE, OSLO FJORD, NORWAY) - A GEOARCHAEOLOGICAL APPROACH

Draganits, Erich (University of Vienna) - Doneus, Michael (University of Vienna) - Gansum, Terje (Norwegian Institute for Cultural Heritage Research) - Gustavsen, Lars (Norwegian Institute for Cultural Heritage Research) - Nau, Erich (Norwegian Institute for Cultural Heritage Research) - Tonning, Christer (Vestfold fylkeskommune) - Trinks, Immo (Vienna Institute for Archaeological Science) - Neubauer, Wolfgang (University for Continuing Education Krams)

The Nordic Iron Age and Viking Age royal burial site of Borre in the Oslo Fjord in Norway is a very important archaeological site in Northern Europe containing outstanding ship burials. Up to 7.5 m high burial mounds, associated archaeological structures and geomorphological features have been analysed by a 1x1 m digital terrain model derived from airborne laser scanning and targeted geoarchaeological fieldwork. Ground penetrating radar profiles investigated the internal structure of selected micro-topographic features. Scandinavia is strongly affected by ongoing post-glacial isostatic rebound, with a present mean surface uplift around 3.7 mm/year at Borre. Local sea-level reconstructions in the Oslo Fjord indicate that the burial site of Borre was located close to the shoreline in the period of its use (ca. 600 and 1000 CE) when the local sea-level was ca. 5-3.5 m higher than today. Elevated beach ridges were documented from within the burial site down to the present shoreline. Two prominent ridges, oriented perpendicular to the coastline, < 4.5 above present day sea-level are interpreted as Viking Age breakwaters facilitating safe landing on the otherwise little protected coast. The probable breakwaters are some 150 m and 170 m long and comprise of polymict, sub-rounded to rounded, up to 1 m sized boulders, which are very rare in the study area, except in the Ra Moraine, an impressive terminal moraine of the Younger Dryas, located only 450 m towards the west. While the beach ridges > 4.5 above present day sea-level are relatively straight and parallel to the coast, those < 4.5 above present day sea-level are strongly deflected around the two ridges. A 120 m long and 40 m wide, deepened area without beach ridges next to one breakwater is interpreted as a human intervention to prolong landing of Viking ships at the continuously uplifting coast.

330 TEXTILE RECORDS: PAST, PRESENT AND FUTURE OF TEXTILE-RELATED ARTEFACTS RECORDING IN THE MEDITERRANEAN AND BEYOND

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Iancu, Alina (National Institute of Heritage of Romania) - Sarri, Kalliope (University of Peloponnese)

Session format: Regular session

Since always textiles have been a necessity for daily protection, social display, home furnishing, transportation, war logistics and various other purposes. Even though textiles only survive under extreme environmental conditions, many

archaeological finds bear witness to these indispensable goods as well as to the craft itself. Finds such as fragmentary preserved fabrics, textiles mineralised on metal objects, carbonised fibres and textile imprints provide data on the quality and type of materials and techniques used to produce textiles in the past. In addition, a wealth of tools offers insights into the technologies used by prehistoric and ancient craftspeople to process the raw fibres into finished textile products.

Even though textiles were crucial to past societies, they are less represented in archaeological publications than other finds. One of the reasons for this could be their gender-specific character. For decades, they were thought to be the result of a modest domestic craft, mainly practised by women. Other reasons are the general lack of interest in the subject and the lack of knowledge about such objects. As a result, the publication of textiles and textile-related tools is still prone to confusion and misinterpretation.

Recent advances in the field of archaeological textiles provide good reasons for a reassessment of the old literature and for an in-depth analysis of how professionals in archaeology might approach and better publish textile-related artefacts in the future. We call on both archaeologists and textile experts to share their insights into the history of recording textile artefacts, and to suggest new methodologies to integrate these finds into general archaeological publications with the same consistency as other finds. We are also interested in producing, if possible, a short and comprehensive step-by-step guide with basic information on how to correctly record, describe, illustrate and publish textiles and textile tools in archaeology.

ABSTRACTS

1 RECORDING TEXTILE TOOLS' CONTEXTS? CASES FROM AEGEAN PREHISTORY

VAKIRTZI, Sophia (Hellenic Organization of Cultural Resources Development)

Recording textile tools ideally begins in the field, by documenting, in as much detail as possible, their context. Context is crucial, not only for their chronology and spatial associations, but sometimes even for their identification as textile implements. Furthermore, it often clarifies issues of textile technology, scale or mode of production.

This paper discusses early to recent cases of textile tools' context recording (or lack thereof) from the literature of Aegean prehistory and from the author's research experience. It showcases exceptional contexts of loomweights and spindle whorls as well as problematic cases whose interpretation remains open to research. It also presents examples of a particularly challenging circumstance for recording these contexts, which is rescue excavations, characterized by extraordinary fast paces of digging and recording.

The aim of the paper is to contribute to discussions concerning the establishment and communication of protocols for recording context data of textile tools during fieldwork.

2 NECROPOLIS OF THE WIELBARK CULTURE IN WILKOWO AS AN EXAMPLE OF SUCCESSFUL COOPERATION BETWEEN FIELD ARCHAEOLOGISTS, CONSERVATORS AND TEXTILE ARCHAEOLOGISTS

Przymorska-Sztuczka, Magdalena (Archaeological Museum in Biskupin, Poland)

On the necropolis of the population of the Wielbark culture (2nd half of the 2nd century - 1st quarter of the 3rd century A.D.) in Wilkowo, Poland, more than 200 graves were discovered, of which inhumation burials predominated. Numerous textile tools and metal artefacts were found, with remnants of textiles preserved (over 250 fragments in total). The excellent documentation of the archaeological objects during the excavation (marking the location on the grave plan of each artefact) and the later photographic documentation of the metal objects before their conservation led to the discovery that, in several cases, fabrics of different types were layered. This made it possible to determine with a high degree of probability that a deceased person was buried in several layers of clothing. There may have been a garment consisting of two parts: a sleeveless peplos-style outer garment made of thicker material and fastened with brooches at the shoulders and a long shirt or tunic with sleeves made of softer and thinner fabric. The field documentation has also made it possible to identify the co-occurrence of particular categories of textile tools, e.g. spindle whorls and hooked pins. The experience gained from working with field archaeologists and conservators has allowed the author to create textile object cards, which she uses in her research on the prehistoric textile economy.

3 GREY AREAS IN THE IDENTIFICATION AND RECORDING OF TEXTILE TOOLS. SOME ENIGMATIC CASES FROM AEGEAN PREHISTORY

Sarri, Kalliope (Postdoc researcher, Centre for Textile Research (CTR) Saxo Instit)

Weaving is one of the most important sustainable technologies of prehistory. However, the lack of actual fabrics and the production of tools from perishable or recyclable materials have resulted in a limited knowledge of textile technology for much of the prehistoric era.

Another reason is that most researchers are not familiar enough with the technology, production stages and development of textile art that would lead to the accurate identification of the relevant tools. Apart from the standard and easily identifiable finds (e.g. loom weights, spindle whorls and needles), several textile tool groups are hidden in other groups of finds. Some are included in the large and vague group of 'small finds' without their exact purpose being determined. Others are related to weaving or textile products due to similar materials and shapes (e.g. spools, miniature whorls and conuli). However, we are unaware of which production phase these have used. In some cases, a false interpretation is conveyed, and due to their enigmatic purpose, they have been placed not only in the realm of utilitarian objects but also in the context of rituals as objects of worship and symbolism (e.g. clay anchors).

The use of modern methods of analysis and recording, which could easily solve several problems of interpretation, such as traceology or experimental approaches, is still minimal. These problems in identification and museological management lead to misrepresentations of textile tools in many exhibitions and consequently to misinformation of visitors, perpetuating a knowledge gap. The paper will discuss the identification and purpose of some textile tool groups from the Aegean prehistory (e.g. hooks, bone awls, spinning bowls, conuli) that need to be understood and clarified and propose new reconstructions and methods to approach and record them.

4 ROMAN SPINNING TOOLS A HISTORY OF MISUNDERSTANDING

Dankovic, Ilija (Institute of Archaeology, Serbia)

Arguably, there is not a single item of Roman material culture that has more often been wrongly interpreted and recognized than that is the case with distaffs, and to some extent, spindles. Former are being mistaken for hairpins, stirring sticks, ointment applicators, etc. to this day. This is surprising as they are frequently depicted on grave stelae and found together in female burials.

In this paper, reasons for such a situation will be reasoned as parts of two wider occurrences in the archaeology of ancient Rome. First of these was the long and painful intrusion of women-related topics into the study of the mentioned period. The other is the general understudy of textile production.

With few notable exceptions, Roman spinning implements haven't been comprehensively studied and published. Many questions regarding dating, distribution, and functionality remain open. There is a clear necessity for gathering entire corpora of spinning implements, with the archaeological context where it is available, to make one step further in their understanding.

5 ANYTHING BUT A DISTAFF: THE MISIDENTIFICATION OF TEXTILE TOOLS IN THE NORTH-WEST PROVINCES OF THE ROMAN EMPIRE

Hamelink, Anique (University of Amsterdam)

Ritual staff, scroll holder, hair curler: these are some of the interpretations given to objects which textile specialists identify as distaffs. Due to their diversity in shape and material throughout the Roman empire, textile tools in general, and distaffs especially, are difficult to identify for the non-specialist. As a result, textile tools suffer from poor archaeological visibility and the study of their distribution, use and meaning is limited.

Yet it is their variety in form and material that makes distaffs especially interesting. Distaffs were objects that were functional tools used in the spinning of fibers as well as items of beauty, economic, and symbolic value. They were often decorated elaborately and/or crafted from precious materials such as amber, bronze or jet. Their placement in graves suggests they were meaningful objects that represent an aspect of the identity of the deceased.

The contemporary occurrence of both local and pan-regional distaff types is notable: some, such as amber bead distaffs, are found across large areas of the Roman empire, while others appear to be entirely local forms. The geographical distribution and archaeological context of distaff types merits investigation. It provides the opportunity to study textile tools and their users as active participants in empire-wide and local trends in textile production.

This paper will present a study of ornamented distaffs from Roman Britain and the Netherlands, discussing two types that are unique to the north-west provinces. These distaffs have been inaccurately identified as various other items unrelated to textile production. By presenting this study, I hope to contribute to the systematic and complete collection of textile tools in the Roman world.

6 IMPORT OF TEXTILE TOOLS TO ROMAN HISPANIA. SOME CASE

Bustamante Álvarez, Macarena (Universidad de Granada)

A set of textile tools found in Hispania is presented, which initially came from other parts of the Empire. Specifically, we are referring to some distaffs made of jet and amber, typical products of the northeastern border areas.

In addition to a typological characterization, an archaeometric as well as contextual study is addressed. Likewise, there are other parallels of similar typology located in others in the Mediterranean.

The analysis reinforces the cross-border nature of some technological practices such as textiles. This study serves to present these pieces in their context and evaluate them not only from a technical point of view, but also from cultural responses.

Likewise, we want this communication to serve to encourage tracking in other parts of the peninsula.

This study is part of the results of a research project developed by the University of Granada under the title *Texlus. The Economy Of Textile Craft In Roman Lusitania*.

7 LEAD SPINDLE WHORLS AND LOOM WEIGHTS IN THE AEGEAN AND IN PONTUS IN THE FIRST MILLENNIUM BC

Iancu, Liviu Mihail (Institute of Advanced Studies in Levant Culture and Civilization Bucharest)

Despite its huge importance, textile production was one of the ancient economic branches that required the most basic, affordable, and within-reach tools. Among other factors, the ability of spinners and weavers to produce their own tools – spindles, distaffs, and looms – from cheap materials like wood and clay contributed to the persistence of spinning and weaving largely as domestic crafts.

However, some components of the textile production implements, in particular the spindle whorls and the loom weights, could have been made of metal. More durability, standardization, and compactness were gained in exchange for increased manufacturing costs and limitation of production to specialized metallurgical workshops. Symbolically, the owners of metal implements could have claimed a higher position in the social hierarchy.

Against the lack of written sources about these textile tools, their correct identification in the archaeological record becomes a significant issue. Particularly numerous lead artefacts resembling spindle whorls and loom weights were discovered at various sites in the Aegean and Black Sea region, in contexts associated with the Greeks of the first millennium BC or other closely linked peoples, such as the Scythians. Most scholars interpret the finds as implements for textile production yet there are differing views on this assessment. Lead spindle whorls are sometimes treated as beads, buttons, and clothing accessories. Lead loom weights are alternatively considered to be fishing or commercial weights.

Based on the examination of the archaeological contexts and the functional parameters of these artefacts, the paper demonstrates that they can often be reliably connected to the production of textiles. A set of practical criteria for the archaeologists seeking to establish their functionality is proposed. Additionally, some observations are made on how these tools were produced, traded, and used by their final consumers.

8 FROM TEXT TO LOOM: WRITTEN AND ARCHAEOLOGICAL SOURCES ON LOOMS AND THEIR TOOLS FROM THE 1ST-5TH CENTURIES CE

Vega Medeiros, Claudia (Complutense University of Madrid (Spain)) - Morgado-Roncal, Leyre (University of Granada (Spain))

The aim of this paper is to put forth a diachronic interdisciplinary study that synthesizes the written and archaeological evidence available to shed light on the evolution of late Roman and early Byzantine looms and their tools.

To achieve this, we will offer a comprehensive philological examination of a selection of relevant Greek and Latin sources from the 1st – 5th centuries CE, ranging from literary works to lexicographies and glossographies. Our objective is to not only present the insights into weaving practices that can be deduced from these written testimonies, and, in this regard, we will revise Muthesius' commentary (2002: 156-157) of Theodoret of Cyrrhus' depiction of a 5th-century loom ("De Providentia", 83.617, 40-53), which in our understanding is an overinterpretation of the text; but also, to undertake a thorough analysis of the lexicon pertaining to loom tools within their respective contexts, which is crucial for a genuine understanding of the nature of these objects. Specifically, we will focus on the terms for pin-beaters, weft-beaters (Gr. κερκίς, σπάθη; Lat. "radius", "spatha"), and heddles (Gr. διάσμα, κανών, μίτος; Lat. "licium"), which vary extensively depending on the author, context and period.

In conjunction with this in-depth philological examination, several archaeological and ethnographic case studies of these "instrumenta textilia" (mainly beaters and heddles) will be presented. Although these implements were basic elements of the loom, they have rarely been identified "in situ", mainly due to insufficient expertise and polyfunctionality within this field of archaeology. As a result, these tools often lack a precise archaeological context, hence our

desire to showcase their morphological characteristics, drawing comparisons between the testimonies of the written sources and the tangible evidence of the archaeological record, in hopes of contributing to their future identification.

9 LOOMWEIGHTS THROUGH THE AGES. WHAT CAN THEY LOOK LIKE - HOW HEAVY SHOULD THEY BE?

Trinkl, Elisabeth (University of Graz)

Loomweights are an indispensable part of the warp-weighted loom, which has been the most important tool for the production of fabrics in almost the entire Mediterranean region in antiquity. The widespread use of this textile technique resulted in an equally widespread use of loomweights, usually made of clay, but there is also evidence of loomweights made of stone or metal. The other parts of the loom were made of perishable material and have therefore mostly disappeared – apart from a few in situ finds.

A comparison of loomweights in different regions and eras reveals strong regional and chronological differences. In addition to the textile raw material and the weaving technique, the shape and weight of the loomweights in particular determine the appearance and characteristics of the finished product. Hence, the analysis of the imperishable loomweights allows us to draw conclusions about the material properties of textiles made with them. Standardised documentation and publication are essential for this.

10 NET SINKERS OR LOOM WEIGHTS? PERFORATED SHERDS FROM THE PREHISTORIC SETTLEMENT ON KOUKONISI, LEMNOS AS A STUDY CASE

Boloti, Tina (National and Kapodistrian University of Athens)

Among the textile tools which usually survive archaeological deposition are the loom weights. The latter constitute a valuable source of information to archaeologists working with textiles and textile production, since they testify undoubtedly the use of the so-called warp-weighted loom, a loom type, which, according to E. Barber "was born and developed in southeast Europe and perhaps Anatolia in the Neolithic, expanding farther and farther to the north and west in the Late Neolithic, Bronze and Iron Ages, but not generally expanding to the south or east, presumably because the inhabitants of those territories already had a practical loom, the ground loom".

In the Bronze Age Mediterranean, the loom weights were usually made of either fired or low baked/ unbaked clay (simple pebbles may also have been used although these are almost impossible to identify in the archaeological record). Apart from a large variety of loom weight shapes (from flat discoid to flat rectangular, from spherical to hemispherical, and conical to pyramidal), there are also cuboid, cylindrical or spool shaped and crescent shaped types, although, since the first publications, it has been controversial whether all such shaped artefacts were in fact used as loom weights. Within this broad category (of potential loom weights) perforated sherds are included.

Despite the functional identification of perforated clay objects as loom weights is highly controversial (some are called 'net sinkers' or just 'perforated objects'), in this paper I aim at examining the corpus of perforated sherds from the prehistoric settlement on Koukonisi Lemnos as a study case, in order to contribute to the related discussion.

11 HOW WERE PERFORATED CLAY LOOM WEIGHTS MADE, AND WHY IS THEIR SHAPE SO DIFFERENT?

Boertien, Jeannette (Groningen University)

Loom weights appear in a wide range of different sizes and shapes. They are usually classified on morphological criteria. In a technological study of Iron Age loom weights from Transjordan a simulation experiment led to the reconstruction of the chaîne opératoire in the fabrication of perforated clay loom weights. The experiment showed convincingly that it is indeed probable to distinguish between traces originating from manufacturing techniques and traces caused by the weaving process.

Analyzing the chaîne opératoire paved the way for determination of variability in shape and perforation due to the production process, leading to a new classification for perforated clay loom weights.

Working with this new classification made it possible to categorize meaningful differences within assemblages of loom weights.

Variety in weight is essential for the weaving process, it is a key to reconstructing whether vegetable material or wool was being used. And finally, the shape and especially the thickness of loom weights on a loom tells what kind of cloth was being woven, be it open and fine, or thick and fluffy. The position and the amount of loom weights within a set ads information on the question if patterns were being woven.

Technical research on the production process of loom weights from five different Iron Age sites in Transjordan opened up new views on textile production in this region and period.

12 A LESS KNOWN YET ESSENTIAL CLASS OF TEXTILE TOOLS: CLAY SPOOLS IN ARCHAEOLOGY

Iancu, Alina (National Institute of Heritage of Romania; The Hellenic Centre for Research and Conservation of Archaeological Textiles (ARTEX))

Spools appear to be essential components for deciphering the art of prehistoric and ancient textile manufacture, together with loom weights and spindle whorls, given the regular quantity of such objects on many settlements.

Clay spools have been found at various prehistoric and ancient sites throughout the Greek world, including on the islands, on the mainland (e.g. on Crete, throughout the Peloponnese, Thessaly, Aetolia and Chalkidiki) and beyond in the Ionian and Pontic colonies. The Italic region, Sicily, the Iberian Peninsula and other parts of Europe (such as Switzerland, Germany, Austria, Romania, Bulgaria and Ukraine) are also known for consistent or at least sporadic occurrence of spools. They are also known throughout the Near East, which includes Israel, Palestine, Syria and Anatolia.

Nevertheless, among all the clay textile implements used by prehistoric and ancient craftspeople to equip their spinning and weaving installations, the objects identified in archaeology as spools, bobbins, reels, or cylinders seem to be ambiguous. For this reason, they are not so well represented in the literature. Therefore, while the traditional types of loom weights and most clay spindle whorls have already been published with detailed descriptions and classifications, spools remain a controversial topic in Mediterranean archaeology and beyond.

This paper aims to provide an overview of the topic, point out their enigmatic presence in the literature and offer a revised method for cataloguing and publishing clay spools. The following elements are among the most important that will be covered: 1. terminology related to spools; 2. typological classification of spools according to their morphology; 3. the proper method for describing them and the reasons why marks, wear traces, and clay properties are important for understanding the function of these tools. And last but not least, it will be suggested how to properly illustrate spools in archaeology.

13 TOOL BOXES FOR TEXTILE WORK? FUNERARY MODEL CHESTS FROM IRON AGE ATHENS IN THE LIGHT OF RECENT TEXTILE RESEARCH

Houby-Nielsen, Sanne (The Nordiska museet)

Model chests of pottery constitute a well-known feature in Iron Age burials in Athens, Greece. They have been the subject of much scholarly debate and seen as characteristic markers of rich female burials. Yet, the actual wooden chests which the models supposedly imitate have seldom been discussed from a functional point of view, nor the function of the models themselves. This paper will discuss the models in the light of recent textile finds from Iron Age and Archaic Athens (11-7th century BC) and in the light of recent research into Iron Age textile industries. Drawing on ethnological parallels from the Mediterranean, Scandinavia and other parts of the world, the paper proposes that the models imitate larger chests for various kind of specialized textile making, such as fine wool working, spinning of very fine threads, plying of threads and colour dyeing techniques, all of which signalled a very high status of the deceased woman and the degree to which complex textile products were a status marker. The models should therefore be registered as textile tool boxes in placed in the history of textile making along with items such loom weights, spindles, distaffs and the like.

14 RECORDING USE- WEAR TRACES ON TEXTILE TOOLS WITH REFLECTANCE TRANSFORMATION IMAGING (RTI): A CASE STUDY FROM ARCHAIC MESSAPIA

Sabetta, Gaia (Università del Salento)

This study aims to elucidate the application of Reflectance Transformation Imaging (RTI) in the study of archaeological artifacts from two sites in Archaic Messapia (Apulia, Italy).

By leveraging Reflectance Transformation Imaging (RTI), it is possible to explore the surface features of these artifacts. By capturing detailed surface data from multiple angles under controlled lighting conditions, we have been able to reveal subtle traces of wear, tool marks, and manufacturing techniques embedded within the surface. In archaeology, this process is successfully applied to various classes of materials, albeit not extensively. In the case of the presented Messapic sites, the method has been employed for the analytical description and examination of textile production indicators, such as terracotta spindle whorls, loom weights and bone pin beaters.

This research, developed within the framework of the author's doctoral project, has allowed the observation of various types of traces connected both to the manufacturing processes of the analyzed tools and their use in the operational chains in which they are inserted. The protocols used for image acquisition, the tools employed, and the processing times required for each elaboration are thus illustrated. Additionally, some of the results obtained from the experimentation of the RTI method on the examined materials are presented, followed by a discussion concerning the potentials and limits recognized during the application.

15 COMMUNICATING TEXTILE ARTIFACTS: TEACHING AND EXHIBITING THROUGH SCIENTIFIC AND DIGITAL STORYTELLING

Nikolovieni, Gerasimoula Ioanna (Brown University)

As modern-day people, we are currently used to consuming products that we have not produced ourselves or ignoring their production methods. For this reason, most of us are not quite familiar with ancient or traditional textile crafts. In such a context, the textile tools of ancient communities could be bewildering and unfamiliar. As textile craft researchers, we mainly communicate our work with two groups of audiences, students and the public, and we often have difficulties in communicating our research adequately. This paper will look into methods of teaching textile crafts through their material culture and use collections for hands-on teaching experiences. Microexhibitions will be suggested as a teaching and exhibition tool, as well as a method to connect collections, students and researchers, and the public. In addition, the paper will also discuss the benefits of scientific and digital storytelling and how both can be employed to communicate textile tools both to students and the public.

331 ACROSS DESERTS AND SEAS: TEMPOS AND MODES OF NEOLITHIZATION IN THE HORN OF AFRICA AND THE ARABIAN PENINSULA

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Scancarello, Olivier (Université Côte d'Azur, CNRS, CEPAM) - Maiorano, Maria Pia (Goethe University Frankfurt, Institute for Archaeological Sciences, Dept. Near Eastern and Classical Archaeology)

Session format: Regular session

The Holocene witnessed a profound shift from millennia of hunting, gathering, and fishing to the emergence of food producers worldwide. However, the timing and nature of this transition to domestication varied greatly across the globe. In the Horn of Africa, renowned for its diverse ecological niches, this period still needs to be fully understood. To date, the earliest evidence of herding in the region can be traced back to the Middle Holocene. In contrast, in neighboring regions such as Sudan and the Arabian Peninsula, evidence for domestication practices date back to several thousand years earlier. Moreover, substantial evidence of exchange networks and intercontinental human interactions across the two shores of the Red Sea has been demonstrated since at least the Middle Holocene. However, the adoption of production economies was not always an unambiguous choice. Furthermore, while hunting-gathering-fishing were the only practices known in the Horn of Africa during the Early Holocene, the presence of small-scale herding practices without any evidence of cultivation were common in several regions of the Arabian Peninsula. Finally, in different areas, the adoption of agropastoralism did not necessarily coincide with pottery production, and vice versa. These complex divergences underscore the need for a comprehensive understanding of when and how the phenomenon of neolithization unfolded. In light of this considerable variability, likely influenced by highly diverse local paleoecological characteristics and potential bias in the preservation of organic remains, this session aims to foster discussions on the linked processes of the emergence of the Neolithic era in the Horn of Africa and the Arabian Peninsula. We invite papers submissions in the field of archaeozoology, archaeobotany, lithics, pottery, rock art, and genetics, all of which serve as valuable tools for deepening our knowledge of the emergence of the Neolithic within and across these two key regions.

ABSTRACTS

1 HOW TO DIFFERENTIATE LITHICS FROM MESOLITHIC AND NEOLITHIC PERIODS DURING SURFACE SURVEY IN CENTRAL SUDAN?

Kapustka, Katarina (Institute of Archaeology CAS; Czech Institute of Egyptology FF UK)

Within the Nile Valley rather poor preservation of stratigraphic record has been a well-known problem of prehistoric research. High number of finds often comes from surface survey and similarity of Mesolithic/Neolithic toolkit and raw material economy complicate chronological association of sites. The only clear marker is the presence of gouges during the Neolithic period. This paper presents the methodological approach we employed to gather more systematic information of composition of lithic collections at sites in the regions of Sabaloka and Shaqadud in central Sudan. Our aim was to find a way to compare different surface records and to capture basic characteristics of recorded sites, not only to pick up some tools, but also to gather complex information on raw material proportions, production categories composition, size of lithic pieces and, of course, typology of the site. This approach consists of a series of total counts, in which several small spots are characterized as to raw material, size, production category and typological characteristics, with collected data suitable for comparison not only within the studied region, but with other published sites too. This approach enables us to discern basic economic trends in the lithic production and consumption, because it is not focused only on selected artifacts (e.g. tools), but is also coping with production waste, so it shows overall view of

the lithic collections from the sites. In this paper we point out the similarities and differences between sites associated with different chronological periods.

2 SPOTLIGHT INTO LATE PALAEO-LITHIC - NEOLITHIC TRANSITION IN SOUTHERN ARABIA: THE WĀDĪ SAYY ROCK SHELTER

Chlachula, Dominik (Research Centre for the Paleolithic and Paleoanthropology, Institute of Archaeology Brno, Czech Academy of Sciences, Brno – Czechia; Department of Archaeology and Museology at Masaryk University, Brno - Czechia) - Maiorano, Maria Pia (Institute for Archaeological Sciences, Goethe University Frankfurt, Germany) - Danielisová, Alžběta (Institute of Archaeology Prague, Czech Academy of Sciences, Prague – Czechia) - Garba, Roman (Institute of Archaeology Prague, Czech Academy of Sciences, Prague – Czechia; Nuclear Physics Institute, Czech Academy of Sciences, Prague – Czechia)

The area surrounding the port city of Duqm in south-central Oman has undergone significant industrial and economic development. In 2015, an Italian rescue archaeological mission documented hundreds of archaeological sites within the Special Economic Zone at Duqm (SEZAD). These sites include tombs, triliths, and abundant surface lithic scatters, tentatively dated to the Holocene and presumably the Terminal Pleistocene.

One noteworthy discovery by the Italian team is a small rock shelter (DUQ-25a) in the Wādī Şayy, representing one of the few stratified sites. Lithic material, including a biconvex tanged projectile point excavated from the initial test trench in 2015, suggested a placement in the Middle Neolithic period. However, subsequent excavation seasons in 2023 and 2024, conducted under the ARDUQ archaeological project, revealed a much more complex occupation history ranging from the Late Palaeolithic to the Middle Neolithic.

Through absolute 14C dating and material culture analysis, the ARDUQ project provides the first direct evidence of Late Palaeolithic occupation in central Oman. This evidence indicates continuous development, at least into the Middle Neolithic. Our presentation focuses on the technological study of lithic industries within the dated stratigraphical context.

Furthermore, the site serves as a crucial witness to the transition between the Early and Middle Holocene, a phase almost unidentified in the region. It offers a unique opportunity to compare this aspect of Arabian prehistory with surrounding regions. While the Early Neolithic in Oman is poorly documented, the exploration of central southern areas is providing new insights into neolithization processes and mechanisms of technological innovation in the broader context of Southern Arabia.

3 UNCHARTED PAST: UNVEILING THE NEOLITHIC PATHWAYS OF THE UAE'S FERTILE COAST THROUGH NEW ARCHAEOLOGICAL INSIGHTS

Lidour, Kevin (DCT Abu Dhabi) - Al Hameli, Noura (DCT Abu Dhabi)

This paper examines recent research on the Neolithic period along the 'Fertile Coast' of the United Arab Emirates. Archaeological evidence suggests the existence of a cohesive culture across the coastal regions of the lower Arabian Gulf from the mid-seventh to the fourth millennium BCE. Despite the regional development of agriculture and pottery manufacture lagging behind that seen in the Levant and Mesopotamia, the indigenous groups forged unique pathways in their Neolithisation processes. Notably, the absence of pottery manufacture did not preclude the presence of advanced pyrotechnology as early as the end of the seventh millennium BCE, which is linked to the production of plaster vessels on the Abu Dhabi islands.

Sclerochronological analysis of fish otoliths has recently revealed evidence of a sedentary lifestyle, accompanied by early stone architecture and an economy predominantly based on maritime resources. Coastal ecosystems, such as mangroves and coral reefs, provide ecological refuges in arid landscapes. These habitats support a rich marine fauna that serves not only as a staple food for daily subsistence but also as a source of raw materials for technological and symbolic productions, in the form of shell tools and personal adornments, respectively. Funerary practices also bear witness to a strong connection with marine animals such as dugongs, dolphins, and sea turtles. The evidence presents an exemplary case study of maritime adaptation by ancient human groups, further highlighted by advanced seafaring and fishing techniques, colonisation of offshore islands, and extensive trade networks that spanned the Arabian Gulf.

The paper endeavours to construct a revised chronology that integrates the latest findings from the Emirate of Abu Dhabi and Northern UAE. By examining the diverse facets of Neolithic economies and material cultures, it aims to contribute to a deeper understanding of this period and to underscore the region's heritage significance for archaeological research.

4 OBSIDIAN FINGERPRINTING AND BACKED GEOMETRICS: TRACKING MOBILITY AND THE ADVENT OF HERDING IN ARABIA AND THE HORN OF AFRICA

Khalidi, Lamya (CEPAM, CNRS, University Cote d'Azur) - Scancarello, Olivier (CEPAM, University Cote d'Azur) - Davtian, Gourguen (CEPAM, CNRS) - Ménard, Clément (CERP, Tautavel) - Gratuze, Bernard (IRAMAT - CEB - CNRS - University of Orléans)

The transition to herding occurred at different times and at different rhythms in South Arabia (~9 ka) and the Horn of Africa (~5 ka), and yet a synthesis of published and new data demonstrates that there was cross-Red Sea contact between populations throughout these periods. Since 2014, the VAPOR-Afar program has been excavating in the Central Afar region of Ethiopia, along the Lower Awash River and the paleoshorelines of northern Lake Abhe. Several Neolithic sites have been excavated and dated and study of the assemblages, which include domestic and wild fauna, impressed and incised pottery, and obsidian stone tools have provided a more detailed understanding of the socio-cultural dynamics of these first herders. Data from obsidian fingerprinting and lithic analysis, also demonstrate local and long-distance mobility during the Mid- Late Holocene transition allowing us to compare the movements, the material culture and the social trajectories of these societies with those of contemporaneous Bronze Age societies in Arabia and to better understand the process of cross-continental Neolithization and cultural exchange.

5 A GENETIC ANALYSIS OF A NEOLITHIC CATTLE FROM SAUDI ARABIA HELPS EXPLORE CONNECTIONS BETWEEN PREHISTORIC ARABIA AND AFRICA

Diquelou, Deborah (Trinity College Dublin) - Mattiangeli, Valeria (Trinity College Dublin) - Kennedy, Melissa (The University of Sydney) - Thomas, Hugh (The University of Sydney) - Mullin, Victoria (Trinity College Dublin) - Bradley, Daniel (Trinity College Dublin)

The shift from a nomadic society of hunter gatherers to sedentary communities cultivating plants and/or herding animals represents one of the major events in human history. Thanks to developments in paleogenomics, we can study this event from a genetic point of view, and reveal information hidden until now in past organisms' genomes. In this study, we focus on cattle remains found in an archaeologically rich region of North-West Saudi Arabia, in the town of AIUla. Recent work from archaeologists are shedding lights on mustatils, 7 000 years old stone structures that are believed to be pilgrimage sites, and where offerings were made, including cattle. However, aridic regions such as Saudi Arabia are challenging for paleogeneticists as the environmental conditions are not suited to DNA survival, thus, ancient DNA studies in Saudi Arabia are very limited. Despite these challenges, we present the first ancient cattle mitogenome from Saudi Arabia sequenced from a Neolithic cow from AIUla. The haplogroup, "T1", determined for this specimen is the predominant haplogroup for African cattle today. This specimen helps to highlight the connection between Africa and the Arabian Peninsula via the human mediated migrations of domesticated cattle.

6 SETTING THE STAGE FOR NEOLITHIZATION: FIRE IN THE MOIST HIGHLAND FORESTS OF SW ETHIOPIA

Bodin, Stéphanie (Senckenberg Gesellschaft für Naturforschung) - Neumann, Katharina (Senckenberg Gesellschaft für Naturforschung) - Brandt, Steve (University of Florida) - Vogelsang, Ralf (University of Cologne) - Demissew, Sebsebe (Addis Ababa University) - Hensel-Karamalakidou, Elena (Kiel University) - Hildebrand, Elisabeth (Stony Brook University) - Casas-Gallego, Manuel (Complutense University of Madrid) - Hahn, Karen (Goethe University Frankfurt)

By the Late Pleistocene, there is ample evidence of landscape burning by hunter-gatherers in the Horn of Africa. By influencing vegetation composition and structure, landscape burning may be regarded as a form of niche construction that can increase the availability of useful plants, or expand habitats for herbivore prey. In the moist highlands of southwest Ethiopia, charcoal from archaeological sites can preserve records of landscape burning through pyrophytes – plants well adapted to repeated burning events. Pyrophytes include grasses and pioneer tree and shrub species that grow quickly after a fire; increased representation of these taxa in archaeobotanical assemblages can signal increasing human efforts to manage ancient landscapes. Two highland rockshelters have intriguing records for pyrophytes and open vegetation taxa: Mochena Borago (2200 m asl, >50-1.5 cal kyr BP), and Sodicho (1900 m asl, 27-0.3 cal kyr BP). At Mochena Borago, the charcoal record shows the presence of forest taxa together with pyrophytes from c. 50 kyr to c. 2 kyr cal BP. The Sodicho record depicts a savanna/forest ecotone with pyrophytes after the African Humid Period. These data contrast with paleovegetation models that predict only Afromontane forest. The discrepancy between modelled and actual data, plus the presence of pyrophytes, suggest that humans managed local landscapes. Their actions might have aimed to improve growing conditions for local underground starch plants, increase ground-level forage to attract herbivores, open land for better hunting visibility, or other goals. Whatever the immediate motive, humans' intensified landscape burning just after the AHP would have created new environments amenable to the later highland cultivation of yams and enset, and laid the groundwork for eventual development of

pastoral fire practices still used in the region today. Southwest Ethiopia provides an important example of fire as a tool of niche construction, ultimately setting the stage for later neolithization.

7 REAPPRAISING PROCESSES OF 'NEOLITHIZATION' IN EASTERN AFRICA: REFLECTIONS ON THE UTILITY OF A COLONIAL CONCEPT

Lane, Paul (Department of Archaeology, University of Cambridge) - Merlo, Stefania (McDonald Institute for Archaeological Research, University of Cambridge)

The routes to the transition from foraging to food production in eastern Africa were extremely varied, entailing the introduction of domesticated plants and animals from both elsewhere on the continent and from outside of Africa, in combination with population movements and autochthonous innovations. In the early decades of research on the region's archaeology, the term 'Neolithic' tended to be used to characterise changes in stone tool technologies rather than the transition to farming. Subsequently, the use of the term was narrowed to refer solely to those archaeological traditions associated with the introduction of domesticated animals and transitions to a pastoral way of life, often marked by the archaeological occurrence of distinctive ceramics. Concurrent research both around Lake Turkana in the north and Lake Victoria in the west, documented earlier instances of pottery pre-dating the arrival of these initial herding communities, however. Nonetheless, the term Pastoral Neolithic has entered the regional archaeological lexicon and is still used to refer to those material traditions associated with the initial transition to food production in the region. While a handy portmanteau term, the of a Pastoral Neolithic concept retains some of its earlier colonial baggage and, as explored in this paper, may need to be replaced.

332 CHANGE AND PERSISTENCE IN THE TRANSITION FROM LATE HELLENISTIC TO EARLY ROMAN IMPERIAL TIMES IN THE EASTERN MEDITERRANEAN

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Beaujean, Bas (KU Leuven) - Daems, Dries (Vrije Universiteit Amsterdam)

Session format: Regular session

The transition from Late Hellenistic to Early Roman times in the Eastern Mediterranean constituted a time characterized by both dynamic transformations and historically layered persistence in societal, economic and political trajectories across a diverse range of communities and environments. This session seeks to examine the multi-dimensional aspects of this transitional period through a number of key processes, including urbanisation and urbanism, trade and exchange, mobility, and the (re)creation of deathscapes. Through a multidisciplinary approach, we aim to shed light on the intricate interplay of continuity and change within this fascinating spatiotemporal framework.

We are particularly interested in contributions using material culture to demonstrate and/or discuss the interplay of change and continuity in community formation, studies evaluating the potential discrepancies and/or congruities between the historical and archaeological record, and research attempting to bridge the gap between change in the local archaeological record (settlements/cities) and broader socio-political, cultural, and economic system shifts (states/empires).

Our session aims to foster a comprehensive understanding of the Late Hellenistic to Early Roman transition in the Eastern Mediterranean. Going beyond homogenising narratives like Hellenisation and Romanisation, and highlighting the social diversity and complexity of this spatiotemporal framework. By bringing together experts in archaeology, history, and related fields, we hope to create a rich tapestry of knowledge that contributes to the broader narrative of the pivotal Late Hellenistic to Early Roman transition in the Eastern Mediterranean. We invite researchers to submit their proposals, thereby contributing to our collective exploration of this topic.

ABSTRACTS

1 MODELLING CHANGES AND PERSISTENCE IN URBANISATION DURING THE HELLENISTIC TO EARLY ROMAN IMPERIAL PERIOD IN ANATOLIA

Beaujean, Bas (KU Leuven, Sagalassos Archaeological Research Project) - Daems, Dries (Vrije Universiteit Amsterdam)

The diverse geography of Anatolia – ranging from well-connected coastal areas to fertile inland valleys and rugged mountain ranges – provided different opportunities and limitations for urbanization in antiquity. As the Hellenistic and Roman Imperial period in particular represent peak urban development across large swaths of Anatolia, this spatio-temporal framework provides opportunities to study the impact of this socio-ecological diversity on urbanisation. As such, in this paper, we model settlements as hubs of energy, resources and information flows (Daems 2021). As our

starting point, we use a well-defined set of selection pressures: subsistence, cooperation, competition, interaction, distribution, production, governance, and demography. These act as probabilistic, multi-level causal factors for the decision-making processes of social groups that shape the energy, resources and information flows driving urban formation. For example, increased competition between cities might initiate increased settlement nucleation, resulting in denser urban centres and decreasing numbers of rural settlements. This could create trade-offs between the need to cultivate sufficient land to sustain the community or the desire to participate in trade networks. By simulating such synergies and feedback loops between multiple selection pressures in a probabilistic framework, we generate scenarios that we can compare to empirical data from the archaeological record. This allows us to better understand change and persistence in urban development trajectories, not only vis-à-vis environmental conditions, but also in relation to changing political dynamics like (official) imperial incorporation in the broader Hellenistic state structures at the time. This study provides therefore a valuable contribution to the broader debate on the relationship between cities and kings in the Hellenistic period and urban development within the political and economic framework of the Roman empire.

2 THE USE OF MUTUAL INFORMATION TO TRACE HELLENISTIC AND ROMAN NETWORKS OF INTERACTION IN THE EASTERN MEDITERRANEAN

Daems, Dries (Middle East Technical University)

The study of material interaction networks in the ancient Mediterranean is a dynamic and multidisciplinary field that encompasses important contributions from archaeological, historical, and geographical perspectives. Important topics include: (1) the identification of trade networks and economic exchange facilitating the spread of goods, ideas and technologies; (2) the production and distribution of material culture; (3) (urban) connectivity and port cities as important hubs of connectivity networks across land and sea; and (4) innovations in transportation technologies facilitating connectivity and interaction. Scholars throughout this research field continue to uncover the rich tapestry of complex interactions and exchanges that shaped ancient Mediterranean societies.

Yet, our insights are hampered by several important restrictions, not the least the almost general lack of direct traces of interaction in the archaeological network. Whatever material residues we have (e.g. amphorae and other forms of ceramics) offer only a limited reflection of the actual socio-economic dynamics of trade and exchange. Yet, they remain our most important material source of information to help us untangle the complex networks of intentions, relationships, interests, and opportunities underlying the production and distribution of material culture in the Mediterranean.

In this talk, I will present a new methodology that can unlock a new avenue of research to further scrutinize the available material. The methodology is based on the combination of standard GIS tools such as least-cost pathway analysis and novel approaches based on mutual information analysis. Using available datasets such as the ICRATES dataset of Hellenistic and Roman tableware, the ORBIS dataset of trade routes in the Roman empire and the Roman Roads Network data, this paper aims to uncover some of the underlying drivers of interaction and exchange in the transformative period of the Late Hellenistic and Early Roman Imperial period (150 BCE – 150 CE) in the eastern Mediterranean.

3 THE ROMAN AGORA DISTRICT OF ATHENS: TRANSFORMATIONS AND INNOVATIONS BETWEEN THE HELLENISTIC AND ROMAN AGES

Mendolia, Chiara (Sapienza, University of Rome; Italian Archaeological School at Athens)

Studies on the archaeology and topography of Athens, regarding the Hellenistic and Roman phases, which have recently received increased attention, are still limited and confined to a few contexts. The city of Athens, unlike many other centers in the province of Achaia, is distinguished in the transitional period between the end of the Hellenistic age and the beginning of the principate by the persistence of a local way of building, which did not take second place to the Roman way.

Within the urban landscape, a case in point is the complex of the Roman Agora at Athens, located along the northern slopes of the Acropolis in one of the nerve centers of the Roman city. This was characterized by a series of changes as early as the Hellenistic age, with the construction of the Tower of the Winds and other buildings along the eastern side of the ancient market. But it was in the early imperial age that the most significant architectural interventions took place, with the monumentalization of the square.

The complex of the Roman Agora, due to its long diachrony, is the key example of a way of building in the Greek tradition that was progressively influenced by Roman building techniques, the mixture of which would then give rise to a new way of building during the 1st-2nd century AD.

Building upon my recent study on the construction techniques and architectural phases of the complex, carried out within the framework of the research of the Italian Archaeological School at Athens and with the support of the Ephorate of Antiquities of the City of Athens, this contribution will attempt to outline the urbanistic developments

and constructed of the area of the Roman Agora during the Hellenistic and Roman age, through an examination of the site dynamics and production processes.

4 DEVELOPMENT OF THE URBAN WATER MANAGEMENT IN THE RESIDENTIAL QUARTER (MALOUTENA AREA) OF NEA PAPHOS DURING HELLENISTIC AND ROMAN PERIODS

Romaniuk, Marcin (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences)

This presentation provides a diachronic overview of the evolution of water management within the residential quarter of the Hellenistic-Roman city of Nea Paphos, Cyprus. It follows the results of research project no. 2018/31/N/HS3/03319, financed by the National Science Centre, Poland, and focused on the relics of hydrotechnical infrastructure discovered by the Polish Archaeological Mission of the University of Warsaw at the so-called Maloutena site in 1965-2016. Thus far, over 300 water installations, such as bottle-shaped cisterns, street sewers, terracotta pipelines, hypocaust baths, multi-seat latrines or siphon towers, have been recorded there. Such abundance and diversity of objects reflect the complexity and sophistication of local water management. Closer analysis has revealed that it underwent several significant transformations over time in response to various natural and cultural circumstances. From relatively simple early Hellenistic installations designed to collect water from winter rainfalls and sparse local intakes to the introduction of the advanced Roman waterworks feeding heavily-water-consuming luxury features such as ornamental garden piscinae or public thermae, the vital symbols of Roman culture. This presentation aims to trace these transformations, exploring their possible causes and implications, on the background of the city's history and the lifestyle of its citizens.

5 CHANGE AND PERSISTENCE: CISTOPHORI AND IDENTITY IN ROMAN ASIA MINOR

McCoy, Marsha (Southern Methodist University, Dallas, TX)

Scott and Webster (2003) situate the role of material culture in the complex and diverse transformation brought about by Roman imperialism. This paper examines the images and language on cistophori, the standard silver currency originally introduced by the Hellenistic Attalid kingdom by the mid-second century B.C.E., and retained after the kingdom was bequeathed to Rome in 133 B.C.E. These Roman period cistophori reveal a little noted but striking development from the late Republic to the early Empire, through which the systemic shift caused by Empire and the multi-dimensional integration of this area into Roman socio-political, economic, and cultural life can be documented. Cistophori first begin using the Latin language while retaining Greek in cistophori issued by Roman magistrates from 58 B.C.E., and most notably in an issue commemorating Cicero's proconsular governorship of Cilicia in 51-50 B.C.E. (Metcalf, 2017). This dual combination of Latin and Greek legends both makes the coins readable to local Greek speakers as well as Roman officials and businessmen, and also acknowledges the ongoing presence of the latter groups, while it keeps intact the traditional visual images of these coins. A decade later, however, cistophori minted in Ephesus in 39 B.C.E. commemorate the marriage of Antony and Octavia by showing the bust of Octavia on top of the traditional cista mystica flanked by snakes, while on either side of the snakes the legend is in Latin alone (Sutherland, Olcay, and Merrington, 1970). This trend continues as Greek completely disappears and the traditional images are displaced or entirely replaced by images reflecting political and social policies of Rome. By the time of Hadrian, cistophori have been completely integrated into the propaganda apparatus of the Roman emperor, as Asia Minor itself has become a thoroughly Romanized territory (Metcalf, 1980).

334 ETHNOGRAPHIC ANALOGY AND THE PLEISTOCENE ARCHAEOLOGICAL RECORD: RE-ASSESSING POTENTIALS AND PITFALLS

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Fusco, Marianna (Sapienza University of Rome; Universitat Rovira i Virgili Tarragona) - Taylor, Nicholas (Stony Brook University, New York; Turkana Basin Institute)

Session format: Regular session

Ever since the concept of a deep human past rose to widespread scientific acceptance in the 1800s, ethnographic and anthropological data have been considered valuable tools for understanding and interpreting the prehistoric archaeological record. Severe criticism of the fallacious and dangerous belief in modern hunter-gatherers as 'living human fossils' – an idea particularly prevalent in the early 20th century – was levelled against this approach, from which emerged a more mature consideration of ethnographic data as a potentially powerful source of testable hypotheses, when applied with appropriate caution.

In Africa for example, the 1960s-1970s witnessed intense debate over the relevance of ethnographic observations and models to the Early Stone Age (ESA) the settled result being archaeological traces >1.8 Ma are better understood using primate rather than human analogues. Ethnography approaches found a new niche in the 1980s as the Middle

Stone Age (MSA) (~0.4-0.03 Ma) was recognised as the likely source of the behaviour of Homo sapiens and its immediate precursors. With current archaeological evidence pushing back the appearance of some characteristic MSA behaviours into the late Acheulean/Early Pleistocene, it is worth revisiting the potentials and limits of ethnographic approaches to the African Stone Age.

This session welcomes current data bearing on all Stone Age periods, as well as comparative work from Europe and Asia. How far back in time modern observations and datasets can be meaningfully employed? How does their applicability vary between social, economic, and technological spheres? To what degree does ecology impact the accuracy and usefulness of ethnographical parallels? We particularly encourage case studies focusing on the interpretation of multi-stranded archaeological datasets, lithic and organic technologies, wider socio-cultural and economic factors, and the role of site formation processes, among others.

ABSTRACTS

1 ETHNOGRAPHY AND DEEP TIME ARCHAEOLOGY: A REEVALUATION

Harmand, Sonia (CNRS, UMR 5608 TRACES; Turkana Basin Institute; Stony Brook University; IFRA) - Taylor, Nicholas (Stony Brook University) - Boes, Xavier (INRAP) - Arrighi, Vincent (INRAP) - Prat, Sandrine (CNRS, UMR 7194 HNHP) - Arroyo, Adrian (IPHES-CERCA)

Ethnography and deep time archaeology: a reevaluation.

Ethnography has historically been a valuable tool for archaeologists in drawing analogies and interpretations about past human behaviors including those during the Pleistocene from about 2.6 million years ago. Ethnographical models have been used to interpret the archaeological evidence in terms of settlement patterns, subsistence strategies, social dynamics, and territorial behaviors. Famous key contributions of ethnography to understanding past human behavior include the landscape models formulated in the 1980s by renown scholars including L. Binford, G. Isaac and R. Potts. This paper will attempt to give a state-of-the-art on the now applicability of these models in the light of new discoveries made in the archaeology of the Pliocene and Early Pleistocene. As the evidence of hominin behavior is becoming increasingly remote in time, this paper will also discuss the relevance of non-human primate models as an alternative perspective to understand our deepest past.

2 THE MISSING OLDOWAN AT NASURA, WEST TURKANA: A CASE STUDY IN NON-HUMAN PRIMATE MODELS

Wilson, Evan (City University of New York Graduate Center; New York Consortium of Evolutionary Primatology; Turkana Basin Institute) - Böes, Xavier (INRAP - UMR 7194 HNHP - Département Homme & Environnement) - Arrighi, Vincent (INRAP-Midi-Méditerranée) - Prat, Sandrine (CNRS, INEE, UMR 7194 HNHP PaléoFED, MNHN) - Harmand, Sonia (CNRS, TRACES, UMR 5608; Turkana Basin Institute)

The time between 2.3 and 2.0 million-years-ago (Ma) is a critical yet poorly understood point of transition in the hominin lineage due to a relative dearth of well-dated archaeological sites. This period saw the widespread dispersal of stone technologies from sporadic, spatially restricted occurrences prior to 2.3 Ma, and the expansion of numerous derived hominin taxa by 2.0 Ma. The Nasura (NAS) site complex from the Nachukui Formation of West Turkana, dated within this interval, offers a unique opportunity to explore diachronic changes in hominin behavior, cognition, and foraging patterns. NAS is comprised of four in-situ archaeological occurrences found close together in both space and time and associated with hominin fossils, as well as high-resolution paleoenvironmental records. Essential to understanding these sites and their formation is the application of appropriate models for reconstructing hominin behavior. Here we present NAS as a case study in the use of the alternative non-human primate models in the Early Stone Age of eastern Africa.

3 POUNDING TOOLS: LIMITATIONS AND ADVANTAGES IN USING PRIMATES TO RECONSTRUCT HOMININ BEHAVIOR

Bocioaga, Cerasela (La Sapienza) - Spinapolice, Enza (La Sapienza)

Pounding tools represent one of the earliest evidence of stone modification in the archaeological record (3.3 Ma) and they have played a significant role in the analysis of the earliest hominin technologies and behavior, making them a good proxy for evaluating the origin of human technology.

However, despite their importance, knowledge about these tools remains extremely limited.

The observation of primates, including modern humans, allows us to examine human technology through the direct observation of behaviors involving the use of stone tools, spatial data collection, chaîne opératoire approach, surface surveys, experimental studies, analysis of raw materials, use-wear, and lithics technology analysis.

Nevertheless, many researchers have criticized the validity of this approach due to temporal, ecological, and cognitive differences between non-human primates and extinct hominins. The limitations of this approach cannot be denied; however, there are also numerous potentials associated with environmental and/or social contexts that may have facilitated the origin and evolution of lithic technology within our lineage. As a result, collaborations among archaeologists, primatologists, and ethnographers have focused on how non-human primates can be utilized as proxies, leading to the emergence of Primate Archaeology, which represents a potential for the development of a methodology suitable to try to understand early technological behaviors.

To construct valid models, it is therefore necessary to adopt a multidisciplinary approach: the percussive behavior and gestures of current primates during the use of pounding tools will be recorded and analyzed through camera traps and field experiments. Subsequently, the tools used will be analyzed through techno-morpho-functional analysis and compared with archaeological ones.

The goal is to understand whether the way current primates manipulate pounding tools shows similarities and/or differences compared to archaeological ones. This approach aims to enhance the understanding of how hominids handled tools and the types of activities they may have engaged in.

4 **MODERN KNAPPERS AND OLD STONE TOOLS: USING ETHNOGRAPHIC AND EXPERIMENTAL COLLECTIONS TO UNDERSTAND THE PRODUCTION PROCESS OF BASALT TOOLS**

Sánchez-Dehesa Galán, Sol (ICArEHB) - Hermann, Aymeric (UMR 8068 TEMPS, Technologie et Ethnologie des Mondes Préhistoriques, CNRS, France.)

Stone tools constitute a major source of information for the study of human history. They can be produced from various types of rocks, utilizing different types of hammerstones and gestures, and resulting from short or long processes, with varying levels of planning. The operational sequences involved in their production and the knapping techniques employed inform us about the technical traditions and cognitive capacities of past knappers.

However, while knapping constraints and technical characteristics associated with different percussion techniques have been well investigated on siliceous materials such as flint or obsidian, volcanic rocks like basalts remain highly unexplored - even though these are among the most common in archaeological assemblages on a global scale.

This paper presents an ongoing repository of technological observations for knapped microlithic volcanic rocks. Our main goal is to provide a characterization of fracture mechanisms and associated characteristics based on reference collections (ethnographic and experimental), as well as detailed documentation on the technical parameters (gestures, techniques, and knapping tools), and for a wide range of volcanic rocks.

Built upon common methodological constraints encountered in two very different chronological and geographical contexts—the production of adzes in central Polynesia and the production of large cutting tools in East Africa—we explore the inputs and limitations of this baseline approach in these diverse case scenarios and its further developments.

Ultimately, this framework will allow for an understanding of strategies adapted to technical constraints and the expertise employed in producing archaeological material cultures, all accessible through an online open-access database.

5 **CENTRAL AFRICAN ETHNOGRAPHIC TOOL-USE AND ITS CONTRIBUTION TO UNDERSTANDING OF THE EARLIEST ARCHAEOLOGICAL TRACES IN THE CONGO BASIN**

Taylor, Nicholas (Stony Brook University)

The earliest archaeological signature of human presence across much of the Congo basin consists of distinctive stone tools attributed to the Middle Stone Age (MSA) Lupemban industry. Dated to ~260 thousand years old (kya) on the southern plateau margin of the basin, in recent years this stone tool industry has been considered potentially significant for understanding the evolutionary origins of our species, *Homo sapiens* ~300 kya (Barham 2001). Its modern geographical correlation with the tropical forest belt led, in the 1960s, to enduring speculation this technology developed as a prehistoric adaptation to rainforest foraging (e.g. Cornelissen 2002), but this association remains unconfirmed due to a lack of well-preserved sites and sequences (Taylor 2016).

Important hypotheses about the possible prehistoric functions of the stone lanceolate points, core-axes, and small blade tools found in the Lupemban have been drawn from ethnographic accounts of iron tool use by Congo basin hunter-gatherers (e.g. Miller 1988). This comparative work has, however, never been undertaken systematically, at least by archaeologists. In this paper I attempt to address this by revisiting available accounts (e.g. Turnbull 1965; Tanno 1981) of how modern tools are deployed to exploit closed-canopy environments in equatorial Africa. While recognizing there are critical differences in the qualities of metal and stone tools, and that there is no direct or continuous cultural ancestry between Lupemban and modern central African foragers, it is hoped a cautious reconsideration of anthropological and archaeological data might help develop further clues about the potential subsistence strategies of the Congo's first inhabitants.

6 **ETHNOGRAPHIC INSIGHTS INTO MSA HUNTER-GATHERERS LITHIC TECHNOLOGIES**

Fusco, Marianna (University of Rome La Sapienza S)

The analysis of stone tool production, in terms of reflection on the gestures, and the complexity of the technical behavior of the human groups that produced them, is among the most used sources of information to reconstruct past human societies. Experimental archaeology has significantly contributed to the development of what is now known as the technological approach to lithic analysis. Alongside theoretical and experimental frameworks, ethnographic observations of tool production, use, and discard have informed the creation of new methodologies for studying prehistoric lithic artifacts. These observations can shed light on the potentials and challenges associated with the application of key analytical concepts of the organizational approach, such as curation and expediency in lithic exploitation. While it's true that the ethnographic observation of modern hunter-gatherers may lead to problematic interpretations of past events, especially due to the different environmental contexts in which they lived compared to modern ones, most of the ethnographic data for stone tool use and production comes from semi-arid environments, which has been proposed to be particularly useful for some African Pleistocene contexts.

This talk aims to revise the application of ethnographic observations and analogy to the understanding of stone tool use and production among African Middle Stone Age hunter-gatherers. Despite the extensive use of ethnographic analogy in the past, it seems that we are still somehow stuck on the challenges of this method for creating a model of hunter-gatherers' behavioural complexity. Thus, it will be conducted an extensive review of what has been done so far to explore new hypotheses for the use of ethnographic data in interpreting MSA archaeological contexts.

7 **SITE FUNCTIONALITY AND MOBILITY PATTERN DURING THE EAST AFRICAN MIDDLE STONE AGE: DATA FROM THE GOT10 SITE, SOUTHERN ETHIOPIA**

Aureli, Caterina (Dipartimento di Scienze dell'Antichità, Sapienza Università di Roma, Italia) - Asrat, Seminew (Dipartimento di Scienze dell'Antichità, Sapienza Università di Roma, Italia) - Melaku, Sahleselassie (Ethiopia Heritage Authority (EHA), National Museum of Ethiopia, Addis Ababa, Ethiopia) - Fusco, Marianna (Dipartimento di Scienze dell'Antichità, Sapienza Università di Roma, Italia; Department of History and Art History, Universitat Rovira I Virgili, Tarragona) - Spinapolic, Enza (Dipartimento di Scienze dell'Antichità, Sapienza Università di Roma, Italia)

Through the analysis of faunal remains, in combination with other proxies, it is possible to clarify past human activities. The analysis of the traces present on the bones, combined with ethnographic studies, provide potential new insights on aspects of human behaviour including settlement patterns and site function; an opportunity to explore aspects of past hunter-gatherer territory occupation systems, mobility, animal resource exploitation, and adaptations to climatic changes during the Late Pleistocene. This approach has rarely been applied to open-air contexts in East Africa due to the scarcity of well dated MSA sequences with well-preserved bone.

In this view, of particular interest are the differences between sites and if and how are they relates to seasonality dynamics and movements of hunter-gatherer groups.

The aim of this talk is to discuss the organization of past hunter-gatherer groups systems through the combination of results from preliminary analyses of the GOT-10 materials in order to consider how much can be understood with the ethnographic analogy.

The GOT-10 site, Gotera area, southern Ethiopia is an open-air site in a modern savannah environment preserving a stratigraphic sequence rich in artifacts and fauna in primary contexts dated to MIS 3. Despite taphonomic processes can potentially affect faunal assemblage, the preservation of this record is good.

To develop a model regarding the patterns of site occupation, it would be ideal to draw it from multiple sources that give us insights regarding how the environment was, where these groups lived, how they exploited this environment and the available resources, how it changed through time. In southern Ethiopia, due to the difference in evidence and contexts, one of the few available proxies for comparison and behavior understanding in an open-air site, is the eroded faunal materials from GOT-10. Here, identification and resolution of knowledge gaps can be achieved through ethnographic studies.

8 **THE MIDDLE AND LATER STONE AGE SEQUENCE AT UMHLATUZANA ROCKSHELTER, KWAZULU-NATAL, SOUTH AFRICA: EXPLANATORY MODELS OF PLEISTOCENE CULTURE CHANGE**

Dusseldorp, Gerrit (Leiden University; Palaeo-Research Institute University of Johannesburg) - Sifogeorgaki, Irini (Leiden University) - Murungi, May (University of Algarve) - Carr, Andrew (University of Leicester) - Schmid, Viola (Austrian Academy of Sciences - Austrian Archaeological Institute)

Rescue excavations at Umhlatuzana rockshelter yielded a largely continuous 2.5 metre-deep sedimentary sequence, covering the last 70,000 years (Kaplan 1990). As the Pleistocene sedimentary sequence at the site is homogeneous

and no clear boundaries between sedimentary units are visible, different archaeological technocomplexes were previously defined on the basis of artificial spits. The site yielded some of the main technocomplexes figuring in discussions about early instances of complex behaviour in southern Africa such as the Howiesons Poort and the Still Bay. Importantly, a thick sedimentary package at the site yielded lithic assemblages considered transitional between the Middle Stone Age and Later Stone Age. However, suspicions of large-scale sediment movement in this part of the sequence made the interpretation of the assemblages complicated.

We conducted geoarchaeological fieldwork at the site in 2018 and 2019. Our work confirms many of the observations from the initial rescue excavations. Using geoarchaeological techniques as well as piece-plotting all excavated materials, we demonstrate no large-scale sediment movement took place.

The piece-plotting also affords greater resolution in the shifts in composition of the lithic assemblages. Our analysis to-date shows a far less gradual transition between Middle and Later Stone Age materials at the site. Raw material preference and debitage production strategies shift within a narrow band across the profile. We interpret these changes in light of recent proposals based on southern African ethnography. We propose that the transition may represent a change in the organization of social networks.

9 ETHNOGRAPHIC DIVERSITY AS A THEORETICAL FRAMEWORK FOR THE RECONSTRUCTION OF ARCHAEOLOGICAL HIDE-WORKING CHÂÎNES OPÉRATOIRES

Caurette, Natacha (University Paris 1 Panthéon-Sorbonne; UMR 8068 TEMPS; UMR 7264 CEPAM)

Many modern nomadic hunter-gatherer communities rely on hide-working to produce clothing, housing materials, and various utilitarian objects. This craft is often considered to be influenced by cultural, technical, and economic factors specific to each human group.

Numerous ethnographic studies have described hide-working, identifying a variety of chaînes opératoires. However, this literature is rarely taken extensively into account by archaeologists working on past hide-working crafts: studies usually present the few ethnographic case studies that parallel their observations, occulting the inherent variability of hide-working techniques.

This paper presents an extensive bibliographic database aimed at documenting the diversity of hide-working chaînes opératoires among sub-actual traditional societies, regardless of their environmental, economic, or social context. Focusing on the technical aspect of this craft, I did not consider groups who use industrial techniques of the manufacture.

This synthesis highlights three patterns: 1) the invariable steps of hide-working, 2) the uniqueness of each chaîne opératoire, and 3) the variability of gestures, tools, and their functioning mode. These conclusions can serve as a theoretical framework for reconstructing hide-working amongst archaeological hunter-gatherer societies. This work shows the usefulness of taking into consideration the ethnographic diversity of techniques for apprehending past crafts.

336 BURIAL AFTER THE END OF THE WORLD

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Meier, Thomas (Center for Apocalyptic and Post-Apocalyptic Studies (CAPAS), Heidelberg University; Institute for Pre- and Protohistory and Near Eastern Archaeology, Heidelberg University) - Turner, Sam (McCord Center for Landscape, Newcastle University) - Moragas Segura, Natalia (Equip de Recerca Arqueològica i Arqueomètrica, Universitat de Barcelona; Institut d'Arqueologia de la Universitat de Barcelona) - Müller, Kathrin (University Freiburg)

Session format: Regular session

Several cultures through space and time placed burials in ruins of a rather recent past still remembered in memory, e.g. burials in monumental ruins of the Classical Maya period or early medieval burials in the ruins of Roman villae. Frequently this locational choice for the dead is explained by the ruin as a haunted place, where the corpse as a haunted object or person is „naturally“ at home. But isn't this interpretation much inspired by romantic and Gothic appreciation and perceptions of the ruin?

Other explanations are possible. Is the ruin as a place of gradual decay especially suited for the dead body in decay as well? Both are processes of transformation of a cultural entity that came out of use into something different, a new status certainly less cultural, but more „natural“. Or were ruins as objects of devastation perceived as places where death cannot be ignored, as Sigmund Freud already stated in 1915? Do ruins introduce death into the „equation of reality“ (Realitätsgleichung)?

On the other hand, only a small selection of dead were buried in ruins and in many cases we don't know whether these bodies were especially privileged or discriminated against by this location. Were they selected at all? Were they treated in a special way?

In this session we want to explore the widespread phenomenon of burial in ruins of a recent past on a transcultural level. Both case studies and comparative papers are welcome.

ABSTRACTS

1 EARLY MEDIEVAL BURIALS AT ANCIENT RUINS AND MOUNDS. A REFLECTION OF DIFFERENT TALES?

Schumann, Robert (University of Hamburg)

It has long been recognized in archaeology of the early Middle Ages in many regions, that, in addition to regular burial sites, numerous Roman ruins and prehistoric burial mounds were reused as burial sites. In central European archaeology the re-use of Roman buildings in the Merovingian period in particular is usually seen either as space-saving, as potential agricultural land is not wasted on burial sites, or as a reference to buildings interpreted as Christian. For the burial mounds, their use is usually interpreted as a pagan statement to a fictive pagan past and it is implicitly assumed that the land was appropriated in the early medieval period through the re-utilization of these ancient monuments. What most interpretations have in common is that the original and earlier meanings of these ruins and old burial sites were lost and these monuments were thus charged with new meanings that are largely/completely detached from the older connotations. Taking into account memory studies and the question of the long-term significance of these monuments in the cultural landscape and their perception, this paper will explore the question of whether these monuments in the early Middle Ages were actually viewed largely beyond their former significance, or whether their subsequent use may not also reflect a reference to old narratives, using case studies from southern Germany. These pre-medieval narratives might echo in the Merovingian period and thus have an effect in the early medieval present, linking different archaeological periods.

2 BURIALS IN AN (ALMOST) FORGOTTEN CITY. TO BE BURIED IN POSTCLASSIC TIMES IN TEOTIHUACAN

Moragas, Natalia (University of Barcelona)

It is well known that the Teotihuacans built their main monumental buildings thanks to the extraction of materials from the earth itself, thereby creating a set of artificial cavities that, in turn, constituted a cultural landscape. The role of these cavities in the construction of Teotihuacan identity will change over time. After the collapse of Teotihuacan, some of these spaces were reopened and reoccupied as burial spaces. During Postclassic times, when the built space is clearly abandoned, an underground space is reconstructed in which the burials constitute a priority.

During the years 94-94, an underground ceremonial complex was excavated that gives us some ideas about the changes that will develop over time regarding the use of this space. The entire complex was sealed around 350 AD. when the city was in full splendor to be forgotten until the Postclassical era. While the exterior space is abandoned, the interior space is reinvented by new cultural groups.

3 BURIAL IN THE RUINS OF THE LATE MINOAN IIIC SETTLEMENT OF VRONDA: COMPREHENDING AND CONSTRUCTING THE PAST, PRESENT AND FUTURE

Bell, Sarah (Brown University)

Archaeological evidence from many parts of the Mediterranean suggests that, in the decades and centuries following the Late Bronze Age “collapse” of around 1200 BCE, Early Iron Age communities began engaging with the ruins of abandoned Bronze Age sites. Burial within these ruins represents the most extreme form of this kind of post-abandonment visitation. While we can only hypothesize the meanings embedded in these practices for those who performed them, the intentions behind them are likely to have been connected to specific narratives about the past that were understood by visiting communities to be represented by these sites. Practices such as those witnessed at certain Late Minoan IIIC (c. 1190-1070) sites on the island of Crete speak to the power of communally shared historical narratives that become embodied within specific places in the landscape, and the role that these play in the formation and perpetuation of social identity. The phenomenological and sensorial power of rites associated with burial in the ruins of upland subsistence settlements such as Vronda—performed as they were, in the wake of a period of social fracture and change—helped Early Iron Age participants to define and come to terms with the past, restructure and then reify their understanding of their own social reality and identity, and ensure that experiential frameworks supporting this reality and identity were projected forward to shape the future for descendent communities. In attempting to isolate the meaning and intention behind the practice of burial within ruins, this case study suggests that

we must work to understand the social function these rites were serving by considering, not only the archaeological evidence surrounding the practices themselves, but comparable practices occurring in the wider area, and, above all, the sociopolitical context in which these episodes of post-abandonment visitation take place.

4 **RESURRECTION OF A LOST WORLD? RECONSIDERING EARLY MEDIEVAL BURIALS IN ROMAN RUINS IN NORTHWEST NORICUM**

Hausmair, Barbara (University of Innsbruck)

Northwestern Noricum is the stepchild of Central Europe's transition from the Roman world to the Middle Ages. One of the many reasons for the region's transitional phase remaining under-researched is the assumption that the collapse of the Roman administration in the late 5th century led to the complete abandonment of the province, leaving behind a devastated and deserted land. But was this really the case? Did the end of the Roman Empire really constitute "the end of the world" in NW-Noricum? And if so, why did some communities settling the land in the Early Middle Ages chose to bury their dead in the ruins of an allegedly lost civilization? This paper looks at burials of the Merovingian period that were deliberately erected in abandoned (?) Roman settlements. Based on the identification of different forms of early medieval mortuary interaction with Roman structures I will discuss different possible motivations for this particular choice of burial places, ranging from pragmatic considerations, to the production of special social groups; the reframing of remnants of a distant past for forging a new society; changing religious beliefs; or even the possibility of a Roman descendant community aiming to "resurrect a lost world" through the reframing of ancient ruins.

5 **EARLY MEDIEVAL CEMETERIES IN ROMAN RUINS ACROSS SOUTHERN GERMANY AND ADJACENT AREAS**

Heidegger, Philipp (Amt für Kultur/Abt. Archäologie, Liechtenstein; Universität Freiburg)

The phenomenon can be regularly observed on numerous excavations and is very familiar to many archaeologists: burials inside and in the immediate vicinity of Roman ruins in the early Middle Ages. However, the current state of research hardly provides any interpretations of this behaviour – even a more detailed examination of its characteristics is not yet available.

By comparing available objective and measurable characteristics for as many of these sites as possible, I have tried to find structure within this poorly understood phenomenon. What emerges is a much more complex picture than is generally expected. Apparently, people are not buried in Roman ruins for one reason; instead, the Roman leftovers seem to be strongly integrated into everyday life and form points of reference for many different situations and groups of people within early medieval society.

While for some variations of the phenomenon, it seems quite easy to identify the background, many other manifestations are much more difficult to understand. However, it appears that the entire social spectrum of society at the time interacted in one way or another with the Roman legacies.

6 **FUNERARY OSTENTATION AND THE MEMORY OF ANCIENT BURIAL SITES: MEROVINGIAN BURIALS NEXT TO A PROTOHISTORIC TUMULUS AT RÉQUISHEIM (ALSACE, FRANCE)**

Fischbach, Thomas (Archéologie Alsace; UMR7044 Archimède) - Roth-Zehner, Muriel (Archéologie Alsace; UMR7044 Archimède)

The 2023 excavation of a vast area in Alsace at Réguisheim, between Colmar and Mulhouse, led to the discovery of a large Merovingian necropolis. This discovery is in fact the continuation of a complex already excavated in 2015. With 257 graves, this is one of the largest necropolises in the region, and all the necropolis's boundaries have been reached, making it unique in Alsace. Despite a high rate of looting, certain remains suggest the presence of a particularly wealthy population on the site. In particular, a large burial site surrounded by two concentric burial rings stands out.

Extensive stripping of the area was particularly marked by the unexpected discovery of a small group of around ten Merovingian burials, including one surrounded by a circular ditch, located next to a protohistoric enclosure and around 150 m north of the large necropolis. This type of settlement next to a protohistoric burial mound would be the fourth of its kind in Alsace, and is similar to a phenomenon known throughout the Merovingian world, notably in Scandinavia and southern England.

This small burial complex was used between the late 6th and early 7th centuries. Despite the high rate of reopening of the burials, the grave goods suggests a population of relatively high social status. Thus, the generally accepted interpretation of this Merovingian practice of installing burials alongside a protohistoric tumulus is that of asserting one's power over an area and legitimizing one's membership of a prestigious social group. It was also an opportunistic way of taking advantage of an existing marker in the landscape. The installation of these burials next to this protohistoric

tumulus was probably not done by chance, and the Réguisheim example therefore provides an opportunity to discuss this practice within the site, in Alsace and on a wider scale.

7 **RUINS AND MORE: EXPLORING THE CHOICE OF BURIAL SITES IN SOUTHERN GERMANY DURING THE EARLY MEDIEVAL PERIOD**

Müller, Kathrin (University Freiburg)

In the early medieval period, a variety of complementary burial sites can be observed in the Central European region. Southern Germany constitutes a central area whose burial landscape is strongly characterized by these very diverse types of burial sites. One of these variants is the burial at Roman ruins, an area shaped by structures from another time. The question arises why this particular place was chosen by certain individuals and relatives.

By closely examining burials at Roman ruins in southern Germany, the investigation aims to understand the possible reasons behind the choice of location. The analysis of occupancy patterns such as gender and age distribution, along with a closer look at the furnishings of the deceased, initiates the discussion on what background can be assumed behind the choice of burial place. This question is explored in particular through a comparison with the other complementary types of burial sites (e.g. in isolated locations, in settlements), thereby differences can be made clear.

motivations that may have guided these choices during the early medieval era in the southern German region.

8 **MAKING RUINS FOR BURIAL: REORIENTING EARLY MEDIEVAL LANDSCAPES WITH SPOLIA IN NORTHUMBRIA**

Turner, Sam (School of History, Classics and Archaeology)

The pattern of burial amidst the ruins of Roman villas and other ancient sites is a familiar one across early medieval Europe. In Britain prehistoric mounds and other features became increasingly prominent burial sites first for elite men and later for women as new polities emerged in the seventh century. It seems likely such places had a role in legitimizing their territorial claims.

But after the most powerful emerging kingdoms in Britain adopted Christianity as their main religion, elites stopped being buried on ancient sites and instead began to cluster around churches. In Northumbria, for example, the process which re-shaped the early medieval landscape involved the deconstruction of Roman structures to provide the material for new churches. Ancient ruins were therefore removed and reassembled in new configurations, but still used to underpin elite claims to legitimacy and territorial centrality. Indeed, by reconfiguring these ruins and giving them new symbolic importance, they became increasingly significant in strategies of power. This contribution will reflect on this process with reference to examples from the Tyne valley and Northumberland.

9 **BURIALS IN THE SETTLEMENT STRUCTURES OF GREAT MORAVIAN CENTRES - SOCIAL PHENOMENA, EVIDENCE OF COLLAPSE, OR GRAVES IN THE RUINS?**

Hladík, Marek (Institute of Archaeology Czech Academy of Sciences, Brno) - Přichystalová, Renáta (Masaryk University Brno) - Mazuch, Marian (Institute of Archaeology Czech Academy of Sciences, Brno) - Dresler, Petr (Masaryk University Brno)

In the 9th and 10th centuries, in the area of the Great Moravian central agglomerations such as Mikulčice and Pohansko, a large number of activities related to the concentration of political, economic or military relations took place. These profane activities were accompanied by activities related to religion, reverence, and funeral behaviour. In addition to the existence of churches and regular churchyards around them, it is not uncommon in Great Moravian centres to find human remains buried outside the so-called "locus sacer". We generally refer to these remains as dispersed settlement burials. In Mikulčice there are two very remarkable groups of these settlement burials: 1) burials in settlement situations in the stratigraphically youngest horizon of the fortifications 2) skeletal remains in the destroyed fortifications. These burials are usually characterised by the absence of an inventory or, at most, by the presence of ordinary personal effects or objects of daily use.

In the paper, we will deal with the problem of how to explain the existence of these graves in Great Moravian centers. Using the examples from Mikulčice, we will show the interpretation possibilities of this phenomenon. We will discuss whether it could have been a socio-cultural phenomenon, evidence of a collapse, or whether these are graves younger than the Great Moravian centres, and we are therefore dealing with the phenomenon of burial of survivors in the space of the ruins of Great Moravian sites in the period after their demise, and whether this phenomenon may be related to a short-term return to pre-Christian religious roots.

10 **DISPERSED BURIALS IN THE EARLY MEDIAEVAL (GREAT-MORAVIAN) STRONGHOLD BŘECLAV-POHANSKO (CZ)**

Prichystalová, Renáta (Masaryk University, Faculty of Arts, Department of Archaeology and Museology)

The stronghold of Břeclav-Pohansko (South Moravia, CZ), dating from the 9th to the first half of the 10th century AD, is a very interesting site in terms of burial behaviour. Two basic types of cemeteries can be distinguished: firstly, the cemetery around the church and secondly, the cemeteries identified throughout the central agglomeration, i.e. the scattered or dispersed cemeteries or small groups of graves within the settlement structures, situated between settlement features.

A total of 559 graves were investigated in the churchyards. Almost the same number of graves - 485 - were uncovered in the context of scattered cemeteries within the settlement structures. Outside the church cemeteries, 46.5% of all discovered graves were located. We have identified very heterogeneous burial practices, which include religious, social and chronological factors. We assume that burial areas and rituals were not organised centrally, but under the auspices of selected authorised persons from individual discrete settlement units. The community that buried its deceased here was well aware of the Christian religion and its burial rules, so why did they choose not to bury their dead in cemeteries around the church? Was it their choice, or could they not be buried there? Can these questions ever be answered?

11 **A RECONSIDERATION OF POST-ABANDONMENT BURIALS AT THE MAYA SITE OF ALTUN HA, BELIZE**

Novotny, Anna (Texas Tech University) - Houk, Brett (Texas Tech University)

The sociopolitical reorganization in the ancient Maya region during the Terminal Classic period, about A.D. 800 – 900, also referred to as the ancient Maya “collapse”, witnessed widespread changes to settlement patterns and ritual expression. Cities were largely abandoned, but archaeologists find evidence of human presence in the form of enigmatic refuse deposits in civic-ceremonial and elite residential locations. The content of these deposits varies, but they tend to contain smashed whole vessels, remains perhaps indicative of feasting, and occasionally human skeletal remains. Prior to the 1990s, archaeologists often attributed these remains to squatters who deposited their refuse in the palaces and temples of the abandoned cities. More recently, however, many Mayanists take a more nuanced approach, recognizing that these deposits represent complex abandonment-related behavior and not necessarily reoccupation. They continue to grapple with the significance of the human remains, however, and propose that they could be sacrificial victims, re-deposited ancestral remains, or evidence of re-settlement. These explanations all suggest a different type of memorialization. Are the interments part of the process of abandonment or evidence for continued ritualization of ceremonial space? In this paper we interrogate 25 previously published post-abandonment interments from the ancient Maya site of Altun Ha, located in eastern Belize, which the Royal Ontario Museum excavated in 1964–1970, reconsidering them in light of more recent scholarship on these types of features. Our bioarchaeological analysis combines their individual attributes, age at death, sex, etc., with details of their mortuary context to explore the significance of these interments in peri-abandonment deposits. We conclude by comparing patterns at Altun Ha to peri-abandonment deposits throughout Belize.

12 **REST IN RUINS – NEW APPROACHES TO DYNAMIC ABANDONMENT PROCESSES AND BURIAL RELOCATION AT THE NEOLITHIC SETTLEMENT OF GÖBEKLI TEPE**

Schönicke, Julia (Freie Universität Berlin; German Archaeological Institute)

For many years, the Neolithic settlement of Göbekli Tepe (9500-8000 calBCE) in SE-Anatolia was interpreted as purely a ritual center or mountain sanctuary without any traces of domestic activities. Since the site revealed large, monumental oval buildings with up to 5.5 m high monolithic pillars and outstanding iconography, this hypothesis was initially convincing. It was presumed that the buildings (often portrayed as “temples”) were intentionally backfilled (“buried”) at the end of their use phase with enormous amounts of soil and sediment debris. In the fill, considerable amounts of human bones were discovered that led to the assumption of burials, human sacrifice, and even cannibalism in the ruins.

However, recent research at Göbekli Tepe did not only reveal settlement architecture and everyday practices. A burial of two individuals below the floor of a domestic building was uncovered, reflecting common mortuary practices in the Early Neolithic of Western Asia. Also, by concentrating on the surrounding landscape and the undulating topography of the site, dynamic taphonomic processes and strong postdepositional relocation of settlement layers have been identified. As my studies focus on abandonment processes and ruin interactions at Göbekli Tepe, I analyzed the fill of several buildings in detail. I argue that the Neolithic people originally buried the deceased in houses. After the abandonment, the ruins collapsed and the building material including the burials eroded into the special buildings. So,

at the current state of knowledge were the ruins neither intentionally buried, nor were they the setting for post-abandonment sacrifice.

My case study demonstrates how archaeological interpretations often prefer the extraordinary to the supposedly simple which leads to misinterpretations and finally to a biased conceptualization of the lifeways of the Neolithic communities.

13 **MAYA RUINS AND POST-COLLAPSE BURIAL BEHAVIOURS**

Vidal Lorenzo, Cristina (Universitat de València) - Muñoz Cosme, Gaspar (Universitat Politècnica de València)

The reuse of Maya ruined buildings as burial places and sites of ancestor veneration was a very common practice in post-collapse Maya society. These abandoned constructions were chosen as places to celebrate rituals and to deposit offerings, especially to the rain divinities. This tradition continued during Colonial times, despite the efforts of the Spanish ecclesiastical authorities to eradicate it; in fact, in some communities in the Maya area it continues to this day.

Unfortunately, little of this post-collapse evidence has been properly documented by archaeological projects despite its enormous importance in the study of the famous final crisis of the Classic period. There are a number of reasons for this neglect. The first is the disdain that traditional studies in Maya archaeology have shown towards the Postclassic period, sometimes described negatively as the “3Ds”: decline, decadence, and depopulation. The second is the fascination aroused by the exploration of Classic buildings and their substructures, the discovery of royal tombs or the search for stone monuments bearing writing, in contrast to the difficulty of correctly distinguishing and dating the remains of later and, in general, less striking occupations. This has led to the interpretation of many of the post-abandonment contexts as vestiges of a transient and disorganized period, rather than as a reflection of a changing social organization and its beliefs. In addition, these remains are usually found mixed with others and in contexts that have often been altered, which hinders their stratigraphic interpretation.

Focusing on different Maya case studies, the paper aims to show how Postclassic offerings and burial data can reflect changing social behaviours, and how these ruined buildings were perceived and integrated into the cultural memory of this people over time.

14 **WHY TO BURY IN A RUIN?**

Meier, Thomas (University of Heidelberg)

The abstracts of this session show that burials in ruins are culturally widespread. Interpretations vary widely, mostly from a perspective of the burial. But what comes into view, if we start from the ruin? What is a ruin at all? The answers depend on the theoretical approach we take:

Functionally, ruins are piles of debris rendering the soil unsuitable for agriculture, they are overgrown by brambles, which rules out husbandry. To make any use of such places, burial is one option. Psychoanalytically, ruins are objects of desolation and as such are perceived as places where death cannot be ignored. Ruins introduce death into the „equation of reality“ and, hence, are appropriate places for the dead.

Cultural theories define ruins as decontextualised remnants from the past that need to be nested in new narratives in order to gain meaning in the present. Such meaning may vary widely. The romantic appreciation of ruins has populated them with the ghosts and turned them into haunted places. Equally, the corpse has been perceived as a haunted person of its own kind, at home in the ruin. In a less Gothic mindset the ruin can be understood as a place of gradual decay and transformation from culture to nature. The dead body is subjected to the same processes of. In a non-anthropocentric perspective, burial in ruins can be interpreted as a measure to maintain the consistency of networks: The network of life expels the no-longer-living body, and the corpse is integrated into the network of death, the funeral mediating between the two worlds.

Such a kaleidoscope of interpretations does not pose the question of “the” true and binding interpretation across time and space. Rather, it appreciates the colourful plentitude of cultural expressions as well as the archaeological imagination.

340 AFTERMATH OF WAR: PRECARITY AND CONSEQUENCES OF ARMED CONFLICTS FROM PREHISTORY TO EARLY MODERN PERIOD

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Matic, Uros (Institute for Classics, University of Graz) - Mihajlovic, Vladimir (Departement for Archaeology, Faculty of Philosophy, University of Belgrade) - Hello-Lapr erie, Germain (National Museum of Natural History) - Deforce, Koen (Ghent University)

Session format: Regular session

Archaeology of war and armed conflicts has often focused on the actors and weapons of war, placing strong emphasis on the conflicts themselves, and less on their consequences and resolutions. Considering the current political climate in the world, with several ongoing conflicts and new ones emerging, archaeology as a discipline needs to address the precarity and consequences of armed conflicts for the different parties involved.

The goal of this session is to examine the visibility of the short-term and long-term social consequences of armed conflicts in the archaeological record from Prehistory to the Early Modern Period. The consequences on the defeated side can, but do not necessarily have to, lead to poor diets or bad health conditions, physical trauma, and higher mortality rates, all of which can be visible in the osteoarchaeological record. Conversely, the victorious community can benefit from plundered resources, which can translate into wealth, opulence and better conditions of life, at least of some of its members. Furthermore, armed conflicts can result in migrations of varying scales, either through forced displacement or deportation. These are well-documented in written sources from historical periods but are less apparent in other periods where we rely solely on the archaeological and osteoarchaeological record.

Last but not least, armed conflicts can, to varying degrees, result in the destruction of settlements and landscapes, making places less hospitable or more precarious to live in. All of the above strongly indicates that understanding the trauma caused by war requires an examination of its corporeal and material components. We invite contributions that address these issues and those that attempt to answer which individuals and groups benefit the most and which suffer the most in the aftermath of war.

ABSTRACTS

1 ON THE HUMAN CONSEQUENCES OF PREHISTORIC WAR: THEORETICAL AND ARCHAEOLOGICAL PERSPECTIVES

Tornberg, Anna (Lund University) - Vandkilde, Helle (Aarhus University)

Skeletal trauma is often direct evidence of warfare defined as a flow of violent social action in several phases whose scale, intensity, organization, and *raison d' tre* vary. War may be strictly local or a population-scale conflict. It may be a short outbreak or endemic. Waging war may or may not be institutionalized. Reasons for warring can be honour, territorial, to acquire women and slaves, or to establish dominance and control of people and resources. In addition, there are co-influencing factors like climate shifts, famine, and population turnovers. One or more of these variables may affect the immediate and long-term consequences of war campaigns.

Theoretically inspired by these variables we focus upon the Nordic Corded Ware Complex. More precisely, we approach human consequences of warfare through a multiproxy analysis of human skeletal remains and related archaeological sources in a period of marked social change and genetic evidence of population turnover. We pinpoint high-resolution chronology of direct violence as the very key to distinguishing temporal trends in the scales of warfare, which in turn promotes understanding of the social practices of war and human consequences thereof. We address the institutionalization of war and control of desirable resources such as high-quality flint as likely key parameters. Socially rooted impairment, cohesion, and inequality are all potential consequences of war affecting individuals, while hierarchization and altered demographics might reveal consequences on a population scale.

2 THE SLINGS AND ARROWS OF OUTRAGEOUS FORTUNE. LARGE-SCALE VIOLENCE AND WIDER IMPACTS AT THE LATE NEOLITHIC BURIAL OF SJAPL, IBERIA

Fernandez-Crespo, Teresa (Universidad de Valladolid (Spain); University of Oxford (United Kingdom))

Expanded skeletal evidence from the site of San Juan ante Portam Latinam (SJAPL) (ca. 3200 BC) has recently provided evidence of large-scale, organized and sustained warfare in the Late Neolithic. Conservative estimations suggest that at least a fourth of the 338 individuals buried in SJAPL, essentially adolescent and adult males, died violently, some of them having previously been exposed to reoccurring confrontations. However, in war, conflict-related victims and casualties are not always a result of physical violence. Settlements can be raided, food stores plundered, fields burned, livestock stolen and daily labour activities and trade disrupted. In an exploratory approach, we have

recorded skeletal evidence for non-specific stress indicators (cribra orbitalia and linear enamel hypoplasia) and nutritional deficiencies. Results suggest unusually high rates compared to those generally estimated for other Iberian Late Neolithic and Chalcolithic sites, which may be interpreted as a glimpse of the health and environmental costs of early warfare.

3 HEALTH, NUTRITION AND INTERPERSONAL VIOLENCE IN THE AFTERMATH OF WAR: THE ANCIENT MIDDLE EAST (CHALCOLITHIC TO IRON AGE)

Baten, Joerg (Univ. Tuebingen) - Benati, Giacomo (Univ. Barcelona) - Sołtysiak, Arkadiusz (Univ. Warsaw) - Tagini, Alessandra (Univ. Tuebingen)

Our bioarchaeological study focuses on the consequences of armed conflict in the ancient Middle East from the Chalcolithic to the late Iron Age. The regions of our study are today's territories of Iraq, Iran, Turkey, Syria, and the Levantine coast. We have collected a new data set of more than 4,500 skeletons, studying the effect of conflicts on nutritional and health indicators (linear enamel hypoplasia and height), as well as on interpersonal violence (using cranial trauma data), because we observed that armed conflict also effects the interpersonal violence behavior of the populations. We assess the short-term and long-term consequences of armed conflicts in these archaeological records, and in particular study the Late Bronze and Early Iron Age conflicts and the corresponding post-war periods.

The data collection for the sub-regions consisted of a thorough review of archaeological reports containing information on dental pathologies from excavated skeletal samples, totaling 74 archaeological sites across the Middle East. We collected data about individuals older than 7 years old and we considered primarily hypoplasia defects encountered in canines and incisors, following the methodology and scoring scheme detailed by Bereczki et al. (2018). In order to assess interpersonal violence, we follow the methodology employed by Baten and Steckel (2018). We use as main indicator the share of individuals exhibiting weapon-related wounds or cranial trauma. This indicator is motivated by the fact that in historical populations, cranial traumas were the most evident skeletal indicators of interpersonal violence.

4 ENCOUNTERS WITH AN EXPANDING PREDATORY STATE: NUBIA DURING AND AFTER THE FIRST WAR WITH EGYPT (CA. 3100-2500 BCE)

Hafsaas, Henriette (Volda University College)

Violent state expansions from Egypt into Lower Nubia are gruesome examples of how the militarily strongest opponent in war could win at tremendous costs to the defeated people, as modern warfare also testifies. State formation processes often involve intense violence as new elites establish a monopoly of power and extract resources from their subjects and people on the frontiers of their territory.

The first kings of the unified state in ancient Egypt violently attacked their neighbours in Nubia between 3100 and 3000 BCE. When the war ended, the people of Lower Nubia either perished, fled their territory, or were reduced to such a basic level of existence that they no longer threatened the Egyptian state. These impoverished people left few traces in the archaeological record, and the Lower Nubian population only recovered from the wars with Egypt around 2500 BCE.

The presentation will discuss to what extent the Egyptian elites took advantage of being an expanding and predatory state. More importantly, I will examine the consequences for the defeated people. I will explore the topic using archaeological data, human remains, and historical records.

This case study aims to deepen our understanding of the enduring legacies of wars by examining the extent to which Egypt exploited its position as the militarily strongest opponent and the consequences of the brutal warfare for the people of Lower Nubia.

5 OUTSOURCING PRECARITY: IMPORT AND INTEGRATION OF FOREIGN LABOUR IN LATE BRONZE AGE EGYPT

Langer, Christian (Freie Universit t Berlin)

Precarity – from a modern perspective broadly understood as the lack in predictability in material life or psychological welfare – increasingly concerns more and more portions of contemporary western societies. To connect with that observation, this paper aims to shed light on the relationship between precarity and foreign labour in Late Bronze Age Egypt (ca. 1550–1069 BCE). That period was marked both by violent expansion of the Egyptian state in Northeast Africa/Southwest Asia and the widespread use of foreign labour power in the Egyptian economy (e.g. state institutions, estates, land holdings outside Egypt), often procured in the aftermath of war or as part of long-term dependencies and unequal relations facilitated by preceding military conflict. Departing from theoretical considerations on precarity, we can ask the questions: how was life in Egypt generally and how was that of foreign labourers in Late Bronze Age Egypt specifically precarious; what can we consider as precarious in the context of Egyptian society and

economy; how did the widespread use of foreign labour power affect precarity for different groups; and who were the ultimate winners and losers in Egyptian society relative to precarity. Combining archaeological, iconographic and historical source material allows approaching answers to these questions. The hypothesis is that the large-scale import of foreign labour power allowed the Egyptian state to effectively outsource precarity from (parts of) the Egyptian population to foreigners, which probably had economic, ideological, and political implications at the micro- and macro-levels. Ultimately an exercise in economic history, a look at the outsourcing of precarity offers a glimpse at the Late Bronze Age in contemporary economics and labour policies at the turn of the 21st century.

6 SUFFERING FROM MEMORIES: PSYCHOANALYTICAL APPROACH TO NEW KINGDOM EGYPTIAN POST-WAR STRATEGIES OF CONTROL IN NUBIA

Matic, Uros (University of Graz)

This paper aims to explore whether the New Kingdom Egyptian state suppressed revolts in Nubia by recreating traumatic experiences and evoking memories of loss and defeat in the post-war period. When examining trauma, contemporary archaeologists often focus on extreme cases of physical injuries which leave traces on the skeletons. However, it is crucial to acknowledge that not all physical injuries, such as beating, mutilation, or sexual violence, leave observable marks on the skeleton. From a psychoanalytic perspective, trauma is seen as an unrepresentable event for the victim. The process of remembering triggers a range of reactions, including flashbacks, overwhelming anxiety, and nightmares, much to the opposite of Cartesian mind-body split. When New Kingdom Egyptian state conquered Nubia, defeated local population was devoid of writing about the events which led to its defeat or depicting them. Monumental media in Nubia were under the control of the Egyptian state. Memories of these events could have been preserved by Nubians only through oral tradition. At the same time, New Kingdom Egyptian written sources indicate severe punishment for rebellions in Nubia, with mutilated bodies displayed in towns. Public events were staged in Nubia where enemies and rebels were mutilated in temple settings. Egyptian temples in Nubia feature reliefs and statues depicting Nubians being smitten or trampled by the Pharaoh. In this context, triggering memories of loss and defeat may have played a role in suppressing the identification with Nubian and fostering an embrace of an Egyptian identity.

7 ORPHANS OF DEMOCRACY – PERFORMING COMMUNAL CARE IN ANCIENT ATHENS

Babic, Staša (Dept. of Archaeology, Faculty of Philosophy)

Contrary to the idealized narrative of 5th century Athens as the realm of high culture, arts, and sophisticated political life, during its most celebrated period of history the famed polis was actually involved in all but constant armed conflicts of various intensity. The ways in which the Athenian democracy aimed at alleviating the losses and restoring the order after the wars reflect the values this very order was founded upon. Almost all its male citizens experienced taking part in the phalanx ranks and many were killed in the process. However, the dire consequences of the armed defence of democracy were not evenly suffered by all. The community celebrated some of its members in various forms, such as public memorials, as materialized expressions of honour and gratitude. The orphans of the Athenian citizens fallen in defence of the democracy were provided with financial and social support. However, not all inhabitants of Athens that perished in war were equally honoured, such as foreigners, metics or slaves, and their orphans did not enjoy equal benefits of communal care. When tracing the roots of the modern democracy to the Classical Athenian paragon, it may be prudent to bear in mind that the same practices of inclusion/exclusion, that determined the scope of the politically enfranchised citizens' body, regulated the extent of publicly expressed honours for the war dead and the subsequent wellbeing of their children.

8 THE AFTERMATH OF WAR: ROMAN VIOLENCE BEYOND THE BATTLEFIELD

Fernández-Götz, Manuel (University of Edinburgh)

The last few decades have witnessed a significant surge in the archaeological information about the Roman wars of conquest, which has led to a reassessment of many military campaigns and their impact on indigenous populations. Less attention, however, has been paid to forms of violence in the post-conquest period. As shown by numerous disciplines (from history to sociology and anthropology), violence is not only a physical phenomenon, but can also include other dimensions such as structural and cultural violence. Violence, from this perspective, did not end with the Roman military conquests, but often extended to many spheres of life in the aftermath of the campaigns: from dispossessing people of their lands in order to make room for colonial settlers to a wide range of changes in the political, economic, and religious realms. In this paper, I will focus on the aftermath of war in the Western Roman provinces, using Padilla Peralta's (2020) concept of 'epistemicide' as an underlying theoretical concept.

9 PREDATORY IMPERIALISM AND CULTURAL GENOCIDE: ROMAN TAKEOVER OF THE CENTRAL BALKANS

Mladenovic, Dragana (University of Southampton)

The paper aims to chart events that accompanied incorporation of the Central Balkans into the Roman empire in the late 1st c BC/ early 1st c AD: starting with conquest violence, followed by onslaught on land and resources, and ending with fragmentation of local communities and disintegration of indigenous social institutions through imposition of new political organisation. These events which took place over decades were not a result of a single decision or persistent policy: securing efficient rule was the only goal that Rome was actively pursuing, by whatever means they thought most effective at any given moment. Textual sources allow us to chart individual imperial actions, undertaken by different agents and for largely unrelated motives. Archaeological evidence, on the other hand, reveals that cumulatively these individual actions led to a genocidal process very much akin to indigenocide, as the observed phenomenon is referred to in colonial contexts. Roman imperialism has often been described as 'middle ground' colonialism, not as harsh, somewhat more respectful and inclusive, but this case study reveals a different imperial practice. After a surge in the past decades of scholarship that empowered the conquered peoples by concentrating on their interests and choices as main determinants of post-conquest trajectories, this case study should also serve as a warning that the agendas and acts of colonial forces should never be underplayed.

10 WHAT ACTUALLY HAPPENED TO SEGESTANI AFTER THE ROMAN CONQUEST?

Drnica, Ivan (Archaeological museum in Zagreb) - Radman Livaja, Ivan (Archaeological museum in Zagreb)

The Iron Age settlement at the confluence of the Kupa and Sava rivers, referred to in ancient sources as Segest(ic) a and Siscia, was one of the most prosperous settlements in southern Pannonia. With various settlement dynamics, it existed continuously throughout the entire 1st millennium BC and reached its peak in the last two centuries BC.

Following the foundation of Aquileia in 181 BC, the Roman Republic began its aggressive advance into the south-eastern Alpine region, in parallel with extensive operations in the eastern Adriatic region. This process culminated in Octavian's campaign in Illiricum (35-33 BC). After the successful conquest of the Iapodian territories, the Roman army besieged Segestica for 30 days. According to written sources, the settlement and its inhabitants – Segestani – were spared after the capitulation and a Roman garrison was stationed in the settlement, consisting of 25 cohorts under the command of Gaius Fufius Geminus.

Soon afterwards, an uprising broke out in the settlement, in which the local population almost drove the Roman garrison out of Segestica, but it was quickly put down before reinforcements arrived. The written sources are silent on the faith of the local population after the revolt, but similar cases indicate their bad faith. This lecture will attempt to provide some answers to this puzzle by analysing all available archaeological and epigraphic data.

11 MARCOMANNIC WARS – CONSEQUENCES OF CONFLICT BASED ON A COMPREHENSIVE DATASET

Vlach, Marek (Institute of Archaeology of the CAS Brno) - Komoróczy, Balázs (Institute of Archaeology of the CAS Brno)

During the first four centuries after the turn of the era, a specific borderland emerged within the Middle Danube region, marking the coexistence of the provincial and barbarian (predominantly Germanic) worlds. This region became a scene of multifaceted Roman-barbarian interactions, primarily peaceful. Although conflict periods constituted a considerably smaller proportion of the Roman Period, some had far-reaching implications for overall relations and geopolitical situations. The large-scale military conflict known as the Marcomannic Wars significantly impacted not only the borderland of the Middle Danube region but also extended deep into Germanic and Roman environments. The presence of direct and indirect evidence of Roman military operations, such as field camps, and their spatial distribution throughout Germanic territories allow for assumptions about Roman military leadership's strategic and tactical conceptions. The impact of this conflict and the post-war development of the region can be inferred from a dataset based on the large-scale collection of published archaeological information from the Marcomannic settlement zone west of the Lesser Carpathians. The dataset MARCOMANNIA emerged as part of a project with one of its objectives being the derivation of quantitatively representative proxies for various development trajectories of Germanic populations within the study region. They were based on archaeological components, primarily settlement and burial grounds, as well as contexts such as burials and finds such as brooches, coins, and militaria. These trajectories offer structured insights into Germanic societies' demographic, economic, political, and social developmental tendencies within the Marcomannic settlement zone and allow for quantification of the impact of the Marcomannic wars.

12 "HOW DOES THE GRASS GROW" - LOOTING OF THE SARMATIANS GRAVES DURING LATE ANTIQUITY

Šarkic, Tamara (Center of Bone biology, Institute of Anatomy, Faculty of Medicine, Belgrade) - Djuric, Marija (Center of Bone biology, Institute of Anatomy, Faculty of Medicine, Belgrade) - Djukic, Ksenija (Center of Bone biology, Institute of Anatomy, Faculty of Medicine, Belgrade)

The Sarmatian cemeteries in the Great Hungarian Plain were plundered extensively in the past. Historical sources and archaeological finds indicate that this area was subject to frequent wars, migrations and turbulent times. Although looting is reported in archaeological reports, a comprehensive study of this phenomenon is lacking. Looting was identified in the archaeological context through intrusion pits, disturbed burial contexts and displaced skeletal remains. Surprisingly, the human bone remains have never been investigated; consequently, bioanthropological and archaeothanatological data are lacking. The present work deals with the bioanthropological analysis and contexts of looted Sarmatian graves from the territory of Serbia (Vojvodina province) from Antiquity and Late Antiquity. The study will encompass 15 cemeteries with over 300 graves. The time of reopening of the grave will be reconstructed using archaeothanatological findings, taking into account the position of the skeletal remains in the grave structures and the progress of the body decomposition. Conversely, by examining the taphonomic characteristics of the skeletal remains, we will identify changes in the bones that indicate bone scattering during the looting, but also the time at which the skeletal remains were exposed to weather conditions after the looting, and whether or not the graves were backfilled after this act. All this data, combined with the stratigraphic details, will allow us to understand how the environment of the cemeteries changed during and after the looting, which ultimately affected the overall poor preservation of the skeletal remains. In addition, it will be possible to reconstruct the phenomenon of the systematic opening of the graves, i.e., the method and model of opening, the timing of reopening, and to further the discussion on the contextualization of the looting phenomenon in turbulent times, which could point to the identity of the robbers and their motives.

13 DISTURBING THE DEAD AFTER WAR? THE CASE OF GRAVE OPENING IN THE LATE ROMAN REMESIANA

Mihajlovic, Vladimir (University of Belgrade, Faculty of Philosophy) - Janković, Marko (University of Belgrade, Faculty of Philosophy) - Bandović, Aleksandar (National Museum of Serbia)

Remesiana was a Roman town in the province of Dacia Mediterranea living its heyday in the 4th century. New excavations unearthed a portion of the town's eastern necropolis with diverse burial forms and practices that reveal coexistence of pagan and Christian traditions. Additionally, in some cases the drywall foundations of funerary structures were partially demolished, while the soil immediately underneath disturbed. The formed pits were backfilled soon after they were dug, and at least in two instances their surfaces contained traces of ritual practices. However, only in one case the pit actually reached the grave, whereas in other four the dugouts missed them by being positioned at the lateral sides of funerary constructions. These failed attempts to get to the content of burials most probably occurred within the limited time span and could be dated to the end of 4th and beginning of 5th century. The period coincides with the several decades long consequences of the Battle of Adrianople (378 CE): after the Roman armies suffered devastating defeat, victorious forces of the "Gothic confederation" remained on the loose and/or settling within the Empire on permanent basis. Overall, this was the age of turmoil and instability in the Balkan provinces, with more aftereffects yet to come.

Such historical context and the mentioned archaeological evidence pose important questions: what was the "destiny" of buried members of defeated population in the aftermath of war; was the intrusion into funerary realm just another plundering practice or could it be something else; was this behavior conducted by "winners" or "losers" and what could have been the motives; what can the practice of graves defilement tell us about the (state of) people who practiced it; does this activities testify to precarity of population, and of which one - victorious or defeated.

14 ANALYSING AND UNDERSTANDING THE EFFECTS OF WAR IN THE EASTERN MEDITERRANEAN DURING THE 7TH CENTURY CE

Olshanetsky, Haggai (University of Warsaw) - Cosijns, Lev (University of Oxford)

Archaeology frequently identifies the effects of war only after destruction layers are discovered. The reality is significantly more nuanced, with destruction being just one possible manifestation of armed conflict. As archaeological finds from the 7th century CE Eastern Mediterranean indicate a decrease in settlement number, size, population, and commerce, but no significant destruction layers, numerous archaeologists and historians have attempted to argue that war was not the main culprit. Instead, many have suggested that climate or epidemiological outbreaks, which can be dated to the middle of the 6th century CE, were the primary cause for the deterioration of the region. However, as recent studies have shown, such chronology is erroneous, with the decline beginning gradually in the 7th century CE.

Thus, the immediate and clear catalyst for such a decline is the armed conflict between the Eastern Roman Empire and the Sassanian Persian Empire, and later the Arab Conquest and their continuous war with the Byzantines. This current presentation will analyse why archaeological finds are the best evidence for war being the primary cause of the decline, alongside an analysis highlighting how the side effects of war and geopolitical changes can result in such depopulation and a drastic decrease in naval traffic and trade. The current presentation will also be used as a case study to demonstrate that, while the abundant textual evidence in this period can be used to establish a clear connection between abandonment and decline in the archaeological record, this is not always the case for most periods. Thus, when locating evidence of abandonment in periods or places where written sources are scarce or non-existent, it is crucial to avoid dismissing war as the direct or indirect cause of abandonment due to the lack of destruction layers.

15 PRELIMINARY BIOARCHAEOLOGICAL RESULTS OF THE FIRST ARCHAEOLOGICAL STUDY CONDUCTED ON THE BATTLE OF MANZIKERT 1071

Bütün, Erge (Hacettepe University, Department of Anthropology; Human Behavioral Ecology and Archaeometry laboratory (IDEA lab)) - Eroğlu, Serpil (Hacettepe University, Department of Anthropology) - Çevik, Adnan (Muğla Sıtkı Koçman University, Department of History; MSKU Research Center For Mediterranean Civilizations) - Alican, Mustafa (Muş Alparslan University, Department of History) - Sertalp, Evren (Hacettepe University, Faculty of Communication, Department of Radio, TV and Cinema; Human Behavioral Ecology and Archaeometry laboratory (IDEA lab)) - Sütçü, Mehmet (Muğla Sıtkı Koçman University, Department of History) - Develi, Tevfik (Muğla Sıtkı Koçman University, Department of History) - Akbaba, Ali (Muş Alparslan University, Research Center Of Seljuk And Manzikert Studies (SEMAM)) - Dolmuş, Muhammed (Human Behavioral Ecology and Archaeometry laboratory (IDEA lab)) - Büyükkarakaya, Ali (Hacettepe University, Department of Anthropology; Human Behavioral Ecology and Archaeometry laboratory (IDEA lab))

The late 11th century battle of Mankizert, which took place on August 26, 1071 between the Eastern Roman and Great Seljuk Empires on the Mankizert plateau just north of the Lake Van basin in the east of present-day Turkey, and which resulted in the decisive victory of the Seljuk Turks, is considered to be one of the decisive developments in the process of breaking the military resistance to the Turkish migrations flowing from Central Asia to Asia Minor and, as an aftermath, the Turkification process of Anatolia. This important battle, which left deep political and social traces on the history of Anatolia and the Near East, has only recently been studied in archaeological contexts.

Launched in 2020 as a battlefield archaeology project in Turkey, the Mankizert Battlefield Detection, Historical and Archaeological Survey Project uncovered many metal objects related to the battle, as well as the Muslim Cemetery of Afşin Village (Seljuk Desolation?) dating back to the 11th century, where witnesses of the Battle of Mankizert were found. In this study, the human remains from this cemetery are examined bioarchaeologically. The study analyzes the socio-cultural change and consequences in the region by considering biological distance, antemortem and perimortem traumatic lesions and other paleodemographic and paleopathological information together with historical documents and intensive survey data.

In addition to evidence of earlier archaeological periods, the research has documented traces of the Christian society and culture of the village of Afşin. The Turkish invasions in the 11th century led to the settlement of the region by Muslim Turks, and bioarchaeological evidence suggests that social tensions and precarity in the region continued unabated after the war.

16 CHAINING UP THE DOGS OF WAR? - THE AFTERMATH OF WAR IN VIKING AGE SCANDINAVIA

Jensen, Bo (Kroppedal Museum)

The Viking Age in Northern Europe (circa CE 750 to 1100) was a period of almost incessant conflict somewhere. During this period, Scandinavian initiated and increased campaign of overseas piracy which eventually became campaigns of conquest. Clearly, many of these military campaigns were extremely successful. In turn, the success of elite warriors ended up transforming the homeland economy and political structure and led, briefly, to a unified North Sea kingdom. In turn, successful conquest (or successful defense) often ended conflict, locally.

Here, I build on Phillip Bourgeois' theory of overspill violence to argue that martial success had two somewhat contradictory consequences: victory allowed for peace and often made further military violence unnecessary for the victor, but fighting and winning wars also habituated victors to use violence as a solution for any and all problems. Fighters were redeployed in positions of civil authority and the martial violence once directed against military opponents was redirected into every other sphere of society.

I argue that we can see the overspill of violence from martial success in such spheres as the symbolism and political structure of kingship; the role of feuds and duels in jurisprudence; and the transformation of the silver economy and the slave economy alike. I argue that in the aftermath of war, violence was both exported to other spheres and brought under increasing social control. This latter development in its turn allowed nouveau riche aspirants to appropriate the symbolism of martial success without having the real-world experience underlying it.

17 **MARTIAL SOCIETIES OF MEDIEVAL DECCAN: A STUDY OF SCULPTURES OF GRAPPLING ON THE VIJAYANAGARA MONUMENTS**

Dhebar, Kush (Department of Archaeology and Museums, Haryana)

Right from the Early Historic Period, the Indian subcontinent had been wrought with rampant warfare. With time, this characteristic became more and more pronounced in Indian society. Various Indian states and kingdoms had been competing with each other and several foreign invaders for land and other resources. During the Medieval Period, with the coming of Perso-Turkic Sultanates, innovations started being noticed in the arts of war. The local indigenous states also had to evolve and adapt for their self-preservation in these arts. The Deccan region of India around the 14th to 16th century was an epicenter of conflicts between Vijayanagara Samrajya and the Bahmani and later the Deccan Sultanates. Martial prowess played a major role in the upward social, economic, and political mobility of the local and foreign populace. Practice and knowledge of Martial and Combat Arts, be it armed or unarmed were a common phenomenon at Vijayanagara and its neighbouring states. This paper will focus on the sculptures of Grappling/Mallavidya/Pehalwani/Kushti which are still visible on the monuments of Vijayanagara and will deep dive into their relevance and symbolisms during the Medieval Period in the Deccan particularly and India in general. Along with that, the paper will also focus on how the present-day arts of war and combat sports have evolved and what all new innovations have been introduced to make grappling an even more effective art.

18 **FLOODING AND LOOTING: THE SIEGE OF COASTAL TOWNS IN FLANDERS DURING THE EIGHTY YEARS' WAR (1568-1648)**

De Decker, Sam (Flanders Heritage Agency) - Pieters, Marnix (Flanders Heritage Agency)

In the middle of the sixteenth century, a revolt against Spanish rule in the Netherlands slipped into a long and continuous war with the Spanish crown on one side and the so-called Staatsen, commanded by the House of Orange, on the other. Finally and after eighty years of fighting, this war led to the splitting up of the Netherlands into an independent northern part and a southern part that remained under Spanish rule.

After the Spanish had reconquered large parts of Flanders, including Antwerp in 1585, the battle moved to the coastal ports and the mouth of the river Scheldt. The Staatsen turned these coastal towns into impressive fortresses, but they also proceeded to a systematic flooding of the surroundings of these towns. Although this proved to be an efficient military strategy, the impact on the population and the landscape was disastrous. For more than half a century, the hinterlands of towns such as Aardenburg turned into an almost uninhabitable no-man's-land, intersected by tidal channels. To this day, the many relics of these tidal channels contributed to the recent recognition of the area as a Flemish Landscape Park.

The fierce battle around the coastal towns and the impact on the local population is also demonstrated by a number of recent archaeological excavations in the vicinity of Ostend. Human inhumations from the late sixteenth century were found at three different locations, with the dead buried in a simple and shallow pit on or near a residential area or farm. The information from these sites makes it clear that these are likely to be civilian casualties caused by looting during the long siege of Ostend (1601-1604).

19 **EXPLOITATION OF WOODLAND RESOURCES BY EARLY MODERN ARMIES: ANTHRACOLOGICAL INSIGHTS FROM LANAKEN (1748, BELGIUM) AND MONTIGNY-LÈS-METZ (1552)**

Hello-Lapr rie, Germain (National Museum of Natural History) - Salavert, Aur lie (National Museum of Natural History) - Deforce, Koen (Ghent University) - De Raymaeker, Annelies (Studiebureau Archeologie) - Brkojewitsch, Ga l (Eurom tropole de Metz) - Callou, C cile (National Museum of Natural History)

The environmental impact of warfare remains a relatively understudied aspect in archaeology. Limited anthracological research has been conducted on this subject in Europe, particularly concerning modern military encampments. However, woodland resources were important to armies for building barracks or siege infrastructures, as well as for soldiers' daily lives. This paper presents the results of charcoal analysis of two siege camps: Lanaken-Europark, located in eastern Belgium (1748: war of the Austrian Succession) and Montigny-l s-Metz "La Horgne" situated in northeastern France (1552: 10th Italian wars). The goals are to improve our understanding of the firewood supplies of modern armies at the local scale and the impact of conflicts on the landscape.

The Lanaken site corresponds to the French siege of Maastricht in 1748. The study of fire pits reveals that the troops primarily sourced firewood from mature oak-dominated forest formations and nearby orchards. The results suggest that the French troops have mainly collected their firewood in the local vicinity. The site of "La Horgne" corresponds to the siege of Metz in 1552. The results show high proportions of oak and fir. However, fir groves do not occur near Metz and it is not commonly used as a fuel. Furthermore, iconography of the XVIth century does not show the presence of oak forests near Metz. These observations suggest that soldiers probably have used timber as firewood, potentially providing evidence of sacking at the end of the occupation.

These results show the diversity of wood resources exploited by armies during modern conflicts. These studies are part of a doctoral project (2022-2025) which aims to better understand the management of wood resources in wartime, the impact of conflicts on the diversity of forests and to provide complementary data to historical sources.

20 **ENVIRONMENTAL IMPACT OF THE BUILDING OF KISV RDA CASTLE ON THE HUNGARIAN-OTTOMAN BOREDERZONE**

N dai, Zs fia Csilla (Research Centre for the Humanities)

The research of the environmental history of Late Medieval and Early Modern Age emerged in Hungary in the last thirty years, thus microregional research questioned previous perceptions of how the war devastated the forests and turned the fields into marshlands. In my paper, I would like to show how human intervention changed the vegetation in the case of Kisv rda Castle. From the middle of the sixteenth century Kisv rda castle (situated near today's northeast border of Hungary), a former aristocratic residence owned by the V rdai family, became a fort on the border zone maintained by the Habsburg party.

How to measure the environmental pressure of the building of a palisade fortification? Due to the archaeological research which revealed the posts and postholes of the earth and wood structure and the analysis of military surveys of the time, one can calculate the estimated demand of raw material for building or maintenance. How many acres of woodland were needed for the defensive works? How did it impact the environment? To what extent can we talk about deforestation and desertion, as the sources recalled? How does it affect the natural process of reforestation?

21 **LIFE IN THE ENEMY CAMP - CONSEQUENCES OF WAR**

Simonsen, Rikke (Museum of Copenhagen)

The 17th century set the stage for numerous wars between the neighboring countries of Denmark and Sweden. In 1658, Sweden occupied Denmark, lacking only the conquest of the capital, Copenhagen, to make the victory final. The Swedish siege camp was surrounded by a bastioned fortification with ramparts and moats, housing 5,000 to 10,000 soldiers for more than 1½ years – not just Swedes, but to a large extent mercenaries from e.g. Finland, Poland, and Germany. Along with the soldiers came craftsmen, priests, traders, and others, likely including women and children too. It is estimated that the camp housed up to or more than 20,000 residents, living in tents and pithouses.

The siege has been subject of both military and memory historical studies, while daily life in the camp and the time after the siege is only sporadically researched. In one of the century's coldest winters, written sources tell of disease, frostbite, and death among the soldiers, while they complained about a desperate lack of food and clothing. What survival strategies did the camp's various inhabitants, encompassing national, social, and gender groupings, employ? They have left behind only few traces in the written sources, but archaeological remains are likely to provide new insights into the impact of war on the community.

Part of the tent camp and an adjoining, now partially filled-in, bog lies today hidden under the grass in a public park. There has never been an actual archaeological excavation of the camp, but in the surrounding gardens, helmets, cannonballs etc. have been found throughout the years. In an upcoming project, Museum of Copenhagen wishes to conduct a research excavation, supplemented by previous archaeological findings and historical studies, which could provide significant new understandings of the consequences of armed conflict and crisis solutions in Copenhagen's enemy city.

22 **MILITI IGNOTI. THE SHORT AND LONG-TERM CONSEQUENCE OF WWI ON THE SOLDIER'S BODIES**

De Luca, Lisa (Centre of Research in Osteoarchaeology and Paleopathology, Department of Biotechnologies and Life Sciences, University of Insubria, Varese, Italy) - Gorini, Ilaria (Centre of Research in Osteoarchaeology and Paleopathology, Department of Biotechnologies and Life Sciences, University of Insubria, Varese, Italy) - Larentis, Omar (Centre of Research in Osteoarchaeology and Paleopathology, Department of Biotechnologies and Life Sciences, University of Insubria, Varese, Italy; LaBAAF-Laboratorio Bagolini Archeologia, Archeometria, Fotografia Dipartimento di Lettere e Filosofia, University of Trento, Trento, Italy; SABAP per le provincie di Como, Lecco, Monza-Brianza, Pavia, Sondrio e Varese, MiC, Milan, Italy) - Gaudio, Daniel (Department of Archaeology, Durham University, United Kingdom)

The World War I devastated Europe reshaping global dynamics, economies, European intellectual discourse, as well as military strategies, armaments, and tactics. Over eight and a half million, with approximately twenty million individuals suffering severe injuries and mutilations occurred worldwide. Italy's main theatre was the Alpine front from 1915 to 1918, focusing on the mountainous regions of Lombardy, Trentino, Veneto, and Friuli Venezia Giulia.

Official records list 65.000 deaths and 800.000 prisoners and missing individuals. Post-war, state authorities encouraged civilians to recover the remains of the fallen, leading to the emergence of a phenomenon known as the "re-

cuperanti,” which remains active to this day. These individuals transitioned from being researchers of soldier’s remains to “relic researchers”. Unfortunately, this led to the despoliation of human remains, where all elements that could provide identity to the deceased are removed, leaving only “bare” skeletons. Additionally, the remains often suffer damage from picks and shovels, further complicating the situation by being moved from the original resting place or dispersed. Rigorous archaeological methods coupled with anthropological studies are crucial for restoring identities and returning remains to families.

This study analysed three skeletons of unknown WWI soldiers found in Vicenza’s mountains, two Italian and one Austrian. It aimed to investigate the biological profile, stress markers, lesions, pathology, and cause of death. Despite their youth, the individuals exhibit stress markers and present dentoalveolar pathologies and injuries from heavy artillery bombardment and postmortem factors. This study allowed the recovery and interpretation of information on the life and death of these men who fought on opposite fronts during WWI. Thanks to the recovery of the military tag and the cross-referencing of anthropological data with those contained in the military record, it was possible to achieve an important result: assigning a name, Gildo Tonello, to the remains cataloged as GM21.

23 TARGET POMPEII: UNEXPLODED BOMB (UXB) - GIS SURVEY

Tiede, Vance (Astro-Archaeology Surveys; Yale University, Alumnus)

An overlooked long-term social consequence of modern warfare is the lingering presence of Unexploded Bombs (UXBs) at major archaeological sites. For example, the UNESCO World Heritage Site of Scavi di Pompei has 160+ bomb craters inside its Archaeological Zone. Therefore, an estimated 16 to 24 (10 to 15%) UXBs may remain buried under the volcanic ash from Mount Vesuvius (AD 79). While the architectural damage wrought by ten RAF/USAAF air raids in 1941-1943 has been largely repaired, the risk of future spontaneous detonations grows; e.g., the M124 Very Long Delay fuze has a celluloid collar that deteriorates over time; eventually releasing the firing pin. To date, several UXBs from Scavi di Pompei have been located (e.g., Surgeon’s House, 14 July 2006) but not all have been publicly reported. Given the recent spontaneous detonations in Germany (Ahlbach, 24 June 2019; München, 1 December 2021), it is probable that an UXB detonation(s) will eventually occur to the detriment of Pompei’s tourist-dependent economy and anyone within the blast radius. The risk to tourists is increased by the fact that the heaviest concentration of bomb craters (and therefore UXBs) is in the south-west quadrant of Scavi di Pompei, i.e., where the heaviest concentration of Pompei’s four million (2023) visitors congregate around the Foro (Regio VII) and Teatro Grande (Regio VIII).

This paper presents a methodology combining Stick-of-Bomb Crater Analysis with RAF Bomb Damage Assessment (BDA) aerial photographs, RAF/USAAF Mission Reports and Operations Summaries correlated with wartime damage reports in the Scavi di Pompei archives, 1941-1943. Probable UXBs have been geo-referenced with Google Earth Pro and handheld Garmin Etrex GPS. A future phase involves Ground Truth confirmation with Ground Penetrating Radar (GPR) and Magcone UXO Tri-axial magnetometer, subject to approval by the Scavi di Pompei administration.

354 SCENE CITY. SETTLEMENT AGGREGATION AND COMMUNITY TRANSFORMATION IN THE BUILT ENVIRONMENT OF THE EASTERN MEDITERRANEAN BETWEEN IV-II MILLENNIA BC.

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: AMADIO, MARIALUCIA (Ghent University) - VOSKOS, IOANNIS (National and Kapodistrian University of Athens) - THEOTOKATOU, CHARA (National and Kapodistrian University of Athens) - BOMBARDIERI, LUCA (University of Siena) - YAVOURANAKIS, GIORGOS (National and Kapodistrian University of Athens)

Session format: Regular session

Archaeologists have focused a great deal of attention on exploring the evolution of village societies and the transition to more complex, especially urban, social formations. Past research has addressed coalescence from a regional perspective and has established that urbanism is a multilinear phenomenon, developed diversely within different geographical and chronological contexts. However, less is understood about the social dimension of this phenomenon, namely how aggregated communities established new spaces for interaction and exchange.

The purpose of this session is to explore the socio-cultural transformations which characterise the passage from villages to urban centres using architectural evidence as the favourite analytical data-set. It also aims to discuss this multiform phenomenon of change through examples from the Eastern Mediterranean region, including the Aegean, Cyprus and the Levant, during the IV to the II Millennia BC.

Transformations in the built and social environment of prehistoric and protohistoric Mediterranean communities are traced at three different analytical scales in order to discuss patterns of architectural variability and constancy and to

compare evidence from different spatial and temporal contexts. Papers dealing with one or more than one scale of analysis are welcome to enhance the discussion.

- The micro-scale includes transformations in the exploitation and use of natural resources and the materials and techniques employed in construction.

-The meso-scale concerns transformations in architectural installations, such as fireplaces and processing equipment, as well as changes in the use of space through the analysis of floors and occupation surfaces.

-The macro-scale is about variations in the architectural forms and structure types, including houses, palaces, fortifications, and about transformations in settlement layout and settlement constitutive elements, such as neighbourhoods, alleys and open spaces.

ABSTRACTS

1 FROM CURVILINEAR TO RECTILINEAR: ARCHITECTURAL TRANSFORMATIONS IN 4TH-3RD MILLENNIA CAL. BC CYPRUS AND THEIR SOCIAL IMPLICATIONS

VOSKOS, IOANNIS (National and Kapodistrian University of Athens) - KLOUKINAS, DIMITRIS (Numismatic Museum, Hellenic Ministry of Culture) - GEORGOTAS, ANASTASIOS (National and Kapodistrian University of Athens)

It is commonly noted that one of the most conspicuous changes in the architectural tradition of prehistoric Cyprus takes place at the very beginning of the Bronze Age (i.e. at around the mid-3rd millennium BC). During this period, the long-held tradition of curvilinear and monocellular ground plans disappeared and the construction of rectilinear/rectangular building complexes becomes the norm all over the island. This development has been invariably connected with major socio-economic transformations, as part of the so-called Philia facies, observable in a wide-range of categories of material culture, in daily practices and even in the ways the world was perceived.

In this paper, we intent to discuss some aspects of this fundamental shift by focusing on the Chalcolithic settlement of Erimi Pamboula and the Early Cypriot settlement of Sotira Kaminoudhia. Both sites are situated in the southern-central part of the island and include a rather rich architectural record. The latter will be examined in order to trace evidence of both change and continuity in the way domestic and communal space was constructed, performed and experienced. The paper will also explore whether certain features of the typical Bronze Age Cypriot ‘courtyard house’ were already present in the preceding Neolithic/Chalcolithic house clusters. Moreover, it will examine whether these features were associated with new social norms involving growing signs of ‘privatisation’ of food processing and storage, increased social competition, different forms of co-habitation etc. The main objective is to approach the transition from curvilinear to rectilinear architecture on a micro-regional and diachronic level and to discuss the wider socio-economic implications of this transformation.

2 THE URBANIZATION PROCESS IN THE SOUTHERN LEVANT DURING THE IV MILLENNIUM BCE: THE CASE STUDY OF JEBEL AL-MUTAWWAQ

Caselli, Alessandra (Perugia University)

The beginning of the Early Bronze Age period in the Southern Levant, dated around 3500 BCE, marked the starting point of several transformation processes which would determine the transition from a village system to a properly urban model. In fact, through the Early Bronze Age I (EB I), and especially in its final phase, it is possible to observe, for example, the slow evolution in the agriculture techniques and the appearance of community areas for food processing, together with the introduction of walls protecting the settlements. It is not easy to date a context between the first phase of the period, Early Bronze Age IA, still characterized by a semi-nomadic system, and the second one, Early Bronze Age IB, showing an incipient urban economy. In fact, the material culture testifies a common tradition for the entire EB I and there are few sites showing an occupation without interruptions between EB IA and EB IB.

The site of Jebel al-Mutawwaq, in the Zarqa Valley (Jordan), was occupied throughout the entire Early Bronze Age I and was abandoned at the beginning of Early Bronze Age II. The absence of later superimpositions and the state of preservation of the settlements allow to deeply analyse the processes occurred at different scale of evaluation. For instance, it was possible to investigate two cultic areas, one pertaining to EB IA and one dated to EB IB and to notice the differences between them. This paper has the aim to analyse how Jebel al-Mutawwaq changed at the end of the IV Millennium BCE and how its interpretation could help to better understand the entire area.

3 THE IV MILLENNIUM BC IN THE SOUTHERN LEVANT: CHANGING COMMUNITIES AND THE NEW SHAPE OF INHABITED SPACE AND NATURE

Paolucci, Domizia (La Sapienza University of Rome)

The IV millennium BC in the Southern Levant is a time frame of movement and change; after the faded, or decisive, end of the Late Chalcolithic period the Early Bronze Age emerged, gradually shaping its own identity, in socio-economic as well as ideological and visual terms. By observing the forms of use and habitation of the territory, which followed one another during the Early Bronze Age I, it is possible to investigate the creation of new social identities, the change in the relationship with the surrounding nature, and the subsequent shift in cult and ritual. In particular, this contribution aims to propose an analysis of some factors that influence such communities in choosing specific areas for the construction of vast and stable settlements. We have chosen four case studies of permanent sites in the Southern Levant, namely et-Tell, Tell Qashish, Bab edh Dhra', Palmahim Quarry, and Khirbet el-Batrawy, in which ritual and funerary attendance in the area before their foundation is observable. Moreover, at times it is possible to highlight an integration of such rituals and cultic imagery in the construction of subsequent sacred places. These observations allow us to delve deeply into the investigation of the connection with natural spaces and with ancestors and to reflect upon the continuous thread that unites groups, social occasions, and places, the latter understood as contexts full of acquired meaning derived by the imagination of humankind.

4 MAKING SPACE FOR THE COMMUNITY IN LATE 3RD MILLENNIUM MALIA (CRETE)

Devolder, Maud (Ghent University) - Caloi, Ilaria (Ca' Foscari University of Venice)

Extensive programs of stratigraphic soundings that explored the earliest levels under the Middle and Late Bronze Age settlement of Malia in northern Crete revealed the remains of an habitat that testifies to the continuous occupation of the site throughout the Early Minoan IIA and IIB phases (2650-2200 BC). Modest houses in mudbricks set on a stone socle and provided with cooking and craft installations, and sturdier structures considered by some to be 'monumental' indicate a flourishing Prepalatial settlement, which came to an abrupt end around 2200 BC. In the phase immediately following this destruction, the ruins of the Early Minoan II habitat were buried in an extensive terracing operation. This major, (early) Early Minoan III undertaking created a large levelled area of about 10,000 sq. m in the centre of the site, the top of which was covered with an earthen floor. In some soundings the pottery hints at ritual communal consumption, although most of the material on this surface was disturbed by the construction of the Palace around 1900 BC. The setting in perspective of this fragmentary but extensive evidence points to a transformative levelling that pushed the Prepalatial habitat away from the plateau at the centre of the site to create a large open surface, and that foreshadowed the construction of the monumental palace and its courts in the early 2nd millennium BC.

5 URBANISATION AND CONNECTIVITY IN THE PREHISTORIC AEGEAN: A BOTTOM-UP APPROACH

Vavouranakis, Georgios (National and Kapodistrian University of Athens)

The first urban centres in Greece and the wider area of the Aegean appeared in the course of the 3rd millennium BC. They are usually seen as manifestations of a high degree of social complexity, often attributed to the emergence of social asymmetries and the first indications for elites. The same applies to Crete, where the first Minoan palaces were often founded within newly formed towns at the beginning of the 2nd millennium BC. Contrary to these interpretations, it is here argued that the link between urbanisation and the first elites is not as close as traditionally accepted. Furthermore, there is evidence to suggest that there are cases where town life evolved without visible central authorities. As a result, their appearance was not the cause, but, instead, a symptom of prehistoric urbanisation in the Aegean. The roots of the latter should be best sought in the high degree of connectivity at the level of horizontal rather than hierarchical social organisation. This betrays a significant effort by these early societies to establish common codes of collective values, especially through ritual activity, so as to ensure the effective reproduction of social relations at a regional scale. Such a bottom-up perspective to the prehistoric Aegean sees the emergence of centralised authorities as a reaction to popular, low-level strategies towards non-hierarchical and inclusive modes of social organisation.

6 "IN THE BEGINNING WAS CHAOS": INVESTIGATING THE ORGANIZATION AND SOCIAL SIGNIFICANCE OF SPACE IN LATE CYPRIOT DOMESTIC UNITS

Theotokatou, Chara (National and Kapodistrian University of Athens)

Past anthropological research has taken significant steps forward in the understanding of the concept of space: moving from a static-unidimensional perception of space to a more dynamic one, research has stated that space is actively created through the synthesis of people and objects in daily activities. The concept of space, though, is also pertinent to archaeology, whose research includes the study of the built environment in order to better comprehend the organization of past societies. In what regards the Late Cypriot domestic environment, past research focused on

the spatial analysis of finds and activities in monumental and elite structures and, by extension, on their social significance. Consequently, non-elite dwellings of the same period have been largely excluded from relevant discussions. This presentation aims to address this research gap, through the spatial analysis of such lower-tier structures, such as the habitation units of Alassa-Pano Mantilaris and Building IX from Kalavassos-Ayios Dhimitrios. This approach aspires to demarcate patterns of intra- and inter-house social dynamics in Late Bronze Age Cyprus, for as Lévi-Strauss highlighted, social phenomena may not be understood separately from their social space.

7 URBANISATION IN PROCESS: FORMAL, TECHNICAL AND CULTURAL FEATURES OF ASHLAR ARCHITECTURE IN LATE BRONZE AGE CYPRUS

Amadio, Marialucia (Ghent University) - Devolder, Maud (Ghent University)

The use of ashlar echoes deep transformations in the social and built environment in Late Bronze Age Cyprus. Individual cut-stone blocks were already incorporated in some of the island's fortified structures at the end of the Middle Bronze Age (MC III, 1800/1750-1690/1650 Cal BC), but it was not before the mature phases of the Late Bronze Age (LC IIC-III A, 1300-1125/1100 Cal BC) that monumental structures showcasing a pronounced adoption of elaborate ashlar masonries were built in key urban settlements involved in prolific exchange networks with neighbouring and far-reaching regions. As a consequence, the late appearance of cut-stone architecture on the island during the Late Bronze Age has often been related to the presence of a foreign specialised workforce who mastered the technology necessary to construct elaborate ashlar buildings. The proposed paper seeks to explore the possibility that there was fertile ground for the development of ashlar in Cyprus well before the mature phase of the urbanisation process, as suggested by pre-LC IIC evidence which indicates progressive development and local experimentation in cut-stone building components and composite masonries. The paper is based on a reassessment of available data pertaining to stone architecture in middle and late 2nd millennium BC contexts on the island. The aim is to highlight the formal and technical features proper to ashlar architecture in Cyprus and to emphasise the role played by local workers in shaping specific architectural elements that would become progressively absorbed into the built environment of Late Bronze Age Cyprus.

355 OCHRE AND CULTURE: THE ODYSSEY FROM EXPLOITATION TO SOCIETAL SIGNIFICANCE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Mauran, Guilhem (UMR 5199 PACEA, University of Bordeaux, France) - Rosso, Daniela (Main Address Departamento de Prehistoria, Arqueología, Universidad de Valencia)

Session format: Discussion session (with formal abstracts)

Across diverse human cultures, our perception of reality is profoundly shaped by cultural significant colours. Materials known for their strong colouring properties, often referred to as 'ochre', have been used for over 300,000 years. Starting around 160,000 years ago, the utilisation of ochre became increasingly common and encompassed a wide variety of functions. These ranged from symbolic purposes, such as its use as a pigment in rock art, body painting or as a nonverbal communication agent, to more technical-economical functions, including its use as an abrasive or tanning agent. This diversity of uses has provided a cumulative inheritance of knowledge and skills that allowed us to truly stand on the shoulders of giants.

While the study of ochre has been widely developed in the last two decades, several questions remain unanswered. We still lack clarity on when and how ochre exploitation was standardised according to social-cultural norms, and we seek to understand the timing and link between changes in ochre usage and the traditions identified through the study of other artefacts that can be related to cultural traditions. This session is designed to bridge these gaps. Specifically, we aim to explore two main questions:

(1) Ochre exploitation traditions: Can we identify distinct traditions related to ochre exploitation? When and how did these traditions emerge? What cultural, technical and environmental factors contributed to their standardisation?

(2) Synchronicity of ochre traditions with other cultural markers: How does the use of ochre align with the development and utilisation of other artefacts that can be related cultural traditions within various societies? What can these synchronicities reveal about the evolution of the human lineage?

Through a thorough examination of these questions, our session aims to provide a deeper insight into the prehistoric exploitation of ochre and its significance in human evolution study.

1 ASSESSING HEATING OF OCHRE AT THE 100 KA BP TINSHMET CAVE, ISRAEL

GAITERO-SANTOS, DAVID (The Hebrew University of Jerusalem, Institute of Archaeology) - ZAIJNER, YOSSEF (The Hebrew University of Jerusalem, Institute of Archaeology)

The obtention and use of mineral pigments, or ochres, in a symbolic context in the Middle Palaeolithic and the Middle Stone Age records has been previously discussed. This includes the preferential extraction of ochres of red colors, as well as the obtention of red color by intentionally heating chunks of originally yellow hues.

The new Levantine Middle Palaeolithic site of Tinsmet Cave (Israel) dated to ca. 100 ka BP constitutes the fifth site in the region containing ochres in context with numerous human remains, configuring a probable relation with complex social practices and symbolism. The ongoing excavations provided more than 7.000 ochre fragments clearly dominated by red pieces (>65%).

Here we present the methods and results for the assessment of the occurrence of heating of ochre. A new methodology that combines XRD and FTIR to differentiate the red ochres derived from heating from the red ones of geogenic origin was applied to 35 archaeological samples. The uneven widening of hematite unstable peaks is calculated as ratios in relation to its stable peaks in XRD, while remains of goethite bands are traced under FTIR as well as thermal changes in clay peaks. The spatial distribution of heated ochres (>50%) and red ochres of geogenic origin suggests that the transformation by heating of originally yellow materials was conducted and controlled by the occupants of Tinsmet, manifesting a clear preference for the use of ochres of red hues.

We consider that the clear preference for selection, production, and use of ochres of red colors constitutes evidence of a behavior related to chromatic symbolism used by the region inhabitants at Tinsmet Cave.

2 MINERAL PIGMENTS USE BY MICOQUIAN NEANDERTHALS IN CRIMEA

d'Errico, Francesco (University of Bordeaux-CNRS; Centre for Early Sapiens Behaviour, University of Bergen, Norway) - Mauraun, Guilhem (Université de Bordeaux, CNRS, PACEA, UMR5199, Pessac, 33615, France.) - Pitarch Marti, Africa (Departament d'Arts i Conservació-Restauració, Facultat de Belles Arts, Universitat de Barcelona, 08028 Barcelona, Spain; Institut d'Arqueologia de la Universitat de Barcelona (IAUB), 08001 Barcelona, Spain) - Majkic, Ana (Department of Archaeology, University of Belgrade, Serbia) - Stepanchuk, Vadim (Institute of Archaeology of the National Academy of Sciences of Ukraine, Kiev, Ukraine)

Over the past two decades, the utilization of ochre has evolved into a crucial archaeological indicator for scrutinizing the foundations of cultures comparable to ours. Nevertheless, the processes and mechanisms responsible for colors assuming such a central role in the existence of several members of our lineage remain inadequately documented and understood. Although largely ignored in the Western literature on Neanderthal mineral pigment use, the utilisation of colouring minerals by Micoquian Crimean Neanderthals has long been attested. We present a taphonomical, technological, compositional and functional analysis of unpublished ochre pieces from Zaskalnaya V, Zaskalnaya VI, Prolom II, and compare their chemical composition with a local ochre source. The multiproxy approach applied in the study of this material enables, for the first time, to propose where ochre was collected by Micoquian Neanderthal in Crimea, and how it was modified and used. Our results support the hypothesis that ochre was actively involved in symbolic practices.

3 SHIFTING PERSPECTIVES: THEORETICAL AND ANALYTICAL TRENDS IN MIDDLE STONE AGE OCHRE STUDIES

Culey, Jasmin (SFF Centre for Early Sapiens Behaviour (SapienCE), University of Bergen, Bergen, Norway) - d'Errico, Francesco (CNRS UMR 5199 De la Préhistoire à l'Actuel: Culture, Environnement, et Anthropologie (PACEA), Université Bordeaux, Talence, France; SFF Centre for Early Sapiens Behaviour (SapienCE), University of Bergen, Bergen, Norway) - Van Niekerk, Karen (SFF Centre for Early Sapiens Behaviour (SapienCE), University of Bergen, Bergen, Norway; Archaeology Division, School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Johannesburg, South Africa) - Velliky, Elizabeth (SFF Centre for Early Sapiens Behaviour (SapienCE), University of Bergen, Bergen, Norway)

Ochre, a pivotal element in discussions regarding the emergence and evolution of cultural/behavioral modernity, is often subjected to extensive scrutiny surrounding analytical and interpretive methodologies. However, beyond this discourse, it is difficult to discern the extent of the inferences we have made regarding ochre use in the past (or how we can best apply these to future hypotheses). Addressing such topics could assist in creating comparative reference collections to answer emerging questions about ochre use, to explore the future trajectory of the symbolic versus functional debate, and in creating a framework to test the inferences we make about past ochre behaviours.

This presentation uses data from an original, comprehensive database of 80 peer-reviewed studies (many of which are frequently drawn on by ochre researchers) on the topic of Middle Stone Age (MSA) archaeological ochre and ochre residues, as well as modern geological ochre assemblages, from African sites. Additionally, we address the content of existing comparative collections (the processing activities and use-wear traces most frequently replicated) and the role of ochreous sediments, surfaces, or layers, once seen as ephemeral, in experimental and analytical research. By tracking the evolution of research on MSA ochre assemblages from the African continent through their objectives, methods, results, and inferences using a newly generated database, this presentation attempts to address the aforementioned topics. It offers an examination of the degree of linkage between research questions and chosen methods (both qualitative and quantitative), charts the historical trajectories of ochre studies, and outlines pathways for future investigations using the database. In doing so, it suggests a framework for addressing the broader research questions posed within this session.

4 OCHRE USE DURING THE UPPER PALAEOOLITHIC AT PARPALLÓ CAVE, GANDÍA, SPAIN

Rosso, Daniela Eugenia (Departament de Prehistòria, Arqueologia i Història Antiga, Grupo de Investigación Prehistoria del Mediterráneo Occidental (PREMEDOC), Universitat de València, Spain) - Roldán García, Clodoaldo (Instituto de Ciencia de Materiales (ICMUV), Universitat de València, Spain) - Murcia Mascarós, Sonia (Instituto de Ciencia de Materiales (ICMUV), Universitat de València, Spain) - Villaverde Bonilla, Valentín (Departament de Prehistòria, Arqueologia i Història Antiga, Grupo de Investigación Prehistoria del Mediterráneo Occidental (PREMEDOC), Universitat de València, Spain)

The use of colouring materials, such as ochre, is considered as a distinctive feature of behavioural complexity. In the past few years, numerous studies on Upper Palaeolithic sites have focused on the geochemical characterisation of ochre related to cave art. However, few studies have explored other possible uses of colouring materials, and there is a lack of information on how Upper Palaeolithic populations processed ochre. In this study, we present the first results of the technological and chemical analysis of ochre pieces found at Parpalló Cave, Gandía, Spain. This site, which has yielded one of the most important collections of Palaeolithic portable art, consisting of more than 5000 painted and engraved limestone plaquettes, features a sequence virtually spanning the entire Upper Palaeolithic. Our aim is to reconstruct different phases of the ochre chaîne opératoire at Parpalló cave and characterise raw materials using micro-Raman spectroscopy and X-ray diffraction. Our results allow us to understand how inhabitants of the cave processed ochre, and suggest that this feature was probably used for a wide range of activities beyond the production of portable art.

5 AN EXPLORATION OF REDS AND YELLOWS IN THE PARIS BASIN: SOURCING STRATEGIES DURING THE UPPER PALEOLITHIC

Chassin de Kergommeaux, Aurélie (Environnements, Dynamiques et Territoires de la Montagne Université Savoie Mont Blanc, Centre National de la Recherche Scientifique : UMR5204) - Salomon, Hélène (Environnements, Dynamiques et Territoires de la Montagne Université Savoie Mont Blanc, Centre National de la Recherche Scientifique : UMR5204) - Rossi, Magali (Environnements, Dynamiques et Territoires de la Montagne Université Savoie Mont Blanc, Centre National de la Recherche Scientifique : UMR5204) - Chalmin, Emilie (Environnements, Dynamiques et Territoires de la Montagne Université Savoie Mont Blanc, Centre National de la Recherche Scientifique : UMR5204) - Peschaux, Caroline (MSH Mondes, UMR 8068 TEMPS) - Lesvignes, Emilie (MSH Mondes, UMR 8068 TEMPS) - Caron-Laviolette, Elisa (MSH Mondes, UMR 8068 TEMPS) - Bodu, Pierre (MSH Mondes, UMR 8068 TEMPS) - Bignon-Lau, Olivier (MSH Mondes, UMR 8068 TEMPS)

Ferruginous coloring materials have been extensively used in various facets of material culture since the Upper Palaeolithic offering valuable insights into the deliberate choices made by ancient societies, illuminating their circulation routes, ideas, preferences, and traditions.

In the Paris Basin, rich in ferruginous coloring resources and numerous Upper Palaeolithic sites, a comprehensive study was undertaken. This involves documenting ferruginous resources from local formations and analyzing archaeological collections spanning from the early Upper Palaeolithic to the Upper Magdalenian period.

Archaeological collections from significant sites such as Grotte du Renne (Arcy-sur-Cure, Chatelperronian), Mont-Saint-Aubin (Oisy, Badegoulian), Pincevent (Upper Magdalenian), and Louviers (Upper Magdalenian) underwent systematic petrological analyses and identifications of traces of past technical modifications using stereomicroscopes. These allowed for the characterization of the nature, provenance (in comparison to geological references), petro-physical properties, working techniques, and uses of the various rocks.

Despite the availability of local lithologies (ferruginous sandstones, limestones, concretions and Oolithic Iron Stones - OIS), certain resources from outside the watershed were preferred and exhibit enduring usage patterns. For instance, ferruginous crinoidal limestones used for powder production at Grotte du Renne, Mont Saint-Aubin, and Pincevent originated from the Hettangian of the northeastern Morvan foothills (35-145 kilometers away).

New resources were introduced during the Badegoulian period and became widespread during the Magdalenian, such as OIS from Ordovician formations in Normandy (100-360 kilometers away), used for perforated disks shaping and powder production. At Pincevent, where twenty levels document recurrent settlements within a short timeframe, the transition in selection of OIS from Aalenian-Toarcian (300 kilometers south) to Norman Ordovician (200 kilometers west) formations underscores changes in material-sourcing practices.

Overall, petrographic and technological cross-examinations unveil specific material selection strategies among ancient human groups, prioritizing desired properties over geographical proximity. This highlights the intricate relationship between human behavior, resource availability, and technological innovation in prehistoric contexts.

6 RED MINERAL PIGMENTS FROM THE LATE UPPER PALAEO-LITHIC CHOCOLATE FLINT MINE OF OROŃSKO, MASOVIAN DISTRICT, POLAND

Kosciuk-Zalupka, Julia (Jagiellonian University) - Kerneder-Gubała, Katarzyna (Polish Academy of Science)

At the Late Upper Palaeolithic flint mine at Orońsko, exploited around 12.800 BP, well-preserved traces of intensive raw material quarrying were discovered. During the 2016-2022 excavations seasons, both mining shafts and various tools were found. Some of the unearthened artifacts bore traces of red material, classified tentatively as ochre.

To approach potential provenience of that pigment, two hypotheses were assumed. The first one implies the possibility of acquisition of red clays from the glacial deposits in the vicinity of the site. Such acquired material could have undergone additional heating in order to change its original hue. That hypothesis is supported by the fact that traces of fire were spotted in the archaeological layer, that was connected to the method of flint exploitation. Nevertheless, hearths could have also been used for other activities.

The second hypothesis assumes the possibility of ochre acquisition from the well-known ochre mine at Rydno, situated 25 km away from the discussed flint mine. Both Orońsko and Rydno were inhabited during similar timespan, thus such case cannot be rejected without further analyzes. If so, those societies could have exchanged flint from Orońsko for ochre from Rydno.

To address this issue and explore potential connections between the Orońsko and Rydno societies, both laboratory methods and experimental clay firing were employed.

7 SHIFTING SANDS AND HUES: INVESTIGATING CULTURAL RESPONSES TO ENVIRONMENTAL CHANGE THROUGH THE OCHRE ASSEMBLAGE AT BOOMPLAAS CAVE

Mauran, Guilhem (UMR 5608 TRACES, University Toulouse Jean-Jaures, Centre National de la Recherche Scientifique (CNRS), Toulouse, France; Rock Art Research Institute, University of the Witwatersrand, Johannesburg, South Africa) - McGrath, James (Tallgrass Archaeology LLC, Iowa City, Iowa) - Chase, Brian (Institut des Sciences de l'Evolution-Montpellier (ISEM), University of Montpellier, Centre National de la Recherche Scientifique (CNRS), EPHE, IRD, Montpellier, France; Department of Environmental and Geographical Science, University of Cape Town, South Lane, Upper Campus, 7701 Rondebosch, South Africa) - Faith, J. Tyler (National History Museum of Utah, University of Utah; Department of Anthropology, University of Utah; Origins Centre, University of the Witwatersrand) - Pargeter, Justin (Department of Anthropology, New York University; Rock Art Research Institute, University of the Witwatersrand, Johannesburg, South Africa; Department of Anthropology and Development Studies, University of Johannesburg)

Ochre found in archaeological layers bears witness to the extensive social and symbolic activities of so-called "modern human culture". Cultural abilities are likely a crucial part of the story explaining the success of the hominin lineage. However, it remains unclear when these cultural capacities came to be and what influence(s) cultural capacities might have had on our survival during periods of marked climate change and resource variability.

Here we present, the terminal Pleistocene (~40-10ka) ochre assemblage from Boomplaas Cave (Western Cape, South Africa). It is currently one of the few sites in Africa with the unique combination of well-dated multi-proxy paleoenvironmental, dietary, and sedimentary records to demonstrate significant climate, vegetation, and resources change during the terminal Pleistocene. Tracking the source and use of ochre at Boomplaas Cave allows us to examine how territoriality varies in relation to environmental change. According to the influential economic defensibility model, we expect a decrease of territorial behaviors during increased environmental instability and reduced ecological productivity (<18ka).

Relying on a naturalistic approach, the analyses of archaeological and geological raw materials by optical microscopy allow us to provide preliminary results about the evolution of ochre exploitation at Boomplaas Cave. Comparison of these preliminary results with paleoenvironmental records derived from nearby hyrax middens, micromammal assemblages, as well as lithic raw material diversity allows us to address the impact of environment changes on cultural behaviours at Boomplaas Cave.

8 RED OCHRE AT ARMA VEIRANA (ERLI, LIGURIA). ANOTHER PIECE OF MOSAIC FOR UNDERSTANDING OCHRE EXPLOITATION AND MANIPULATION IN NORTHERN ITALY

Cavallo, Giovanni (University of Applied Sciences and Arts of Southern Switzerland) - Negrino, Fabio (Department of Antiquities, Philosophy, History, University of Genoa, Genoa, Italy.) - Benazzi, Stefano (University of Bologna) - Hodgkins, Jamie (Department of Anthropology, University of Colorado Denver, Denver, CO, USA.) - Miller, Christopher (Institute for Archaeological Sciences and Senckenberg Centre for Human Evolution and Paleoenvironment, University of Tübingen, Tübingen, Germany; SFF Centre for Early Sapiens Behaviour (SapienCE), University of Bergen, Bergen, Norway.) - Orr, Caley (Department of Anthropology, University of Colorado Denver, Denver, CO, USA.; Department of Cell and Developmental Biology, University of Colorado School of Medicine, Aurora, CO, USA.) - Peresani, Marco (Prehistory and Anthropology Science Unit, Department of Humanities, University of Ferrara, Sezione di Scienze Preistoriche e Antropologiche, Ferrara, Italy.; Institute of Environmental Geology and Geoengineering (IGAG), National Research Council, Milan, Italy.) - Riel-Salvatore, Julien (Département d'anthropologie, Université de Montréal, Montréal, QC, Canada.) - Strait, David (Department of Anthropology, Washington University, St. Louis, MO, USA.; Palaeo-Research Institute, University of Johannesburg, Auckland Park, Johannesburg, South Africa.)

Past research on ochre fragments in Italy allowed to understand more in-depth specific behaviours peculiar in ochre exploitation and manipulation during Palaeolithic. Provenance studies demonstrated that the exploitation of the raw materials was conducted at a local level and that humans were capable of selecting appropriate materials. In addition, the technology of fire use was well known.

The site of Arma Veirana (Erl, Liguria) is located in the Neva Valley, inland from the town of Albenga. The stratigraphy revealed levels with evidence of Mousterian and Late Epigravettian occupations. The ochre samples analysed came from the Mesolithic burial pit, which contained the remains of a female newborn, or in any case from the deposit immediately around.

Eight red ochre lumps unearthened from the archaeological site of Arma Veirana were analysed using optical and electron microscopy (Plane Polarized Light Microscopy, PLM; Scanning Electron Microscopy coupled with Energy Dispersive X-ray Spectrometry, SEM/EDX), and X-ray Powder Diffraction (XRPD) with the scope to characterize the archaeological materials and correlate them with the aforementioned features.

The mineralogical composition of the analysed samples is very homogeneous as they are principally composed of hematite, quartz and muscovite/illite, in variable (relative) amount.

The XRPD profile of most of the samples exhibits the selective broadening of some diffraction peaks that is a robust clue of the presence of artificial hematite obtained through pyrotechnological process of natural goethite. The presence of muscovite/illite indicates that temperatures were lower than T 800 C.

In all the samples, hematite is associated with clay minerals exhibiting a crenulated micro-texture; poly-crystalline quartz displays the loss of intra-crystalline boundary.

The textural, mineralogical, and microstructural features confirm the homogeneity of the materials in terms of the mineralogical composition indicating the same geological source.

9 AN INTEGRATED APPROACH OF ROCK ART: UNDERSTANDING THE TRAJECTORY OF COLOURING MATERIALS FROM THE SOURCE TO THE WALL

Chalmin, Emilie (Edytem) - Defrasne, Claudia (Edytem) - Salomon, Helene (Edytem) - Delannoy, Jean-Jacques (Edytem) - Chassin De Kergommeaux, Aurelie (Edytem) - Le Turnier, Marianne (Edytem) - Martinetto, Pauline (Institut Néel) - Bordet, Pierre (Institut Néel) - Theron, Coline (Institut Néel; Edytem)

The creation of schematic art in rock shelters spanning from the Mediterranean rim to the Alps during the Holocene involved the search for raw materials to produce painting matter. Some of these shelters possess the unique feature of having colouring materials readily available at the base of their walls, such as Le Trou de la Féclaz (Saint-Jean d'Arvey, Massif des Bauges, Savoie), and Otello (Saint-Rémy de Provence, Massif des Alpilles, Bouches-du-Rhône). However, the mineral landscape of these sites also provides access to numerous other ferruginous rock formations suitable for supply. Did the proximity of these colouring materials influence the selection of these sites? Is it a matter of opportunism?

To comprehend the availability of these colouring materials in the environment, it is imperative to document these various outcrops and establish a library of geological materials, a task undertaken within the Pigmentoθήque project. This documentation relies on rock petrography, mineral identification, and geochemistry.

To establish a connection with the matter deposited on the walls, it is essential to seek clues within various remnants and scrutinise the support along with its alterations. Unfortunately, with the loss of material coherence during powder production, accessing the petrography of the raw material becomes significantly challenging.

The cross-referencing of information between geological materials and archaeological remains poses a substantial challenge, necessitating the implementation of an interdisciplinary approach that integrates archaeology, materials science, and geosciences. The collaborative examination of geological materials, wall micro-samples, and the taphonomy of the walls in several schematic art sites has already allowed us to discern diverse mineral landscapes and variations in the painting matter employed.

10 NEW DATA IN THE CHARACTERIZATION OF LEVANTINE ROCK ART STYLISTIC HORIZONS THROUGH PIGMENTS: LIMITES AND POSSIBILITIES OF NON-INVASIVE METHODS

López-Montalvo, Esther (CNRS UMR 5608 TRACES) - Gallelo, Gianni (University of Valencia) - Roldán, Clo-doaldo (University of Valencia) - Ramacciotti, Mirco (University of Valencia) - Goemaere, Eric (Royal Belgian Institute of Natural Sciences) - Murcia-Mascarós, Sonia (University of Valencia) - Morales-Rubio, Angel (University of Valencia)

Included in the World Heritage List in 1998, Spanish Levantine rock art is a unique form of open-air pictorial expression in recent prehistoric Europe. In the last decades, many researches have attempted to characterise the stylistic sequence, the thematic content of scenes or even the territorial distribution of the rock art shelters in order to make progress in its chronological framework, which is still uncertain due to the impossibility of obtaining radiocarbon dates. Despite these advances, little is known about the composition of the coloring materials, and stylistic approaches involving a technological dimension remain unexplored.

This contribution presents a non-destructive in situ protocol for the elemental characterization of Levantine pigments based on field portable X-ray Fluorescence (pXRF). A close observation of rock weathering and a stylistic approach to paintings, supported by multivariate analyses, allowed for investigating the pXRF capabilities in the characterization and discrimination of prehistoric pigments.

Our research proposes a non-destructive protocol to obtain a useful pre-screening to explore technical traditions at different temporal and territorial scales, and opens up new avenues for the redefinition of Levantine stylistic horizons, integrating both formal and technological variables.

11 OCHRE OR CINNABAR? WHICH RED FOR THE CHEVRON-DECORATED ANTHROPOMORPHIC STELAE OF SOUTHEASTERN FRANCE?

Le Turnier, Marianne (IPAG, Université Grenoble Alpes, UMR 5274; Edytem, Université Savoie Mont-Blanc, UMR 5204) - Beck, Lucile (LSCE, Université Versailles Saint-Quentin, UMR 8212) - Chalmin, Émilie (Edytem, Université Savoie Mont-Blanc, UMR 5204) - Defrasne, Claudia (Edytem, Université Savoie Mont-Blanc, UMR 5204) - Schmitt, Bernard (IPAG, Université Grenoble Alpes, UMR 5274)

This research aims to mobilize archaeometric data in a social and cultural interpretation of the use of coloring materials between the Monts de Vaucluse and Lubéron in the Neolithic period. It focuses on the coloring of engraved steles, associated in rare cases where it is present, with a funerary context, and aims to question the diversity of these coloring materials and their origins regarding their social and cultural uses. One of the challenges of this thesis is to question the presence of cinnabar on stelae, a singular coloring matter, absent from the region studied, which may have circulated over long distances and been reserved for the funerary sphere. Where did the cinnabar, used to color the stone bodies of the deceased in Spain, originate? While recent studies appear to support the funerary use of cinnabar in Spain based on materials from collective burials (bones and objects), this inquiry has yet to address two crucial points: (i) the application of cinnabar to steles, which represent real stone bodies, and (ii) its potential relevance to the herringbone steles of Provence.

Hyperspectral imaging could reveal traces of pigments that are no longer visible, as has been done on painted shelter walls. The second benefit of this non-invasive, portable method would be to characterize the mineral paint materials used, by studying the spectral signal of each pixel emitted by the image obtained from the stele. Other methods, such as XRF, XRD or isotopic analysis (lead), will also be used to cross-reference and complement the results for an integrated, multiscale study.

Finally, a comparison with the geological coloring materials, (ochre, bauxite) widely present in this geographical area, could contribute to a better understanding of exchange networks, the circulation of materials and cultural dynamics, and provide a glimpse of some fragments of Neolithic ideal universes.

12 COLOURS AT HOME - UNEARTHING THE TRADITION OF COLOUR USE IN STONE AGE NORWAY

Riise, Mari (University of Bergen)

Though the use of colouring materials, and more specifically ochre, is widespread throughout the European palaeolithic, the few reported cases on stone-age Fennoscandia are primarily from burial contexts. Even less is known about

Norwegian stone-age colouring behaviours, though there are some scattered reports of rock paintings and ochre pieces from archaeological sites.

Piecing together information from literature, site reports, and museum collections, we found that there are more materials labeled "ochre" than previously assumed. Most distinct is the occurrence of ochre in cultural layers in settlement and activity sites and not in grave contexts as in the neighboring countries.

With an intent to shed light on a possible tradition of colour use in Norway, two museum districts were chosen for comparison, the northern region (The Arctic University Museum of Norway) and the western region (The University Museum of Bergen). A multianalytical approach was chosen. We used visual, contextual, and elementary analysis to understand the composition of the ochre material and to possibly differentiated ochre from naturally occurring iron formations.

Preliminary results indicate that the ochre material contains great potential for further studies. As ochre sites are abundant and are dated to all time periods of the Stone Age it could contribute to a better understanding of social and symbolic aspects of the hunter-fisher-gatherer societies and its traditions. Future analysis should include material from other geographical areas and further geochemical analysis, to obtain more details regarding the distribution and origin of the ochre material.

13 THE RED WAY TO THE LIFE BEYOND

Zagorska, Ilga (LU Institute of History of Latvia)

During the Stone Age in the Eastern Baltic, ochre was in widespread use, constituting one of most important aspects of human life and death.

Evidence of ochre use has been recovered from burials and settlement sites, and in connection with various artifacts (ceramics, amber, bone, art pieces etc).

Due to the long duration of use of burial grounds in the Eastern Baltic (8th–4th millennium BC), it is possible to trace strong traditions as well as changing practices of ochre use.

The obtained radiocarbon datings permit identifying the pattern of use of ochre at Zvejnieku burial ground to follow in particular periods. The use of ochre in burials was more prevalent during the Middle and Late Mesolithic periods. Its usage decreased at beginning of the Neolithic era,

but more intensively was used again at the Middle Neolithic, when special votive deposits appeared. Ochre has not been found with the Late Neolithic crouched burials.

The burial traditions involving ochre use testify to the Stone Age people's firm belief in a life beyond the grave and their strongly structured social rites.

359 THE 4TH AND 3RD MILLENNIUM BC STEPPE IMPACT ON PREHISTORIC EUROPE

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Heyd, Volker (University of Helsinki) - Kulcsár, Gabriella (Institute of Archaeology, HUN-REN Research Centre for the Humanities) - Dani, János (University of Szeged) - Topal, Denis (National Museum of History of Moldova) - Palalidis, Stefano (Università Ca' Foscari Venezia)

Session format: Session with keynote presentation and discussion

In January 2019, the ERC Advanced Project 'The Yamnaya Impact on Prehistoric Europe (YMPACT)' embarked on a journey to investigate the massive transformation that swept across Europe approximately 5000 years ago. Hosted by the University of Helsinki, Finland, and with partners working in the UK, Germany, and Hungary, the project has been an international and interdisciplinary team effort focusing on the western end of the huge Yamnaya distribution area, in the steppe landscapes of present-day territories of Romania, Bulgaria, Serbia, and Hungary. Despite the unforeseen obstacles presented by the COVID-19 pandemic and the Russian invasion of the Ukraine, close collaboration with local archaeologists in these countries facilitated intensive fieldwork and sample collection, culminating in three archaeological excavation campaigns, in Boldești-Grădișteța in Romania (2019), Mogila in Bulgaria (2021), and Hajdúböszörmény in Hungary (2023).

This session aims to offer a comprehensive overview of research conducted not only by YMPACT in the past five years, but also inviting other scholars to add data enriching our understanding of the Yamnaya impact on prehistoric Europe and opening up lines of future research. Drawing inspiration from the project's collaborative and interdisciplinary approach, the session will host contributions spanning archaeology, bio-anthropology, genetics/ancient DNA, biomarker lipids, and isotope biogeochemistry. Geo- and environmental sciences will contribute to discussions on palaeoclimatology, climate change research, soil formation processes, and landscape reconstructions. Lectures will present latest research, delving into the funerary archaeology of Yamnaya kurgans and material culture; exchange dynamics with southeastern European societies; the physical appearance and population dynamics of the Yamnaya; data

on their mobility, diet, occupation, and lifestyle; their intricate connection with the environment; and the profound nature of the wider Yamnaya Impact.

ABSTRACTS

1 **MIGRATION AND SOCIAL TRANSFORMATION: NEOLITHIC DECLINE AND CORDED WARE EXPANSION**

Kristiansen, Kristian (Department of Historical Studies, University of Gothenburg)

In this contribution I shall analyze the possible conditions and causes of a Neolithic demographic decline, preceding the Corded Ware migrations. This includes the effects of plague as a major killer, as well as possible contradictions between more closed Neolithic societies versus more open pastoral societies.

2 **THE YAMNAYA IMPACT ON PREHISTORIC EUROPE: CURRENT UNDERSTANDING AND PAVING THE WAY FOR FUTURE RESEARCH**

Preda-Balanica, Bianca (University of Helsinki)

Over the past decade, the migration of Yamnaya groups from the Pontic-Caspian steppes to Southeastern Europe 5000 years ago has sparked intense debate in both archaeology and genetics. The Yamnaya have attracted the interest of prominent research projects, including the ERC Advanced Project “The Yamnaya Impact on Prehistoric Europe” based in Finland at the University of Helsinki, which has contributed to the topic through fieldwork and interdisciplinary studies. Further efforts have been undertaken by scholars in Southeastern and Eastern Europe to research regional and super-regional aspects of the Yamnaya culture. Through intensive international cooperation in recent years, much more detailed knowledge of the burial practices and material culture of Yamnaya groups has been acquired. Additionally, a more precise and refined chronology of the various phases of their presence west of the Black Sea, has been developed. Furthermore, a deeper understanding of their lifestyle, which is reflected in their bio-anthropology, has been gained. Other research approaches integrate data provided by genetics and archaeology to explore the complex relationship between biology and culture in the creation of social identity within the context of the Yamnaya migration. This presentation aims to provide a comprehensive overview of the research progress accomplished in recent years and pave the way for future research on the topic of the Yamnaya impact on prehistoric Europe.

3 **SPATIAL MODELLING OF THE EARLY YAMNAYA EXPANSION USING RADIOCARBON DATES**

Suvorov, Alexander (University of Helsinki)

The expansion of the Yamnaya peoples in Europe around 5000 years ago has been in the center of interest for over a hundred years, but especially in the last decade. Recently acquired information from aDNA and isotope analyses conducted on Yamnaya individuals from kurgans in Russia, Ukraine, Moldova, Romania, Bulgaria, Hungary, and Serbia has led researchers to believe that while moving from the east to the west, the fierce Yamnaya brought war and diseases like *Yersinia pestis* over to Europe, which resulted in a rapid disappearance of local communities. However, the absence of archaeological evidence of violence and disease during that period challenges the suggested hypothesis of a vicious invasion, and thus archaeological material must be re-examined with a new multidisciplinary approach. In this paper, one such possibility, which combines archaeology, chemistry, and GIS, is explored. Radiocarbon dates obtained from Yamnaya graves are used to analyze the early stages of the expansion by implementing the spatial analysis method, kriging. Kriging is used to predict the progress of the expansion based on the distribution of radiocarbon dates expressed as Z-points. In this paper, known radiocarbon dates from publications have been gathered and divided into a comprehensive (not quality controlled) and an audited dataset (quality-controlled). Based on these categories, several models have been created to reflect the speed and direction of the expansion and to test, whether the Yamnaya did in fact move from east to west as has recently been hypothesized. The models are analyzed in a social and cultural context and the probability of violence in this expansion is discussed. The paper also presents possible centers of origin, the direction of the expansion as well as indicates several problems resulting from the lack of consistent and reliable radiocarbon sampling.

4 **INTERCULTURAL INTERACTIONS IN THE NORTHWEST PONTIC DURING THE EARLY YAMNA PERIOD (3350-2900 BCE)**

Nikitin, Alexey (Grand Valley State University) - Ivanova, Svitlana (Institute of Archaeology, The National Academy of Sciences of Ukraine)

The Yamna archaeological complex (YAC) exerted significant economic, cultural, and demographic influence on post-Neolithic Europe and Yamna's immediate neighbors in the North Pontic region (NPR). In the northwestern part of the NPR, Yamna closely interacted with various archaeological groups in the late 4th – early 3rd millennium BCE, as evidenced by archaeology and archaeogenetics. Archaeogenetics reveals the presence of Yamna genetic ancestry in the northwest NPR since approximately 3350 BCE. Apart from appearing in a Yamna culture-specific burial context, Yamna genetic ancestry was also found in burials exhibiting mixed material culture features with other archaeological groups such as Corded Ware, Globular Amphora, steppe Eneolithic, and Zhyvotyivka-Volchans'k. In burials displaying mixed features, Yamna genetic ancestry was often admixed as well. In some cases, burials displaying unadmixed cultural features of archaeological groups of local origin in the northwest NPR, such as Usatove, harbor unadmixed Yamna genetic ancestry. The presentation will also explore potential vectors and consequences of inter-cultural interactions in the northwest NPR from both regional and continent-wide perspectives.

5 **THE FUNERARY TRADITIONS IN THE YAMNAYA CULTURAL HORIZON (CA. 3400 - 2300 CAL BC): DEVELOPMENT AND DIFFERENTIATION**

Palalidis, Stefano (Università Ca' Foscari Venezia)

In 1968 the Soviet archaeologist N. Ya. Merpert submitted his doctoral dissertation on the study of the burial customs of the Yamnaya cultural horizon throughout its (almost) entire geographical and chronological extension. Since then, only studies focused on restricted regions have been conducted by scholars of the respective countries, in most of the cases showing a high degree of accuracy and detail, but on the other hand lacking the general picture that is provided by the comparison with neighbouring and more distant regions. With a dataset of more than 5700 graves attributed to the Yamnaya cultural horizon from the Tisza river in the west to the Ural mountains in the east, my PhD project aimed to investigate the Yamnaya cultural horizon in its entirety and study its different trends in the funerary practices of different regional groups and chronological phases, in order to renovate Merpert's approach with fresh methodologies and new data from more than 50 years of excavations.

This paper will summarise the main results of my doctoral dissertation, presenting an overview of the analysis conducted on the archaeological and anthropological data in order to investigate patterns in cemetery occupation, grave construction, funerary rituals, demographic structure, sex ratio and grave goods composition and distribution. A critical selection of the reliable radiocarbon dates for the Yamnaya cultural horizon will then be used as the basis for a multivariate statistical approach aimed at investigating whether the observed differentiation in burial customs can be explained by calibrated radiocarbon age.

6 **'YAMNAYA', 'CORDED WARE', 'BELL BEAKER' ETC. THE IMPACT OF ARCHAEOLOGICAL TAXONOMIES ON ANCIENT DNA RESEARCH**

Brami, Maxime (Palaeogenetics Group, Johannes Gutenberg University Mainz)

Over the last ten years, 'Yamnaya' or 'steppe' ancestry has been identified in human genomes all the way from Central Asia to Western Europe, supporting notions of large-scale population movements from the Pontic-Caspian steppes during the 4th and 3rd millennia BC. This ancestry component appears to be especially prevalent in genomes associated with 'Yamnaya', 'Corded Ware' and Northwest European 'Bell Beaker' graves, but is completely missing in 'Globular Amphora'-related individuals.

In this seminar, I want to turn the problem on its head and ask how far archaeological taxonomies (i.e. the categorical labels used by archaeologists to describe phenomena in archaeology) inform genetic research and influence the results. Indeed, the labels used to justify clustering genomes into sets of individuals for statistical modelling of genomic variation are usually provided by archaeology, based on criteria that are rarely made explicit. Individuals whose ancestry profile does not match their expected cultural assignment are often flagged as outliers and excluded from further analysis. I show how random sampling and reshuffling of archaeological labels can produce different demographic scenarios.

Parametrizing the material record in the most objective way is thus essential. I demonstrate how the use of Artificial Intelligence could help to mitigate taxonomic issues in archaeology by creating consistent datasets that can be independently sorted through machine learning approaches.

7 DEMOGRAPHY OF THE STEPPE

Blöcher, Jens (Johannes Gutenberg University) - Diekmann, Yoan (Johannes Gutenberg University; University College London) - Preda-Bălănică, Bianca (University of Helsinki) - Thomas, Mark (University College London) - Heyd, Volker (University of Helsinki) - Burger, Joachim (Johannes Gutenberg University)

Profound cultural transformations already beginning in the fifth millennium BC heralded the end of the Neolithic, in Eastern Europe most visibly materialising in the form of Kurgans. These have long been associated with mobility and westward migration of people and ideas from the Pontic-Caspian steppe, however, the demographic details of the expansion and interactions of populations and emerging cultures remain elusive. Here, we present 46 newly sequenced genomes, most of which were purposefully excavated in the interaction zone of the Yamnaya culture with local farming societies along the Black Sea in Romania and Bulgaria. We find population structure in the Pre-Yamnaya period, in which individuals with genomic ancestry indistinguishable from Yamnaya inhabited the westernmost Dobrudzha steppe ecozone in nowadays Romania and Bulgaria, coexisting with genomically predominantly local Neolithic individuals in the neighbouring mountainous Thracian and Ploiesti regions. After c. 3050 BC, this structure disappears and all individuals are dominated by steppe ancestry. Focussing on the steppe fraction of the genome, we infer a strong population size bottleneck around 3500 BC that reduced genetic variation in all descending individuals with steppe ancestry. This causes individuals to appear closer related, affecting estimates of the speed of expansion of steppe populations. We account for this effect by exclusively considering Neolithic ancestry as a marker, and find shared genomic segments between Polish Globular Amphora and late Neolithic Ukrainian individuals, to later Corded Ware in Germany, and ultimately to Fatyanovo in Eastern Europe. This may suggest the displacement of a Ukrainian population towards Poland, Czechia and Germany as the origin of the Corded Ware Culture.

8 EARLY CONTACT BETWEEN LATE FARMING AND PASTORALIST SOCIETIES IN SOUTHEASTERN EUROPE

Penske, Sandra (Max Planck Institute for Evolutionary Anthropology)

Around 3300 BCE, Europe experienced major cultural and genetic changes due to the expansion of pastoralist groups from the Eurasian steppe, predominantly associated with the Yamnaya cultural complex. This group has sparked intense scholarly debate as their spread was not only linked to new burial practices, namely kurgans into areas outside of the forest/steppe zone, but also suggested to have brought Indo-European languages to central and western Europe. The kurgan hypothesis, proposed by Marija Gimbutas, suggested that pastoralist groups from this region imposed themselves and the kurgan culture on local people as early as the 5th and 4th millennium BCE. The demise of the Copper Age in southeastern Europe ~4250 BCE was used as a primary example for this hypothesis. However, evidence to support this scenario is sparse since archaeological findings from the following ~1000 years suggest very little settlement activity in this region, whereas activity had increased in the northwestern Black Sea region.

By analysing 135 individuals spanning this critical time period and important eco-geographic zones, we have evidence for genetic continuity between Early Neolithic and Copper Age groups in southeastern Europe which even extends into the Early Bronze Age. This finding leads us to reject the idea of an early (lasting) spread of the kurgan culture into eastern Europe. By contrast, prehistoric groups from a contact zone in the northwestern Black Sea region, that are derived from the preceding southeastern European Copper Age carry a genetic component that is associated with pre-Yamnaya pastoralist groups from the eastern forest/steppe zone. This indicates cultural and biological interaction between the two groups and the introduction of steppe-related ancestry ~1000 years early than previously anticipated. Only later, during the Early Bronze Age, we find the expansion of Yamnaya-associated steppe ancestry in individuals from southeastern Europe and the northwestern Black Sea region.

9 GENOMIC STABILITY AND TRANSFORMATIONS IN PREHISTORIC TRANSYLVANIA

Rohrlach, Adam (Max Planck Institute for Evolutionary Anthropology)

The region of today's Transylvania has long been a region of rich natural resources, fertile farming land and relative protection from the surrounding Carpathian and Apuseni mountains. However, the genetic history of the people that have inhabited this region is poorly understood, and the archaeogenetic record in Transylvania is only represented by very few individuals. Conversely, the history of the regions in southeastern Europe surrounding Transylvania have been well studied, and attest to dramatic genetic turnovers accompanying the change from a hunter-gatherer to a sedentary agricultural lifestyle, and the arrival of steppe-related ancestry with the expansion of pastoralist societies from east of the Carpathian mountains.

In this study we report archaeogenetic results from individuals from Transylvania and the surrounding regions in Romania, spanning the Neolithic to the Late Bronze Age. We report a surprising level of genetic continuity within Transylvania, with little evidence for an influx of steppe-related ancestry into individuals associated with the main cultural groups until the Late Bronze Age, coinciding with the arrival of people associated with the Noua culture. In stark contrast to this, we also find evidence for Yamnaya and Yamnaya-related groups from the Early Bronze Age who appear

to have been unsuccessful in making a genetic foothold in the region. In summary, we find that Transylvania was at times a melting pot of genetic profiles, but still maintained a relatively continuous genetic legacy during the Copper Age and much of the Bronze Age.

10 STUDIES ON THE BIOANTHROPOLOGY OF INCOMERS FROM THE STEPPE AND LOCAL RESIDENTS OF SOUTHEASTERN AND CENTRAL EUROPE

Trautmann, Martin (University of Helsinki)

About two decades of intensive archaeological, bioarchaeological, and paleogenetic investigation have revealed stupendous details about the cultural and biological impact of Aeneolithic populations from the Eurasian steppes on their agrarian counterparts in Southeastern and Central Europe.

Now, a nuanced understanding of their interactions emerges, revealing a spectrum of disparities across genetics, physical characteristics, lifestyles, dietary habits, social structures and behavior - a complex pattern of displacement, assimilation, hybridization and adaptation that fundamentally reshaped the future development of Europe's human population.

With the osteological studies undertaken for the YMPACT project we add to the former research focus on genetic understanding of ancestry and population movement, replacement or admixture. Skeletal traces of environmental adaptation, physical stress and workload, health risks from diseases or violence, diet, gender- or lineage-dependent status differences provide insight into aspects of human life that transcend mere biology.

Analysis of bioanthropological data to date suggests that the region west of the Black Sea represented a borderland between two very different populations with very different lifestyles. From the 4th millennium onwards, an initially sporadic and later increasing influx of steppe groups to the west can be seen, which displaced and transformed the local resident population, but also changed and adapted to the new habitat.

11 THE DIETARY IMPACT OF THE YAMNAYA HORIZON ON EARLY BRONZE AGE AGRICULTURALIST POPULATIONS IN PREHISTORIC EUROPE

Sandoval, Elena (University of Bristol) - Heyd, Volker (University of Helsinki) - Cramp, Lucy (University of Bristol)

The ERC project "The Yamnaya Impact on Prehistoric Europe (YMPACT)," was started in January 2019 to explore the effect the Yamnaya Horizon had on the fabric of society in Europe. As a subsection of the YMPACT project, this study seeks to investigate the influence of the Yamnaya horizon on prehistoric Europe, through the lens of diet, via stable isotopic analysis and organic residue analysis. Based on the lack of settlement evidence, a pastoralist subsistence pattern is generally assumed for the Yamnaya populations, but dietary patterns are difficult to reconstruct due to this lack of associated material culture. This study reconstructs dietary practices within the Yamnaya from the human remains themselves, using bulk stable isotopic analysis. Samples of 208 skeletal individuals were chosen to reflect this angle of inquiry creating a sample group that is comprised of Eneolithic, Early Bronze Age, and Middle Bronze Age skeletal remains from across modern day Bulgaria, Romania, and Hungary, creating an in-depth study to enable comparison of both spatial and temporal dietary trends. The organic residue analysis was conducted on 170 pottery sherds of four Early Bronze Age settlements to compliment the skeletal dietary investigation and give insight into dietary patterns of sedentary Bronze Age societies.

Here I will present the findings from the analysis of multiple skeletal elements from Yamnaya individuals and non-Yamnaya individuals from 34 sites combined with lipid biomarkers. This study provides the first detailed picture of the subsistence patterns and change throughout the Yamnaya migration and subsequent contact with Early Bronze Age societies through a Bayesian statistical modeling framework. This research presents a multi-level modeling approach to investigate dietary patterns and potential cultural flow between the Yamnaya and Early Bronze Age settlements as well as dietary patterns within the Yamnaya, targeting differences in diet between sex and age categories.

12 'SUBSISTENCE, LIFE AND DIET IN THE WESTERNMOST YAMNAYA COMMUNITIES BASED ON BIOARCHAEOLOGICAL DATA.' (CASE STUDIES)

Dani, Janos (University of Szeged, Archaeological Department; Déri Museum, Debrecen) - Bálint, Marianna (Hajdúsági Museum, Hajdúböszörmény) - Volker, Heyd (University of Helsinki) - Lisztes-Szabó, Zsuzsanna (HUN-REN Institute for Nuclear Research, Debrecen) - Trautmann, Martin (University of Helsinki) - Hajdu, Tamás (Eötvös Loránd University, Budapest) - Kelentey, Barna (Faculty of Dentistry, University of Debrecen) - Angyal, János (Faculty of Dentistry, University of Debrecen) - Horváth, Anikó (HUN-REN Institute for Nuclear Research, Debrecen) - Gábor, Emese (Magyarságkutató Intézet)

The westward migration of the Yamnaya people and the resulting changes in the genetic make-up of Prehistoric Europe has been a very highlighted topic of archaeological research for about 10 years. The Carpathian Basin, and within it the Great Hungarian Plain, was the westernmost station of this migratory process, which provided the people

arriving here with very diverse living conditions, different from those of the Eastern European steppe. The burials excavated in prehistoric kurgans in Hungary during the last decade have given us the opportunity to investigate the lifestyle, subsistence and diet of the westernmost Yamnaya population, in addition to the traditional archaeological methods and aDNA analyses. At the same time, it also provides opportunity to compare the way of life of the local western communities with that of the eastern groups living in the Caspian steppes.

Beyond the basic physical anthropological analyses, the application of several new bio-archaeological methods (dental calculus & stable isotope analyses, paleo dentistry, facial reconstruction) will provide detailed insights into the daily life of this nomadic people. In this presentation, we will present some exciting case studies that significantly enrich the picture of the Yamnaya population.

13 PALEOENVIRONMENTAL AND PALEOSOIL STUDIES OF KURGANS WITHIN THE YMPACT PROJECT

Peto, Ákos (Hungarian University of Agricultural and Life Sciences) - Braun, Ádám (Hungarian University of Agricultural and Life Sciences)

Kurgans are man-made geomorphological values of the Eurasian steppe zone. During the construction of these structures, humans sealed one of the most important information sources of the ancient environment: the surface soil cover. This conscious human act – the building of these earthen features – isolated and therefore kept the original soil in untouched conditions. These buried soil profiles act as ‘time capsules’, which can be opened for the sake of the better understanding of the contemporary environmental conditions.

Current presentation provides an overview of the complex paleoenvironmental research conducted at multiple kurgan sites within the research area of the YMPACT project. Case studies and comparative analysis covers kurgans from Hungary, Bulgaria and Romania.

The main objective at each kurgan was to collect data on the possible construction phases of the mound structure, to identify and describe the buried paleosoil, and to collect paleoenvironmental data in order to complement our knowledge on the ancient environment of the Bronze Age.

14 KURGANIZATION WITHOUT KURGANS. PLANIGRAPHIC PATTERN OF SOME PRE-YAMNAYA FLAT CEMETERIES OF NW PONTIC AREA

Topal, Denis (National Museum of History of Moldova)

The kurganization of the south of Eastern Europe can undoubtedly be considered one of the most remarkable events in the history of this region. The praxis of erecting barrows over the dead appeared in the Northwest Pontic area of Eastern Europe not later than in 3900–3800 BC, and at least 134 tumuli with 254 burials belong to the period before the penetration of the Yamnaya communities. The mounds appear in their most developed form, with the most sophisticated monumental features of stone, ring ditches, sanctuaries, and various ritual manipulations with fire and sacrificial animals. However, the complexity and monumentality of these structures contrast with the poverty of the grave goods of the central burials, which can be explained by the change from intra-group competition to intra-group consolidation. The emergence of burial mounds and the further development of barrow architecture could influence the layout of flat cemeteries, which did not stand out in the landscape like tumuli. For example, the Usatovo culture flat burial grounds (Dancu, Dănceni, Usatovo, Mayaky, Koshary) are formed according to the same principle as the barrow sites by small groups of burials, according to a radial planigraphic pattern. However, not only were flat burials of the Usatovo culture (for which barrows are known) arranged according to this principle, but also the burial sites of the communities without any barrows. The burial site near Vykhvatintsy-Ofatinți is also formed by compact groups of 5-6 graves arranged in arcs, sometimes with a burial in the centre and a stone circle. These groups of burials have been interpreted as “family” or “influencers” cemeteries. Both interpretations suggest synchronous use of these burial areas. Still, there is every reason to assume that these groups were formed sequentially, similar to the mounds in barrow cemeteries.

15 THE WAGONS OF YAMNAYA CULTURE: THE EARLY STAGE OF THE DEVELOPMENT OF WHEELED TRANSPORT IN THE EURASIAN STEPPE

Rzonca, Justyna (PhD candidate, Jagiellonian University)

The oldest evidence for the usage of wheeled transport in the territory of the Eurasian Steppe comes from Yamnaya graves. Parts of wagons were included in the Yamnaya burial rite since the early stages of development of this cultural community: this type of practice first appeared in the late IV millennium B.C. or very early III mill. BC. Currently all grave finds amount to a total of 49, located in the territory between the Danube and Ural river basins and their frequency of occurrence seems to be regular, but also dependent on the cemetery at the micro-regional level. The parts used in the burial rites were mostly wheels and single pieces of the wagon’s body. The analysis of the wagon’s remains

placed in the grave pit can lead to several kinds of conclusions. Firstly, this allows the identification of the construction types of the earliest known wagons in this area. Secondly, this can lead to identifying how important wheeled transport was for a society of the Eurasian Steppe in the Early Bronze Age and why they were placed in such sacred contexts. And thirdly, it is important to identify who the people buried with wagons and their elements were for their immediate social environment and if it is possible to find a common trait among them. Because this rite was long-lasting and supraregional, the tradition survived to the later stages of the Yamnaya culture and would eventually be inherited by younger Steppe area groups. The question about similar Yamnaya influences on other parts of Europe, in both the technological and ritual spheres, is the subject of an ongoing inquiry.

16 LANDSCAPE ANALYSIS OF THE EARLY BRONZE AGE MOUNDS IN THE MIDDLE AND LOWER TUNDZHA RIVER

Valchev, Todor (Historical museum - Yambol) - Sobotkova, Adela (Aarhus University)

The second half of 4th and the first half of 3rd millennium BC is one of the most dynamic and interesting periods in Balkan history. This is a period of movement of people, ideas and innovations.

During this time, the Tundzha River Valley sees the arrival of the steppe people – mainly the Yamnaya culture communities originally spread from the Ural Mountain to the Hungarian plain. Their presence is attested by burial mounds, which represent a new way of depositing the dead within earthen monuments so as to facilitate remembrance of venerated relatives and claims to land.

This paper reviews the properties of ten excavated Early Bronze Age mounds in the Yambol Province, showing these mounds are substantial in size and tend towards high-prominence locations in the landscape. These attributes are then used to extract mounds of similar properties from a dataset of 1090 mounds registered in the Yambol province since 2009. Two different sets of criteria produce two subsets of 52 potentially Early Bronze Age mounds, differing slightly in location.

17 OCHRE IN THE PICTORIAL ACTIVITY OF PIT-GRAVE TRIBES OF CENTRAL UKRAINE

Syvolap, Mykhaylo (Cherkasy City Archaeological Museum)

The article deals with the few cases of the pictorial activity of Pit-Grave burial rite.

In 1989, the author excavated 5 burial mounds in the triangle at confluence of Sula tributary into Dnieper on the Left bank Dnieper terrace plain. The biggest mound No4 (h 3m, d 51m) was located 3km northeast of the Klishchyntsi village, Zolotonosha district, Cherkasy Region, Ukraine. It contained 9 ancient burials, 6 of which belonged to the Pit-Grave culture [Syvolap, 1989]. The burial rite of these burials was specific to the Northwest group of Yamna culture (Merpert, 1968). The inlet burial No4 was the latest in the mound, inserted according to the radial principle. The deceased was orientated with head to SW & laid on the back with arms extended along the body & legs bent with knees up. The most interesting feature of this burial were the remains of drawing in bright red ochre between two layers of three-layer bedding, traced on both sides of the upper part of the deceased. Due to significant damage of the burial, only one composition in the form of six-axis wheel (d 10cm) can be clearly distinguished.

Small unreadable remains of similar drawings were discovered by the author twice more in the burial No5 of the same mound & in the mound No11 “Valiavkyna Mohyla” [Syvolap, 1990] on the right bank of the Dnieper near Cherkasy City.

Another interesting case of ochre use in the ritual visual practice of the Pit-Grave tribes is evidenced in barrow No1 “Vorozhbyna Mohyla” some 6km to the northwest of “Valiavkyna Mohyla”. The primary burial contained the skeleton of teenager with same orientation as Klishchyntsi burial deceased. On the skull of deceased a layer of red ochre formed two parallel stripes 4-5cm wide (ochre drawing?) & traces of white plaque (white paint?).

18 TWILIGHT OF THE GOLDEN AGE

Burdo, Nataliia (Kyiv Domain Archaeological Museum) - Videiko, Mykhailo (Kyiv Borys Grinchenko University)

The impetus was climate change, thanks to which pasture resources for nomads increased. Before finally disappearing, Trypillia-Cucuteni led to the creation of a number of new cultural groups with other economic systems, including pastoralist ones.

These groups (the Usatovo, Zhivotilivka in the Steppe zone; the Gorodsk, Sofivka in the Forest zone), were considered by some researchers to be part of the Trypillia-Cucuteni for a long time. Their emergence can be considered as a process of adaptation of various population groups to new natural conditions.

There are several formations in the Steppe, the influence and participation in the formation of which Trypillia-Cucuteni was different. The Usatovo culture contains the most Trypillian components. Nomadic animal husbandry was the basis of the economy of the Usatovo culture. The Vykhvatyntsi cemetery was left by a group with mixed traditions – Trypillia and Usatovo. The origin of the not Trypillia tradition in the Usatovo culture is rightly associated with the

Chernavoda-I culture. Trypillian traditions were most clearly manifested in the barrow burials of the Usatovo eponymous landmark. The mixed nature of the population of the Usatovo culture is confirmed by DNA research.

The post-Mariupol culture and the Zhytylovka group show connections with Maykop. Trypillia-Cucuteni artefacts in their mound burials should be considered as imports and imitations of Trypillia-Cucuteni traditions. Archaeological materials show the penetration of Zhytylovka traditions along with carriers into the Usatovo area. This is also confirmed by DNA research.

After 3000 BC, the diversity of cultural traditions of the “twilight of the golden age” was replaced by the uniformity of the traditions of the pit culture nomads, whose way of life turned out to be more adapted to the new climatic realities.

360 THE 4TH AND 3RD MILLENNIUM BC STEPPE IMPACT ON PREHISTORIC EUROPE PART 2

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Topal, Denis (National Museum of History of Moldova) - Heyd, Volker (University of Helsinki) - Kulcsár, Gabriella (Institute of Archaeology, HUN-REN Research Centre for the Humanities) - Dani, János (University of Szeged) - Palalidis, Stefano (Università Ca' Foscari Venezia)

Session format: Session with keynote presentation and discussion

In January 2019, the ERC Advanced Project “The Yamnaya Impact on Prehistoric Europe (YMPACT)” embarked on a journey to investigate the massive transformation that swept across Europe approximately 5000 years ago. Hosted by the University of Helsinki, Finland, and with partners working in the UK, Germany, and Hungary, the project has been an international and interdisciplinary team effort focusing on the western end of the huge Yamnaya distribution area, in the steppe landscapes of present-day territories of Romania, Bulgaria, Serbia, and Hungary. Despite the unforeseen obstacles presented by the COVID-19 pandemic and the Russian invasion of the Ukraine, close collaboration with local archaeologists in these countries facilitated intensive fieldwork and sample collection, culminating in three archaeological excavation campaigns, in Boldeşti-Grăditea in Romania (2019), Mogila in Bulgaria (2021), and Hajdúszendrőd in Hungary (2023).

This session aims to offer a comprehensive overview of research conducted not only by YMPACT in the past five years, but also inviting other scholars to add data enriching our understanding of the Yamnaya impact on prehistoric Europe and opening up lines of future research. Drawing inspiration from the project’s collaborative and interdisciplinary approach, the session will host contributions spanning archaeology, bio-anthropology, genetics/ancient DNA, biomarker lipids, and isotope biogeochemistry. Geo- and environmental sciences will contribute to discussions on palaeoclimatology, climate change research, soil formation processes, and landscape reconstructions. Lectures will present latest research, delving into the funerary archaeology of Yamnaya kurgans and material culture; exchange dynamics with southeastern European societies; the physical appearance and population dynamics of the Yamnaya; data on their mobility, diet, occupation, and lifestyle; their intricate connection with the environment; and the profound nature of the wider Yamnaya Impact.

ABSTRACTS

1 SEPARATION, HYBRADISATION, AND NETWORKS: GLOBULAR AMPHORA SEDENTARY PASTORALISTS CA. 3200-2700 BCE

Mueller, Johannes (Kiel University)

Around 3000 BCE, a turning point occurred in Europe: Long-existing regional societies entered into a process of transformation. The result is a world in which new global communication networks brought different regions closer together.

From 3200/3100 BCE, the Globular Amphora phenomenon was the trailblazer in Eastern and Central Europe. Due to the focus on pastoral subsistence, new ritual practices were created. We initially observe the symbolic separation of sedentary pastoralists from more agrarian societies. The structural process is linked to the creation of supra-regional GA networks from the Elbe to the Siret, but also to hybridisation effects in different regions.

The emergence of the GA networks is described as social separation on the basis of social disharmonies within Funnel beaker societies, which is also visible via a reduction of the human impact in palaeoecological archives. A new connectivity of diversified groups developed as a form of levelling mechanism, which in the long term was part of the transformation of the entirety of European prehistory around 3000 BCE.

2 GLOBULAR AMPHORA AND YAMNA COMMUNITIES AS NEIGHBOURS: TOWARDS INTEGRATION OF ARCHAEOLOGICAL AND BIO-ARCHAEOLOGICAL DATA

Szmyt, Marzena (Adam Mickiewicz University in Poznan; Archaeological Museum in Poznan)

The forest-steppe zone between the Carpathians and Dnieper river is where the Globular Amphora and Yamna communities could stay in direct contacts. After many years of research, there is no doubt that they were partly synchronous and proximate. This was a consequence of two population shifts: the migration of a part of a Globular Amphora populations from the core area to the south-east and ultimately to the forest-steppe, and the movements of Yamna groups from the steppe into the forest-steppe. That they did indeed come into contact is shown by an increasing evidence that includes three series of features: Globular Amphora and Yamna ‘pure’ graves and syncretic ones (with traits from both units). The latter respected the principal rules of a ‘Yamna’ funerary ritual, supplementing it with single ‘Globular Amphora’ artefacts. At present, most archaeological information concerns the western end of the forest-steppe (on the Prut and Dniester rivers), less information is available on its eastern end (on the middle Dnieper), while the least is known about its central portion (on the Southern Bug).

Thanks to new data, it is now possible - at least in part - to test whether the diversity of material record is reflected in bio-archaeological data, mainly isotopic ones. For this purpose both archaeological sources and the results of isotopic analyses (carbon, nitrogen and strontium) will be used. This will become the background on which genetic data will also be discussed.

3 DISTANT EVIDENCE OF CLOSE CONTACTS: CENTRAL EUROPEAN FEATURES IN THE MATERIAL CULTURE OF YAMNAYA PEOPLE

Teslenko, Dmytro (Independent researcher)

The problem of the impact of the Yamnaya culture on the Central European region has become recently increasingly popular. The concepts of armed invasion by conquerors from the Northern Pontic do not seem relevant. But the presence of Yamnaya people to the south and west of the Carpathians is indisputable, supported also by anthropological evidence and isotopic analysis.

The first appearance of steppe groups in Central Europe dates to the Eneolithic, so it is unlikely that this territory was “terra incognita” for Yamnaya people. The topography of kurgans here suggesting a traditional pastoral way of life. The practice of constructing kurgans – monumental cult structures marking the occupied territory as well as the fact of ancestor burial, indicates that Yamnaya groups were not merchants or tourists. The artifacts from burials, as well as radiocarbon data, show the presence of Yamnaya people here throughout the entire period of the culture’s existence.

On the other hand, the cultural environment and opportunities for exchange transformed, for example, Transylvania into a major contact zone between Yamnaya people and their neighbors, like Northern Prut and Dniester regions.

Metal had a primary interest for pastoralists. The Northwestern Pontic became a kind of transshipment base for imports on their way to the east. European imports and imitations, together with, for example, Budzhak ceramics, traveled far to the east. Along with metal, other “exotic” artefacts, primarily ceramic products, also entered the Yamnaya environment through contact zones. Subsequently, through internal exchange these things traveled far to the east, reaching the Dnieper basin and beyond. The meaning and direct purpose of them sometimes became lost along the way, as in the case of a vessel of the Mako culture found in a Yamnaya burial on the Ingulets River. The journey of objects often was longer than the way of people.

4 THE HIDDEN PATTERNS OF THE PAST – CARPATHIAN BASIN IN THE 3RD MILLENNIUM BC

Kulcsár, Gabriella (HUN-REN Research Centre for the Humanities)

The existence, extent and orientation of prehistoric networks can be detected based on the analysis of various classes of archaeological remains from simple pottery forms to complex ideological structures. The background of these connections, an invisible world of concepts, ideas and innovations can, however, be revealed through thorough analyses, in which Big Data and network analysis should play a key role in the future.

The transition/transformation from Late Copper to Early Bronze Age societies in the Carpathian Basin, the issue of continuity and discontinuity, interactions from the final fourth to the mid third millennium BC, and the roles of locals and incomers, remain controversial. Current research faces a number of issues regarding the processes of eastwards and westwards mobility/migrations affecting the Bronze Age Carpathian Basin as well.

Network research and network visualization have proved to be one of the most promising scientific methodological innovations in recent years/decades, which seems to be an effective tool for the study of cultural and social phenomena, including the archaeology scene. This network approach promises a comprehensive, universal method by which almost any context can be examined with scientific accuracy.

How modern technologies and methods help us to understand and visualise the context of the past, the hidden networks of the 3rd Millennium BC.

5 'LOOKING INTO' THE EARLY BRONZE AGE MOUNDS OF NE ROMANIA. AN INTERDISCIPLINARY APPROACH

Brasoveanu, Casandra (Alexandru Ioan Cuza University of Iasi, Institute of Interdisciplinary Research, Arheoinvest Centre) - Asandulesei, Andrei (Alexandru Ioan Cuza University of Iasi, Institute of Interdisciplinary Research, Arheoinvest Centre) - Brunchi, Radu (Alexandru Ioan Cuza University of Iasi, Institute of Interdisciplinary Research, Arheoinvest Centre) - Enea, Sergiu ("Ion Neculce" Theoretical Highschool, Targu-Frumos) - Tencariu, Felix-Adrian (Alexandru Ioan Cuza University of Iasi, Institute of Interdisciplinary Research, Arheoinvest Centre) - Popovici, Sergiu (National Archaeological Agency, Chisinau) - Ciobanu, Ion (Orheiul Vechi Cultural-Natural Reserve, Institute of Bioarchaeological and Ethnocultural Research, Chisinau) - Boghian, Dumitru ("Stefan cel Mare" University of Suceava, Faculty of History and Geography) - Simalcsik, Angela (Olga Necrasov Centre for Anthropological Research, Romanian Academy) - Agulnikov, Serghei (National Archaeological Agency, Chisinau)

The northeastern region of Romania exhibits a significant presence of burial mounds, many of which remain unexplored and poorly understood. Previous research confirmed that the big majority of such monuments, located on the territory of interest, was erected by the Early Bronze Age communities belonging to Yamnaya culture, and re-utilized by later human groups, up to medieval times. However, there has been a notable lack of systematic efforts to document these monuments, establish their chronology, or analyze their geomorphological features. Additionally, many of these sites are under constant threat from natural and human-induced factors, leading to irreversible destruction.

This current study seeks to address these gaps by employing a novel methodological approach centered around high-resolution, non-destructive ground-based geophysical and airborne sensing techniques. These techniques include vertical gradient magnetometry, Electrical Resistance Tomography, oblique aerial photography, photogrammetry, and LiDAR. Focusing on the Bahluiet River catchment area, the first objective was to precisely locate and characterize the micro-morphology of the tumuli monuments. A quick view of the specialized literature for the aforementioned region revealed only 36 documented sites, with varying degrees of accuracy in their locations. Using high-resolution digital elevation models, derived from LiDAR measurements, we were able to highly increase the number of this type of sites (adding 129 novel sites) and to reconsider their spatial distribution within the landscape of the Bahluiet River catchment. Furthermore, the research involved conducting geophysical measurements for various case studies, which were subsequently excavated, providing valuable validation for the hypotheses generated through spatial and non-invasive research methods. Despite the challenges encountered during this endeavor, it is deemed crucial in the broader context of preserving these monuments, particularly in light of the ongoing threat posed by intensive modern agricultural practices.

6 SAME POTS, DIFFERENT PEOPLE? EXPLORING THE DUAL BURIAL CUSTOM OF WESTPHALIA'S FUNNELBEAKER CULTURE

Kopner, Lea (Universität Münster; Altertumskommission für Westfalen)

In the Late Neolithic, the groups of the Funnelbeaker culture (TRB) were the first farming communities to populate the North European Plain where they erected thousands of megalithic tombs. The Westphalia region in western Germany is located on the southern periphery of the TRB-West-group.

From the turn of the 4th and 3rd millennia, TRB burials in Westphalia also appeared in so-called flatgraves. This dual burial custom reflects the beginning of a cultural transformation: while the monumental megalithic tombs were used for collective burials, burials in flatgraves focused on the individual. Compared to more central TRB regions, Westphalia has a relatively high density of known flatgrave sites, while megalithic tombs only occur sporadically. This tendency towards spatial separation suggests that the flatgraves might be the expression of a separate group that made the transition to individual burials particularly early.

To date, no clear qualitative differences between the inventories of flatgraves and megalithic tombs have been identified. Using new methods for analysing communication networks on the basis of pottery, the aim is now to investigate the extent to which cultural differentiation can be retraced behind the two burial phenomena. Furthermore, the area will be examined from a landscape archaeological perspective in order to uncover possible differences in site selection. A third focus are possible cultural continuities of the sites after the end of the Funnelbeaker culture and how these differ depending on the type of burial.

7 "CORDED WARE SYMBOLS" IN THE LATE FOURTH MILLENNIUM BC OF CENTRAL EUROPE

Schultrich, Sebastian (Institut fuer Ur- und Fruehgeschichte Kiel)

In recent years, biochemical analyses have been increasingly applied in archaeology and have given us astonishing insights into the population dynamics of European prehistoric societies. In particular, the early third millennium BC, when a new material and immaterial culture, which we call Corded Ware (CW), appears across a vast area in Central and Eastern Europe, is accompanied by a significant shift in the genetic composition of societies. However, to better understand the emerging changes and the complex interplay of innovation diffusion, mobility and migrations, we need to consider the period before the initial formation of CW: The late fourth millennium BC.

From a Central European perspective, this paper shows which 'CW symbols' were present before the emergence of classical CW. In addition to well-known examples such as amphorae and cord decoration, single graves and hammer axes are highlighted in order to challenge the narratives associated with the initial spread of CW societies.

The paper will show that pre-CW and CW societies do share and specific symbols and patterns of mobility. It will argue that the archaeological complex we call CW is not something new at the time point of its emergence. Rather, this point is only one in a sequence of ongoing transformations. Thus, the originally formulated idea of a strong CW impact - or the wider Yamnaya impact on Europe - needs to be put into perspective.

8 SEMIAUTOMATED CLASSIFICATION, AN OBJECTIVE WAY TO DETERMINE CONTINUITY AND DISRUPTION IN CERAMIC EVOLUTION? CERAMIC TYPOLOGY IN SWITZERLAND BETWEEN 3400-2400 BC

Gottardi, Corina (University of Bern) - Hinz, Martin (University of Bern) - Hafner, Albert (University of Bern)

In Switzerland, in the first half of the 3rd millennium BC, more than a thousand years of continuous development of vessel pottery ended supposedly with the sudden appearance of the Corded Ware pottery. It is often assumed that this abrupt change is connected with a wave of immigration. But does this sudden interruption of a long ceramic evolution correspond to reality? Or was the arrival and adoption of the Corded Ware already foreseeable more than 100 years in advance? In order to test this hypothesis, a classification by eye, that is often highly subjective, was supplemented with an automated and therefore more intersubjective classification system. The unsupervised classification is informed by a database that contains information on measurements, shape, decor and the exact profile of the vessels. Using the example of the period between 3400-2400 BC in Switzerland and neighbouring countries, the aim is to show that a typological differentiation of vessels can be achieved with the help of autoclassification and whether corded pottery clearly separates itself from all preceding pottery styles. The results show that the semiautomated classification does not succeed in making a clear distinction between the Corded Ware and the western Swiss style Auvener-Cordé, which precedes the Corded Ware. On the other hand, in central Switzerland the change is far more abrupt. Therefore, at least for western Switzerland, a rapid wave of immigration is rather unlikely. It is more plausible that at first either individual people with new techniques in ceramics or even only the knowledge of the new techniques reached western Switzerland and a "mixed style" developed, and at a later point in time the Corded Ware style was adopted completely.

9 SOCIETIES FROM WESTERN SWITZERLAND AROUND 3000 BC: CONTINUITY AND DISRUPTION THROUGH MATERIAL CULTURE AND SETTLEMENT LAYOUTS

Schiess, Delphine (University of Bern) - Bolliger, Matthias (University of Bern; Archaeological Service of Canton Bern) - Hafner, Albert (University of Bern)

Understanding change in early societies is a longstanding key question in European Prehistoric Archaeology, but the decisive parameters of societal vulnerability and resilience were largely neglected so far. One of the most significant societal transformations occurred during the Late Neolithic around 2800 BC: for the first time an overarching cultural phenomenon spread across Europe, characterized by specific burial practices and similarities in pottery styles referred to as "Corded Ware".

To gain a better understanding of this phenomenon, we are studying the societies that preceded it in western Switzerland. Three pile-dwelling sites on Lake Biel, dated by dendrochronology between 3400 and 2700 BC, are exceptionally well preserved and have delivered a lot of archaeological material. The new study of the material culture (ceramics, stone and deer antlers objects) has enabled us to deepen our knowledge of these societies, which existed before the Corded Ware. We can then discuss the changes, or on the contrary the continuity, between the different settlements, as well as the exchange networks in place around 3000 BC. The question of resilience to social pressure and potential environmental changes (such as rising lake levels as a result of climatic changes) and its visible effects can also be discussed through the spatial organization of the settlements and the transformation of material culture.

10 PERSISTENT FEATURES AND DISRUPTIVE ELEMENTS IN THE EASTERN BALTIC SEA AREA IN THE 4TH-3RD MILLENNIUM BCE

Nordqvist, Kerkko (Helsinki Collegium for Advanced Studies, University of Helsinki)

The transformation of societies in the 4th and 3rd millennium BCE in boreal northeastern Europe shows a very different trajectory and dynamics compared to many southern areas of the European continent. In the eastern Baltic Sea area (Finland, the Baltic States, northwestern Russia), events are characterized by the development of diverse forager societies with advanced socio-cultural features in the 4th millennium BCE, followed by the introduction of the Corded Ware Complex, the first farming (animal-herding) population in the area in the early 3rd millennium BCE. This talk first outlines the stage set by these forager societies, as well as the boreal environment and climate change during this time. Second, it traces some of the continuities, persistent features, as well as disruptions that occurred before, during and after the arrival of Corded Ware Complex. Particular attention is placed to the gaps in our archaeological understanding of this period and the narratives created about it.

364 MODELING PLEISTOCENE SURVIVAL DYNAMICS: ECOLOGY, ENERGETICS AND EVOLUTION

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Prado Nóvoa, Olalla (Virginia Tech) - Vidal Cordasco, Marco A. (Universidad de Cantabria) - Zorrilla Revilla, Guillermo (Universidad de Burgos)

Session format: Regular session

It has been asserted that “energy is to ecology what genetics is to evolution” (Sibly et al., 2012), highlighting the fundamental role of energy transfer in almost all ecological processes. In essence, the flow of energy among living organisms underpins a wide array of phenomena throughout human evolution, being a key factor in understanding fitness and survival.

This session delves into the integration of bioenergetics, paleoecology, and human evolution, utilizing advanced modeling methods to elucidate the myriad factors that shaped the survival and adaptations of hominins within the dynamic Pleistocene landscapes. We welcome contributions that explore the integration of archaeological and paleontological data, human bioenergetic experimentations, and cutting-edge modeling methods such as species distribution models or network analyses, to assess how energy flux within ancient ecosystems influenced the survival challenges faced by hominins.

We invite proposals aiming at understanding the dynamics between human evolution, ecology, and energy fluxes during the Pleistocene through empirical case studies or theoretical approaches.

ABSTRACTS

1 THE ECOCULTURAL NICHE OF THE EUROPEAN ACHEULEAN

Leonardi, Michela (Department of Zoology, University of Cambridge, United Kingdom; Natural History Museum, London, United Kingdom) - Lycett, Stephen (Department of Anthropology, University at Buffalo (SUNY), Amherst, New York, USA) - Manica, Andrea (Department of Zoology, University of Cambridge, United Kingdom) - Key, Alastair (Department of Archaeology, University of Cambridge, United Kingdom)

The Acheulean is the most spatially and temporally vast stone tool industry ever produced by early humans, persisting for more than 1.6 million years across three continents. Bifacially-flaked core tools – which technologically define the tradition – are, however, sometimes regionally and periodically absent. Biface presence is broadly associated with, but rarely formally tested against, environmental conditions.

Here, we reconstruct the ecocultural niche of European Acheulean populations between 726 and 130ka. We performed ecocultural niche modelling using a comprehensive sample of European sites, and a set palaeoclimatic and palaeoenvironmental time series of the continent for the whole period considered.

We were then able to reconstruct the Acheulean distribution in Europe through the cycles of climate changes observed between MIS 8 and MIS 5. This allowed us to identify its geographic boundaries, their variation through time along with the climatic variables that drove the distribution itself. Our analyses also show clear associations between Acheulean presence and specific environments, especially warm forests.

2 THE ROLE OF MIS3 CLIMATE OSCILLATIONS AND MODERN HUMANS IN NEANDERTHAL AND CARNIVORES' DEMISE ACROSS EUROPE

Vidal Cordasco, Marco (1EvoAdapta Group, Dpto. Ciencias Históricas, Universidad de Cantabria. Av. Los Castros 44, 39005, Santander, Spain) - Marín Arroyo, Ana (1EvoAdapta Group, Dpto. Ciencias Históricas, Universidad de Cantabria. Av. Los Castros 44, 39005, Santander, Spain)

The ecological impact of invasive species mainly depends on their potential niche overlap with native species. Since the beginning of the Middle Pleistocene, Neanderthals evolved in Europe along with a stable carnivore guild. However, upon the arrival of *H. sapiens* on the continent, there was a notable decline in various secondary consumer species, such as cave bears and cave lions. To evaluate the potential competition associated with the arrival of our species, this study tests whether *H. sapiens* had a broader niche overlap with carnivores compared to *H. neanderthalensis*. We compiled 1,272 occurrences of 13 secondary consumer species in Europe and used Marine Isotope Stage 3 paleoclimate data to model the potential geographic distribution and overlap among secondary consumers (humans & carnivores). Results obtained show that the potential geographic range of *H. sapiens* was significantly larger than that of Neanderthals. Moreover, *H. sapiens* shared a significantly larger territory with all secondary consumer species than *H. neanderthalensis* did, which mirrors the potential ecological impact of the formers. Twelve of the thirteen secondary consumer species included in this study lost a substantial portion of their geographic range between 45 and 35 kya. Those species having narrower ranges, such as Neanderthals or *Ursus spelaeus*, became extinct first. These findings highlight the combined effects of climate change, niche breadth and the arrival of modern humans as key vulnerability factors for the Late Pleistocene extinctions in Europe.

3 SPECIES DISTRIBUTION MODELLING AS A TOOL FOR STUDYING CLIMATE RESILIENCE IN TWO HOMININ SPECIES

Burke, Ariane (Universite de Montreal; Oeschger Centre for Climate Change Research) - Paquin, Simon (Universite de Montreal) - Albouy, Benjamin (Universite de Montreal) - Riel-Salvatore, Julien (Universite de Montreal)

The permanent settlement of Eurasia by *Homo sapiens* during the Late Pleistocene coincides with the decline and eventual “disappearance” of other human populations. Whether they were driven to extinction by unstable climate conditions, competitive exclusion, demographic processes or a combination of these factors is still hotly debated. Recent archaeological discoveries, improved chronology and advances in paleogenetics, climate reconstruction and climate modelling have added fuel to the debate. It is now generally accepted that *H. sapiens* coexisted and interbred successfully with other species of human for several thousand years. These allied species appear to have possessed the ability to adapt to climate change through technological and social innovation. Why then did they become extinct? Species distribution modelling is used in this research to investigate the climate resilience of Neanderthals and *H. sapiens* populations in Europe in a context of rapid climate change during MIS 3, in an attempt to answer this question.

4 THE BEST HUNTING GROUNDS: RETHINKING HOMININ CHOICES ALONG THE LEVANTINE COAST, AND THE ROLE OF LEBANON

Russo, Gabriele (University of Tübingen)

Understanding the connection between paleoenvironmental dynamics and hominin paleoecology is essential for addressing questions about human evolution, including behavioral adaptations, subsistence strategies, and migration. The Mediterranean Levantine Coast (MLC) plays a pivotal role in this context. During the Late Pleistocene (ca. 130–70 ka), the Levant witnessed the habitation by Neanderthals and *Homo sapiens* in its favorable Mediterranean climate and environment. However, the lack of theoretically informed predictions on hominin-environment dynamics during this crucial timeframe for the eastern Mediterranean coast limits our inferences and understanding of this significant period in our evolutionary history.

The primary goal of our study is to formulate new predictions on hominin hunting strategies based on environmental dynamics in the MLC during the Late Pleistocene using a holistic approach. To achieve this, we first compiled existing records of vegetation and fauna distribution, incorporating isotopic records on ungulate tooth enamel, ungulate dental wear, zooarchaeological, and palynological data from Late Pleistocene archaeological sites along the MLC. We supplemented this review with previously unavailable paleoecological data on high-rank prey taxa hunted in three Middle Paleolithic sites located at the heart of the Levantine coast in Lebanon. Next, we verified the existence of regional ecotones and uniform ecosystems along the MLC and inferred animal habitat choice. The identification of suitable habitats is crucial to predict ungulate distribution and, consequently, hominin preferences for specific habitats or specific taxa for hunting.

Finally, we combined this data with the premise of the optimal foraging model to propose new hypotheses ad hoc for different regions of the MLC, enabling a more accurate inference of later *Homo* evolutionary and cultural adaptive behaviors.

5 RE-THINKING NEANDERTHAL ENERGETICS: AN ALTERNATIVE APPROACH TO ESTIMATING TOTAL ENERGY EXPENDITURE IN EXTINCT HOMININS

Prado Nóvoa, Olalla (Virginia Tech) - Zorrilla Revilla, Guillermo (Universidad de Burgos) - Howard, Kristen (Virginia Tech) - Davy, Kevin (Virginia Tech)

Introduction:

Estimates of extinct populations' total energy expenditure (TEE) are a useful tool to model survival needs and the interaction between humans and their environments. However, classic approaches which involve applying multiples of estimated resting metabolic rates (RMR) have proved inaccurate for recent populations. In addition, extinct hominins have been considered to have engaged in vigorous physical activity levels ($PAL \geq 2.5$), especially Neanderthals. However, these levels are not common for current hunter-gatherers. Therefore, the purpose of the present study is to estimate the TEE of Neanderthal individuals using an equation recently validated against the gold standard doubly labeled water method to measure free-living TEE.

Methodology:

The estimated age at death, body mass, height, and sex of 18 Neanderthals were collected from the literature. TEE was estimated for these individuals using the Leonard and Robertson (1997) equation, the FAO/WHO/UNU (2005) equation for RMR multiplied by different physical activity levels (PAL) (factorial method), and the validated Vinken et al. (1999) equation. The TEE obtained was compared between methods and with the literature regarding hunter-gatherers TEE.

Results:

Leonard and Robertson (1997) and Vinken et al. (1999) equations provided an average TEE for Neanderthals of 2544 ± 272 and 3042 ± 293 kcal/day, respectively. These values for TEE are close to those measured in hunter-gatherers, although slightly higher due to the larger body mass in Neanderthals. The factorial method resulted in 50-100% higher levels of TEE (i.e. 5009 ± 617 kcal/day).

Conclusions:

Recent literature on hunter-gatherers TEE suggests that classic approaches to estimating energetic requirements of extinct hominins' need to be re-addressed. Associating high PALs to Neanderthals resulted in TEE values that are only present today in extreme endurance events and thus, very unlikely to be characteristic of extinct hunter-gatherers' lifestyle. Vinken et al. (1999) equation can be used as an alternative when modeling past hominins' energetic demands.

6 MODELING THE HUMAN WALKING FLEXIBILITY. APPLICATIONS TO A LATE PLEISTOCENE HUMAN GROUP

Zorrilla Revilla, Guillermo (Laboratory of Human Evolution (LEH). University of Burgos (Burgos, Spain); Research Center for Anthropology and Health (CIAS). University of Coimbra (Coimbra, Portugal); Department of Human Nutrition, Foods, and Exercise (HNFE). Virginia Polytechnic Institute and State University (Blacksburg, USA)) - Prado-Nóvoa, Olalla (Department of Human Nutrition, Foods, and Exercise (HNFE). Virginia Polytechnic Institute and State University (Blacksburg, USA)) - García-González, Rebeca (Laboratory of Human Evolution (LEH). University of Burgos (Burgos, Spain)) - Laskaridou, Eleni (Department of Human Nutrition, Foods, and Exercise (HNFE). Virginia Polytechnic Institute and State University (Blacksburg, USA)) - Howard, Kristen (Department of Human Nutrition, Foods, and Exercise (HNFE). Virginia Polytechnic Institute and State University (Blacksburg, USA)) - Marinik, Elaina (Department of Human Nutrition, Foods, and Exercise (HNFE). Virginia Polytechnic Institute and State University (Blacksburg, USA)) - Ramadoss, Rohit (Department of Human Nutrition, Foods, and Exercise (HNFE). Virginia Polytechnic Institute and State University (Blacksburg, USA)) - Carretero, José (Laboratory of Human Evolution (LEH). University of Burgos (Burgos, Spain)) - Davy, Kevin (Department of Human Nutrition, Foods, and Exercise (HNFE). Virginia Polytechnic Institute and State University (Blacksburg, USA)) - Volpe, Stella (Department of Human Nutrition, Foods, and Exercise (HNFE). Virginia Polytechnic Institute and State University (Blacksburg, USA))

Understanding the variables that determine humans' mobility behaviors is fundamental to studying their interactions with their environment. Optimal locomotion speed (OLS) and its energy expenditure (minCoT) are some of the principal influencers on groups' mobility. In this context, sex/age may also play a role. We aimed to test how sex and age affect mobility variables and model locomotion behaviors of a Pleistocene group.

A predictive equation to calculate OLS (km/h) and minCoT (kcal/km) in children/adolescents was computed using 33 individuals (8-17 years old) walking at 5 speeds. OLS and predictive equations published by Wall-Scheffler (2012) were used to estimate adult females' and males' minCoT. CoT was calculated for each group walking at the OLS of the other sex/age groups and differences from their observed OLS were calculated. The same calculations were applied to the average speed estimated from Hatala (2020) for a mixed-sex/age Late Pleistocene group.

Males show the highest minCoT (66 kcal/km) and OLS (5.18 km/h). Children/adolescents were energetically penalized less (+0.16; +0.15 kcal/km for males and females OLS respectively) than adults while walking outside their OLS. However, males are the most penalized (+0.82; +0.42 kcal/km for females and children/adolescents OLS respectively). Females are penalized minimally walking at children/adolescents but more strongly so when using the OLS of males. When applied to a Pleistocene group, the average speed calculated from Hatala was the same as Wall-Scheffler's for males, with females penalized more (+0.94%) than children/adolescents (+0.27%).

Our results indicate that the human mixed group paced at males' OLS despite penalizing females and children/adolescents. This could be explained by higher walking flexibility for both females and children/adolescents at suboptimal speeds. The decision to adapt to the males' pace would reduce costs for the energetically less flexible members of the group, resulting in overall energy conservation for the entire group.

7 EXPLORING THE ENERGETICS OF GESTATION

Cordey, Cédric (Institute of Evolutionary Medicine, University of Zürich, Winterthurerstrasse 190, 8057 Zürich, Switzerland) - Webb, Nicole (Department of Palaeoanthropology, Senckenberg Gesellschaft für Naturforschung, Senckenberganlage 25, 60325, Frankfurt am Main, Germany) - Haeusler, Martin (Institute of Evolutionary Medicine, University of Zürich, Winterthurerstrasse 190, 8057 Zürich, Switzerland)

Human childbirth is uniquely difficult among mammals as inferred by high global maternal and fetal mortality and morbidity rates. These have been very high in the past and continue to be high in some regions of the world, translating in a dramatically high lifetime risk of between 1:6 to 1:16 of dying in childbirth. The traditional view, attributing human birth difficulties to bipedalism-related pelvic constraints and larger brain size, has been theoretically challenged in recent years. The "Energetics of Gestation and Growth" (EGG) hypothesis, posits that maternal metabolic limitations and fetal energy requirements are central to the observed secondary altriciality and birth timing in humans. According to the EGG hypothesis, labour is initiated when fetal energy requirements surpass a maternal "metabolic ceiling". Yet, upon reviewing 11 additional studies on pregnant women with varying geographic and socioeconomic backgrounds, we encountered enormous variability in maternal metabolic scope. In fact, they repeatedly exceeded the supposed maternal metabolic threshold during pregnancy. Maternal metabolic scope in twin-pregnancies also exceeded this suggested metabolic ceiling by the third trimester. Further, based on weight data of over 6.5 million livebirths, we found rapid growth of fetal energy requirements until pregnancy week 35 with substantial tapering thereafter. Collectively, these findings contradict the exponential growth pattern of fetal energy requirements towards the end of pregnancy and the starvation of the fetus immediately before birth, as assumed by the EGG hypothesis. Rather, our findings support recent research indicating a more intricate interplay of factors affecting birth timing, e.g., biological clocks and alarms. Our results thereby indicate that female metabolic capacity is not approaching its limits during pregnancy, thus making the EGG hypothesis alone insufficient in explaining birth timing. Rather, a series of factors likely influence this complex process including possible physical constraints imposed by the pelvis.

369 ANIMALS IN BRONZE AGE EUROPE: NEW PERSPECTIVES

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Bruck, Joanna (University College Dublin) - Houghton, Mark (Aarhus University) - Huisman, Floor (University College Dublin) - Kanne, Kate (University College Dublin)

Session format: Regular session

Other-than-human and multispecies perspectives have had an increasing influence on archaeology over the last decade, transforming our understanding of agency as distributed and relational. We have seen novel and sophisticated interpretations of the significance of animals in hunter-gatherer and early farming communities. Yet these new theoretical approaches have had relatively little impact on research in the Bronze Age. Bronze Age animals are usually figured as resources for human consumption: as food or sources of secondary products to support wealth production and human socio-political aspirations, or as symbolic resources – symbols of chiefly power and religious authority. In neither case are animals considered to be active co-participants in Bronze Age sociality – as sentient beings with whom humans negotiated meaningful relationships. In this session, we invite contributors to how consider how animals and people lived and worked together; how their lives and deaths were interwoven; how bodily, inter-species engagements shaped everyday experience; how animal attributes, characteristics and personalities were taken into account; and how relations of attachment, difference and inequality emerged between humans and animals in particular social settings. We welcome contributions that address these and related themes drawing on any type of archaeological data from Bronze Age Europe, including but not limited to animal iconography, isotopes, zooarchaeological analysis, architecture and landscape, animal materials, proteomics, depositional practices, etc.

1 THE SOCIAL WORLDS OF BRONZE AGE ANIMALS**Brück, Joanna (University College Dublin)**

Although cattle and sheep were central to the everyday lives and wellbeing of Bronze Age communities, they are often strangely lacking from our narratives of the period. After the Neolithic, it seems, archaeologists rarely consider domestic animals to be interesting. However, Bronze Age people clearly thought otherwise, as animal iconography and the careful deposition of complete and partial animal bodies in graves, pits and ditches suggests. The traces of cattle and sheep are present in other ways too, in hoofprints around waterholes and in landscape features like droveways that appear at this time, but we too rarely consider what such evidence can tell us beyond the economic significance of animals and their products. Integrating multispecies and posthumanist perspectives that highlight how living with animals involves intimate interaction and interdependency, this paper explores how it might be possible to explore the role of cattle and sheep as active participants in Bronze Age social worlds, considering animals on their own terms while not ignoring power asymmetries in domestication relationships. By reconstructing the intertwining of people and animals in life and death, we can consider how together they generated Bronze Age worlds of work, sociality and meaning.

2 FOLLOWING COWS: CATTLE AS GEOPOLITICAL AGENTS IN BRONZE AGE SCANDINAVIA**Wehlin, Joakim (Uppsala University) - Odebäck Ljunge, Magnus (Stockholm University) - Armstrong-Oma, Kristin (University of Stavanger)**

The paper explores the possibilities and benefits of tracking the life- and death journeys of cows in Bronze Age Scandinavia. How did cows inhabit different Bronze Age communities of Scandinavia, and where can we find traces of them? Following cows rather than humans inserts a novel angle into Bronze Age research. Such an approach allows for multi-species communities where humans as well as other-than-humans provided impetus for historical trajectories and change.

Like other mammals, cattle are sentient creatures with agency, and imbued with the particular abilities of their species - the “cowness of cows”. The paper draws inspiration from the animal turn and considers cattle as a range of states of being: as living agents, active producers of secondary products, meat, symbols, and art - good to live with, think with, and eat. We focus on the plethora of human-cow practices as they move through materialized networks and landscapes. This entails an approach whereby we follow the cows through life and death, as their state of being as well as their bodies are incorporated into beliefs, rituals, and myths, and as their being and bodies provide nurture ranging from economic subsistence strategies to social structures.

3 ANIMAL ARCHITECTURES - HUMAN-ANIMAL INTERACTION IN THE BRONZE AGE OF NORTHWESTERN EUROPE**Huisman, Floor (University College Dublin)**

One of the most defining characteristics of The Middle Bronze Age in northwestern Europe is the development of extensive fieldsystems, in combination with evidence for permanent settlement (including recognizable houses). These changes in the archaeological record are often explained in practical terms, as the result of economic intensification and the emergence of property ownership with competing warrior chiefs accumulating personal wealth. This capitalist interpretation of the Bronze Age results in a familiarization of the past, and several assumptions, including the idea that animals are products, used, traded and eaten by people. Yet ethnographic examples and historical sources demonstrate that human-animal relations in small-scale farming societies may be far more complex and dynamic. Here, animals may be seen as conscious beings with their own personalities, and everyday care and interaction may result in close bonds between animals and people. Recent research on human-animal relations equally argues that animals are part of human culture and society and actively participate in human sociality.

Seeing animals as more than resources and recognizing their agency has major implications for how we view the Bronze Age fieldsystem and settlement evidence in northwestern Europe. This paper aims to examine this evidence from a posthumanist, multi-species perspective, considering human-animal movement and interaction within houses, settlements and fieldsystems. Using case studies from the southeastern UK and West Frisia in the Netherlands, it will study different kinds of ‘animal architecture’ to reconstruct daily human-animal encounters and embodied engagement at multiple scales. Rather than relating this architecture only to the management or control of animals, it also views these structures and features as spaces of encounter where human-animal interaction created a shared social world.

4 OBTAINING THE CERTIFICATE OF TRADITION - BRONZE AGE ANIMALS IN NORTHERN DALMATIA**Grguric Srzentic, Maja (University of Zadar)**

So far, our knowledge about the Bronze Age archaeological sites in the area of northern Dalmatia in Croatia is mainly limited to the remains of material culture, i.e. to settlements and temporary habitats (hillforts, caves), graves, hoards, and mostly ceramic and metal finds from the given context. The remains of animal bones used to be observed as incidental findings that confirm the obvious, that there were animals involved in society’s economy. Namely, the observed geographical area was very active in livestock breeding, especially in the form of transhumant pastoralism, until several decades ago, when certain political and economic reasons led to the almost complete disappearance of this economic activity. As far as archaeology is concerned, no further analyses have been made and most of the animal remains are today lost. The proposed paper will present first preliminary data of zooarchaeological analyses from several new Bronze Age sites originating from different geographical areas – coast, inland and mountain. Parallel analyses of the ethnographic data from the given areas alongside with archaeological data coming from different environmental conditions will give new insights into the tradition of transhumant pastoralism.

5 ANIMAL CARE AND WELFARE IN BRONZE AGE BRITAIN**Osborne, David (University of Nottingham)**

How can the attitudes of prehistoric people towards their non-human animal companions be assessed? Among the often large quantities of animal remains found on prehistoric sites, are there any clues that might suggest how human/non-human relations played out in the past? The framework of the bioarchaeology of care (Tilley 2012; 2015) was devised to explore disability and care among humans in the past. From the perspective of the post-anthropocentric approach that is integral to posthumanist theory (Braidotti 2013; Crellin & Harris 2021), I suggest that the bioarchaeology of care could be extended to include non-human individuals. This widens the scope of traditional zooarchaeological analysis of bone pathologies, often approached from an economic viewpoint, to consider the care of non-humans as co-constitutive members of the communities of which they were part. Taking as a starting point the husbandry of cattle and sheep at the edge of the Lincolnshire Fens, this paper explores issues around the care of animals in the light of recent research on their cognition and communication.

6 NONHUMAN ANIMAL DEPOSITION PRACTICES IN BRONZE AGE EUROPE: A POSTHUMAN REANALYSIS**Swallow, Eleanor (University College Dublin)**

Our current understandings of the European Bronze Age are dominated by narratives that have been constructed through a humanist reading of the period. One significant result of this has been the projection of our modern western, cartesian ontology onto our central considerations of nonhuman animals in the Bronze age. Within studies of faunal deposition this can be exemplified by methodological and interpretative themes such as: a focus on “special” or “unusual” deposits defined as categorically distinct through contemporary perception; animals of the domestic sphere being considered ‘known’ therefore leaving their interpretative potential beyond commodification unconsidered; and the objectified remains of nonhuman individuals being passive to the human provision of agency.

Recent years have seen a rise in studies challenging such narratives. Amongst them, this PhD aims to contribute a more holistic, multiscale reanalysis of Bronze age animal deposition practices, particularly concerning ‘livestock’ species. Working through this, the theoretical framework draws heavily on concepts from multispecies archaeology, broader Human-Animal studies, and posthumanist thought with an emphasis on post-anthropocentrism.

This paper will discuss the project’s pilot study on a Bronze Age settlement site in Cambridgeshire, Eastern England, with regards to its methodology and implications for future directions of the research. The study examines (pre-) depositional processes and trajectories of contextualised deposits through demographic observations; spatial analyses of skeletal element’s placement, configuration, and associations; and taphonomic considerations. It will reflect upon how suited the approach proves in addressing some of the working research questions; investigating for instance how a subject’s treatment in death can elucidate their experience and role in life, and what the specificities and characterisations of deposition processes can inform us of the agentic potentialities of the animal remains.

7 METHODS IN PRACTICE: INTEGRATIVE APPROACHES FOR NEW INTERPRETATIONS OF ANIMALS AND SOCIETY IN BRONZE AGE EUROPE**Kanne, Katherine (University College Dublin)**

The rise of a multitude of cutting-edge scientific methods applied to animal bones, such as ancient DNA, dietary and mobility isotopes, and proteomics, has led to a rapid increase in high resolution datasets informing archaeologists

about human-animal relations in the past. Despite our newfound abilities to understand animals through ever more fine-grained analyses, many of these results are interpreted with older models of human-animal interactions, where animals are largely viewed passively as subsistence, wealth, or symbol. In the new European Research Council funded project, 'Animals and Society in Bronze Age Europe' (ANSOC), we merge novel theoretical approaches to animals with cutting-edge, multiproxy scientific methods to understand how animals and people laboured together in daily life, and what this may mean about Bronze Age societies more broadly. In this paper, I provide an overview of how ANSOC integrates the theoretical with the methodological in zooarchaeology and its complementary scientific analyses to explore how everyday life in the Bronze Age was a multispecies cohabitation and collaboration, social relations with animals shaped lived experience, and how animals actively participated in and structured society.

8 UNTIL THE PIGS COME HOME: THE ROLE OF ANIMALS IN MEDIATING CONNECTIVITY IN LATE BRONZE AGE BRITAIN

Madgwick, Richard (School of History, Archaeology and Religion, Cardiff University, UK) - Esposito, Carmen (Department of Cultural Heritage, University of Bologna, Italy) - Lamb, Angela (National Environmental Isotope Facility, British Geological Survey, UK)

During the Bronze Age–Iron Age transition in Britain, the scale and character of community connectivity changed. Whilst the situation is complex, evidence suggests that the status of bronze altered, and networks anchored on the exchange of artefacts dissipated. In southern Britain animals become increasingly important and a new site type, commonly termed a midden, emerges. These vast monumental mounds, some comprising millions of artefacts/eco-facts dominated by animal bone and ceramics, signal a societal refocus towards agricultural intensification and communal feasting on a grand scale.

This paper examines the role of animals in mediating landscape use and the networks that centred on these feasting middens. As part of the FEASTNET project (UK AHRC-funded), a major multi-isotope dataset of 252 animals from six middens has been generated. The integration of multiple isotope proxies on a large number of animals allows greater resolution on faunal management and movement than is usually possible. Results demonstrate that the vast faunal assemblages from middens represent much more than haphazard feasting waste. Structured practices are clearly evidenced with different domestic animals being sourced from distinct catchments and being subject to specific modes of management. These practices differ from site to site, but almost all show species-specific patterns. This demonstrates that animals were not viewed purely as meat for the feasts, but through husbandry and supply (and consumption), prescribed modes of treatment mediated human–animal relations and had an active role in landscape management and connectivity in Late Bronze Age Britain.

9 NEW PERSPECTIVES ON LATE BRONZE AGE FRENCH ALPINE PILE-DWELLINGS USING ZOOARCHAEOLOGICAL DATA

de Roux, Anaïs (Toulouse University) - Billaud, Yves (DRASSM) - Costamagno, Sandrine (Toulouse University) - Milcent, Pierre-Yves (Toulouse University)

"Tell me what you eat, and I'll tell you who you are", said Brillat-Savarin. Man maintains a privileged relationship not only with his environment, but also with the animals he breeds. The knowledge, uses, beliefs and representations associated with food, form part of culture. It also results from a set of multiple interactions: physiological needs, economic, technical and symbolic systems, social interactions and uses, etc. Reading food practices, and on a wider scale Human-animal relationship, thus enables us to approach the vision that societies have of themselves. However, Late Bronze Age societies in France are rarely examined through this prism, due to the scarcity of bone remains. The starting point of this paper is to study Late Bronze Age populations through the zooarchaeological study of remains from sites whose excellent level of preservation enables a detailed restitution of practices: the pile-dwelling of Conjux 1 in le Bourget lake. It was on this site that a ceramic and bone heap covered by boulders was unearthed. The presence of a horse skull associated with bracelets and bronze pins, suggest that this was probably the expression of a particular manifestation. By confronting these data with other Bronze Age sites, we will try to better understand the status of this area.

The zooarchaeological findings of Conjux 1 will be put into perspective with those of two sites on Lake Annecy and Lake Geneva. Differences in practices and choices will be examined. Various studies of pile-dwellings have already shown that cultural identities and spiritual domains differ greatly. However, this will be the first time this question will be raised for French pile-dwellings since no prior zooarchaeological have been carried out. It will allow to take a new look at the Human-animal relationship in the context of densely populated settlements of the European Bronze Age.

10 ASSEMBLING THE LATE BRONZE AGE HORSEHAIR ORNAMENT FROM THE CROMAGHS HOARD, CO. ANTRIM, NORTHERN IRELAND

Line, Oliver (University College Dublin)

This paper will interpret the horsehair ornament from the Cromaghs hoard, Co. Antrim, Northern Ireland, from a perspective principally influenced by the philosophy of Deleuze and Guatarri. Previous interpretations are dominated by explanations with rationalist and capitalist undertones that impose a modern, western dualistic understanding of how the world is structured onto the past. Underpinned by this ontological standpoint, the ornament is classed as a passive reflection of the status of its owner, as well as the prosperity and connections of the society from which it emerged. This paper considers the ornament as an actor in its own right with a complex history, that produced affects and possessed its own material reality.

To unveil the capacities of the horsehair ornament, this paper will explore the broader social and ontological significances of the techniques involved in its manufacture and the animal origins of the materials used to allow for a historically specific reading of the processes that brought the ornament into being. The analysis investigates the role of horses in late Bronze Age social worlds and how this may have affected the symbolic potential of the ornament. This will be achieved through a combination of the extant literature on the Bronze Age, animal ethologies, and theories of human-animal relations with the archaeological evidence for horses during this period. By exploring the social elements of the processes in which the ornament participated throughout its life history, this paper will demonstrate how analysts can incorporate cultural/symbolic components of entities without falling into the realm of generality, a common feature in interpretations of animal materials in prehistory. By giving a holistic account of the ornament, examining its material, technological, and symbolic aspects, the Deleuzian-inspired approach employed will illustrate how these different dimensions of the artefact are co-constitutive and should, therefore, be studied in tandem.

11 CROUCHING ARCHAEOLOGIST, HIDDEN DEER: EXPLORING ANIMAL-HUMAN RELATIONSHIPS THROUGH THE UNPARALLELED DEER CARVINGS OF DUNCHRAIGAIG CAIRN (KILMARTIN, SCOTLAND)

Valdez-Tullett, Joana (University of Glasgow; Wessex Archaeology)

Most European prehistoric rock art traditions include animal depictions, even if they are part of a wider assemblage of other figurative and/or abstract motifs. Britain and Ireland are an exception to this tendency, with a rock art tradition typically based on circular imagery, of which the cup-and-rings and cupmarks are most iconic. Recently, the unprecedented discovery of clearly prehistoric carvings representing two stags and other deer on the underside of a large capstone at the Early Bronze Age Dunchraigaig Cairn in Kilmartin (Scotland), has provided much food for thought. There are virtually no other representations of animals in prehistoric Scotland, and this find raises a number of questions regarding the wider carving practice, prehistoric inter-regional connections and relationship between these animal engravings and the cup-and-ring rock art tradition extensively created across the surrounding landscape. The context of the animal depictions, within a rather unusual burial with different characteristics to neighbouring monuments in Kilmartin, and the funerary context itself, also raises questions regarding the choice of representation and the potential animal-human relationships involved. This paper will examine the deer depictions relationally, considering the particularities of the carvings and their immediate archeological context within the cairn. It will also explore the relationship between these animals and other burials in Scotland, the process of 'becoming deer' and the implications this would have for both animals and humans in the Early Bronze Age (Conneller 2004).

Conneller, Chantal. 2004. Becoming deer. Corporeal transformations at Star Carr. *Archaeological Dialogues* 11: 37–56.

12 ELK IN THE DUTCH BRONZE AGE: A LIMINAL ANIMAL?

Brusgaard, Nathalie (Leiden University) - van Dijk, Joyce (Archeoplan Eco) - Aal, Jordy (BAAC)

Increasing attention is being paid to multispecies and more-than-human perspectives on animals in the past and their encounters with humans. However, in post-domestication settings, wild animals tend to receive less attention as nonhuman persons and agents than domestic species. This holds true for studies of the Bronze Age, in which the emphasis on animals overall lies on their use as resources, and in particular wild animals are often relegated to the role of 'extra' economic resource, hunted merely as an occasional supplement to farming. In this paper, we explore the many possible roles of elk (*Alces alces*) in the Dutch Bronze Age. Overall an infrequent occurrence in archaeological assemblages in the Netherlands – and now extirpated in this region – elk are a remarkably regular presence at Bronze Age sites. Moreover, they occur in various archaeologically interesting contexts, such as depositions of skulls and skeletal elements. In this paper, we discuss the evidence for elk in this period through (zoo)archaeological and isotopic data. We explore the ways in which humans and elk may have encountered one another in the Bronze Age landscape and, based on ethnographic analogies, the possible liminal role that elk may have had, blurring the boundary between

wild and domestic. Through doing so, we endeavour to open up new avenues for discussing multispecies perspectives on Bronze Age, and other post-domestication, human-nonhuman animal relationships.

374 FROM LAB TO FIELD, FROM VERTICAL TO HORIZONTAL. NEW APPROACHES TO THE USE OF PORTABLE X-RAY FLUORESCENCE (PXRF) IN ARCHAEOLOGY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Dallai, Luisa (University of Siena) - Volpi, Vanessa (University of Siena) - Doonan, Roger (Archaeological Research Services LTD) - Cannell, Rebecca (Norwegian Institute for Cultural Heritage Research)

Session format: Regular session

Geochemical analysis of different environmental matrices has grown in popularity in recent decades, becoming a common practice in archaeological projects; the enrichment or depletion of specific elements in soil and sediments, their spatial distribution and statistical treatment have been used as a “chemical fingerprint”, with possible correlations with differing past human activities. Among the techniques available, portable X-ray Fluorescence (pXRF) has gained popularity for its affordability, flexibility and non-destructive nature. In addition, pXRF analyzers are now very easy-to use and this has taken geochemical analysis out of the lab and into the field, transforming archaeological sites and landscapes into primary locations for scientific enquiry. With this comes new challenges, especially with the ease of obtaining geochemical data for sophisticated and complex problems that include environmental, geological, archaeological and epistemological/training concerns. This means that the opportunity for the inappropriate use of geochemical analysis is now greater than ever before, highlighting the need for guidance and accepted protocols across the discipline and wider profession.

Following the ongoing scientific debate, this session invites contributions discussing the use and results achieved by application of pXRF within archaeological projects. A special focus will be posed on how the techniques can address:

1-archaeological issues (i.e. identifying functions of spaces within an archaeological site or human presence within historical landscape; identifying production cycles, particularly related to mining and metallurgical activities; analysing geoarchaeological contexts).

2-methods and protocols of use (i.e. define limits and contexts of use; outline protocols on site and landscape scale; define possible integration between pXRF and others analytical methods).

3-success and good practices (i.e. how and where a pXRF analytical approach, alone or in combination with other techniques, has made the difference in understanding an archaeological context, both in research projects and for professional archaeology).

We welcome examples from different geographical and historical contexts.

ABSTRACTS

1 P-XRF STUDIES DO NOT NEED STANDARD PROTOCOLS! ... OR DO THEY?

Schauer, Michaela (Vienna Institute for Archaeological Science (VIAS); Cifa Deutschland)

While p-XRF has been an important and sometimes integral part of many archaeological projects and studies, the method itself, as well as the best practices for handling and applications, are still not well defined. Unlike chemical laboratory-based methods, users and specialists of p-XRF do not have internationally accepted protocols and guidelines. There is no standard procedure or training scheme for data acquisition, processing, or interpretation. Despite arguments against implementing rigorous quality control schemes for p-XRF, this paper will discuss the contrary. It aims to outline the most crucial topics to be addressed and agreed upon for standard procedures, including daily testing for device performance, routines on device handling and sample preparation, and procedures to ensure high-quality, representative measurement data for archaeological samples. The paper will also highlight the importance of a specialist network and proper training schemes for the use and application of p-XRF in archaeological settings. Rather than just complaining, the paper will provide some initial ideas on what these guidelines could look like in order to foster thought and result in further discussions.

2 IS LABORATORY PREPARATION WORTH IT? USE OF PXRF FOR FIELD MAPPING MAGNA ROMAN FORT, NORTHUMBERLAND, UK

Taylor, Gillian (Teesside University) - Gillis, Franki (Vindolanda Trust) - Marta, Alberti (Vindolanda Trust) - Ebiesuwa, Oladipo (Teesside University) - Williams, Rhys (Teesside University) - Birley, Andrew (Vindolanda Trust)

A comprehensive field scanning exercise utilising pXRF was undertaken at the Roman Fort of Magna. Magna ‘the fort on the rock’ Roman fort and settlement remains one of the most intriguing Roman military landscapes along Hadrian’s

Wall, UK. Magna has a complex and multi-period history, no other single site along the Roman frontier has the combination of so many key elements of Roman occupation concentrated into such a small area, around 42 acres. These include Hadrian’s Wall, milecastle 46, the Vallum, a series of forts and their towns (both pre-Hadrianic and Hadrianic, and post-Roman), cemeteries, industry, temples, and three major Roman highways.

Firstly, a series of five bore holes across the Magna site were undertaken in 2021 and analysed using pXRF. Secondary, horizontal mapping of soil field samples were undertaken pre-excavation and during excavation of milecastle 46 during the 2023 field season. Furthermore, direct in-situ analysis using pXRF will be compared to the laboratory prepared samples, highlighting the importance of samples preparation, showing the critical need for standardising protocols for the use of pXRF in the field.

3 CALIBRATION OF P-XRF IN THE ANALYSIS OF ANTHROPOGENIC SEDIMENTS: A MULTI ANALYTICAL RESEARCH

Rix, Keelie (CASEs Research Group, Dept. of Humanities, Universitat Pompeu Fabra, Ramon Trias Fargas, 25-27, 08005 Barcelona, Spain) - Ibáñez-Insa, Jordi (Geosciences Barcelona (GEO3BCN - CSIC), Carrer de Lluís Solé i Sabarís, s/n, 08028 Barcelona Spain) - Biagetti, Stefano (CASEs Research Group, Dept. of Humanities, Universitat Pompeu Fabra, Ramon Trias Fargas, 25-27, 08005 Barcelona, Spain; School of Geography, Archaeology and Environmental Studies (GAES), University of the Witwatersrand, Johannesburg, South Africa)

This paper reports the initial results of an investigation within the framework of the project CAMP (ERC CoG 2022, CAMP-101088842) which aims to develop an in-field protocol and calibration of Portable X-Ray Fluorescence (p-XRF) for its implementation on anthropogenic sediments of pastoral sites that will allow for the generation of qualitative and quantitative data. This protocol and calibration will aim at creating an optimized method for the analysis of anthropogenic sediment that requires minimal sample preparation and still achieves reliable and reproducible results. The main objective of the calibration and implementation of p-XRF in-field, is to identify human activities through chemical signatures (anthropic markers) in the anthropogenic deposits from ethnographic settlements — inhabited and abandoned — and archaeological sites. By sampling known ethnographic sites some conclusions may be drawn on the expected elemental distributions of known use areas which may be used as references to recognize similar patterns in ephemeral archaeological pastoral sites.

The analytical setup involves analyzing hundreds of samples using the built-in calibrations of commercial pXRF devices (in this case the GeoExploration calibration implemented in the Bruker CTX portable benchtop analyzer). Additionally, Inductively Coupled Plasma Mass Spectrometry (ICP-MS) and X-ray Diffraction (XRD) will be employed for elemental and mineralogical characterization. The results from these analyses will form the basis of a purposely developed calibration.

4 PORTABLE X-RAY FLUORESCENCE (PXRF) FOR ARCHAEOLOGICAL SOIL CHEMISTRY: TOWARDS BEST PRACTICES

Doonan, Roger (Archaeological Research Services Ltd)

The advent of portable X-ray fluorescence technology has provided archaeologists with the ability to undertake chemical analyses rapidly in the field. While there are many benefits that come with in-situ analysis and instantaneous data, perhaps the most valuable is the ability for field directors to use this data to inform excavation or survey strategy while in the field. There are significant challenges in making prompt use of data and it is imperative that any approach or method for archaeological materials analysis has embedded systems for analytical control and reporting. While true for all archaeological materials, this paper focuses on the in-situ analysis of soil using hand-held pXRF (HH-pXRF).

When applied systematically across landscapes and archaeological sites, HH-pXRF soil analyses can be used to identify areas of past human presence/absence and/or map spatial patterns related to activity areas i.e. craft production, food storage etc. The kinds of datasets generated by HH-pXRF soil surveys differ from those produced by conventional lab-based methods in several ways, i.e. sampling protocol, precision, number of samples, and as a result they can invite different types of questions and demand new ways of scrutinising data.

By highlighting the current variation in methods, instrumentation, calibration, and research designs, in both academia and professional practice, an outline for what may constitute best practice for the use of HH-pXRF in soil analysis is proposed. The implications of different sampling and analytical protocols is assessed alongside the types of site/landscape and the kinds of questions that may be asked of geochemical survey data. The aim of the proposal is not only to generate dialogue on sampling strategy, calibration, and reporting formats but also to increase soil chemistry literacy among archaeologists so they are better able to critically assess and use the results from surveys undertaken across increasingly diverse sites and landscapes.

5 A MEDIEVAL IRON WORKSHOP ON ELBA ISLAND: NON-INTRUSIVE PXRF ANALYSIS ON MONTE SERRA

Monni, Giada (University of Siena)

The aim of this contribution is an update on medieval iron production on Elba Island (Tuscany, Italy) based on a multi-disciplinary approach that includes an on-site use of pXRF. The study focuses in particular on an ironwork located on Monte Serra, in the municipality of Rio (eastern Elba Island). First investigation on site dates back to the 1990s, and included surveys and excavation. New research undertaken in 2021 analysed the landscape geochemical characteristics in order to obtain a general background map; in addition, historical-archaeological data were collected and managed on a GIS platform. New pXRF surveys were planned with diagnostic and descriptive purposes; on-site measurements were collected following a regular grid using different scales. The results obtained within the site allowed us to observe how the distribution of chemical concentrations could differentiate possible metallurgical areas from residential spaces. The results of the analyses confirmed the hypotheses proposed by previous research and allowed us to highlight new areas of interest that had not been identified by past investigations.

6 WORKSPACES AND ORE DEPOSITS - REMOTE SENSING AND SOIL GEOCHEMISTRY AS TOOLS FOR IDENTIFYING PAST IRON PRODUCTION ENVIRONMENTS

Karavidovic, Tena (Institute of Archaeology, Zagreb, Croatia) - Brenko, Tomislav (Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb, Croatia) - Sekelj Ivančan, Tajana (Institute of archaeology, Zagreb, Croatia)

In the past several years, part of the Croatian lowland Drava River valley region has been systematically studied for traces of iron production – from the identification of potential ore deposit areas to archaeological site recognition (field survey, geophysics) and excavation. An interdisciplinary multi-method geoarchaeological approach yielded recognition of physical parameters for potential bog iron ore occurrences unknown to the region previously and spatial-environmental patterns related to placement of archaeological sites with testified iron production activities. More than 150 sites were recognised through surface surveys and excavated workspace areas were dated to Late Antiquity and the Early Middle Ages (4/5th – 8/9th centuries). The latter sites could be referred to as iron production environments. These include workspaces with traces of past human iron production activities and adjoining areas with natural prerequisites for the development of bog iron ores or existing ore deposits beneath the topsoil level. In order to define the latter character of the site and the potential for non-destructive and remote site recognition in a specific lowland landscape, a multi-stage methodological approach was applied to a case study area – the Kalinovac-Hrastova greda site. The approach includes a surface field survey, geophysical investigation, excavation and a geomorphological, relief, pedological and hydrological analysis of the area, as well as geochemical and vegetational indicator analysis. Through the analysis, a number of parameters that can be used remotely and non-destructively were defined as high probability indicators for the recognition of iron production in the past environments – 1) predictive GIS analysis and satellite imagery analysis (vegetational and pedological indicators), 2) spatial and statistical analysis of topsoil geochemistry defined with the use of pXRF (pedological indicator).

7 PXRF ANALYSIS AND ARCHAEOLOGICAL RESEARCH IN THE COLLINE METALLIFERE DISTRICT: CHEMICAL FINGERPRINTS OF PRE-INDUSTRIAL MINING AND METALLURGICAL ACTIVITIES

Dallai, Luisa (University of Siena)

The Colline Metallifere district (Southern Tuscany, Italy) have a long-term mining history, due to the presence of polymetallic mineral deposits rich in copper and lead/silver sulphides, iron oxides and hydroxides. Mines in the area were active from Bronze Age until the 1990s and their impact on the environment has been extremely relevant, particularly after the second world war. Despite this final intense season of exploitation, the territory hosts outstanding historical evidence of mining works, as well as slag heaps, that are the remains of pre-industrial metallurgical activities. For all these reasons, the Colline Metallifere district represents a privileged area of research for Italian mining archaeology, where investigations have been undertaken from the 1980s on. Since 2015, within the ERC nEUMed project (<https://neu-med.unisi.it/>) the University of Siena has boosted a new multidisciplinary approach to the historical research in the area; this includes the systematic use of pXRF analysis at both site and territorial scales. Through the mapping of soil contamination, long-term mining and archaeo-metallurgical areas have been identified and described. pXRF analyses have soon become part of a multidisciplinary protocol that has made it possible to characterise numerous aspects of the landscape of production, through the identification of geochemical contamination patterns of specific chemical elements (i.e. As, Cu, Pb, Zn). The proposed contribution will present some case studies and discuss the multidisciplinary protocol applied in the field and in the lab, debating strengths and limitations of large-scale application of pXRF analysis in support of archaeological fieldwork.

8 LIVING METALS: PXRF AND UAV FOR DEFINING ACTIVITY AREAS

Sharp, Kayeleigh (Northern Arizona University)

Early and widespread practices of metalworking and metallurgy in the Central Andes presents abundant opportunities to examine the social context of metals and their significance. While copper constitutes the material foundation of many sought-after Andean goods on one hand, copper and its alloys were imbued with rich cultural symbolism, meaning and power, on the other. Beyond objects made of metal, examination of social context of practices that revolved around copper mineralization in general, mining and transformation of metallic ore more specifically, allow us to search for structures of meaning embedded within the metal itself. Were miners and metal workers granted privileged status because of their ability to locate, extract, and transform mineralized copper ore, or were they simply servants of the elite? Were metallurgical activities restricted to specific areas within early monumental centers or were metalworking activities supervised by elites? Can interconnectivity between resources, production loci, and living spaces be determined without disturbing fragile site components? Such questions are traditionally answered through site excavation which is destructive and sometimes unproductive. Our combined approach which tests the interconnectivity of site components and activity areas using UAVs (a.k.a. drones) and pXRF soil analysis to make determinations prior to excavating, however, is novel. This paper examines the efficacy of our combined methods for elucidating the social and geographical contexts of ancient mining and metallurgy at the site of Huaca Letrada, Peru, and the physical spaces where copper was transformed from raw mineral into usable materials for manufacturing. Despite both success and failures, we find several advantages when implemented as an inexpensive, environmentally friendly, hands-off, and non-destructive means for expedient diagnostic site evaluation.

9 GONE BUT NOT FORGOTTEN? USING PXRF ON THE VIKING CHAMBER GRAVE AT GJELLESTAD, NORWAY

Cannell, Rebecca (NIKU - Norwegian Institute for Cultural Heritage Research) - Rødsrud, Christian (Museum of Cultural History, University of Oslo) - Wenn, Camilla (Museum of Cultural History, University of Oslo)

The Viking ship burial at Gjeltestad was excavated in 2021-2022, however it was clear from the start that the ship was poorly preserved, that the grave chamber had been opened more than once, and objects removed. Comparatively, Viking burials within ships tend to be accompanied by a wide range of high-status objects, but the only remaining physical finds within the chamber were a horse skeleton, a bead, a possible spinal whorl, and a few fragmented fittings. Employing a vertical and horizontal sampling strategy, over 300 soil samples were taken from the chamber. These were analysed using pXRF (Bruker and Niton), and the results revealed the invisible traces 'remembered' by the soils within the chamber. The interpretation is challenging and requires an in-depth consideration of comparable Viking graves, whilst being open to new phenomena, the soil processes, and of course the limitations of the data. In this case, pXRF aided the archaeological interpretation of a poorly preserved site, which together with other analyses helped us to see invisible traces and build a more comprehensive interpretational platform. This was achievable because the method was integrated into the excavation, including site visits before samples were taken to gather information on the site conditions, and discussing the feasibility and aims of the approach with the project team.

10 MULTIPROXY APPROACH TO RECONSTRUCT HISTORICAL LANDSCAPE: PXRF DATA FROM SOUTHERN TUSCANY COASTAL PLAIN (ITALY)

Volpi, Vanessa (University of Siena, Department of Historical Science and Cultural Heritage, Italy) - Poggi, Giulio (Center for Cultural Heritage Technology, Istituto Italiano di Tecnologia, Italy; University of Siena, Department of Historical Science and Cultural Heritage, Italy)

The coastal territory of southern Tuscany located by the Pecora and Cornia rivers, the reliefs of Colline Metallifere and the gulf of Follonica (Grosseto and Livorno provinces), has been for many years at the centre of archaeological research projects undertaken by the University of Siena, aimed at reconstructing diachronic settlement patterns. The intense transformations of the territory caused by fluvial and coastal dynamics, as well as modern agricultural practices and land reclamation activities, make the reconstruction of historical landscapes in alluvial and coastal plains a challenging task.

Starting from the 2015 the ERC nEU-Med project has adopted a multidisciplinary approach to study the environmental complexity of the alluvial coastal plains. The study combines traditional archaeological survey and remote sensing techniques with on-site geochemical analysis (pXRF), coring, archaeobotany, chemical and geoarchaeological analysis providing absolute chronologies (C14 dates) to which to anchor the long-term landscape transformations.

In this contribution we will focus on the Cornia river coastal plain, a liminal landscape characterized by different features, including extensive lagoons along the coast and widespread flooded-swampy areas in its distal segment. These features persisted until the beginning of the 19th century AD, when reclamation activities were undertaken.

Within the project, extended geochemical maps and the use of chemical variables verified through statistical validation and combined with the archaeological record, greatly helped to characterize landscape forms, identifying environmental dynamics, and relating them to soil nature or anthropic activities.

In particular, we will discuss how both horizontal (i.e. an extensive geochemical survey that collected approx. 8000 measurements) and vertical pXRF data (data coming from a coring campaign), collected in selected area of the Cornia Valley, can contribute to identify and describe historical landscapes at different scales.

11 **PXRF AND ARCHAEOMETRY AS SUPPORTING TOOLS FOR THE PROVENANCING OF POTTERY. PRODUCTION AND DISTRIBUTION IN SOUTHERN TYRRHENIAN TUSCANY (ITALY)**

Russo, Luisa (University of Siena, Department of Historical Sciences and Cultural Heritage) - Ponta, Elisabetta (University of Siena, Department of Historical Sciences and Cultural Heritage) - Intermite, Davide (University of Siena, Department of Historical Sciences and Cultural Heritage) - Volpi, Vanessa (University of Siena, Department of Historical Sciences and Cultural Heritage) - Fornacelli, Cristina (University of Siena, Department of Physical, Earth and Environmental Sciences)

The strong interdisciplinary nature of the ERC nEU-Med project, carried out by the Department of Historical Sciences and Cultural Heritage of the University of Siena from 2015 to 2021, allowed for an in-depth archaeometric study based on the comparison between raw materials and finished ceramic products. The selected sample consists of over one-hundred common ware ceramics dating to the Medieval period and characterized by coarse, fine and selezionata textures, mainly from sites in the the district of the Colline Metallifere, located in the hinterland of Grosseto, and the royal court of Vetricella in the adjacent coastal board, together with a number of clays sampled from deposits in the same area. All the samples underwent mineralogical, petrographic and chemical analyses. For the latter the use of pXRF proved of fundamental importance as it constitutes a rapid method that enables the acquisition of significant volumes of data useful for initial screening. Processed results underwent a statistical review based on principal component analysis (PCA). The availability of such a large number of samples, coupled with an extensive compositional database, made it possible to establish preliminary groupings that were further defined by way of chemical and petrographic analyses (XRD and SEM-EDS). The identification of specific geochemical markers was key in understanding the provenance of the clays used in the production of the ceramics as well as the circulation of finished products in sites from the case study area, this last allowing to substantiate and formulate historical-archaeological hypotheses on the possible economic connections between settlements.

12 **TRACING LITHIC RAW MATERIALS FROM OUTEIRO DO CIRCO (BEJA, PORTUGAL) - PORTABLE X-RAY FLUORESCENCE (PXRF) UTILITY**

Soares, Sofia (Portuguese National Laboratory of Energy and Geology (LNEG)) - Silva, Teresa (Portuguese National Laboratory of Energy and Geology (LNEG)) - Serra, Miguel (Center of Archaeology, Arts and Heritage Sciences (CEAACP), University of Coimbra) - Porfirio, Eduardo (Center of Archaeology, Arts and Heritage Sciences (CEAACP), University of Coimbra) - Silva, Sofia (Outeiro do Circo Project)

The Late Bronze Age settlement of Outeiro do Circo in Beja, Portugal underwent archaeological excavations from 2008 to 2021. During these excavations, the lithic industry identified shows the maintenance of ancient traditions, that reveal a former chalcolithic occupation, but mainly the presence of an important set of lithic artefacts, mostly made up of sickle elements, which played an important role in some essential activities, to the Late Bronze Age community, such as agriculture. This paper focuses on the chemical characterization of the lithic materials found at the archaeological site using portable X-ray fluorescence (XRF) equipment. The results obtained from this technique were compared with those obtained from other techniques such as X-ray diffraction (XRD) and Raman spectroscopy. The aim was to establish “chemical fingerprints” that can be used to correlate the lithic materials with the different rock types found in the area. The preliminary results of this study are presented and discussed. Additionally, the utility of portable X-ray fluorescence as a non-destructive technique for determining the provenance of lithic materials is evaluated. In summary, this paper provides insights into the lithic industry found at the Late Bronze Age settlement of Outeiro do Circo and to the use of portable X-ray fluorescence, along with other techniques, for the determination of lithic raw materials.

13 **BRONZE AXES STUDY: A MULTIDISCIPLINARY APPROACH**

Volante, Nicoletta (Siena University) - Metta, Christian (Siena University) - Mustone, Gaia (Siena University) - Volpi, Vanessa (Siena University) - Dallai, Luisa (Siena University)

The present contribution illustrates a protocol for metal artefacts analysis following a multidisciplinary methodology, developed thanks to the observation on an Early Bronze Age conspicuous set of axes and “panelle” (ingots), found in storage places or in isolated contexts located in a wide area including Siena and Grosseto districts. The project aims not only the reviewing of the published material to date (typological and chemical analyses), but also a preliminary

approaching to the study of the techno-functional and post-depositional traces visible on the finds performed in the Laboratory of Techno-Traceological analysis (LaTT) and non-invasive archaeometric analyses such as XRF and FT-IR performed in collaboration with the Laboratory of Topography of Mining Territories (LTTM).

The observed materials come from very different contexts and their states of preservation is also very heterogeneous, which is why the analysis was conducted by elaborating targeted investigation protocols, based on the characteristics of the finds.

Specifically presented here are some preliminary results of the investigation conducted with pXRF, an analytical technique chosen for its non-destructiveness and versatility in the analysis of many finds of various types, which made it possible to obtain useful information regarding the chemical composition of the surface of the artefacts, alteration patinas, and possible contamination deriving from the different contexts of deposits.

381 **CAPACITY BUILDING FOR FAIR DATA SHARING AND DIGITAL PRESERVATION**

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Rose, Thomas (Forschungsbereich Archäometallurgie, Leibniz-Forschungsmuseum für Georesourcen/Deutsches Bergbau-Museum Bochum) - Richards, Julian (Archaeology Data Service, University of York) - Giaccari, Matteo (Department of Earth Sciences, Sapienza University of Rome) - Niccolucci, Franco (PIN, University of Florence) - Ercoles, Isabella (Department of Earth Sciences, Sapienza University of Rome)

Session format: Discussion session (with formal abstracts)

More than other disciplines, archaeology relies on the proper collection, documentation and publication of data because of excavations being an inherently destructive methodology. Moreover, research progress relies strongly on sharing this data to allow for comparison and contextualisation of findings and processes.

In the last decade, data sharing was boosted by the development of research infrastructures such as ARIADNE RI (Research Infrastructure), which now also provides the archaeological expertise in the EU-funded ATRIUM project. ATRIUM aims to consolidate and expand such services across the Arts and Humanities.

Despite all these activities, the SEADDA COST Action identified a fragmented landscape. Many countries lack the capacity and expertise to create and manage data according to the FAIR principles (Findable, Accessible, Interoperable, Reusable), or to ensure their long-term preservation. Moreover, researchers may have already heard about such research infrastructures but often are held back in sharing data through them. A major obstacle seems to be the lack of standards and guidance but also intuitive tools to feed one's own data into a research infrastructure. Consequently, data are still not as widely available and cannot flow as easily as would be desirable to boost archaeology.

Our session brings together researchers and infrastructure providers, archaeologists and archaeological scientists. We invite contributions spanning users and providers which identify and discuss the issues and challenges we face when using datasets, sharing data and keeping them available in the long-term, from the peculiarities of single data sets over the huge diversity of data archaeologists handle, to the current volatility of funding for research infrastructures. In the discussion, we will aim to define some guidelines on how data sharing can be facilitated on the different levels and what actions are needed by individuals and institutions to let data flow with research infrastructures as their safe and permanent havens.

ABSTRACTS

1 **RESEARCH INFRASTRUCTURES FOR FAIR DATA SHARING IN THE HERITAGE SECTOR**

Richards, Julian (University of York; ARIADNE RI) - Niccolucci, Franco (PIN; ARIADNE RI)

The European Commission is making major investments in research infrastructures and online data services in the heritage sector, with a plethora of national and European initiatives and a wealth of acronyms: Europeana, European Open Science Cloud (EOSC), E-RIHS (European Research Infrastructure for Heritage Science), and most recently the ECCCH (European Collaborative Cloud for Cultural Heritage), to name but a few. Many of these services are also being mirrored at national level. The landscape is crowded and confusing, but it is important that the archaeological and heritage sector makes the most of these new opportunities to leverage what we need. The ARIADNE Research Infrastructure has emerged from successive European investments as a Knowledge Base and data aggregator for our sector, now providing access to 4 million archaeological resources across 40 countries. Rather than a top-down initiative it is a community-driven membership association, developing and maintaining a sustainable aggregation service and research infrastructure for archaeological and heritage data. In 2024 it has embarked on a new 4-year EU-funded project, ATRIUM, to ensure it is embedded within broader Arts and Humanities research infrastructures (DARIAH, CLARIN and OPERAS) and the EOSC marketplace. It also a member of the ECHOES consortium, which is establishing the ECCCH, to be launched in September 2024. This paper will seek to introduce the rapidly changing landscape from the perspective of an infrastructure provider, seeking input from researchers and

heritage professionals on their needs and how these new European-level investments can best serve the archaeological community.

2 CAPACITY BUILDING AT NATIONAL LEVEL: ORGANISATIONAL AND TECHNICAL ISSUES OF ARCHAEOLOGICAL DATA INFRASTRUCTURE IN THE CZECH REPUBLIC

Novak, David (Institute of Archaeology of the CAS, Prague)

The Czech archaeological data infrastructure has changed radically in the last decade and is gradually catching up with advanced data repositories providing similar services abroad. The originally disparate environment based on intuitive approaches has been consolidated under the unified research infrastructure Archaeological Information System of the Czech Republic (AIS CR). Today, both individual datasets and related services are integrated in one place, but most importantly, the team responsible for managing and developing the infrastructure in a sustainable manner is involved. The paper will focus on several aspects of the whole process of building and managing the AIS CR: organisational, i.e. what conditions had to be created in order for the process to be successfully launched and maintained; technical, i.e. how the operation and development of the server and software environments is ensured and what problems need to be solved in this area in the long term; impact, i.e. what effect the existence of the AIS CR has on the archaeological domain in the Czech Republic and where there are still gaps that need to be filled. The aim of the paper is mainly to highlight the key decisions and prerequisites leading to a sustainable and actively used infrastructure, but also to point out the dead-ends we have encountered in building AIS CR. The whole topic will be placed in the broader context of the implementation of the EOSC initiative in the Czech Republic, allowing for an interdisciplinary comparison of the position of Czech archaeology in terms of FAIR data management. It will also give an outlook on where the development of AIS CR will go in the coming years and what we see as possibilities in terms of moving the state of the art.

3 DIGITAL ARCHAEOLOGICAL ARCHIVING IN POLAND - SEADDA COST ACTION AND BEYOND

Oniszcuk, Agnieszka (Narodowy Instytut Dziedzictwa/National Institute of Cultural Heritage)

During the SEADDA COST Action, the National Institute of Cultural Heritage in Poland investigated the preservation of digital archaeological data. The main focus was on state heritage service, which operates within the binding legal framework. The study has revealed that, despite the digital shift observed in many areas of life, particularly since the pandemic, state services responsible for archaeological heritage are lagging behind. The lack of a dedicated repository that would enable access and re-use, and the absence of a long-term national strategy for the digitisation of archaeology-related administrative processes has resulted in data fragmentation and general inaccessibility. Heritage professionals across the country are not fully utilizing the potential of properly preserved advanced archaeological records.

An analysis of archaeological archiving practices in state heritage services, combined with a European overview of the current situation, has allowed for the identification of various levels of an ideal digitisation strategy. This includes targeting law and policy makers, as expressed in the EAC's 'call for action' (Novák et al. 2023), developing and implementing digital tools, and ensuring systematic training and contact points for users. These findings are universal; however, the paper will discuss their practical application in the Polish context and provide an update on the current state-of-the-art.

*Novák, D., Oniszcuk, A. and Gumbert, B. 2023 Digital Archaeological Archiving Policies and Practice in Europe: the EAC call for action, *Internet Archaeology* 63. <https://doi.org/10.11141/ia.63.7>.

4 IS A DISTRIBUTED NETWORK OF SUPPORT STAFF THE WAY FORWARD? THE SND EXPERIENCE

Jakobsson, Ulf (Swedish National Data Service)

During the SEADDA COST action, it was identified that many countries lack the capacity and expertise to create, manage, and share data according to the FAIR principles. SND (<https://snd.gu.se/en>), member of that action, had the same experience when looking at the Swedish universities. In 2018, SND's mission was broadened to be a national research infrastructure for all research areas, resulting in the initiation of the SND network (<https://snd.gu.se/en/about-us/snd-network>). This happened due to the realization that without a massive increase of SND staff, the universities would have to do most of the data management/curation themselves, so research data could be shared in accordance with the FAIR principles (e.g., via SND's research data catalogue: <https://snd.gu.se/en/catalogue/search>), but also to make sure that each university had the capacity to archive and manage the data.

As a result, and initiated by SND, each university started a Data Access Unit (DAU), often consisting of librarians, archivists, legal advisors, and IT staff. The DAU was offered training by SND and gained access to SND's network, where exchange of knowledge, policies, guides on good practice, workflows etc. was done. Interest groups were started, seminars, workshops and thematic network meetings were planned and offered. A few years on, the activity in the network is steadily increasing, as is the number of published research (meta)data.

This presentation will demonstrate and highlight one possible way of building capacity for FAIR data sharing and reuse.

5 ARCHAEOLOGICAL INFRASTRUCTURES IN NORWAY

Uleberg, Espen (Museum of Cultural History, University of Oslo) - Pantos, George (Museum of Cultural History, University of Oslo) - Indgjerd, Hallvard (Museum of Cultural History, University of Oslo) - Callieri, Marco (Visual Computing Lab ISTI-CNR) - Dell'Unto, Nicolo (Museum of Cultural History, University of Oslo; Department of Archaeology and Ancient History, Lund University) - Bonelli, Letizia (Museum of Cultural History, University of Oslo) - Kimball, Justin (Museum of Cultural History, University of Oslo) - Kristensen, Steinar (Museum of Cultural History, University of Oslo) - Samdal, Magne (Museum of Cultural History, University of Oslo) - Aarseth, Bjarte (Museum of Cultural History, University of Oslo)

The Norwegian university museums cooperate in National data infrastructures for archaeology. The new web-based user interface for the Archaeology system was launched in January 2024, following the completion of the new system for Numismatics in 2021 and Ethnography in 2022. This work included migration of data from the Delphi-based MUSIT database to the new UniMus database, which is a Postgres system using an event-based datamodel. Data from all museums is published at the Unimusportal (unimus.no/portal) and is also downloadable from unimus.no. This georeferenced archaeological data from UnimusArk is also made available through the Ariadne portal (<https://portal.ariadne-infrastructure.eu/>).

Another part of the National infrastructure is ADED (Archaeological Digital Excavation Documentation). ADED mainly contains detailed GIS excavation information from 2011 onwards and includes links to excavation photos and artefact records held in the other shared databases. Earlier excavations will be included later.

The Museum of Cultural History (MCH), in close cooperation with DARK Lab (darklab.lu.se) at Lund University and the Visual Computing Lab (ISTI - CNR) has developed the BltFROST platform, based on 3DHOP, for the museum's 3D models. It is currently used for 3D models of artefacts, but extended applications will also include excavation data. The possibilities for sharing annotations and commented models are important features of BltFROST and there is potential for this system to be developed into another element of the national infrastructure.

MCH has come a long way in making its archaeological data FAIR. The aspect of reusability is especially receiving special attention this year through the project UI3D (Understanding and Immersion in 3D). UI3D aims to address reuse and active use of Heritage Data in Teaching and Research. It is funded by the University of Oslo's framework for competence hubs in IT research and will interact with the ERASMUS+ cooperation Virtual Worlds Teaching in Archaeology.

6 RE-ENGINEERING WHICH PROCESSES? TO WHAT EXTENT ARE POST-EXCAVATION PRACTICES, TECHNIQUES AND DOCUMENTATION AS WELL ESTABLISHED AS METHODS FOR ON-SITE RECORDING?

May, Keith (HE - Historic England; University of South Wales; University of Sheffield) - Taylor, James (University of York)

Current practice for archiving of digital records of the stratigraphic data from excavations is still very variable internationally, particularly for commercially excavated sites. Experience in the UK, as reported through ARIADNE+, shows "comparison of the number of archives deposited with the Archaeology Data Service (ADS) against an estimated number of projects found that, at best, 2-3% of all commercial projects have been digitally archived with the ADS" (Tsang 2021).

There is no commonly accepted consistent (FAIR & Open) practice for ensuring that primary stratigraphic data from excavations is included in digital archives. Although valuable initiatives, such as the ClFA "Dig Digital Toolkit" (<https://www.archaeologists.net/digidigital>), have begun to address what is included in the digital archive from excavations, the actual processes used in the post-excavation (PX) analysis stage of projects varies quite markedly and, therefore, the by-products from that stage of the archaeological process are far less consistent in any resulting digital archives. A big question remains: "To what extent are PX practices, techniques and documentation as well established as the methods for on-site recording" and what are the related opportunities and challenges, we still face?

This paper will present outcomes and published recommendations from The Matrix project [AH/T002093/1] which has addressed some of the current limitations in certain approaches to analysis and digital archives of archaeological stratigraphic and phasing data. It will introduce work and key deliverables from 'The Archaeologists Guide to Good Practice - Handbook' (AG2GP-Handbook) [AH/X006735/1] project. The aim of this new project is to draw together the collective expertise of the main archaeological contractors and associated researchers in the UK and, in consultation with other stakeholders from the sector, undertake the necessary feasibility work and organize the required collaborative activities to develop a consortium approach and online tools and resources to support best working practice for this work.

7 OVERCOMING BARRIERS TO PRESERVING AND DISSEMINATING ARCHAEOLOGICAL DATA: THE CASE OF PEPADB

Romero-Garcia, Galo (Universidad de Sevilla) - Sánchez-Gómez, Daniel (University of Lisbon) - Garrido-Cordero, José Ángel (Universidad de Sevilla) - Odriozola, Carlos P. (Universidad de Sevilla)

Archaeological research data preservation and sharing from publicly funded projects are severely limited, largely due to the requirement for data curators to have knowledge of software, programming, web technologies, international standards and data management systems. Similarly, a large proportion of archaeologists have not yet grasped the need to implement strategies to promote the dissemination of scholarly data in Open Access formats. This explains why there are only a few web-based tools offering Open Research Data (ORD) to users.

Given that the practices embedded in data curation represent a regulatory obligation by European bodies, as well as a methodological and technological support necessary to address issues of data quality and accessibility, significantly maximising their reusability, this work aims to highlight the importance of adhering to such practices in archaeological funded research. That is why we will detail the implementation of a methodology for curating prehistoric personal ornaments data from the PEPADB (Prehistoric Europe's Personal Adornment database) long-term project (<https://pepadb.us.es>).

8 LEVERAGING 3D REPOSITORIES FOR ARCHAEOLOGICAL DATA: STANDARDS, ACCESSIBILITY, AND FUTURE DIRECTIONS

Pallan, Carlos (University of Bonn; Bonn Center of Digital Humanities) - Grigowski, Edouard (University of Bonn; Bonn Center of Digital Humanities) - Lang, Matthias (University of Bonn; Bonn Center of Digital Humanities) - Bres, Ewa (University of Bonn; Research Data Service Center) - Zerr, Sergej (University of Bonn; Research Data Service Center)

The digital era has opened up unprecedented opportunities for archaeological data management, emphasizing the need for robust digital infrastructures to support diverse project requirements. Rising to meet these challenges, the Bonn Center for Digital Humanities and the Research Data Service Center at the University of Bonn have engaged in the development of a research data repository for 3D cultural heritage objects and archaeological data. The repository is closely linked to the National Data Infrastructure for Objects and attempts to implement and evaluate the standards developed here in an exemplary manner.

In this study, we will describe the technical foundations of the repository as well as the employed metadata schemas and vocabularies, with practical examples from both museum and field archaeological data collection. Furthermore, we will identify the subsets of the raw data and derived products that are the best predestined for long-term reuse, and determine the optimal data formats for their preservation. These challenges will be addressed and explored in detail using data collected from various contexts and with different data collection methods.

Finally, we will envision how the data stored in the repository can be seamlessly integrated with other data management systems in this research field, thus directly facilitating collaborations between researchers, museums, students and the general public. This integration will be discussed using a virtual reality environment and a museum database as case studies.

9 DIGGING COINS. NOMISMA.ORG, A CONTROLLED VOCABULARY AND ONTOLOGY FOR NUMISMATIC ... AND ARCHAEOLOGICAL? ... LINKED OPEN DATA

Wigg-Wolf, David (Römisch-Germanische Kommission des Deutschen Archäologischen Instituts (RGK))

As more or less standardised, mass-produced serial products, coins are ideally suited to digital applications, in particular in the context of databases, linked open data and the semantic web.

Since 2011 the Nomisma.org consortium has developed a controlled vocabulary and ontology for numismatics that is now widely applied in the discipline and beyond. For example, by employing the concepts of Nomisma.org, The American Numismatic Society alone hosts data on more than 500,000 coins from 86 international projects and institutions that are accessible via portals such as Online Coins of the Roman Empire (<https://numismatics.org/ocre/>) and the Nomisma.org SPARQL endpoint (<http://nomisma.org/sparql/>). Many other projects such as Coin Hoards of the Roman Empire (<https://chre.ashmus.ox.ac.uk/>) implement the Nomisma.org vocabulary and so are fully integrated into the wider world of linked open data.

The ARIADNE EU-FP7 project "Report on the ARIADNE Linked Data Cloud" mentioned Nomisma.org as a particular example of good practice from which the archaeological community can benefit.

Whereas work initially focused primarily on coins from collections and typologies, coins from excavations, as well as finds made by the public, have increasingly become a focus. This not only involves resources such as the Portable

Antiquities Scheme of England and Wales aligning their data with Nomisma.org, but also portals such as Numisdata (<https://numisdata.org/>) that publish excavation coins.

This paper will present the development and architecture of Nomisma.org, as well as the philosophy behind it. Questions addressed will include how Nomisma.org can – and can not – be a paradigm for archaeological data, as well as how it can facilitate better integration of numismatic data (and thus numismatics) into archaeological research and discourse.

<https://nomisma.org/>

<https://nomisma.hypotheses.org/nomisma-org>.

10 RECENT ADVANCES IN QUERYING THE ROAD DATABASE TO MAKE DATA FAIR

Kandel, Andrew (Heidelberger Akademie der Wissenschaften) - Haidle, Miriam (Heidelberger Akademie der Wissenschaften) - Hochschild, Volker (Heidelberger Akademie der Wissenschaften; University of Tübingen) - Kanaeva, Zara (Heidelberger Akademie der Wissenschaften) - Conard, Nicholas (Heidelberger Akademie der Wissenschaften; University of Tübingen)

The "ROCEEH Out of Africa Database" (ROAD) is the largest compilation of archaeological datasets covering Africa and Eurasia from 3,000,000 to 20,000 years ago. When the project began in 2008 (<https://www.hadw-bw.de/en/research/research-center/roceeh/home>), one goal was to create an open-access, online, research database to answer large-scale questions about early humans expansions. ROAD gathers data from fields of archaeology, paleo-anthropology, paleontology and paleobotany in a geographic framework.

Here, we present recent advances in querying ROAD. We discuss how ROCEEH provides its users with data and focus on a new, user-friendly feature that facilitates data retrieval. The new interface, called "Ask ROAD," embodies our philosophy of making the data we collect as FAIR as possible.

Queries in ROADWeb are performed in various ways: simple filters on one table provide basic results; an SQL query tool allows the joining of several tables; a SPARQL endpoint is also available; finally, we collaborate with partners to tailor complex queries. Results can be viewed in ROADWeb or accessed through a URL, and exported in several interoperable formats.

Experience with users motivated us to create "Ask ROAD". This intuitive interface works in a scaffolded way with five sequential steps: 1) select geographic region and/or site type; 2) choose types of assemblages and/or define time-frame; 3) specify details about assemblages; 4) perform unions of datasets; and 5) conduct detailed searches. After each step, a table pops up, which users can download in their preferred format. References are generated after the first step and attributes displayed at any time.

We plan to add more features in the future, for example a routine to extract data from ROAD and process it using statistical packages such as R. We encourage you to visit ROAD (<https://www.roceeh.uni-tuebingen.de/roadweb/>) and provide expanded access to anyone interested. Discover for yourself what ROAD can do!

11 ABOUT GEOHISTORICAL FAIR DATA IN THE FRENCH CONTEXT OF RESEARCH. THE CASE OF THE PARCEDES PROJECT ON AGRARIAN LANDSCAPES

Odore, Angelo (Université de Rennes 2) - Watteaux, Magali (Université de Rennes 2) - Costa, Laurent (ArScAn – UMR 7041 « Mondes grecs archaïques et classiques »)

The PARCEDES project funded by the French National Research Agency (ANR) involve multiple institutions across France, Italy, and England and aim to study the organization and evolution of agrarian parcels or field boundaries from Protohistory to the present day in four different areas (Vendée, Nîmes, Maremma, Devon) in order to identify local particularities and general scenarios for the evolution of agrarian parcels. The project has a strong digital component, which complies as closely as possible with the FAIR principles, using a number of French digital tools, some of which are supported by the French government.

Since 2023, several actions have been undertaken to give access to an visualise certain data produced or used during the project and to promote the research carried out within the project:

- the production of webGIS with ArcGis online for public access enabling the display of datasets (<https://parcedes.hypotheses.org/category/webgis>);

- the storage and sharing of data sets on the "Fabrique Numérique du Passé.

(https://www.fabriquenumeriquedupasse.fr/pages/homepage_v2/) dedicated to the storage and dissemination of geohistorical data, backed by the "Projects Time Machine" consortium of the IR* Huma-Num (French State Research Infrastructure)

(<https://parcedes.hypotheses.org/1155>);

- the ongoing publication of data papers on certain datasets produced by ANR PARCEDES;
- promoting the results of PARCEDES research in the form of StoryMaps (<https://parcedes.hypotheses.org/984>)

The challenges outlined in the paper, such as the fragmented landscape of data sharing, lack of standards, and obstacles in feeding data into research infrastructures, highlight the importance of initiatives like PARCEDES. By addressing these challenges, the project contributes to facilitating data sharing in archaeology and ensuring the long-term preservation of valuable geohistorical information. The guidelines and actions proposed in the paper align with the goals of collaborative projects like PARCEDES in creating a more accessible and interoperable geohistorical data.

12 **RADIOCARBON DATABASES TOWARDS INTEROPERABILITY: THE CASE OF MEXICO AND THE ARQUEODATA PROJECT**

Alcántara Chávez, Luis Alberto (ArqueoData Project, Mexico; Museo del Templo Mayor, INAH, Mexico)

One of the major discussions in archaeology revolves around chronologies. This paper aims to present an overview of absolute dating databases in the web with radiocarbon results and discuss the information gap on Latin American archaeological dating, especially in Mexico. This paper will present some databases or datasets compilation projects in Latin America (AndesC14, BRC14, MesoRAD), Europe (p3k14c), and North America (CARD). The analysis of the information in these projects, allows us to identify the gap that exists in Mexico radiocarbon results in the web. Likewise, a database proposal for Mexico will be presented: ArqueoData, and we will discuss on the interoperability opportunities offered by the creation of an Application Programming Interface (API) for effective communication between projects and databases. API allows us to discuss standardisation, controlled vocabularies, and similar ways for presenting information to ensure interoperability and bridging the gaps. Also considering the importance of the different contexts between Latin America (Global South) - Europe and North America (Global North).

13 **KEEP CONTROL OF YOUR DATA! A DECENTRALIZED, OPEN-SOURCE AND COMMUNITY-DRIVEN APPROACH TO ARCHAEOLOGICAL DATA SHARING THROUGH THE "ARCHEOVIZ PORTAL.**

Plutniak, Sébastien (CNRS (France); Laboratoire CITERES-LAT) - Vignoles, Anaïs (Université de Liège) - Caron-Laviolette, Élisabeth (Université Paris 1)

Recent literature highlights several barriers to the availability of field archaeological data: 1) the absence of user-friendly tools, 2) a lack of data management training, 3) limited time to prepare data for publication, and 4) insufficient recognition of data publishing efforts. To address these issues, "archoViz" offers a solution as a stand-alone application for visualising and statistically exploring spatialised archaeological data. Designed as a cornerstone of a decentralised web network for excavation and survey data, "archoViz" supports multiple instances for individual datasets, allowing users to deploy these instances on their choice of institutional or personal servers, thus avoiding centralised data storage.

Importantly, "archoViz" serves as a data editorialising tool, making data publishing a desirable, though not mandatory, endeavor. It encourages the open publication of comprehensive workflows, including datasets, any necessary reprocessing code, and their respective "archoViz" instances, using third-party services.

However, decentralised approaches present challenges, such as the risk of component dispersion. To mitigate it, we propose: 1) detailed bibliographic referencing of "archoViz" instances as distinct editorial units and 2) the "archoViz Portal" for indexing and enhancing the discoverability of instances (<https://analytics.huma-num.fr/archoviz/home>). This portal allows for searching instances via keywords or a map, aligns metadata with standard vocabularies (e.g. Geonames), and integrates with "Openarchaeo", a semantic web repository for archaeological data.

Ultimately, the "archoViz portal" facilitates data sharing and the visual restitution of archaeological findings, benefiting scientists and the general public alike.

14 **GLOBALID: A NEW COMMUNITY-DRIVEN RESEARCH DATA INFRASTRUCTURE FOR SHARING FAIR LEAD ISOTOPE DATA**

Rose, Thomas (Forschungsbereich Archäometallurgie, Leibniz-Forschungsmuseum für Georessourcen/Deutsches Bergbau-Museum Bochum, Bochum, Germany) - Greifelt, Tim (Forschungsbereich Archäometallurgie, Leibniz-Forschungsmuseum für Georessourcen/Deutsches Bergbau-Museum Bochum, Bochum, Germany) - Westner, Katrin (Forschungsbereich Archäometallurgie, Leibniz-Forschungsmuseum für Georessourcen/Deutsches Bergbau-Museum Bochum, Bochum, Germany) - Hornschuch, Annette (Forschungsbereich Montanarchäologie, Leibniz-Forschungsmuseum für Georessourcen/Deutsches Bergbau-Museum Bochum, Bochum, Germany) - Hsu, Yiu-Kang (Forschungsbereich Archäometallurgie, Leibniz-Forschungsmuseum für Georessourcen/Deutsches Bergbau-Museum Bochum, Bochum, Germany) - Wiethoff, Helge (Rechenzentrum, Technische Hochschule Georg Agricola, Bochum, Germany) - Klein, Sabine (Forschungsbereich Archäometallurgie, Leibniz-Forschungsmuseum für Georessourcen/Deutsches Bergbau-Museum Bochum, Bochum, Germany; Institut für Archäologische Wissenschaften, Ruhr-Universität Bochum, Bochum, Germany; FIERCE, Frankfurt Isotope & Element Research Centre, Goethe Universität Frankfurt, Frankfurt am Main, Germany)

Lead isotopes currently are the most powerful method for the reconstruction of the raw material provenance of non-ferrous metals. Crucial for the successful application of the Pb isotope method are reference data from all potential ore deposits or other suitable materials with a known production location. The first open-access database with such data was OXALID, and many more followed since. They all have two major drawbacks: They are static, i.e. either not maintained anymore or published as spreadsheets in, e.g. the supporting information of articles. They each follow their own approach in the description of the data, sometimes resulting in ambiguous or missing information. Consequently, Pb isotope data currently largely lack interoperability, making this strategy obsolete.

GlobalID aims to overcome this problem by developing an infrastructure to publish, access, and use Pb isotope reference data and supporting meta-information that comply as much as possible with the FAIR principles. Development will be carried out in close contact with the community to ensure that the infrastructure meets its needs and becomes deeply rooted in it. GlobalID's aim is to reuse already existing solutions, standards, and infrastructures wherever possible. These efforts are complemented by the development of corresponding open educational resources and the organisation of training workshops.

This contribution will present GlobalID with a focus on its strategy in positioning itself among already existing research infrastructures and within the Pb isotope community. A key element of this strategy is the combination of technological aspects to ensure interoperability and close interlinkage with a comprehensive effort to involve the community and all relevant stakeholders in all steps. A welcome side effect of this strategy will be the improvement of data literacy skills throughout the community regardless of the educational and research background of users, adding to the value of GlobalID beyond being a data infrastructure.

15 **CHROMA: TOWARDS INTEROPERABILITY OF ARCHAEOLOGICAL SURVEY DATA BY ADDRESSING COLOUR VISION DEFICIENCY IN THE MAP LEGEND**

McKeague, Peter (Historic Environment Scotland) - Cramer, Fabio (Undertone Design) - Binding, Ceri (University of South Wales) - Tudhope, Douglas (University of South Wales)

Archaeology uses a range of non-invasive approaches including airborne mapping, ground survey and a range of remote sensing techniques to identify, analyse and interpret archaeology in the landscape. In Scotland, Historic Environment Scotland (HES) has built up substantial datasets over thirty years from its ground survey and airborne mapping programmes. However, most survey work is undertaken on a project-by-project basis by the private sector, academia and community groups for a range of reasons. As archaeology is highly deregulated in Scotland, there is no consistent approach to collecting and sharing data beyond the project lifespan. Issues of accessing or archiving the primary data aside, little effort has been made to address aggregating survey data from different projects and techniques. A further challenge is to improve accessibility to that data, presented against already colour rich mapping and orthoimagery backgrounds, for about 4.5% of the UK population (according to Colour Blind Awareness) who have difficulty distinguishing shades of colour.

Drawing on the extensive HES survey datasets, the CHROMA (Cultural Heritage Review on Map Accessibility) project explored the challenge of aggregating data collected over many years to present a consistent colour vision deficiency friendly interpretation of the archaeological landscape. Mapped features were classified by the narrow terms in the Scottish Monument Thesaurus (published on [Heritagedata.org](https://www.heritagedata.org)). With eighteen top level term coupled with the poly-hierarchical nature of the thesaurus, results were cartographically unsatisfactory failing to adequately present the story of the archaeological landscape. Thesaurus values were further grouped into ten categories using SKOS:collection to model the connection of categories with the thesaurus for cartographic representation. As part of HES's Equalities Action Plan, the project worked with a colour scientist to improve colour vision accessibility for the key.

The interoperability of the approach was tested against the recently released Historic England Aerial Investigation Mapping Open Data.

16 "AS OPEN AS POSSIBLE & AS CLOSED AS NECESSARY"? UNCOMFORTABLE HERITAGES AND DATA SHARING OF HUMAN(REMAIN)S.

Alves-Cardoso, Francisca (Centro em Rede de Investigação em Antropologia (CRIA); In2PAST - Associate Laboratory for Research and Innovation in Heritage, Arts, Sustainability and Territory,)

Many museums and similar institutions have collections that include human remains. These collections are deemed essential for scientific research that aims to depict the history of human beings, exemplifying cases of past human behaviour, health, and wealth. Technological development has impacted on the information that can be retrieved from these collections. Nowadays, we are not just limited to the remains themselves. Virtual 3D models, datasets of macro and microscopic observation, aDNA, and geochemical analysis are also attached to these collections and must be curated. In addition, publication data resulting from the interpretation of raw data must also be managed. Therefore, ethical issues no longer relate to the human remains alone. They extend to their metadata, including repatriation, governance, circulation, and ownership issues. It is, therefore, essential to develop data management plans and sharing policies, which consider major ethical issues when data sharing and collection access is in place. This is pivotal for collections with uncomfortable histories due to historical legacies and procurement practices. These issues are already part of the academic discussion when addressing marginalized and BIPOC communities, and needing to be included when addressing contemporary built collections, such as modern cemetery-based collections. This paper explores the policies for managing and sharing data related to modern cemetery-based collections, by referring to published information and access guidelines provided by museums and institutions. By analyzing these results, we can identify major issues and offer solutions to shape existing access and data-sharing policies, proposing an approach similar to the data treatment and availability systems used in biobanks for biomedical research. This will support the ethical framing of collections, which provenance may be seen as unethical.

387 ARCHAEOLOGY & THE GLOBAL MIDDLE AGES: OPPORTUNITIES, CHALLENGES, AND FUTURE TRAJECTORIES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Herold, Hajnalka (University of Exeter) - Fazioli, K. Patrick (Mercy University) - Petts, David (University of Durham)

Session format: Regular session

This session aims to investigate how the concept of a "Global Middle Ages" can facilitate a more dynamic and inclusive medieval archaeology. Originally developed by medievalists in history and literary studies, the Global Middle Ages approach has sought to challenge the Eurocentric nature of medieval research by foregrounding long-distance connections, cross-cultural analyses, and non-western contexts. However, on the one hand, 'Eurocentric' medieval research has usually not included all of Europe, but only western Europe, or sometimes even only Britain more specifically. And, on the other hand, the notion of Global Middle Ages has received comparatively little attention in archaeology, especially outside of the Anglophone world, despite the tremendous potential to explore these themes based on the archaeological record.

We invite papers on the archaeology of the Global Middle Ages from any region, but especially those that have been traditionally underrepresented in this framework. Both synthetic, theoretical explorations and specific case studies are welcome. Possible themes include, but are not limited to: How does widening our geographical perspective shape the questions we ask of the archaeological record? Should a global framework be limited to investigating clearly related topics, like long-distance trade, migration, and communication, or should it infuse our entire understanding of the past? How can we make the geographical coverage within Europe more balanced? In what ways is the 'New World' part of Global Middle Ages? What are the advantages (and dangers) of framing non-western societies as 'medieval'? Can a global approach to medieval archaeology address inequalities in the contemporary research landscape?

ABSTRACTS

1 GLOBAL MEDIEVAL ARCHAEOLOGY - ACCESS TO THE 'BIG PICTURE'?

Herold, Hajnalka (University of Exeter)

This paper examines the use of the global medieval framework in archaeology on two levels, by a) looking into the emergence and effects of this approach and b) presenting a case study where this approach can be useful. Part a) explores the following questions: What is global medieval archaeology and how did it come about? What (conscious

and unconscious) factors have shaped its emergence and why did it emerge where it did (English-speaking world)? How does it shape current research landscapes? Where/how can it be useful to us and what implications does it have on research landscapes and potential research results? Is there scope to make this approach widespread beyond the English-speaking world? Part b) presents research on 'oriental' glass beads that are assumed to have been produced in the Middle East and found wide distribution in Europe and beyond in the 8th and 9th centuries CE, connecting areas that have so far largely been studied separately.

2 REVEALING AND OBSCURING LONG-DISTANCE CONNECTIONS AT EARLY MEDIEVAL LINDISFARNE

Petts, David (Durham University)

The notion of the 'global middle ages' is gaining traction within the world of medieval archaeology and history. Researchers are increasingly recognising that there are trans-global flows of both materials and objects, as well as concepts and ideas over the longue durée. At certain points in time and space, these links can be seen to expand and contract, whilst particular contexts (such as elite and religious spaces) can be seen to catalyse the clotting of distributions of globalised material resources. However, the ability of archaeologists to plot origin points for raw materials and trace networks of exchange mean that today we often have a better understanding the dimensions of trading networks that contemporary participants in these patterns of exchange may not themselves have had. This paper uses the case of early medieval monastery at Lindisfarne (England) and the relics of St Cuthbert to explore how a range of long distance material and intangible connections might have bound a monastery into the wider world, whilst trying to identify to what extent these long-distance links may have been recognised by those who participated in them at the time. It argues that in many cases, the recontextualization of exotic goods into new social contexts can serve to obscure or hide their original origins and trajectories. The notion of a global middle ages might look very different to modern scholars studying it, from the views of those participating in them at the time.

3 IT'S THE SOURCES STUPID! - OR IS IT DARKER THAN THAT..?

Hill, David (NIKU - Norwegian Institute for Cultural Heritage Research)

When the firework-loaded train that was the Viking Age crashed and burned at Stamford Bridge in 1066 taking with it the spectacularly mobile and ultimate Viking - Harald Hardrada - a very different period in Norwegian history begins. Seemingly those 'Vikings' who were left standing quietly exit the stage and vanish into thin air. The ensuing Medieval narrative becomes strangely pedestrian, domestic and institutional. In a lockdownesque way foreign travel becomes very rare, taxes and rents are conscientiously paid, the corners and edges of forests are diligently cleared, log cabins are built, and churches constructed in every district as if nothing else matters.

The sources from here on do indeed shift in nature and content such that history and archaeology no longer throw out tabloid headlines, and the statisticians and social historians of the Medieval period sharpen their pencils and get to work. However, by peeking behind the state-formation narrative, long-range contacts and global impulses continue to influence and shape political and economic society albeit in a silent way.

This paper will examine how the Medieval Norwegian narrative of the nineteenth and twentieth centuries favoured domestic rather than global impulses. Contemporary norms and trends allow us to explore the themes of globalization and decolonialization, however do we have enough sources to do undertake that task?

4 CAHOKIA MOUNDS AND THE GLOBAL MIDDLE AGES

Baires, Sarah (Eastern Connecticut State University)

How does the 'New World' fit into the Middle Ages? A period of time, roughly 1,000 years, that in our colloquial imagination focuses solely on Europe as marked by the plague, the Crusades, and a sustained reliance on the Christian religion. Yet, the Middle Ages was also a time of innovation in agriculture and art, and a population surge during the Medieval Warm Period contributing to a restructuring of social organization in this region. Expanding our comparative understanding of the Middle Ages to include sites in global contexts requires a reconsideration of how this period is defined geographically. To include sites from the Americas means we must grapple with the uniquely European derivation of this period--one that generally considers global history as confined to the era after Columbus landed in the 'New World'. To be 'global' was to be 'colonial' and we all know how that played out in the Americas. In this paper I consider how a focus on pre-contact Native America contributes to a global framing of the 1,000 years prior to 1500 through an examination of the extensive social and political networks characteristic of Mound Building societies in the Eastern Woodlands as well as the deep history of mound building across the region.

5 TEACHING AND RESEARCHING THE GLOBAL MIDDLE AGES ON AND WITH TURTLE ISLAND: ARCHAEOLOGICAL PERSPECTIVES

Knutson, Sara Ann (University of British Columbia, Vancouver)

This paper observes that 21st-century medieval studies has reached a critical inflection point as it engages important material-, global-, and indigenous turns as well as a shift towards the “Global Middle Ages. I argue in this paper that the updated “Global Middle Ages” label, however, demands more than artificially fashioning the traditional “middle ages” into a new, “global” costume. Instead, the adoption of “Global Middle Ages” signifies active commitments to transforming the multidiscipline with some critical methodological and ethical considerations. In this paper, I draw on my multidisciplinary training as an anthropological archaeologist and historian, my experiences as the designer and instructor of an undergraduate course, “Global History, pre-1500 CE” at a North American institution, and as a researcher working with archaeologically-uncovered materials in the Middle East and Europe. I argue for why societies on Turtle Island (“North America”) should be included in archaeologies of the Global Middle Ages and, more importantly, how. As a case study, I discuss my archaeological research on coinage from the ‘Abbāsīd Caliphate and Viking-Age Scandinavian burial practices (e.g. Knutson 2023) and I demonstrate why and how listening to people (past, present, and future) from and on Turtle Island also matters to the archaeological study of these “medieval” societies. I argue that archaeology offers important training for scholars to meaningfully and ethically engage the enduring material traces and oral traditions of non-European societies as well as to help destabilize Euro-western forms of knowledge production. There are also powerful ethical limits to this work that archaeologists must also respect. Ultimately, these current debates matter not only to researchers, teachers, and students of the “Global Middle Ages,” but more importantly, they have profound implications for the descendant communities of global indigenous societies.

6 GLOBAL MIDDLE AGES, ARCHAEOLOGY, AND POSTHUMAN LANDSCAPES

Fernández Fernández, Jesús (University of Oviedo)

The concept of the Middle Ages emerges within the construction framework of the modernity-coloniality civilizational project. The modern colonization of time, achieved through the conceptualization of terms such as prehistory or the Middle Ages, evolved parallel to the colonization of physical space, reinforcing the latter through the notion of the denial of coevalness. Over the past century and a half, these Eurocentric and ethnocentric concepts have been widely disseminated within the historical and archaeological disciplines.

Towards the end of the 20th century and the beginning of the 21st century, initial attempts at revision were articulated through postcolonial studies, and concepts such as the global Middle Ages emerged. However, these movements fail to address a central issue in this discourse, namely, the implicit anthropocentrism embedded in the humanistic disciplines. The idea of the existence of a nature separate from human and its culture is foundational to the entire modern and Western civilizational project, serving as a potent semantic tool of domination. This framework led to the establishment of dichotomous, hierarchical, and functional categories that sustained the modern patriarchal, capitalist, speciesist, and colonialist assemblage.

Disciplines such as history and archaeology, inherently anthropocentric, perpetuate through their epistemological programs and methodologies this naturalistic ontology, making it inherently challenging to relinquish these epistemic hierarchies. Consequently, I posit that a global Middle Ages cannot materialize without transcending its implicit anthropocentrism. In this paper, I present a critique framed in this ontological debate and assert the impossibility of undertaking the theoretical turn towards a global Middle Ages without integrating archaeology, environmental sciences, and a posthumanistic scientific project. This transdisciplinary approach is crucial in embracing this new concept.

7 SILK ROAD INTERSECTIONS: REDISCOVERING ARPA SETTLEMENT IN VAYOTS DZOR WITHIN THE GLOBAL MIDDLE AGES

Babajanyan, Astghik (Institute of Archaeology and Ethnography NAS RA) - Franklin, Kathryn (Birkbeck, University of London)

This paper presents results from excavations in the South Caucasus as a case study in the construction of locality in the context of the Global Middle Ages. This study focuses on the medieval Arpa settlement, located in the Vayots Dzor region in Armenia. Despite its role as a local government seat for the ruling Orbelyan clan and as a pivotal Silk Road node connecting major cities such as Dvin, Tabriz, and Partav during the 12th-15th centuries, this site and its region remain overlooked in discussions of medieval globality. To address this gap, the co-authors initiated the “Vayots Dzor Silk Road Survey” project in 2015. This ongoing interdisciplinary project was designed to comprehensively explore the area, offering a nuanced perspective and contributing to the broader discussion of medieval Eurasian connections.

The Armenian highlands, particularly the river canyons and mountain passes of Vayots Dzor, acted as crossroads for expanding Eurasian empires and population movements. Simultaneously, it stood apart from key Ilkhanate centres such as Tabriz, Dvin, Ani, or Partav. The region’s diverse political landscapes, and dynamic hierarchies collectively

contributed to a unique historical narrative, reflected in the rich archaeological record. Our discussion explores how the complexity of the Armenian highland influenced its cultural products, revealed through excavations at Arpa. A contextual examination of the material culture sheds light on the political and cultural polycentrism which characterized social life in the high medieval Caucasus and surrounding regions. The findings shed light on how Arpa, as a local government seat and Silk Road node, played a crucial role in shaping the broader medieval Eurasian landscape, challenging the narrow east-west binary of Silk Road narratives.

This research underscores the significance of incorporating peripheral regions into discussions of the Global Middle Ages, emphasizing the need to examine nuanced interactions in areas removed from major centres of power.

8 TOWARDS A GLOBAL HISTORICAL ARCHAEOLOGY OF EUROPE AND SOUTH ASIA

Hueglin, Sophie (University of Tuebingen)

Some archaeological disciplines are more predestined to develop global perspectives than others. I am thinking of maritime or landscape archaeology, numismatic or ceramic studies but also very much of the archaeological sciences. Regarding the historical periods, where we often are confronted with an abundance of historical sources, finds and features, archaeologists tend to work with a regional or even local focus. Often, they even lose sight of the larger geographical and historical contexts of their findings.

Adopting varying global perspectives in historical archaeology works best together with colleagues from other world regions. To develop a keen interest in and a deeper understanding of other cultures, students and scholars must have and seek opportunities to travel, acquire languages and experience other world views. Today, researchers can find each other and stay connected over great distances through purely online or hybrid platforms. Where, if not here in Rome, should we look beyond Europe and venture into the global chapter of historical archaeology?

Taking examples from recent publishing and teaching projects, I will describe the opportunities and difficulties of a global approach in historical archaeology.

9 WITHOUT EUROPE. SINOCENTRIC VISION OF MEDIEVAL AGES

Zukowski, Robert (Institute of Archaeology and Ethnology Polish Academy of Sciences)

Although both written and archaeological sources confirm some contacts between China and the West, China developed in relative isolation from what we name „Western culture” for most of its long history. The geographic situation of the Zhongguo, as well as Chinese geopolitical theories, describing the world in terms of opposition of Tianxia (All Under Heaven)- the area accepting the Chinese values system, versus outer lands inhabited by barbarians, caused the general lack of interest in establishing contacts with the distant lands.

Although the Roman Empire, called Da Qin, and thereafter Byzantine Empire, named Fulin, are the subjects of relatively more abundant descriptions than the other countries in the Chinese official histories, the echoes of historic events occurring in Medieval Europe are particularly inexistent in Chinese medieval historiography. Moreover, the present state of archaeological research seems to confirm that the western influences in material culture were rare, and usually transient.

The Chinese map of the world, drawn in 1402, preserved only in Korean copy known as Gangnido “Map of Integrated Lands and Regions of Historical Countries and Capitals (of China)” shows a detailed representation of the whole Asia, small Africa and the Middle East, while Europe is practically not even marked.

This view seems to be interestingly parallel to the Eurocentric views, mirroring their biased, exclusive character. This paper aims to analyse its potential in understanding the Global Medieval Ages.

10 WHAT IS A GLOBAL MEDIEVAL ARCHAEOLOGY FOR?

Fazioli, Kirk (Mercy University)

Following broader trends in medieval studies, the concept of the Global Middle Ages has begun to appear more frequently in archaeological scholarship. While at first glance this framing seems relatively unobjectionable, archaeologists should carefully weigh the potential advantages and drawbacks before incorporating it into the disciplinary lexicon. For some scholars, the Global Middle Ages are about highlighting long-distance connections and cross-cultural comparisons during the medieval millennium, while for others the goal is to challenge the longstanding Eurocentrism/whiteness of the field. Is the inherent ambiguity of this term a strength or weakness? How well does it align with archaeological datasets and methods? Is it ultimately about refining our understanding of the past or addressing social inequities in the present? This paper will explore such questions while also considering what recent debates over the “global turn” in the historical and social sciences reveal about the promise and pitfalls of a global medieval archaeology.

390 MODELLING CONNECTIONS: NEW METHODOLOGIES TO UNDERSTAND HUMAN MOBILITY, ROUTE NETWORKS AND LAND USE

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Montesanto, Mariacarmela (Università degli Studi di Firenze; Durham University) - Co-to-Sarmiento, María (Centre for Urban Network Evolutions (UrbNet); Aarhus University) - Cimadomo, Paolo (Università della Basilicata-ISPC CNR) - Ritondale, Manuela (Groningen Institute of Archaeology, University of Groningen) - Sommella, Virginia (Bilkent University)

Session format: Regular session

Human mobility has been translated in various ways, allowing the creation of networks between people for the exchange of ideas, goods, cultures and technologies. However, modelling mobility still presents some challenges, such as scant information about ancient routes in the past, environmental changes, or the difficulties of taking into account cultural and cognitive factors, engaging history, geography, environmental studies and anthropology.

The study of human mobility is important in understanding political, social, and cultural transformations of ancient trade networks and economies, as well as core-periphery interactions in the archaeological record. The last 20 years have seen an explosion of studies on ancient route networks, with much of this research using computational tools. However, while these approaches have the benefit to help in reconstructing road maps based on specific itineraries, there is a well-recognised mismatch between tracking the movements of people and material along these routes. The interpretation of the generated models of movements and their relation to settlement patterns and urban layouts needs to be contextualised, and much experimental work is required to better model different types of movements and to understand traffic patterns. In addition, the issue of how to validate and test terrestrial, maritime or riverine routes remains mostly unheeded.

This session aims to explore human mobility in the past by assembling contributions dealing with new methodologies and approaches. We welcome contributions focused on methods to analyse human mobility (GIS, modelling, remote sensing, among others), approaches to seaborne and riverine routes (seasonal navigation possibilities, shipping routes), route networks, urban layouts, or multi-scalar interaction among regions without any restriction in chronology or study area.

ABSTRACTS

1 RBASIS METHOD. A METHODOLOGY AND MODEL TO HISTORICALLY STUDY THE RELATIONSHIP BETWEEN AN ARCHAEOLOGICAL SITE AND ITS IMMEDIATE SURROUNDINGS

Trapero Fernández, Pedro (Cádiz University)

In the historiography of historical spatial analyses, the typical focus lies in scrutinizing the correlation between a designated point or polygon representing the archaeological site and the broader territory it inhabits. Additionally, detailed analyses of the space itself, incorporating aspects such as soil types, geology, and environmental conditioning factors, are commonly conducted. We have developed a method tailored to investigate the intricate relationship of an archaeological space, particularly emphasizing productive centres like villas or farmhouses, with their immediate environs. Our model introduces a nuanced approach, advocating for a mixed analysis methodology. In this approach, we delve into the calculation of the minimum mobility space associated with a settlement and production centre, aiming to unravel the intricacies of how the surrounding space was articulated. This involves the application of sophisticated techniques such as cost analysis and statistical studies, utilizing a diverse set of geographical and historical parameters. The culmination of these efforts yields what we term the RBASIS (Relationship Between an Archaeological Site and its Immediate Surroundings) method, a comprehensive framework that offers multifaceted insights into the dynamics between archaeological sites and their proximate environments. This method not only enhances our understanding of the spatial relationships but also provides a more nuanced perspective on the historical and environmental factors shaping these archaeological spaces. The RBASIS method holds great promise for advancing our comprehension of the complexities inherent in the interactions between settlements and their immediate surroundings.

2 APPLICATION OF LANDSCAPE ANALYSES TO TRACE THE FIRST OCCUPATION OF SICILY

Zaia, Sara (Harvard University) - Patania, Ilaria (Rutgers University) - Tryon, Christian (University of Connecticut)

Geospatial analyses and modeling have been increasingly applied to archaeology to investigate migrations and travel across great distances in ancient times. In such analyses, geomorphology, historical sources, and environmental factors are included in addition to the information from archaeological investigations. Such an approach is often applied to identify patterns that could lead to new archaeological evidence, such as predictive modeling combined with field

survey to locate sites. This paper presents the results of geospatial analyses of the human dispersal and occupation of the island of Sicily.

The oldest uncontroversial evidence for human arrival on a Mediterranean island is in Sicily at ~17 kya, with some evidence from ancient DNA suggesting that these early populations were small and focused on terrestrial foods. It is widely accepted that these groups entered the island through a short-lived land bridge that connected Sicily to Italy between 21.5 and 20 kya, following the Last Glacial Maximum (LGM ~26.5-19 kya) when portions of the coastal landscape were exposed by lower sea levels. The extent to which other parts of the habitably parts of the island now lie submerged by sea level rise since the onset of the Holocene is incompletely known. Our analyses use published geomorphological and archaeological data to calculate migration routes through the island following the LGM and model a sustained human occupation of Sicily.

3 TRANSCORDILLERAN PATHS AND INTERREGIONAL INTERACTION IN SOUTHERN SOUTH AMERICA: A PROPOSAL BASED ON GIS MODELING

Lucero Ferreyra, Gustavo (Universidad Católica de Temuco, Carrera de Arqueología, Chile.) - Barberena, Ramiro (Centro de Investigación, Innovación y Creación, Universidad Católica de Temuco.; Instituto Interdisciplinario de Ciencias Básicas, CONICET; Universidad Nacional de Cuyo, Argentina) - Mera, Rodrigo (Sociedad Chilena de Arqueología, Gorbea, Región de La Araucanía, Chile.) - Beron, Monica (CONICET; Universidad de Buenos Aires) - Paez, Florencia (Universidad de Buenos Aires) - Fernandez, María (Conicet) - Scartascini, Federico (Conicet; Universidad Nacional de Río Negro) - Sacchi, Mariana (Universidad de Buenos Aires, Facultad de Filosofía y Letras; Universidad Católica de Temuco, Carrera de Arqueología)

The Andean mountain range is South America's most remarkable mountain system, with average altitudes between 2500-3000 masl in its meridional sector. The complexity of this landscape has been central to archaeological discussions about landscape use patterns, movements, and articulation of their different environments. In the Andean Araucanía area of south-central Chile, an occupation model based on a tradition of hunter-gatherers adapted to temperate Andean rainforests was proposed. However, more recently this perspective is being discussed by means of new theoretical and methodological approaches. In this paper, we present the results achieved from the GIS application to the study of human mobility. This is based on the idea of the Andes Mountains as a sociocultural spatiality, an articulator of regions and relationships that allows ecological complementarity and movement of material goods, ideas, and people (social relationships). In this way, archaeology, anthropology, history and geography have provided enough information to show common Andean spatial historicities among groups from both slopes, including bioceanic connections throughout the last 5000 years. We aim to explore this phenomenon based on an actualistic prediction model that integrates geographic, environmental, archaeological and ethnographic data, and serves as a framework to discuss the incidence of these variables on mobility, use of space, transport of resources and distribution of archaeological sites along possible routes that connect a millenary transcordillera network. This approach seeks to test the internodal theory in a far southern environment and a much wider region (Araucania Andina, Chile, Norpatagonia and Pampa, Argentina) rather than the Circumpuna Andes, the environment for which the theory was modeled.

4 MODELLING MOBILITY IN THE NEOLITHIC: LEAST COST PATHS ON A LARGE CANVAS

Soriano Elias, Biel (Universitat Autònoma de Barcelona) - Bach Gómez, Anna (Universitat Autònoma de Barcelona) - Monforte-Barberan, Andreu (Universitat Autònoma de Barcelona) - Molist Montanya, Miquel (Universitat Autònoma de Barcelona)

Movement modelling through the use of GIS is a method that has shown stimulating results in its application to the study of past societies in the last decades. However, this usually refers to relatively small study areas and limited comparative cases. For these reasons, we aim to present an analysis focused on the bigger picture, a study designed to test the method's utility on a large canvas. Our main objective here is to assess the importance of mobility in the settlement pattern of past societies. For this study, we selected the communities in the northeast of the Iberian peninsula during the Middle Neolithic (4500-3500 cal BCE) and used least-cost paths and cost surfaces to model mobility networks. In this context, we constructed different models of natural movement for each zone and then compared them to the network of settlements. We also contrasted them with a network of surviving shepherd paths to verify their credibility.

5 ROADS AND RIVERS. THE IMPORTANCE OF REGIONAL TRANSPORTATION NETWORKS FOR EARLY URBANIZATION IN CENTRAL ITALY (1000-500 BC)

Prignano, Luce (UBICS (Universitat de Barcelona Institute of Complex Systems); Heurística Barcelona) - Fulminante, Francesca (Bristol University; Oxford University; University Roma Tre) - Cozzo, Emanuele (UBICS (Universitat de Barcelona Institute of Complex Systems); Heurística Barcelona)

Ancient routes were crucial for settlement interactions, influencing societal development and urbanization. Terrestrial routes, reflecting social interactions, required resources and cooperation for maintenance. Navigable rivers offered complementary connectivity, shaping the development of roads. Together, they formed a regional transportation system, a product of social relations and interactions with the environment. This study examines transportation networks in Central Italy (1000-500 BC), a period marking the emergence of regional groups and the first city-states in Western Europe.

We devise a methodology to assess the integration of fluvial and terrestrial transportation, applying multiplex network formalism to analyze the infrastructure's complexity. This approach considers settlements as nodes within a multi-layered system, where different transportation modes constitute separate layers connected by inter-layer links. This framework allows for an inverse engineering approach to qualitatively and quantitatively assess transportation modes' interplay without complete data on maintenance costs and transport speed.

We introduce two distinct parameters: the first quantifies the relative maintenance costs of rivers compared to roads, and the second represents the overall average costs associated with ports. Using these parameters, we define a quality function known as "algebraic connectivity." This metric evaluates network resilience, favoring systems with efficient paths and penalizing redundant ones susceptible to node failures.

Our study conducts a longitudinal analysis, dividing the timeframe into five slices, to explore changes over time. The results highlight how transportation systems in the Latin and Etruscan regions not only differed from each other but also evolved within each region across different periods. This comprehensive approach sheds new light on the dynamics of ancient transportation networks, highlighting the complex interplay of environmental, economic, and social factors in shaping regional connectivity and resilience.

6 THE LANDSCAPE OF THE RABAGÃO VALLEY: TRANSFORMATIONS AND DISPARITIES IN THE TERRITORY FROM THE IRON AGE TO THE ROMAN PERIOD

Dias, Bruno (Universidade do Minho (UM)) - Blanco Rotea, Rebeca (Laboratório de Paisagens, Património e Território (Lab2PT); Laboratório associado para a Investigação e Inovação em Património, Artes, Sustentabilidade e Território (IN2PAST)) - Magalhães, Fernanda (Universidade do Minho (UM); Laboratório de Paisagens, Património e Território (Lab2PT); Laboratório associado para a Investigação e Inovação em Património, Artes, Sustentabilidade e Território (IN2PAST)); Unidade de Arqueologia da Universidade do Minho (UAUM))

The Rabagão valley, located in the north of Portugal, covers an area of around 248km² and is characterised by the abundance of natural and geomorphological resources such as gold, tin, copper, along with fertile land, as described in written sources by authors such as Strabo and Pliny the Elder. We intend to analyse this study area in order to understand how the landscape was constructed, modified and conceptualised by Iron Age and Roman communities. To answer these questions, we gathered a diverse amount of bibliographic, cartographic, photographic and spatial data from the area under study so that we could analyse it from a geospatial perspective. This combination allows us to approach the Rabagão valley from a macro-spatial scale, using Landscape Archaeology as our research strategy. Our methodological proposal combines data from bibliographic sources with spatial tools, such as geographic information systems. With this approach, we were able to locate various elements that characterise the landscape of the Rabagão valley, such as settlements and communication routes, especially the Via XVII. Once these elements had been geospatially located, they were reviewed in the field to characterise them based on the existing materialities. Then, we defined the types of analysis needed to understand the spatiality of each of the two periods and how the spatial organisation of the Rabagão valley changed. Although we are at a preliminary stage of geospatial analyses, it is possible to observe an intense occupation pattern along the via XVII, which runs through the entire valley and the mining areas in its vicinity. However, it is also important to understand the role of secondary roads in the construction of the valley's landscape.

7 MOVING AWAY FROM THE ROADS: RECONSTRUCTING LANDSCAPES OF MOBILITY IN THE DUTCH LIMES

Groenhuijzen, Mark (Utrecht University, Department of History and Art History) - Verhagen, Philip (Vrije Universiteit Amsterdam, Faculty of Humanities)

Research on transport and mobility in the Roman Empire is strongly focused on the surviving remains of the paved road networks that spanned Europe, the Near East and North Africa. While reconstructing the position and chronology of this Empire-wide road system is a challenge in itself, it provides us with only part of the picture. The great ma-

jority of rural Roman settlements were not located on or near a primary road but were connected through an extensive network of secondary, mostly unpaved roads. These are only known in small sections that have survived because of good local preservation conditions, and cannot be reconstructed as a network in any meaningful way. Furthermore, only part of all transport took place over land: in many parts of the Roman Empire rivers were of prime importance for the movement of goods and people. This means that we will have to use a wider variety of data and apply specific analysis tools to try to understand the day-to-day practices of transport and mobility in the Roman countryside.

In this paper, we will use the case of the Dutch Roman frontier zone to demonstrate how a combined approach of least-cost path modelling and network analysis can be extremely helpful in reconstructing possible landscapes of transport and mobility. The paper will discuss the potential of these methods for better understanding possible road locations, and to assess the role of roads and settlements in transport and mobility networks. Also, we will demonstrate how these methods can be used to model the development of transport networks through time, and to assess the effects of scale on mobility. While the paper will focus on reconstructing secondary connections in a specific corner of the Roman Empire, these approaches are also applicable to other case studies.

8 CONNECTIVITY, ROAD NETWORKS AND THE RURAL ECONOMY OF ROMAN ISTRIA

McLean, Andrew (Institut Català d'Arqueologia Clàssica (ICAC)) - Šprem, Katarina (Independent Researcher)

Attempting to understand rural economies is a complex and daunting undertaking, but one which often has far-reaching important implications. These economies are closely linked to the connectivity and mobility of a landscape, as well as the infrastructure that facilitates this connectivity. The Roman roads of the Istrian peninsula have seen numerous attempts to model them, most prominently by Bosio and Matijašić. Understanding the accuracy of these proposed routes and the landscape through which they ran has traditionally been tested through intensive survey. However, recent quantitative trends have allowed for greater and easier insight into landscapes of connectivity. In particular, the use of Least Cost Path analysis has started to be expanded upon with newer approaches such as Circuit Theory and cumulative cost surface corridors. These developments are leading to a better understanding of a hierarchy of connectivity, rather than simply identifying single routes. In this paper, differences between the outputs of the connectivity models are analysed in order to determine how far the outputs align with the proposed Roman road networks. These results are then compared to the distribution of Roman urban centres and routes between the urban nodes can be established. Moreover, when the roads take routes between these nodes that do not strictly follow the predicted routes of the model, something else other than low cost routes between urban centres must be at play. We show the extent to which these discrepancies can be explained by the rural landscape of Roman Istria. We show that the roads not only linked large urban centres, but acted to connect the rural economies with one another as well as the urban. Through detailed analysis of the models and available data, predictions can be made about the nature and makeup of the rural economic landscape, without need of survey.

9 CROSSING THE DESERT(S). SIMILARITIES AND DIFFERENCES BETWEEN THE LIMES MAURETANIAE CAESARIENSIS AND THE LIMES ARABICUS (3RD C. CE)

Cimadomo, Paolo (ISPC-CNR; Università della Basilicata) - Giordano, Vincenzo (Università di Bari)

This paper aims to analyse the defensive system of the Roman Empire through the analysis of the limes of Mauretania Caesariensis and the limes arabicus during the Severan age. These two systems have many points in common (i.e. both are 'open' systems, because they allow the circulation of goods and people, and both border the desert). As a matter of fact, the African and Arabic limes do not define a clear boundary between the Roman and the local cultures. They testify, instead, a number of exchanges amongst the populations inside and outside the empire.

This study is going to find similarities and differences that may allow us to reconstruct strategies and interventions promoted by the imperial authority during the first half of the third century. The main research activities will focus on a systematic analysis of the road system, by georeferencing the inscriptions connected to it and the building of fortifications that characterized these frontiers.

In this way, we will reconstruct the building, re-building, and maintenance phases of these roads. Whenever possible, historical satellite images, in particular the images taken by the American spy satellites during the 1970s, will be useful to integrate the archaeological remains. The purpose is therefore to reconstruct and date imperial interventions on these roads and to demonstrate the permeability of the borders.

10 EXPLORING MOBILITY IN SALENTO (SOUTHERN APULIA): A GIS-BASED INVESTIGATION INTO ROMAN ROAD SYSTEM

Pesce, Stefania (University of Salento) - Moderato, Marco (CAsES UPF)

This paper aims to investigate the characteristics that distinguish mobility through Apulia region and its connections with the City during the Roman domination. Thanks to the traditional sources of ancient topography, it is possible to

know which were the main roads of the region, the respective capita viarum, and the distance in miles between them and the different road stations. However, these sources alone can hardly help archaeologists understand the reasons behind selecting specific routes to connect locations. Therefore, this research aimed not only to reconstruct Roman roads in Apulia but also to identify factors that influenced their development in the past. The case study proposed is the Via Traiana "Calabra", located in the Salento peninsula (southern Apulia), which guaranteed Rome the access to one of the most important ports to the East: the city of Otranto. As for the second half of the road, still uncertain, there are two hypotheses of the path. Through a post-dictive approach, we used GIS applications to explore the complexity of the natural and anthropic factors that may have affected mobility in this area. The GIS approach consists of modelling cost surfaces based on geomorphological, hydrographic and archaeological data and calculating the least cost path, or the most convenient route to reach a point from another by moving in a certain direction. This framework aims to assess potential least cost paths to compare to the two hypotheses of the route in order to understand which could be the most reliable in Roman times. The reconstruction of the road routes serves as a proxy for modeling connectivity, understanding human mobility, route networks, and land use within the context of Roman Apulia.

11 HISTORICAL TRAVEL AND COMMUNICATIONS IN FINLAND (HISCOM)

Tiilikkala, Jasse (University of Helsinki) - Lahtinen, Anu (University of Helsinki) - Oksanen, Eljas (University of Helsinki) - Saarenpää, Ida (University of Helsinki)

The project Historical Travel and Communications in Finland, c. 1650-1917 (HISCOM) creates a comprehensive GIS road map database of late Early Modern (c. 1650-1809) and Autonomy Era (c. 1809-1917) Finland from various atlas sources. HISCOM will advance the study of cartographic materials in historical and archaeological research. It aims to assess changes in the structure and character of travel and communication networks from the Early Modern period to the early twentieth century.

HISCOM's goals therefore include methodological advancement, assessment of diachronic change and finding regional distinctions.

The main methodological question is: how can we best approach the process of digitizing and analyzing the historical travel network through an interdisciplinary mixture of computational and qualitative methods?

Using interregional, regional, and local case studies based on both quantitative (GIS) and qualitative (historical sources) data HISCOM will analyze the impact of economic, administrative, and demographic changes on the travel and communications networks that took place before, between and after the time-slices captured by the digitization process.

Given the differences in geography, social and demographic organization in different parts of Finland, the project considers what structural differences we can detect in the road networks within these broad regions, and do these results assist in refining our understanding of regional differences and long-term change.

12 VIABILITY AND TRADE IN JORDAN IN THE EARLY BRONZE II-IV: THE CASE OF KHIRBET EZ-ZERAQON TO REINVESTIGATE REGIONAL CONNECTIVITY

Lanzaro, Nicola (Sapienza Università di Roma)

The Early Bronze II-III are considered the periods in which urbanization emerges, spreads, and collapses throughout the Southern Levant. These dynamic phases are followed by a period of non-urban organization, the Early Bronze IV. These changes in settlement patterns, society, and material culture influence and are influenced by changes in the regional exchange network. Some sites are particularly interesting to analyze the connection between urban centers, territory, and economic dynamics. One such case is that of Khirbet ez-Zeraqon (Irbid Governorate, Jordan) and the neighbouring coeval sites. The main site seems to be part of those exchange dynamics over short and medium distances and is certainly in contact with the Jordan Valley and the Hula Valley. From a geographical point of view, Khirbet ez-Zeraqon is located at a strategic crossing point of Wadi el-Shellalah, halfway between the Jordan Valley and the settlements of the basaltic desert of Southern Syria. The other secondary sites between Khirbet ez-Zeraqon and the Jordan Valley seem to be located at strategic crossing points (such as narrow plain terraces between eroded wadis) in order to control them.

The aim of this study is to investigate if and how these sites were interconnected and through which paths goods, people, and ideas arrived at and moved from Khirbet ez-Zeraqon. In order to answer our research questions, all the data are processed in a GIS-based geodatabase to implement network and landscape analysis, including least-cost path analysis algorithms and viewshed analysis. Furthermore, the data available about the local paleo-landscape and geomorphology, the Roman Period viability (according to the route inertia principle), and are taken into account reconstruct what were the most suitable ancient routes and the actual degree of interconnectivity of the area during the Early Bronze Age.

13 MODELLING CONNECTIONS: NEW METHODOLOGIES FOR UNDERSTANDING HUMAN MOBILITY, ROUTE NETWORKS, AND LAND USE

Melfi, Roberto (Scuola Superiore Meridionale)

The proposed intervention aims to study the socio-economic and land ownership relations between Crete and Campania, with a focus on Capua. The study is based on ongoing doctoral research. Literary sources show a close relationship between Capua and Crete, as for example through the Augustus' foundation of a Capuan colony in the territory of Knossos (Vell. Pat. 2, 81, 2) and the presence of Campanians in Crete.

Here the aim is to analyze the maritime connections and modes of transportation of Cretan wine to the Gulf cities of Naples and Capua. It will be important to examine the port of Naples, given its likely relevance as revealed at the last conference in Taranto. The extensive presence of tituli picti on Cretan amphorae found in Campania, coupled with the extensive prosopographical studies by M.B. Bowsky (1999, 2001, 2004) for the Cretan side, and by D'Isanto (1993) and Camodeca (2005, 2008, 2018), for the Campanian side, would provide a useful database to initiate geospatial analyses. Through a GIS platform, the aim is to elucidate the nuances of human mobility and trade connections between regions by analyzing both the container typology and related inscriptions that mention characters, trade and production information.

Cross-analysis of such data allows for an update of the figures who intervened in these relationships and a better understanding of the transit of wine between the Bay of Naples and Capua, with a possible passage through Cumae or the Volturno River.

It is hoped to provide a preliminary overview of the interactions between the players involved in Cretan wine production, maritime connections and the reception of this product.

14 ROADS LESS TRAVELLED: GEOSPATIAL ANALYSIS OF POTENTIAL ROMAN STONE TRADE ROUTES

Ferjan, Ines (University of Edinburgh)

The transportation of stone during the Roman period required effective logistical solutions, primarily influenced by the feasibility of topography to facilitate the movement of such cargo, and economic considerations. This study aims to employ the application of geospatial models, specifically Circuit Theory, Least Cost Path Analysis, and Orbis, to unravel the intricacies of potential Roman stone trade routes. Using the abovementioned geospatial models, the research concentrates on the decision-making process involved in selecting specific routes for trading stone, examining the circumstances under which overland transport might be preferable to fluvial transport. The employment of these methodologies is evaluated through case studies in the inland Balkan region, where imported marble and porphyry traversed seas before continuing overland to reach distant Roman settlements. The results of the analysis present that frequently overlooked overland routes may offer faster alternatives compared to upstream fluvial routes, albeit at a potentially higher cost. Thus, the combined application of Circuit Theory, Least Cost Path, and Orbis sheds light on the intricate dynamics of stone movement during the Roman period. Circuit theory, in particular, emerges as a valuable tool, suggesting alternative routes that might be otherwise easily overlooked and providing a nuanced understanding of the potential stone trade network. The findings emphasize the importance of economic factors and logistical considerations in determining the most suitable modes of long-distance transport. Nevertheless, the results suggest routes that require further assessment, preferably complemented by an examination of other archaeological evidence. These modern analytical approaches undoubtedly contribute to the archaeological discourse but their limitations also need to be acknowledged.

15 MEDITERRANEAN AND EXOTIC GOODS WITH THE ARCHAEOLOGICAL RECORD FROM THE ANTIQUITY WITHIN THE DISTRICT PÍSEK, SOUTH BOHEMIA

Hiltscher, Tomáš (Prácheňské muzeum v Písku) - Jiřík, Jaroslav (Prácheňské muzeum v Písku; Charles University in Prague) - Pixová, Erika (Prácheňské muzeum v Písku; University of South Bohemia in České Budějovice)

District Písek is located in the South of Bohemia. Despite the recent more or less peripheral localization of the region within the territory of Bohemia, the abundant presence of imported goods originating from the supra-regional contacts with the territories to the south reflects the temporal increasing importance of this part of the country. Thus from the Iron age we observe the presence of the luxury items, which originated in the Etruria, Northern Italy or the Adriatic region, but also in Carthage or even Phoenicia. Later the Roman influence plays decisive role, which is reflected by a number of the costume accessories, luxury silver plate and rarely military equipment. Such a situation can reflect a temporal importance of the local sources and exploitation of the alluvial gold and the course of one of the branches of the amber trail. The imported goods reflect mostly the prestige items intended for the presentation of the elites in the wider area north of the Alps.

16 GOLD-GARNET JEWELLERY OF THE LATE ANTIQUITY - CLUES FOR THE MUTUAL RELATIONSHIPS BETWEEN MEDITERRANEAN AND CENTRAL EUROPE ?

Jiřík, Jaroslav (Institute of Archaeology, Faculty of Arts, Charles University in Prague; Prácheňské muzeum v Písku) - Pinar Gil, Joan (University Hradec Králové) - Calligaro, Thomas (C2RMF, Louvre Paris)

The recent archaeometrical research (undertaken by AGLAE C2RMF, Louvre Paris) confirmed the presence of the Bohemian garnets as an embellishing feature of the luxury jewelry in polychrome style related to the group of the finds from graves in Tournai and Apahida. This group of jewellery was likely produced within the Imperial workshops of Constantinople. The later finds of the same character from Mšec in Bohemia and Kranj in Slovenia underline these relationships. The gold buckle from Mšec in Bohemia with its dating probably corresponds to the chronology of the major finds of the Tournai - Apahida group, and likely reflects the relationships between Bohemia and the Odoacrian regime in Italy (re-distributing these insignia among the Barbarian representatives north of the Danube). The specimen from the grave in Kranj is, however, slightly younger and fits probably to the era of the reign of Theoderic the Great. But also in this case the presence of the Bohemian garnets was confirmed. This shows the continuity of the trade in Bohemian garnets to the turn of the 5th and 6th century AD and mutual relationships between Italy and Central Europe, which is not supported only by the written sources, but also by the abundant archaeological record.

17 WHY SAILING TIMES AND MARITIME ROUTES MATTER - TWO CASE STUDIES

Warnking, Pascal (Trier University; LEIZA - Leibniz-Zentrum für Archäologie)

Recent years have seen significant advancements in the assessment of sailing times and the determination of maritime routes, with further progress expected. The information garnered has often been directly useful in evaluating historical contexts. Moreover, these results can serve as crucial input data for advanced economic models, allowing the application of such models for the first time. This paper begins with a brief introduction to sailing times and includes a report on sailing tests conducted with a replica of a Roman freighter in the Mediterranean and in a towing tank. It then presents two case studies where the calculation of sailing times and routes resolves open historical questions. The case studies focus on sea routes between Greece and Syracuse, and the grain deliveries from Cyrene to Greece documented in the inscription SEG IX 2. These examples illustrate how modern methodologies can shed light on ancient maritime dependencies and contribute to our understanding of mobility, trade and politics.

18 NEW QUANTITATIVE MEASURES OF SAILING MOBILITY IN ANTIQUITY: OPPORTUNITIES AND CHALLENGES

Gal, David (University of Haifa, Department of Maritime Civilizations)

Recently developed quantitative methods to measure potential sailing mobility in Antiquity are providing novel measures of sailing mobility. The method for direct sailing passages derives potential sailing mobility by simulating millions of daily sailings of a period merchant ship throughout a 15-year meteorological dataset at high spatial and temporal resolutions (27km and 1 hour). Statistical analysis of the 5,400 simulated sailings on every passage, provides measures of practical potential sailing mobility previously unobtainable beyond the single measure of passage duration. The new monthly measures include: the probability of having a passage with favourable winds; expected time spent waiting to sail; distribution of points-of-sail encountered during the passage; and environmental parameters encountered on the passage. The data of more than 500 measured passages has been published in a continuously growing atlas of ancient sailing mobility from the Arabian Sea to the European Atlantic Coast. Data exists primarily for ships with single loose-footed square sail and on certain passages also for Lateen rigs.

The set of measures for potential sailing mobility present opportunities for deeper insight into the functioning of maritime links exposing likely routing preferences, mobility bottle-necks, seasonality of passages, and cost factors. Analysis of complex historic maritime contexts, such as the grain supply from Egypt to Rome, is well supported. New opportunities also raise new challenges in integrating quantitative processes. The quantitative output of the sailing mobility modelling can serve as one of the inputs for downstream quantitative modelling such as maritime network analysis or modelling of ancient economies. Integrating processes requires voyage costing strategies, whether in relative terms or in absolute prices, and these require a validation strategy. Strategies are also needed to match model temporal dimensions (annual, seasonal or monthly) as the downstream modelling may be based on a different temporal dimension.

19 AS THE WATER FLOWS: A METHOD FOR ASSESSING RIVER NAVIGABILITY IN THE PAST

Filet, Clara (University Bordeaux-Montaigne - France; UMR 5607 Ausonius) - Coto-Sarmiento, Maria (UrbNet - Aarhus University) - Laroche, Clément (EA 4345 SAMM)

Although textual and archaeological sources inform us about the importance of this mean of transport in Protohistory, Antiquity and the Middle Ages, integrating river navigation into studies of ancient mobility remains a challenge.

Empirical data on the navigable sections of rivers in the past are scarce and ambiguous and need to consider the intensity of human modification of wetlands over the last two centuries. Therefore, empirical studies of navigability are particularly time-consuming, and are only possible for rivers well documented by historical, archaeological and geomorphological studies.

This work aims to propose a method for realistically approximating navigable sections in the absence of empirical data, by algorithmically detecting the plain sections of a river, and test its reliability as an indicator for navigability. Using 18 rivers in central-eastern Gaul for which we have empirical knowledge of ancient navigable sections, we demonstrate that estimating river plain sections based on a break detection algorithm provides a good approximation of navigable sections. This method is then applied to 42 rivers in the Roman world for which empirical information is lacking.

The application of this method thus offers a new perspective on navigable areas in the Roman world, as a reasonable first guess that could guide future empirical research into the navigability of ancient rivers.

393 CONTINUITY AND CHANGE IN RITUAL LANDSCAPES DYNAMICS: REUSE AND TRANSFORMATION OF PREHISTORIC RITUAL PLACES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Turek, Jan (Center for Theoretical Study, Charles University, Prague) - Křišťuf, Petr (Department of Archaeology, University of West Bohemia in Pilsen) - Przybyl, Agnieszka (Institute of Archaeology, University of Wrocław) - Vale, Ana (Faculdade de Letras da Universidade do Porto)

Session format: Regular session

The ritual monuments of prehistoric Europe symbolically structured the landscapes in which they were built, for several millennia. How did later prehistoric communities perceive these monuments? Did they respect and reuse the ritual sites of their ancestors? Did these places retain their sanctity or were they simply transformed into areas of secular settlement, thus losing their original sacredness? Awareness of the original ritual purpose of these monuments, which remain clearly visible in many parts of the European landscape, was certainly passed down in oral tradition. In this session we aim to investigate the development and perception of ritual sites and landscapes by successive generations of prehistoric farmers. Combining modern archaeological and scientific methods, it is possible to analyse and reconstruct how these monuments were reused and altered and, in some cases, destroyed, by later generations. We want to explore both continuity and change at these monuments and how they may have been perceived long after they were built. Archaeological evidence found at some monuments, reveals that they continued to function as arenas of ritual and social interaction. At others, the evidence shows that their original spiritual function was terminated. We believe that the new data provided by both remote sensing and interdisciplinary research, leads us towards a better understanding of prehistoric monuments and landscape dynamics, from the Neolithic to the present day.

ABSTRACTS

1 LONG-TERM LAND USE DYNAMICS WITHIN THE AREAS OF NEOLITHIC RITUAL PLACES IN BOHEMIA (CZECH REPUBLIC)

Turek, Jan (Charles University) - Křišťuf, Petr (University of West Bohemia in Pilsen)

In our view an important aspect of perception of the ritual areas represent monumental constructions. We are going to investigate the durability of individual monuments and their reuse and further development after abandonment of their primary functions. The first Neolithic monuments in Central Europe played an important role in symbolic 'colonization' of landscape as important territorial landmarks and places of far-reaching ancestral legacy. In the context of the study of Neolithic ritual areas, we ask several fundamental questions: How did communities living there hundreds or thousands of years later treat these sites? How did people use ritual areas? Did these sites retain their spiritual purpose? Or were they incorporated into the profane parts of the settlements and gradually overlaid with residential and economic features and why? The potential of the long term existence of Neolithic monuments is evident in the cases of constructions that survived in the landscape until present. In some regions, such as Bohemia, the visible evidence of such monuments (i.e. long barrows, causewayed enclosures) disappeared from the landscape entirely. The research on the erosion or/and deconstruction of sacred monuments was mostly neglected by archaeological interest. The intervals of use and destruction of monuments was only reconstructed according to field record of horizontal stratigraphy. In our current projects we have tested the range of scientific methods (geochemical analysis, soil micromorphology, OSL/14C dating) that produced valuable new quality data for the reconstruction of people's perception of monuments in landscape and overall land use dynamics.

2 THE LONG TERM CONTINUITY OF THE NEOLITHIC RITUAL LANDSCAPE: FROM LONG BARROWS TO THE RITUAL ENCLOSURE AT VŠCHLAPY IN BOHEMIA

Kristuf, Petr (University of West Bohemia) - Švejcar, Ondřej (Institute of Archaeology in Prague, Czech Academy of Sciences)

Causewayed enclosures in Bohemia occurred in the late phase of the Jordanów Culture (4200 BC) and early Michelsberg Culture (4000 BC). Based on the remote sensing data the causewayed enclosure at Všeclapy (Nymburk District, 3.6 ha oval shape) was presumed to be of the same date. However the 2017 excavation brought evidence of the Globular Amhara Culture (3000-2700 BC) and later use during the Bell Beaker period (2400-2200 BC). After the abandonment of the enclosure and final infilling of the ditch the site was levelled and covered with the middle Bronze Age occupation layer. Further on the site was used as an early medieval cemetery. Further non-destructive investigation of the site revealed that the ditch enclosure is a continuation of previous Neolithic ritual activity, as the plans of two long barrows were discovered in close proximity to the enclosure (4th millennium BC). The cultural landscape of prehistoric farmers was divided and structured in a continuous diachronic development and the archetypes of landscape divisions and monuments (enclosures, long barrows) as landmarks were part of the cosmological legacy for generations. In this way, some monuments, seemingly isolated, fit into a much wider spatio-temporal structure of prehistoric community areas. The evidence from Všeclapy suggests land use dynamics pulsating from ritual activities to profane farming use and later return to the funerary use of the site.

3 OLD HOUSES AS BURIAL PLACES FOR THE DEAD?

Kalabková, Pavlína (Palacký University Olomouc)

During a rescue archaeological research in the autumn of 2022 in Unicov (Czech Republic, Moravia), graves were discovered in a Neolithic settlement placed in the ruins of older houses. We believe that this was a deliberate selection of this burial site. Important finds in this site include three Lengyel inhumation graves located in the areas of older LBK buildings. In the graves, burials of an adult man and young individuals placed in the crouched position on their left and right sides were examined. The equipment contained vessels, chipped industry, a boar tusk and pigment. These are probably possible examples of the pattern for burial in the so-called long barrows. In addition, other evidence of special rituals has been discovered - double Lengyel burial in a storage pit and the find of a "hoard" consisting of seven Lengyel vessels on the bottom of a storage pit. Double Lengyel burials were women's skeletons in the crouched position on both the right and left sides. The colour of the surface and the carbonized inside of the bones indicate that the bodies were intentionally covered with a hot layer. Even these activities are not frequent in this period. The finds from Unicov are further evidence of the social changes accompanying the end of the Neolithic in Moravia.

4 HILLTOP „HENGE-LIKE” MONUMENT AND BURIAL SITE FROM THE BELL BEAKER PERIOD IN LOWER AUSTRIA, POYSBRUNN

Czene, András (Salisbury Régészeti Kft.)

During excavations ahead of the construction works of the A5 motorway between Vienna and Brno, Salisbury Archaeology has uncovered a prehistoric monument on a high plateau near Poysdorf in Lower Austria. One of the double posthole circles from the middle of the 3rd millennium BC was a burial place of a prominent person, while the other could have been the site of ceremonies. Traces of a palisade wall enclosed the sacred area have also been found, together with traces of various pile structures. The particularity of the complex is that the monument was prominent in the landscape. The two double circular structures, pillars and possible other structures in the area were located on a plateau on a higher mound, together with the palisade wall. Looking around the excavation, the surrounding area was clearly visible, which also meant that the ceremonial complex and burial site were visible from a distance in prehistoric times.

The most spectacular parallels to the enclosed round buildings are to be found among the 'henge' structures of the British Isles. The monument is one of the few very rare sites in Central Europe where a circular building of the Bell Beaker period with a sacred purpose has been found. It provides an insight into the beliefs and social customs of the period.

5 DIVIDING THE WORLD: SPACE FOR THE LIVING VS. SPACE FOR THE DEAD IN THE BRUSZCZEWÓ-ŁĘKI MAŁE REGION, 2500-1800 BC

Czebreszuk, Janusz (Adam Mickiewicz University in Poznan) - Szmyt, Marzena (Adam Mickiewicz University in Poznan)

The aim of our paper is to give a specific and, so far, unique picture of settlement on a small fragment of the Polish Lowlands, located in the middle Odra river basin. It extends from Łęki Małe site in the north to Bruszczewo site in the south. Both sites are well known due to the relics of the Early Bronze Age (specifically: Únětice) structures discovered

there: the so-called 'princely barrows' cemetery in Łęki Małe and the fortified settlement in Bruszczewo. Result of multifaceted analyses indicate a functional relationship between the two eponymous sites. Archaeological investigations (invasive and non-invasive) have been carried out there since the 19th century. Their results have outlined the division of the study area during the period 2500-1800 BC into two parts: a space used only for funerary purposes, and a space used actively for economic purposes and daily life. The beginning of this specific form of settlement organisation is related to the communities of the late Corded Ware culture. They inaugurated the use of the space, which stood out from the local natural landscape, for burial practices and located there a small cemetery consisting of several flat graves. This use for funerary purposes was later continued by the builders of Únětice barrows that were erected directly on the previous flat cemetery. It seems that the activities of the communities of the late Corded Ware and early Únětice, until recently considered two separate stages, in reality made up a common sequence of funerary practices, commencing after 2500 BC and continuing until ca. 1800/1775 BC. It should be emphasised that in the light of current knowledge, this is the only such clear indication of a long-term separation of the space for the living and space for the dead in the given period on the Polish Lowland.

6 COINCIDENCE OR PRINCIPLE? THE SUCCESSION OF BARROWS AND BURIALS FROM DIFFERENT PERIODS IN A FUNERARY COMPLEX IN THE MUSZKOWICE FOREST

Przybył, Agnieszka (University of Wrocław)

A small wooded area near Muszkowice village, in Lower Silesia (south-western Poland), represents a sacred landscape well established since the time of Neolithic. The landscape is marked by 35 separate burial places with the prehistoric and early mediaeval burial mounds of different shapes and sizes. Some of the barrows co-occur in the same locations. Is this a coincidence or was it a principle? That was the basic question asked, when in 2018, the excavations, carried out at the site Muszkowice 45, revealed two small artificial round mounds. They were established in superposition to the Neolithic earthen long barrow. Even despite previous non-invasive surveys, with the use of both airborne and terrestrial laser scanning, till the time of the site excavations these small cremation mounds remained undiscovered.

In my presentation I would like to ask if this is an outstanding example of long-lasting social memory, deeply embedded in space, which was cultivated continually by the communities inhabiting these lands from the Neolithic well until the modern times or is this only a random coincidence of the location of burials from two separate, distant periods.

The studies presented were conducted with the financial support of the National Science Centre, Poland, research project No. 2017/25/B/HS3/01442.

7 MULTI-PHASE POLY-CULTURAL RITUAL SPACE IN EAST-CENTRAL EUROPE

Gašpar, Adam (Institute of Archaeology of the Slovak Academy of Sciences) - Olšav, Štefan (Institute of Archaeology of the Slovak Academy of Sciences) - Ruttkay, Matej (Institute of Archaeology of the Slovak Academy of Sciences) - Vojteček, Marek (Institute of Archaeology of the Slovak Academy of Sciences) - Cheben, Michal (Institute of Archaeology of the Slovak Academy of Sciences)

Last year's massive rescue excavation projects, related to the building of Valaliky Industrial Park near Košice (Slovakia), detected a ritual landscape. The village of Valaliky has been well known for its high density of archaeological finds. The cadaster is placed in a lowland of Pleistocene terraces of the Hornád River. An area larger than 2,500,000 m², revealed more archaeological sites dating from the Neolithic to the Middle Ages.

This contribution presents the ritual area unearthed by excavators at one of the sites (an area of about 40,000 m²). At least five phases of different archaeological cultures have been recognized here. The oldest evidence of human occupancy represents settlement features of the Baden culture. After, about ten barrows were built in the Late Neolithic. They had been making an irregular line with a natural terrain mound to the south. Nowadays, the barrows "are" preserved as shallow circular ditches in a subsoil, almost without the finds (except a small piece of obsidian and daub). We also investigated a cenotaph grave related to the Early Bronze Age (OFCC) between the barrows. North from burial mounds, thirty-eight Urnfield graves dated to the Middle Bronze Age have been discovered.

The last phase presents a settlement containing about twenty dwellings, features related to metallurgical activity, a grain pit, and several wells in the lowest part of the site dated back to the Middle Ages. The contribution will contextualize the ritual space in a broader context of nearby sites and landscapes.

8 UPS AND DOWNS: RECENT RESEARCH ON PREHISTORIC BURIAL MOUNDS IN THE LAKE NEUSIEDL AREA (HUNGARY)

Melis, Eszter (HUN-REN Research Centre for the Humanities Institute of Archaeology) - Berta, Adrián (HUN-REN Research Centre for the Humanities Institute of Archaeology) - Ekrik, Ákos (HUN-REN Research Centre for the Humanities Institute of Archaeology) - Mrenka, Attila (Museum of Sopron) - Kiss, Viktória (HUN-REN Research Centre for the Humanities Institute of Archaeology)

In several historical and prehistoric periods, communities buried their dead under a mound of earth and/or stones erected in their honour and remembrance. The landscape around Lake Neusiedl, one of the largest bodies of standing water in Central Europe belonging to modern-day Austria and Hungary, is dominated by these tumuli. The research so far suggests that nearly 1,000 barrows can be linked to prehistoric burials, frequently in the catchment areas of hilltop or fortified settlements. In addition to the majority of Early Iron Age mounds on the Austrian side of the lake, several ones from the Late Copper Age and Bronze Age are known, and a LiDAR survey of the entire area is open access. On the Hungarian part, it is mainly the Early Iron Age mounds that have been investigated.

More recently, with the support of the HUN-REN Research Centre for the Humanities, we have been able to carry out a high-resolution ALS survey of about 60 km² in the Hungarian territory west of the lake. We are focusing in this study area on Bronze Age features, involving literature and archive sources, as well as non-destructive methods on the field (systematic fieldwalking, metal detector survey, magnetometry, photogrammetry) in cooperation with the Museum of Sopron.

Our research has identified previously unknown mounds, and we intend to present the preliminary results of their study and possible dating. On the other hand, our presentation aims to summarize the construction traditions and patterns of the tumuli in the Lake Neusiedl region, highlighting in this context the period from the Late Copper Age to the Late Bronze Age (2800 - 800 BC), based on the available research data.

9 CONNECTING THE PAST WITH ITS PAST: THE OVERLAP OF MEDIEVAL STEĆCI AND PREHISTORIC MOUNDS

Milosavljevic, Monika (University of Belgrade) - Grahek, Lucija (Research Centre of the Slovenian Academy of Sciences and Arts, Institute of Archaeology) - Čaval, Saša (Research Centre of the Slovenian Academy of Sciences and Arts, Institute of Anthropological and Spatial Studies) - Škerjanec, Luka (Research Centre of the Slovenian Academy of Sciences and Arts, Institute of Anthropological and Spatial Studies)

Distinctive from the 12th to 16th centuries AD, stećci are enigmatic and understudied tombstones that scatter the Western Balkans. Medieval cemeteries, home to these remarkable monuments, are often found on the location of prehistoric burial sites - both Bronze- and Iron-age mounds. The reasons for this may have been practical, for example, environmentally based choices of burial; they may reflect the long-lived memory or could be an appropriation of places haunted by a mysterious past. Although this practice is well-known and studied in other regions across Europe, ancient funerary landscapes began to be reused in the Western Balkans only from the 12th century AD - roughly 400 years later than elsewhere in Medieval Europe. Our team will share the initial results of the pilot archaeological research on two distinct sites in Eastern Herzegovina (Bosnia and Herzegovina). The Hatelji and Baljci sites were studied to explore the intriguing relationship between prehistoric barrows and medieval burial locations. We shall present the identity and social structure of the people who had picked these locations for burying their dead. Moreover, through our analysis and comparison with similar cases in the region, we will address the significance of ritual landscapes in the medieval Balkans, the (dis)continuity of funerary ideologies, and the appropriation of old funerary places over time.

10 FOLLOWING THROUGH THE MOUND CEMETERIES LANDSCAPE. THE STORY OF BARROW TRADITION SUCCESSORS FROM THE PRE-CARPATHIAN AREA

Makarowicz, Przemyslaw (Faculty of Archaeology, Adam Mickiewicz University in Poznań, Poland) - Rud, Vitalii (Institute of Archaeology, National Academy of Sciences of Ukraine in Kyiv, Ukraine) - Romaniszyn, Jan (Faculty of Archaeology, Adam Mickiewicz University in Poznań, Poland) - Ilchyshyn, Vasyl (Kremenetsko-Pochaivskii Derzhavnyi Istoriko-arkhitekturnyi Zapovidnik, 47003 Kremenets, Kozubskogo 6, Ukraine) - Kochkin, Igor (Faculty of History, Politology and International Relations, Vasyl Stefanyk Precarpathian National University in Ivano-Frankiv'sk, Ukraine) - Kossakivski, Viktor (Vinnytsia State Pedagogical University, Vinnytsa, Ukraine) - Hildebrandt-Radke, Iwona (Department of Quaternary Geology and Palaeogeography, Faculty of Geographical and Geological Sciences, Adam Mickiewicz University in Poznań, Poland) - Niebieszczański, Jakub (Faculty of Archaeology, Adam Mickiewicz University in Poznań, Poland)

The selection of a space for a future burial place was one of the most fundamental acts that integrated prehistoric communities. The choice of the location of cemeteries had symbolic and practical significance. It flowed from past history and influenced the future activities of the founders and users of the necropolises.

The areas of the current Ukrainian Precarpathians were inhabited by communities that built mounds over graves in the Early and Middle Bronze Age (3rd and 2nd Millennium BC). These mounds formed long chains of cemeteries, sometimes stretching for many kilometers, and creating a kind of barrow landscape. The barrow necropolises were successively used by subsequent communities known in the archaeological record as the Corded Ware culture (2800-2200 BC) and the Komarów culture (1800-1400 BC).

The Precarpathian area has been archaeologically explored by the international Upper Dniester Expedition for nearly 15 years using multidisciplinary methods. Thanks to non-invasive prospections, excavations and multi-aspect specialist analyses, the rules of the funeral rites of the mentioned communities have been documented. Studies on funeral landscapes revealed the continuity of necropolis use for nearly 1,500 years, although with some interruptions and processes of adaptation and rearrangement of the funeral space.

The aim of this work is to present data and conclusions regarding the processes that took place during the adaptation of the funeral space. The authors present the specificity of the rituals, taking into account the chronological aspect, and answer questions about the main directions of the genesis of the barrow phenomenon. Thanks to a wide methodological spectrum, the characterized processes were placed within the broader socio-cultural context. The obtained results suggest that the Precarpathian area was an area with an original trajectory of socio-cultural development, in particular regarding the presence of unique and continuing forms of funeral rites.

11 THE DYNAMICS OF THE RITUAL LANDSCAPES CHANGES IN THE NORTH PONTIC STEPPE DURING ENEOLITHIC - BRONZE AGE

Androsov, Andriy (Independent researcher) - Teslenko, Dmytro (Independent researcher)

The onset of anthropogenic landscape changes in the North Pontic Steppe is associated with the architectural realization of the idea of a significantly sized kurgan in the late Eneolithic. The first monumental structures in the Steppe and equally served both burial and ritual functions. Comparative analysis and mapping of the early kurgans allow us to speak about the formation of unified ritual landscapes. For example, Monuments were located within direct visibility and were built according to unified technological and metric canons, using large stone slabs for cromlechs.

The Steppe is a territory where population turnover, along with ideology, was a common phenomenon. At the turn of 4th and 3rd millennia BC part of the obviously incoming tribes deliberately destroyed the architectural and symbolic integrity of the previous kurgan. They removed slabs from the cromlechs, which remained visible on the surface, but did not use them in burial practices. There was a kind of reloading of the ritual function of the kurgan, but the ritual landscape remained unchanged.

The time of Yamnaya culture is marked by mass construction of kurgans and, as a result, changes in the ritual landscape. All steppe space is covered with kurgans, located within direct visibility. Burial mounds from the previous period are included in this landscape.

The next changes in the ritual landscape are associated with the population of the Srubnaya culture. They built new kurgans, often of elongated forms and united the constructions of predecessors into unified "long" kurgans.

In the 12th-10th centuries BC, there were fundamental changes in the ideology of the Steppe inhabitants. Kurgans ceased to be used as burial sites, and settlements were often located at their foot.

Next landscape changes and the return of the kurgan to the functions of a ritual center occur in the Scythian period in EIA.

12 LONG-TERM SACRIFICIAL SITES OF THE DEER CULT IN EURASIA

Mykhailova, Nataliia (Institute of archaeology of National Academy of Sciences of Ukraine) - Kirkinen, Tuija (University of Helsinki)

In Northern Europe and Asia there are numerous sacrificial sites and sanctuaries of the deer cult, which origin from the Stone Age until the Middle Ages. As usual, they were associated with the most prominent places in the landscape, such as calving grounds, deer migration routes and hunting grounds. The inventory of the sacrificial sites included the attributes of the ritual offerings: deer/elk skulls, antlers and bones, weapons such as sacred tools for slaughtering deer, flints for making sacred fires, bowls for the sacred meal, and gifts to the Great Mother, e.g. deer figurines, jewellery, and coins.

The earliest known site is the Upper Palaeolithic Un'inskaya cave in the North Urals (northern Russia). At that site, accumulations of reindeer antlers were found that might be evidence of totemistic rituals. In the cave, there are layers that can be dated to the Bronze Age, Iron Age and Medieval period.

Several large sanctuaries were founded in the Neolithic period and functioned until the Middle Ages (Kanin Cave, Gliadenovskoe Bone Collection, Heibidia Pedar). Some sacrificial sites were associated with rock paintings (Pisany Kamen, Surukhtakh Kaya).

In the northernmost Europe, Sami offering sites emerged in ca 500-700 AD until the 17th century and even later. At these sites, people provided offerings, such as metal objects, reindeer antlers and heads, meat, or fish. The places selected for offering sites were often natural formations such as lakes and mountain tops.

In this presentation, we will give an overview of the sacrificial sites related to deer in Eurasia. Moreover, we will discuss the longevity and large areal coverage of this kind of sites.

13 THE PERSISTENCE OF MEMORY: USE, REUSE, AND COMMEMORATION OF THE ALTO DAS MADORRAS MEGALITHIC NECROPOLIS (MURÇA/ALIJÓ, PORTUGAL)

Sanches, Maria (Faculdade de Letras da Universidade do Porto; CITCEM, Centro de Investigação Transdisciplinar “Cultura, Espaço e Memória” (unidade de I&D 4059 da FCT)/FLUP.) - **Teixeira, Joana** (CITCEM, Centro de Investigação Transdisciplinar “Cultura, Espaço e Memória” (unidade de I&D 4059 da FCT)/FLUP; FCT (2020.06831. BD)) - **Ramos, Nuno** (Morph – Geociências, Lda. / Grupo Dryas. Rua Dr. José Augusto Saraiva de Aguiar, nº 18, 1º A, 5150-616 Vila Nova de Foz Côa, Guarda (Portugal).) - **Sá, Manuel** (Morph – Geociências, Lda. / Grupo Dryas. Rua Dr. José Augusto Saraiva de Aguiar, nº 18, 1º A, 5150-616 Vila Nova de Foz Côa, Guarda (Portugal).) - **Ferreira, André** (Morph – Geociências, Lda. / Grupo Dryas. Rua Dr. José Augusto Saraiva de Aguiar, nº 18, 1º A, 5150-616 Vila Nova de Foz Côa, Guarda (Portugal).) - **Almeida, Miguel** (Octopetala, Lda. / Grupo Dryas. Estrada de Coselhas, 107, 1300-125 Coimbra (Portugal).); **Uniarq** - Centro de Arqueologia da Universidade de Lisboa. Faculdade de Letras da Universidade de Lisboa, Alameda da Universidade, 1600-214 Lisboa (Portugal).)

Located on the biogeographical boundary of the Atlantic and Mediterranean regions in NW Iberian Peninsula, the Neolithic necropolis of Alto das Madorras is the region’s most extensive inland megalithic necropolis. Recognition of its heritage value resulted in its declaration of Public Interest site.

The topographic dominance of this monumental complex (which would have had around four dozen tumuli) over the surrounding territory emphasizes the value of funerary monuments as cultural landmarks, structuring the territory and settlement.

The subsequent creation of an adjacent sub-necropolis of lower tumuli proves the persistence of the Alto das Madorras sacredness in the Bronze Age.

If the impact of these landmarks in later communities’ imagination, if not ontologies, remains unknown to us, evidence shows that during Roman and medieval times the necropolis area was still crossed by important roads, eventually derived from Prehistoric pathways. We assume that travellers would not be indifferent to the Prehistoric monuments.

By the end of the 19th century, the necropolis was first extensively scavenged by systematic treasure hunting and then excavated archaeologically. Although the excavation methods are now outdated, their results served as a base for our present research, aiming to understand the necropolis’ long-term use throughout Late Prehistory.

Our present research further relies on the results of geophysical, pollinic, and petrographic analyses to set the global framework of the Madorras’ plateau funerary and secular long-term prehistoric occupation.

Finally, it should be stressed that the scientific approach isn’t the only consequent 20th/21st century focus on regional prehistoric sites. In a world driven by continuous tension between incompatible development strategies, where historical memory doesn’t always deserve adequate attention, the Buraco da Pala Prehistoric site was Christianised, while, paradoxically, the whole Serra de Passos seems to have been deprived of its relevant meaning to favour a new aeolian energy project.

14 CONTINUITY, CHANGE, USE AND REUSE: A CONCEPTUAL CONUNDRUM SEEN FROM PERDIGÕES ENCLOSURE

Valera, Antonio (Era-Arqueologia, SA)

In the approaches to the past, continuity, change, use, and reuse are concepts usually applied to features, monuments, and settlements, etc. They refer to biographies of those entities, or better, they traduced the perceptions of their biographers. Frequently, though, they sound more like boundless words. In fact, these are concepts that implicate a careful ponderation of the criteria used to organize and interpret what occurs within the fluidity of time.

Good contexts to reflect on these words as more bounded concepts, therefore more operative in the historical discourse, are those with a long-lasting life, following social trajectories in the long duration where these concepts can be tested and shaped.

Perdigões is one of these contexts. With a long biography in Late Prehistory (at least 1400 years, but certainly more), presents a complex set of scenarios spread over time that we may use to discuss these concepts used to organize the fluidity of life in time. So, for this presentation, I propose to question the dualities continuity/change and use/reuse through the ceremonial contexts of the central area of Perdigões, through its eastern funerary monuments, and through some other peripheral settlements.

15 THE CHALCOLITHIC ENCLOSURE OF CASTANHEIRO DO VENTO DURING THE BRONZE AGE: USE AND OBLIVION

Vale, Ana (University of Porto - FLUP/ CITCEM) - **Cardoso, João** (NOVA FCSH - CHAM)

Castanheiro do Vento (north-east Portugal) is a walled enclosure built and used during the 3rd millennium BC and was an integral part of the monumentalisation of the surrounding landscape. The site has been understood as a place of aggregation for both things and communities, with the formalisation of community structures, and the symbolic representation of everyday life.

At the turn of the 2nd millennium BC, the site changed. It shrank, accompanying shifts in how the landscape/territory was inhabited and the retraction of identifiable archaeological sites; and changes occurred in material culture, such as ceramics, with the emergence of new manufacturing techniques, shapes, and decoration, and with Cogeces pottery becoming identifiable at Castanheiro do Vento for the first time.

During the Middle Bronze Age (until circa 1300 BC) alterations to the landscape became more evident. Burial structures in pits appear, associated with Proto-Cogotas and Cogotas pottery (Medal) as well as stelae with anthropomorphic representations. Castanheiro do Vento seems to have been deactivated during this period, although it was revisited sporadically throughout the 1st millennium BC. This suggests shifts in identity dynamics, in the experience of the landscape, and a new understanding and materialization of symbolic practices.

Did the Castanheiro do Vento enclosure, built during the 3rd millennium BC, continue to be understood as a reference for identity during the 2nd millennium BC? Did its monumental, aggregating, and highly symbolic nature persist within Bronze Age communities? This presentation aims to explore these questions. Additionally, it considers that the site seemingly was forgotten after the 1st millennium BC, with no oral traditions or memories being preserved among current inhabitants of the landscape.

16 CONTINUITIES AND CHANGES IN RITUAL LANDSCAPES DYNAMICS: THE REUSE AND TRANSFORMATION OF MEGALITHIC MONUMENTS IN NORTHWESTERN PORTUGAL

Vilas Boas, Luciano (Minho University; Lab2PT) - **Bettencourt, Ana** (University of Minho; Lab2PT) - **Aluai Sampaio, Hugo** (University of Minho; Lab2PT) - **Almeida, Pedro** (University of Minho)

The construction of funerary megalithic monuments during the Neolithic pretended to immortalize the memory of the buried ancestors, but also contributed to model the Neolithic landscape. Creating artificial scenarios, this monuments assumed multiple meanings to the communities that coexisted and dealt with them within time and space.

This work intends to show how megalithic monuments maintained and maintain, until recent times, both a functional and a symbolic role linked to the different groups of people from the North of Portugal that interacted with them. Also, to demonstrate that the original role of these monuments was adulterated over time, originating a distinct relationship between people and megalithic monuments that culminated with the oblivion of some of those by local populations during the last 50 years.

Such a theoretical approach will focus both the archaeological evidence, placenames, and legends associated to several megalithic monuments and/or their surroundings, recurring to ancient cartography and documents. The collection of legends and oral traditions will be carried out by contacting with local elder and middle-aged populations that had any kind of knowledge about these monuments.

This approach will underline that multiple reutilizations, from regional Chalcolithic onwards, including during the Bronze and Iron Ages, apparently demonstrate that the original spiritual function of these architectures was changed and transformed, specially from Roman period, if not before, during Middle Ages. However, the persistence of place names (toponymy) and legends demonstrates their importance to the local traditional farmer and shepherd societies until the 1st half of the XX century. In fact, much of these monuments were actively used as special “landmarks” to effectuate physical boundaries of villages, councils, regions or countries.

17 BEYOND BIOGRAPHIES: A MULTI-STRANDED APPROACH TO UNDERSTANDING THE PAST IN THE PAST

Clements, Sheridan (Cardiff University)

Like an old farmhouse, we inhabit a planet of palimpsests in which we inherit, live within, and alter the material remains left behind by previous generations. These remains are encountered within each present context, and the ways in which we understand them depends upon individual experience as well as the collective memory (the shared understanding of the past, beliefs, and values) of the group.

The study of the palimpsest nature of the archaeological record, however, has been primarily confined to depth-studies – site biographies and changes in a place over time. While biographies may be incredibly useful, in order to fully

understand examples of 're-use' in prehistory and the cosmological understandings of time by various communities, we must also consider wider perspectives beyond the use and alteration of monuments in successive periods.

This project, as part of ongoing PhD research, aims to develop an approach to the palimpsest record from a different direction; a more breadth-focused study, concentrating on what interactions with the remnants of the past during the Iron Age may reveal about communities' concepts of the past, time, and identity. The project considers the ways memory practices may be materially visible in the archaeological record, using categories such as 1) landscape and placemaking, 2) settlement, structure, and organization, 3) material culture, status, and subsistence, and 4) treatment of the dead and investigates these in relation to the treatment of older sites, monuments, and material culture within three case study areas (Orkney and Caithness, Ireland, and the southwestern Fens).

395 OLD STORIES AND NEW DATA ON SLAVS. HOW TO INTERPRET THE GENETIC, LINGUISTIC AND SUBSISTENCE SHIFTS IN EARLY MEDIEVAL EUROPE?

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Machacek, Jiri (Masaryk University, Brno, Czech Republic) - Hofmanova, Zuzana (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany)

Session format: Regular session

Recently, new data from archaeogenetic research suggest a demographic shift at the beginning of the Early Middle Ages in Central, Southeastern and Eastern Europe. This is supported by new analyses of subsistence (via isotopes and lipids). Archaeologists have noted these changes much earlier, not only in specific parts of material culture (e.g. pottery) but more recently also in large archaeological datasets analysed by machine learning methods. Also, a linguistic change in this period is traditionally posited from linguistic research. All these developments are inevitably linked to a long-standing debate in anthropology, history and archaeology: the migration of the Slavs. According to some written sources (e.g. Procopius, Jordanes), the appearance of Slavic-speaking groups or people with specific habitus (housing, subsistence, social system, economy etc.) should have been the final dramatic act in the highly dynamic Migration Period. Indeed, at some point, a vast part of Europe became Slavic-speaking rather than Germanic-speaking. However, the question of how and when this change actually took place remains unresolved. Indeed, local indigenous communities may have 'become' Slavic not through migration but through language shift and acculturation.

While this debate has recently slowed down due to a lack of new data and the reinforcement of existing positions, new information from other methods is reopening it. In this session, we are looking for papers that bring new archaeological, historical, linguistic, genetic or bioarchaeological data to the discussion of the putative migration and ethnogenesis of the Slavs. We try to reflect the old stories in the light of new scientific data. The integration of results from all disciplines is necessary to grasp this complex question and also to guide further research in related fields.

ABSTRACTS

1 SHAPE SHIFTERS AND TWISTERS: MORPHOLOGICAL ANALYSIS OF CENTRAL EUROPEAN EARLY MEDIEVAL POTTERY

Nosek, Vojtech (Department of archaeology and Museology, Faculty of Arts, Masaryk University) - **Košťál, Martin** (Department of Archaeology and Museology, Faculty of Arts, Masaryk University) - **Macháček, Jiří** (Department of Archaeology and Museology, Faculty of Arts, Masaryk University)

Morphological analysis of 3D scans of archaeological artifacts opens opportunity to harness possibilities in the fields of morphometrics and surface typology for the study of early medieval pottery in Central Europe. When applied to a statistically significant dataset with an adequate number of complete vessels, this approach allows for the comparison of similar artifact series from different locations and archaeological contexts. This leads to unveiling correlations within and between datasets. We propose new approach that allows combination of pottery spatial data and shape of high number of ceramic vessels. Early medieval ceramics from Moravia and the surrounding regions (Bohemia and Western Slovakia) does not primarily serve the purpose of identifying Slavic ethnicity of its creators, which can be problematic, but as an indicator of characteristic distribution networks, technological development and social change (both users and creators). Further on, we can discern the system, which linked together regional producers and the technological linkages among communities and the populations across Central Europe.

2 THE SUBSISTENCE SHIFT BETWEEN LATE ANTIQUITY AND MIDDLE AGES IN CENTRAL EUROPE: THE DATING AND EXPLAINING BY A TRANSDISCIPLINARY APPROACH

Machacek, Jiri (Masarykova univerzita, Filozofická fakulta) - **Dunne, Julie** (University of Bristol) - **Prichystalova, Renata** (Masarykova univerzita, Filozofická fakulta) - **Zeman, Tomas** (independent researcher)

At the end of Migration period, the last of the large ethnolinguistic groups that subsequently shaped the continent's history—the Slavs—appeared. Thus, a large part of Central Europe became Slavic-speaking instead of Germanic-speaking, which is thought to have been the result of Slavic migration into Central Europe from Eastern Europe sometime between 500 and 700 AD. However, the question of how and when this transformation really occurred remains unresolved, as pots and other material remains alone cannot serve as the main and only indicator of Slavic migration from elsewhere. Did these groups differ from the indigenous population in their lifeways? The fruitful way to explore the change by archaeological means is through practices involved in cuisine. The cooks can express identity through variability in the food served or through the preparation and presentation of dishes representing cuisine. The shift in the kitchen culture, could reflect not only the social transition, but also the migration. The reliable method for identifying food remains is the analysis of organic residue in pottery. Was the eventual change in subsistence related to the new "Slavic" social and cultural model that emerged in Central Europe? Can this change be precisely dated? To answer these questions, organic residue analysis was carried out on Late Antique ("Germanic") pottery from Zlechov (n=24), dating to the 4th/5th century AD and on Early Medieval ("Slavic") pottery from the sites of Pohansko and Láňy from the 6th-7th century AD (n=51). Lipid recovery was 56%. For the first time, we combined the Bayesian modelling of numerous radiocarbon measurements with the analysis of the organic residues in the cooking vessels. In this way, we were able to precisely date the turning point of the change in the habitus of the local population.

3 EARLY MEDIEVAL SLAVIC DIET: THE MILLET QUESTION

Drtikolová Kaupová, Sylva (National Museum, Prague, Czech Republic) - **Vytlačil, Zdeněk** (National Museum, Prague, Czech Republic; Department of Anthropology and Human Genetics, Faculty of Science, Prague, Czech Republic) - **Hofmanová, Zuzana** (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Institute of Archaeology and Museology, Masaryk University, Brno, Czech Republic) - **Loskotová, Zuzana** (Institute of Archaeology of the Czech Academy of Sciences, Brno, Czech Republic) - **Macháček, Jiří** (Institute of Archaeology and Museology, Masaryk University, Brno, Czech Republic) - **Poláček, Lumír** (Institute of Archaeology of the Czech Academy of Sciences, Brno, Czech Republic) - **Zlámalová, Denisa** (Institute of Archaeology and Museology, Masaryk University, Brno, Czech Republic) - **Velemínský, Petr** (National Museum, Prague, Czech Republic)

As the beginning of the 9th century AD brought the gradual replacement of cremation burial sites by inhumations, the Great Moravian period (9th-10th century AD) is linked to the earliest Slavic skeletal series in Central Europe. Over the last decade, extensive isotopic analyses have enabled reconstruction of the Great Moravian diet, as well as descriptions of the agricultural practices applied.

This contribution considers new and previously published carbon and nitrogen isotopic data from Great Moravian sites (Mikulčice, Pohansko, Josefov, Prušánky), as well as from comparative Germanic datasets from the Migration Period (Kyjov, Mušov).

The clear difference in carbon isotopic values between the Germanic and Great Moravian samples confirms the hypothesis about millet being a "signature crop" of the Slavic populations. The subsistence shift must have occurred sometime between the 6th and 9th century AD. Further, intra-population differences in the proportion of animal products were found between proto-urban and rural sites, as well between distinct Great Moravian socio-economic groups. Finally, the isotopic values from Mikulčice and Pohansko are linked to genetic data describing the dietary characteristics of biological kinship groups.

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4 THE "MEGASITE" OF ROZTOKY AS A SOCIAL PROJECT

Kuna, Martin (Institute of Archaeology CAS, Prague)

The early medieval "megasite" in Roztoky (Czechia, end of the 6th-7th century AD, estimated at about 1000 sunken houses) represents a unique archaeological phenomenon and a great challenge to research. Despite intensive analysis of ecofacts and environmental data, no conclusive evidence for specific economic activities, subsistence strategies, or unusual types of events has yet been identified. Moreover, some of the details of subsistence figures indicate the difficulties of living in such a large community rather than its advantages. A potential way out of the dead end of current interpretations can be sought in other levels of community life, namely in levels connected with social identity and ideology.

The finds from Roztoky demonstrate not only the variability of individual types of material items, but also their biographies and mutual relationships. They show that people's behaviour was subject to complex rules, determining, e.g., the internal structure of houses and the ways in which they were abandoned and rebuilt. The rules of conduct were clearly linked to ritual and cosmology and were generally so strong that they could hardly have been the result of mere passive imitation of cultural tradition. Instead, one can assume a conscious subscription to a social identity, created and reproduced in opposition to other social systems. This assumption could become a new starting point for the interpretation of the site, but it can also contribute to the understanding of its broader historical context. If the patterns of material culture can be acquired by conscious choice, the relationship between material culture and other levels of the human world (e.g., genetic patterns, language) is loosened. This does not necessarily contradict migration theories, but it could explain some of their weaknesses, e.g. the problem of rapid demographic growth during the expansion, the apparent absence of direct contact with previous populations, etc.

5 THE IMPACT OF LALIA ON THE "INVISIBLE" EMERGENCE OF THE WESTERN SLAVS

Schneeweiss, Jens (Kiel University; Centre for Baltic and Scandinavian Archaeology; Leibniz-Zentrum für Archäologie)

The Western Slavs, in the territories south of the Baltic Sea between the Elbe and the Vistula rivers, can be traced from the 7th–8th centuries at the latest. It is still unclear how and when they appeared here. In the centuries around the middle of the 1st millennium AD, fundamental changes took place in large parts of Europe. The Germanic population that had previously lived here had left this area by the 6th century. This was followed by the "Dark Ages" (6th–7th century), a period about which little is known in detail. The Late Antique Little Ice Age (LALIA), a global cooling phase due to volcanic eruptions, falls into this period. It had a negative impact on grain growth in the northern latitudes. Consequently, in northern Europe, lifestyle models were favoured that did not depend on yields from crop cultivation. In the woodlands of Eastern Europe, people lived with a complex economic system that was adapted to the forest and apparently included swidden agriculture. The habitat of these people naturally expanded with the recovery of forests in the territories largely abandoned by the Germanic settlers before. Swidden agriculture probably promoted their successive spread. An assimilation with a hypothetically remaining small Germanic population is conceivable. Such a process leaves hardly any archaeologically detectable and correctly interpretable evidence. Most simple and chronologically insensitive material culture as well as only a small-scale impact on the surrounding environment mean that this population is archaeologically almost "invisible". Only at the end of the third quarter of the 1st millennium did these people come into contact with neighbouring cultures, when the situation in Europe began to consolidate. A certain social differentiation started at this point. Only at this stage is it possible to speak of the ethnogenesis of the Western Slavs.

6 MIGRATION OF ALPINE SLAVS AND MACHINE LEARNING: SPACE-TIME PATTERN MINING OF AN ARCHAEOLOGICAL DATA SET, PART 2

Stular, Benjamin (Research center of Slovenian Academy of Sciences and Arts)

The session addresses new data from archaeogenetic research that suggest a demographic shift at the beginning of the Early Middle Ages in Central, Southeastern and Eastern Europe. Our own recent research noted these changes in examining an archaeological Deep Data set using a machine learning method termed time series clustering and geospatial analysis called multiscale emerging hot spot analysis. It confirmed two separate migrations into the Eastern Alps: The earlier one sometime after 500 CE upstream the Mura and Drava rivers, and the later one sometime before 700 CE upstream the Sava river. The envisaged number of immigrants was relatively small and this process was by no means a mass migration like, for example, that of Theodoric's Ostrogoths or Alboin's Lombards. Along the Mura and Drava rivers, it likely took the form of a series of near neighbourhood colonisation of mostly uninhabited landscape. Along the Sava it was more akin to a small group infiltration. The next step of the study employed the convergence of evidence from archaeology, linguistics, and population genetics. Linguistics and population genetics have, independently from archaeology and from each other, also deduced that there were two separate migrations to the South-eastern Alps (present day Slovenia). The study was therefore able to define the immigrants as Alpine Slavs (no inverted commas), people who spoke Slavic and shared specific common ancestry and who immigrated in Eastern Alps in sixth and seventh century.

In the study described above, only existing interpretations from linguistics and population genetics were used. In this presentation, we will build on the published results by analysing the linguistic data in more detail using spatial analysis methods in the context of archaeological data. The aim is to gain evidence about the migrating people independently of the archaeologically discovered material culture.

7 GENOMIC TRANSECT OF EARLY MEDIEVAL MORAVIA AND SLOVAKIA UNCOVERS POPULATION TURNOVER

Zlámalová, Denisa (Department of Archaeology and Museology, Masaryk University, Brno, Czech Republic) - Macháček, Jiří (Department of Archaeology and Museology, Masaryk University, Brno, Czech Republic) - Hladík, Marek (Institute of Archaeology, Czech Academy of Sciences, Brno, Czech Republic) - Mazuch, Marian (Institute of Archaeology, Czech Academy of Sciences, Brno, Czech Republic) - Poláček, Lumír (Institute of Archaeology, Czech Academy of Sciences, Brno, Czech Republic) - Krupičková, Šárka (Institute of Archaeology, Czech Academy of Sciences, Brno, Czech Republic) - Ruttkay, Matej (Institute of Archaeology, Slovak Academy of Sciences, Nitra, Slovak Republic) - Ingrová, Pavlína (Department of Archaeology and Museology, Masaryk University, Brno, Czech Republic) - Krause, Johannes (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Hofmanová, Zuzana (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany)

In the 6th century, a population labeled as "Slavs" appeared in Central Europe. According to historical records, a principality connected to these people later existed in Moravia and neighboring territories. However, the processes leading to the formation of this principality are still debated due to the limited number of written records in this region and period. This is connected to a general question concerning a possible demographic turnover in this and surrounding regions. The hypothesis is challenging to address due to the cremation burial rite in key periods of the turnover and an extremely low number of genetically studied Slavic-related inhumations predating 1000 CE.

To provide insights into a proposed population turnover between the 5th and early 8th centuries CE, we investigate Migration Period and Early Medieval genomic data from Czechia and Slovakia where such material is available. This chronological transect clearly identifies a genetic shift in the region. Our findings support the hypothesis that the observable change in the material culture in this period was propagated by a demographic turnover with a significant impact on the later genetic diversity of the region.

Importantly, we also present genetic data from the oldest known inhumation connected to the Prague material culture (in its earlier phases associated with Prague-type pottery) that already evidences this demographic shift and hence points at genetic continuity from the 7th to the 10th century CE, to the period clearly connected to the "Slavs". In the later period, we show tight genetic connectivity of the sites allowing us to study social structure of the newly formed society, though there are also influences of genetic components present already in the region previously.

8 GEOGRAPHY AND CHRONOLOGY OF SLAVIC DISPERSAL IN CENTRAL AND EASTERN EUROPE ACCORDING TO ARCHAEOGENETIC DATA

Vyazov, Leonid (University of Ostrava) - Flegontov, Pavel (University of Ostrava; Harvard University) - Flegontova, Olga (University of Ostrava) - Ringbauer, Harald (Max Planck Institute for Evolutionary Anthropology) - Reich, David (Harvard University)

Limited suitability of PCA, ADMIXTURE, and qpAdm methods of genetic analysis relying on allele frequencies for distinguishing many populations that were important historical actors in the Roman and Migration Period Europe can be overcome by the implementation of an approach based on autosomal haplotypes, "identity-by-descent" (IBD). Imputation of missing genotypes, phasing and IBD inference were performed for ancient Eurasians using the ancIBD method (Ringbauer et al. 2023). IBD links for subsets of these individuals are represented as graphs, visualized with a force-directed layout algorithm, and most clusters that were inferred in these graphs with the Leiden algorithm are in remarkable agreement with archaeological evidence, reflecting communities of distantly related individuals. Based on this approach, we identified a distinct population group that existed in Central and East Europe from the late 2nd century CE to the Medieval period. This group played a significant role in population processes and, from the 6th century onwards, was identified in written sources as the Slavs. Considering recent linguistic and archaeological advancements, it is plausible that this group included Slavic speakers from its early formation. Considering the results of other analyses based on allele frequencies (PCA, ADMIXTURE), a hypothesis for the origin and history of this population can be proposed: it was formed in close vicinity of the Eastern Baltic region and dispersed over Central, Eastern, and Central-South Europe in several waves of migrations. The earliest representatives of this population group were found along the wide arc from the Middle Danube to the Middle Volga that limits from the south the poorly sequenced area with the domination of the cremation ritual, in the context dated to the late 2nd–early 3rd century CE. The latest individuals of this IBD cluster were buried in the Medieval Slavic-associated context.

9 ANCIENT DNA CONNECTS LARGE-SCALE MIGRATION WITH THE SPREAD OF SLAVIC-ASSOCIATED CULTURE

Gretzinger, Joscha (Max Planck Institute for Evolutionary Anthropology) - Mager, Hellen (Max Planck Institute for Evolutionary Anthropology) - Schwarz, Ralf (Landesamt für Denkmalpflege und Archäologie in Sachsen-Anhalt) - Muhl, Arnold (Landesamt für Denkmalpflege und Archäologie in Sachsen-Anhalt) - Orschiedt, Jörg (Landesamt für Denkmalpflege und Archäologie in Sachsen-Anhalt) - Biermann, Felix (Institute of History, University of Szczecin) - Slaus, Mario (Croatian Academy of Sciences and Arts) - Meller, Harald (Landesamt für Denkmalpflege und Archäologie in Sachsen-Anhalt) - Hofmanová, Zuzana (Max Planck Institute for Evolutionary Anthropology) - Krause, Johannes (Max Planck Institute for Evolutionary Anthropology)

Today, speakers of Slavic languages comprise around one-third of the European population and inhabit nearly a half of the European continent. Yet, there is no consensus among historians and archaeologists how this present-day distribution is connected to the spread of Slavic-associated material culture in the fifth to sixth centuries over major parts of Eastern and Central Europe, as the evidence from the written and archaeological record is characterised by both continent-wide similarities as well as region-specific trajectories. Consequently, the question of to what extent this cultural and linguistic transformation also affected the genetic composition of the continent has been a subject of enduring debate. Here we present an extensive dataset of genome-wide ancient DNA data from several sites in Central Europe, dating between 400 and 1200 CE and spanning the relevant phase of cultural and linguistic transition. We demonstrate that the arrival of Slavic-associated material culture in the studied regions is associated with a substantial influx of genetic ancestry from a region in present-day northern Ukraine and Belarus. Comparing archaeological and genetic evidence, we find that this change in ancestry coincided with a change in social organization, characterised by an intensification of inter- and intrasite genetic relatedness and strong signals of patrilocality and -lineality.

10 SLAVS ON THE ODER AND VISTULA RIVERS - ONE OF THE LONGEST DISPUTES OF POLISH ARCHAEOLOGISTS

Jedrzejska, Sylwia (University of Rzeszów)

Interest in the issues of the origin of the Slavs and the formation of their Early Medieval culture has a long tradition in Polish archaeology, dating back to the interwar period. The causes and the course of the processes that led to a pronounced cultural and settlement change in the Oder and Vistula river basins in the 5th to the 7th century are the subject of lively discussion. One of the key threads of the ongoing discussion is the 'eternal' presence of the ancestors of the historical Slavs in Central Europe north of the Carpathians or their arrival from the east in the 2nd half of the 5th or early 6th century at the earliest. As a result, it is possible to identify proponents among researchers of two main concepts – 'western' and 'eastern' (from the Polish point of view, autochthonistic and allochthonistic, respectively).

The paper will present the current state of research on the cultural-settlement situation of contemporary Polish lands at the beginning of the Early Middle Ages and how the available archaeological sources are interpreted. The main assumptions of the 'western' and 'eastern' hypotheses will be discussed, the arguments that have emerged with the development of the research, and the extent to which archaeologists reach for data outside their own discipline. In addition, the question will be raised – what impact on the development of the discussion have the recently published results of the study of ancient DNA of representatives of societies living in the Oder and Vistula river basins, buried in cemeteries dated from the 2nd century BC to the 4th century AD and from the late 10th(?) to the 13th century AD.

11 BECOMING SLAVIC - MIGRATION AND TRANSFORMATION

Brather, Sebastian (Albert-Ludwigs-Universität Freiburg)

What happened in East-Central Europe in the 6th and 7th centuries, is still quite unclear. Eventually, this region became Slavic. The name is first mentioned by Byzantine authors of the 6th century, who discovered the Slavs north of the Lower Danube. Archaeology cannot observe the changes directly, but can illustrate them by comparing the situation before and after. The spread of Slavic language(s) can only be seen in retrospect. How the migration of people and the transformation of culture were related to each other, can easily be transferred to the public sphere, and debated in terms of nation-states, "Urheimat", continuities, and priorities. Isotope analysis can identify non-locals and probable locals, but this refers to individuals and not to mass movements. The analysis of aDNA seems to offer new insights, but it is still quite unclear how geographical distinctions can be made and when the DNA characteristics developed – in the early Middle Ages or before? My paper will give a brief overview of this complex field which has to avoid mixing up the perspectives.

12 SLAVIC MIGRATION & ETHNOGENESIS - HISTORY & ARCHEOGENETICS

Heather, Peter (King's College London)

Our general understanding of the course of early Slavic History between the fifth century and c.700 AD has been hampered by an overall lack of data. Historical texts provide only a limited amount of information, with a strong bias in the available material towards Slavic expansion towards the west and particularly south of the Danube into the former Roman Balkans. The available stock of traditional archaeological material from this early period is also surprisingly sparse in some ways, with again a similar weighting towards the west and the south. This has left considerable room for reasonable disagreement among modern scholars, particularly when it comes to understanding Slavic origins, and the emergence of well-documented Slavic domination across large tracts of north-central Europe by the early Carolingian period. This paper will attempt briefly to analyse how the new insights emerging from the developing field archeogenetic investigation into early Slavic history compare with the models that might be supported by the available historical evidence.

396 EXPLORING EVERYDAY DOMESTIC LIFE: FROM THE NEOLITHIC TO THE EARLY MODERN PERIOD

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: van Gijn, Annelou (Leiden University) - Tagesson, Göran (University of Uppsala) - Craig, Oliver (York University) - Di Biase, Federica (University of Heidelberg)

Session format: Regular session

While the need for shelter could be said to be universal, most aspects of dwelling are not. How people live their lives in and around their dwellings is highly variable and is strongly connected to social practices and interactions. It is by asking the "small questions" of daily life, the simple and mundane, that we can start to address the extent and meaning of this variability and obtain a deeper understanding of the social aspects of dwelling.

Research into the domestic life of past peoples has recently been reinvigorated by the application of new methods of scientific analysis that shed light on craft activities, culinary practices, mobility patterns and social networks. Such detailed information obtained from seemingly mundane objects found at settlements are starting to paint an evocative picture of daily life in the past. Experimental archaeology can further highlight everyday tasks in the context of their environmental and social settings. With the ever-increasing trend to create 'big' datasets, there is a danger that these smaller-scale insights and the stories they reveal are overlooked. It is however, exactly in "Small things forgotten" (sensu James Deetz 1977) that we can start to obtain meaningful insights into how people lived in and around their houses. In trying to understand domestic buildings, we may ask questions about how houses and rooms were used and perceived, about spatial organization and the relation between the physical structures and their inhabitants.

In this session, we welcome contributions from a broad perspective - geographically and chronologically - on the themes of social practices of building (and rebuilding), living and dwelling. We are interested in papers dealing with house biographies and microhistory, households and habitation. Especially welcome are papers which address these issues from innovative methodological and theoretical perspectives that would elucidate the "small questions" of daily life.

ABSTRACTS

1 ECONOMIC BASIS OF THE EARLY NEOLITHIC SETTLEMENT IN GWOŹDZIEC, SOUTHERN POLAND: CONCLUSIONS FROM INTERDISCIPLINARY RESEARCH

Rauba-Bukowska, Anna (Institute of Archaeology and Ethnology, Polish Academy of Sciences (IAE PAS)) - Czekał-Zastawny, Agnieszka (Institute of Archaeology and Ethnology, Polish Academy of Sciences (IAE PAS)) - Kukułka, Agnieszka (Regional Museum Tarnów) - Craig, Oliver (BioArCh, Department of Archaeology, University of York) - Kufel-Diakowska, Bernadeta (Institute of Archaeology University of Wrocław) - Lityńska-Zajac, Maria (Institute of Archaeology and Ethnology, Polish Academy of Sciences (IAE PAS)) - Robson, Harry (BioArCh, Department of Archaeology, University of York) - Wilczyński, Jarosław (Institute of Systematics and Evolution of Animals, Polish Academy of Sciences (ISEA PAS)) - England, Fiona (BioArCh, Department of Archaeology, University of York)

From the second half of the 6th millennium BC vast areas of Central Europe were settled by the first farmers associated with the Linear Pottery culture.

The Gwoździec 2 site is currently the oldest settlement of this culture in Poland. The site is located within the sub mountain zone, in the Carpathian Foothills, nearby mountain passes, which were migration routes for the first farmers from the south. In the years 2016-2018, we carried out extensive excavations there. As a result, the entire household consisting of a longhouse and an extensive farm zone, was examined in detail.

As a result of excavations and interdisciplinary research, the main economic foundations of the inhabitants of the settlement were established, while discovering many previously unknown facts. The following were performed, among others: archaeobotanical, and archaeozoological studies, micro use-wear analysis of stone tools, petrographic and organic residues analyses of clay vessels.

The basis of the settlement's existence was, of course, agriculture, but gathering and hunting were almost equally important. Domestic animals were bred and cereals, peas and flax were grown. In addition, natural environmental resources were intensively used, i.e. forests, wetlands and streams, catching mammals, fish, mollusks and aquatic crustaceans, collecting fruits, nuts and leafy plants, herbs, grain of certain grass species. Thanks to such diversity, the diet of that time was varied and rich in nutrients. A diet based on animal products seems to be preferred. This is visible throughout the entire period of the settlement's development.

2 EXPLORING THE ARCHITECTURE OF PRACTICE IN THE ABSENCE OF THE HOUSE: COMBINING USE-WEAR AND SPATIAL ANALYSES TO INVESTIGATE ARTEFACT SCATTERS

Chan, Ben (University of Bristol)

The architecture of daily practice, defined here as the spatial, temporal and social organisation of craft and subsistence activities, is fundamental to the construction and reproduction of social relationships and social identity. Therefore, determining the location of activity areas across settlements is a key objective in many settlement studies. Such analyses are normally conducted in relation to domestic architecture, contrasting public vs. private, and household vs. communal spaces. What can we do, however, in cases where we are not fortunate enough for structural architectural features to survive?

This paper explores this question in relation to an artefact scatter known as the West Kennet Avenue occupation site. The site, dating to the Middle Neolithic, lies in the heart of the Avebury landscape in Southern Britain, a landscape better known for its dense concentration of prehistoric monuments. Previous research on the distribution of micro-denticulates across the site showed that a combination of use-wear analysis and the spatial analysis of flint tools revealed different phases of occupation of the site within the unstratified scatter of artefacts. This paper further explores the spatial patterning of artefacts, by including a broader range of tool types, to explore the degree to which the analysis can further distinguish the spatial organisation of activities on the site. Ultimately, it aims to show that in the absence of structural remains, we can still explore the architecture of settlement practices.

3 HOUSE OF CRAFTS - DOMESTIC LIFE IN THE LATE NEOLITHIC WETLANDS OF THE WESTERN NETHERLANDS

van den Dikkenberg, Lasse (Leiden University) - van Gijn, Annelou (Leiden University)

Domestic life is highly variable across time and space. Even in a relatively confined area such as the western Netherlands domestic life varies greatly across different settlements. This paper presents some preliminary results of the Putting Life into Late Neolithic Houses: Investigating domestic craft and subsistence activities through experiments and material analysis (grant number: AIB.19.020). Through micro-wear analysis on lithic assemblages, we will explore domestic life and craft activities on several Late Neolithic Vlaardingen Culture sites (3400-2500 BC), notably zooming in on two houses found in two different environmental zones. One house, from Vlaardingen Arij Koplaan, is located on a levee in the delta. The other house, from Den Haag Steynhof, is located in the coastal dune area. Although the sites are dated in the same period the activities that took place on these sites are varied. In Vlaardingen Arij Koplaan a wide range of activities took place, both wild and domesticated resources were actively exploited at the site. In Den Haag Steynhof a clear focus on hide-working could be discerned. This paper aims to seek an explanation for these differences. It furthermore highlights that domestic life is highly varied, also in earlier periods. It demonstrates the importance of detailed analyses of materials, households and houses in order to fully understand the various modes of domestic life.

4 PUTTING FOOD INTO LATE NEOLITHIC HOUSES: REVEALING HOUSEHOLD CULINARY PRACTICES IN 3RD MBC NETHERLANDS THROUGH INTEGRATED ORGANIC RESIDUE ANALYSIS

Kubiak-Martens, Lucy (BIAX Consult, Biological Archaeology & Environmental Reconstruction, The Netherlands) - Kenney, Andrew (BioArCh, Department of Archaeology, University of York, UK) - Lucquin, Alexandre (BioArCh, Department of Archaeology, University of York, UK) - van Gijn, Annelou (Faculty of Archaeology, Leiden University, The Netherlands) - Craig, Oliver (BioArCh, Department of Archaeology, University of York, UK)

Food is at the heart of every household, and while our knowledge of the types of plants exploited by prehistoric communities is well established, we have far less understanding of how these were prepared, cooked, and consumed. Yet without this knowledge, our picture of life in the early domestic settings is rendered incomplete. Food residues either found encrusted on the surface of ceramic vessels (foodcrusts) or extracted from their walls, provide an exceptional

source of information about how people prepared their daily meals, the types of foods cooked, and the vessels used. Still, the study of charred and degraded residues derived from multiple cooking events is complex and requires a transdisciplinary approach, from microscopy and botany to chemistry and the biological sciences.

Here, we investigated organic residues associated with pottery from three Vlaardingen culture domestic settlements in the Netherlands (c. 2900-2450 BC). We applied a combination of Scanning Electron Microscopy (SEM) and lipid residue analysis of foodcrusts and absorbed residues to investigate their use. The former approach was employed to examine fragments of cereal and other plant tissues, as well as non-plant tissues, that remained after cooking. Lipid residue analysis was used to differentiate fats and oils from ruminant, non-ruminant, aquatic (marine and freshwater), and dairy foodstuffs. Using this combined approach we were able to reveal differences in the types of plant and animal foods used and the ways they were processed across the different sites providing new insights into the diverse daily activities of the Late Neolithic inhabitants of the Rhine/Meuse delta.

5 DOMESTIC MATERIALITY, SPATIAL DYNAMICS, AND SOCIAL ORGANIZATION IN THE BRONZE AGE SETTLEMENT OF CABEZO REDONDO (VILLENNA, SPAIN)

Martín de la Sierra Pareja, Paula (University of Alicante) - García Atiénzar, Gabriel (University of Alicante)

Our study focuses on the Bronze Age site of Cabezo Redondo (Villena, Alicante). It follows an interdisciplinary line of research, analysing the site from an integral vision that includes activities, living and productive spaces, and the settlement, understood as an interconnected and concatenated system.

More than 70 years of excavations at the site have made it possible to document a group of houses organised into different terraces. In many cases, they were affected by destructive events, leaving a large part of their materiality under the collapsed layers. These events have produced contexts with a high degree of preservation, which allow us to approach the internal organisation of the domestic spaces in greater detail.

At the methodological level, we begin by studying the physical structure, its materiality, the practices of building and rebuilding, the spatial relationships and the adaptation or continuity of the dwellings throughout the period of occupation of the settlement. From there, we identify the aspects that define a social unit. These are the elements that allow the proper development and maintenance of daily life (food, storage, rest, etc.). Once the social units have been identified, we will analyse economic patterns and social relations, the change and persistence of domestic practices and the interpretation of spaces.

The aim is to observe the intersection between everyday processes and the socio-cultural framework in which these groups are embedded. By approaching everyday practices, it is possible to deduce how Bronze Age communities shaped their domestic environments. In this way it is possible to understand economic, family, and social life through the study of the most basic form of organisation, the domestic unit.

6 TAKING A CLOSER LOOK AT IBERIAN CULTURE: EVERYDAY LIFE IN THE CONSTRUCTION OF FEMALE GENDER

Rosell Garrido, Patricia (INAPH (University of Alicante))

The Iberian Culture is one of the main Mediterranean Iron Age cultures that inhabited the Iberian Peninsula during the second half of the 1st Millennium BC. The lack of a translation of their direct written texts makes it necessary to use the movable and immovable material record as an essential source of information in order to reconstruct the life of these protohistoric groups. However, as was the case in most ancient Mediterranean cultures, the domestic sphere had not been the focus of study until recently. This change was brought about by the introduction of new perspectives and research paradigms, such as Gender and Feminist Archaeology and the line of Archaeology of Everyday Life, Households and Maintenance Activities.

Nowadays, we can recognise the daily life of the population thanks to the micro-spatial studies carried out inside the rooms and dwellings of the Iberian settlements. Thanks to the application of a detailed methodology (spatial distribution, statistics and understanding of the archaeological contexts) together with a gender perspective in some Iberian settlements in the southeast of the Iberian Peninsula, we have been able to recognise the daily reality of Iberian women and their daily tasks. In this way, the type of dwelling and the spaces occupied by the material culture show the value of maintenance activities and how they change and are distributed according to the type of dwelling over time and the type of settlement. In this way, we are able to recognise the social role and economic weight of women both within the family and in the village as a whole.

7 THE "HOUSE OF THE DOMESTIC SHRINE", A FIFTH CENTURY BC DWELLING IN WESTERN SICILY (MOTYA). DOMESTIC SPACE, ACTIVITIES, AND PEOPLE

Bonanno, Giuliana (Università di Roma La Sapienza)

The House of the domestic shrine is a wide and articulated building located on the slopes of the acropolis of the island of Motya, a Phoenician colony in Western Sicily. With its complex layout, a place for domestic cults inside, and its luxury goods, it is thought to be an aristocratic house, emblematic of the wellness that the island was living in the fifth century BC.

This paper aims at retracing the history of the house, trying to figure out how much and in what ways it reflects the cultural changes the island underwent during the fifth century BC, how it was involved in the social dynamics of the community, and for how long.

By matching the data provided by the renovations and additions to the house over time with the analysis of the artefacts, their nature, quantity and location, we are going to try to clarify a few questions about the people who lived in the house, their number and the relationships they had with each other, as well as other issues about the use of spaces, daily activities, and the connection of the household with the sacred sphere.

Answering to these questions could provide us with a way to understand the everyday life and composition of a wealthy family living in fifth century BC Punic Sicily, its structural changes over the course of time, by taking in or leaving new people, rooms, objects.

8 EXPLORING HEARTHES, HOUSES AND HOUSEHOLD ACTIVITIES: CASE STUDIES FROM CENTRAL AND EASTERN CRETE DURING THE CLASSICAL AND HELLENISTIC PERIODS

Di Biase, Federica (University of Cyprus)

When approaching the study of houses in Crete during the Classical and Hellenistic periods, hearths certainly constitute a special lens through which to investigate daily practices and household activities. Cross-referenced evidence from older and more recent excavations shows that several houses from the central and eastern regions of the island were equipped with fixed hearths, which were mostly located inside a roofed room. This piece of evidence is significant for two reasons: first, the use of fixed hearths seems to be rooted in the Cretan tradition as there is extensive evidence of their employment from the Neolithic age onwards; second, because the use of fixed hearths was quite uncommon in the majority of Greek regions during the Hellenistic period.

Starting from the morphological and functional analysis of fixed hearths, I will delve into architectural and functional study of fixed-hearth-equipped rooms, in order to explore the multipurpose aspect of these domestic spaces.

9 DIVERSITY IN DOMESTIC LIFE: INSIGHTS FROM HELLENISTIC FARMHOUSES IN MACEDONIA

Plika, Peli (International Hellenic University)

This study explores the rich tapestry of everyday domestic life through an examination of Hellenistic farmhouses unearthed in Macedonia. Despite the universal need for shelter, the nuances of dwelling practices varied greatly, reflecting diverse social interactions and lifestyles. Drawing from archaeological excavations revealing seventeen Hellenistic farmhouses in Macedonia, we uncover a spectrum of architectural layouts and functional adaptations. These structures, ranging from single buildings to complex compounds, reflect a lack of strict typology, with design tailored to the inhabitants' needs and occupations. Location played a pivotal role, integrating structures into the natural landscape, while also influencing usage patterns. Through analysis of artifacts and spatial organization, we discern a mosaic of activities encompassing domestic chores, agriculture, craftsmanship, fishing, pastoralism, and military endeavors. This investigation underscores the significance of attending to the "small questions" of daily life, illuminating the intricacies of past social practices and the dynamic interplay between inhabitants and their built environment. By delving into these microhistories, we deepen our understanding of the social dimensions of rural dwelling across diverse geographical contexts.

10 VANDALS IN PEACE. INVESTIGATING DOMESTIC ACTIVITIES IN ROMAN AGE BARBARIAN SETTLEMENTS IN NE HUNGARY

Soós, Eszter (HUN-REN Research Centre for the Humanities, Budapest)

An ordinary 2nd-4th century AD Barbarian settlement outside of the limes of Province Pannonia and Dacia is usually characterized by hundreds of different features and large amount of finds that can be considered as domestic waste. The extensive fieldworks carried out in the last decades in NE Hungary provided great opportunities for the study of the settlements intra-site activity, going beyond the research tradition that only focuses on the problem of chronology and cultural classification.

I examined and compared the patterns perceptible in the spread of domestic waste from two, partly contemporaneous settlements of the Inner-Carpathian Przeworsk culture to define household units and better understand their functioning, a topic that is completely left in the dark by the written sources of the period.

Most of the data derived from the find material likely represents production and distribution (including consumption). As the find assemblage mainly consists of ceramics and animal bones, I primarily investigated eating habits. I also dealt with the remains indicating other domestic production, for example iron- and boneworking, weaving, et cetera. The distribution of the pottery, bone and metal finds have been analysed with multivariate statistical methods. With the help of the model focusing on functionality and spatial arrangement, separate units within a site became distinguishable. Based on the patterns offered by the model, I examine various interpretation possibilities.

Can this units be corresponded as separated households? Could the semi-subterranean buildings (Grubenhäuser) have functioned as residential buildings at all? What are the phenomena that may point to social differences or differences in the traditions and customs?

11 STR 15.2: EXCAVATING THROUGH THE LAYERS OF A ROMAN HOUSE IN ANTIOCHIA AD CRAGUM IN WESTERN ROUGH CILICIA/ANTIOCHIA AD CRAGUM

Remon Alvarez, Sergio (Utrecht University)

This presentation delves into a new, comprehensive excavation project of a Roman house in Antiochia ad Cragum, Asia Minor, shedding light on the multifaceted layers of Roman domestic architecture and its socio-cultural implications. Through meticulous excavation, the project reveals the architectural evolution and spatial organization of the house, offering insights into the daily lives, social structures, and urban development of the region during the Roman period. By integrating archaeological findings with comparative analysis of late antique houses across Asia Minor, the study explores themes of public use, privacy, spatial control, and representation within domestic settings. The findings highlight the intricate balance between private and public spheres, as evidenced by the architectural layout and decorative elements, which reflect broader trends in late antique urban housing. This research contributes to our understanding of domestic architecture in Asia Minor, providing a nuanced understanding of social identity, cultural practices, and urban transformation in the late antique period. Through the lens of the Antiochia excavation, the study not only reconstructs physical spaces but also reimagines the lived experiences of its inhabitants, offering a window into the complexities of Roman domestic life and its enduring legacy in the architectural and urban landscapes of Asia Minor.

12 SEEKING PROTECTION IN THE DOMESTIC SPHERE AT KARANIS

Souto Castro, Iria (University of Vigo)

This study will illustrate the religious motifs related to fertility, childbirth, motherhood, and childcare found in houses at the Fayumic site of Karanis in Ptolemaic and Roman times.

The meaning of the relevant depictions in artefacts and wall paintings will be discussed in the context of the architectural structures with which they are associated, and it will be argued whether earlier objects and decorations suggest the perseverance of previous pharaonic attitudes in the household practice of religious actions to the same protective end, or if the Hellenisation and the Romanisation implied significant changes.

Firstly, a general overview of Karanis will be presented to introduce the site. Then, through different case studies from the houses at Karanis, examples of these compiled artefacts, decorations, and structures will be described and analysed, regarding how they can be interpreted as cultic within the domestic setting. Similarly, a brief discussion on related motifs in artefacts and wall paintings from other periods, namely the Middle and New Kingdoms, will be provided.

13 LIVING IN CIRCLES: DAILY LIFE IN MENORCA FROM PROTOHISTORIC TIMES TO THE MIDDLE AGES

Torres Gomariz, Octavio (Universitat d'Alacant) - Pérez-Juez, Amalia (Boston University) - Smith, Alexander (SUNY Brockport)

The so-called "Cercles" (same word in Catalan) are domestic structures from the Post-Talayotic period (550-123 BCE), unique to the island of Menorca (Balearic Islands). Due to their monumentality and complexity, they have been excavated, studied, and interpreted consistently since the beginning of the 19th century. Many of these works have dealt with general aspects of the architecture, ceramics, use of space or exploitation of the immediate landscape. These studies have enabled scholars to trace a series of characteristics of the peoples who inhabited the Cercles throughout time. The next interpretive step is to fit all the pieces together to glean an accurate social and historical interpretation of these structures, including both the macro and micro aspects of daily life.

In this paper we will focus on the results of the workshop and monograph that we produced gathering information from many teams working on Menorcan Cercles. We also draw information from our experience as members of the

Menorca Archaeological Project (MAP), where we examine these domestic spaces from a diachronic and holistic perspective with the goal of understanding their uses by different cultures over the past 2500 years. With the compilation of this information, we have the tools to better approach future studies of these unique and well-preserved Iron Age dwellings.

However, we don't want to focus on just the general features of these houses, but rather "the small stories" of daily life and use of space. We will show how modifications in the Cercles followed social practices that reflect interactions with the wider Mediterranean. In other words, we aim to study the Cercles through their own biography. We want to present an intersectional panorama of different moments in a single dwelling that can express phenomena of varying complexity, such as the articulation of gender, status, or cultural origin.

14 **BIG VILLAGE LIFE: AN IMAGE OF HOUSEHOLDS IN A MEDIEVAL FORTIFIED VILLAGE IN SOUTHERN MORAVIA**

Šimík, Jakub (MUNI - Ústav archeologie a muzeologie; ARCHAIA Brno z. ú.)

The contribution presents archaeological manifestation of life in a medieval fortified village in the specific environment of Southern Moravia (Czechia). The focus of the contribution are the results of extensive rescue excavations of a deserted medieval village called „Kapansko“ which was established in the 13th century. Several households with preserved above-ground parts of houses were captured by modern documentation methods (such as photogrammetry). Excavations have also uncovered a number of archaeological evidence showing the aspects of villagers' everyday life, which was set in the scenery of a strictly wood-and-clay fortified village. These include ways of using public space, using various storage spaces, dealing with waste disposal, how inhabitants obtained water and how they got rid of its excess, or even some folklore (non-Christian) habits shown in the archaeological record of the village. These factors, together with the still unanswered question of the village's demise, create the environment for the reconstruction of daily life in this medieval village.

15 **HOUSES AND EVERYDAY DOMESTIC LIFE IN EARLY MODERN SWEDISH TOWNS**

Tagesson, Göran (University of Uppsala) - Lindström, Dag (Uppsala university)

Apart from architecture and building traditions, houses are above all associated with social organization, ways of living and living together, organizing family life and production. The built structure is influenced and shaped by practical and functional factors, but also by traditions, norms and style. Conversely, the built structure affects life and how it is organized. Houses in general, but also the individual house, change and are affected by life and activities in the house.

Archaeological documentation of houses holds many possibilities; to study the design and change of the physical environment over long periods. But the possibilities of combining houses and change with detailed knowledge of social organization are limited before historic times. Around about 1980, the concept of household archeology was launched as a way to bridge the gap between large structures and stories on an aggregate level and the individual buildings. The possibilities of discussing the household (i.e. the group that lives, eats and works together) in relation to the physical house is a challenge.

The Houses and Social Practice AD1600-1850 (Uppsala university, Sweden) project combines archaeological documentation of standing buildings and buildings documented underground, with the historical household as it appears in contemporary written source material. The project focuses on issues around houses and households, during a period where both houses and the households are undergoing strong change. The interdisciplinary approach should be seen as a kind of laboratory, where we apply a clear micro-historical method to study agents and social structures. Gender is an important aspect, to study the relationship within the household and the home. Life course is also an important concept, where the changing relationships of the house, the household and the individuals over time are crucial to capturing the dynamics.

16 **HEAT AND LIGHT IN AN EARLY MODERN CONTEXT - WHAT DO THEY TELL US ABOUT DWELLING IN THE PAST?**

Eriksdotter, Gunhild (Uppsala university) - Qviström, Linda (Uppsala university; Upplandsmuseet)

The use of heat and light is closely entwined with the use of dwellings. In early modern houses, heat and light were facets that needed planning and maintenance. Their availability varied between different social contexts, but for everyone they in part formed the conditions for what could be done where and when.

Constellations of heat- and light sources, and distinctive room features, reflect conditions and strategies used to create indoor climates on different scales, and the use of light for various purposes.

Despite the importance of heat and light in early modern dwellings, this is a relatively unexplored field of research in archaeology as well as in architecture and history.

In this paper, we present a recently started research project, in which we address heat and light in relation to spatial structures of houses, and in relation to what different spaces may have been used for, and by whom. The aim is to include in our analysis a wide range of features that have affected indoor climate and lighting conditions, in order to broaden the understanding of dwelling and dwellings.

We will present examples where different sources of heat and light have been used for specific activities, and where a deliberate effort to take account of the indoor climate is noticeable in the design of different rooms.

An important question is, how the interaction between spatial design and the use of heat and light has transformed over time, and how this relates to other contemporary changes in the buildings.

Although we focus on early modern buildings in Sweden, we believe that the theme is relevant to anyone working with the concept of "dwelling", regardless of time and place.

17 **THE AGENCY OF EARLY MODERN CROFTERS - A MICROARCHAEOLOGICAL APPROACH TO DWELLING**

Williamsson, Sara (Lund university)

In the 1860's there were approximately 100 000 crofters in Sweden. None of them owned the land they lived on, and they paid dues in the form of day labour, cash, or kind to their landlord. This group of rural subalterns were often marginalized in the landscape and in society, as well as in the written records. Subsequently, qualitative research on crofters have sometimes been claimed to be difficult - in previous research they are often presented as a collective. Yet, when surveying the material remains of the crofts, it is obvious that they differ a lot in both location and appearance. Can these differences be connected to the agency of the crofters? How much influence did they have on the layout and organization of their croft? This presentation focuses on the theories and methods of an on-going PhD-project, where the agency of some individual crofters is explored through a microarchaeological approach. By focusing on the crofters' dwelling, and on their perception of their environment, a more nuanced understanding of this marginalized group might be possible.

398 **WHAT DO ANIMAL BONES HAVE TO OFFER? ZOOARCHAEOLOGY AND TAPHONOMY DURING THE MIDDLE TO UPPER PALAEOLITHIC TRANSITION IN SOUTHERN EUROPE**

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Real, Cristina (Departamento de Prehistoria, Arqueología e Historia Antigua, Universidad de Valencia) - Silvestrini, Sara (Department of Cultural Heritage, University of Bologna) - Vidas, Lia (Centre for Applied Bioanthropology, Institute for Anthropological Research) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main; Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia)

Session format: Regular session

One of the most extensively researched Palaeolithic topics revolves around the disappearance of Neanderthals and the subsequent expansion of anatomically modern humans (AMH). This pivotal shift, known as 'Middle to Upper Palaeolithic Transition' was of particular significance in Southern Europe, where Neanderthal populations survived longer and, at some places, coexisted with the first AMH.

Much research has explored this key transition event, employing the study of archaeological sites occupied by Neanderthals and AMH, with the primary goal of defining and comparing the economic behaviors, technological advancements, and cultural traditions of each group.

Within the context of this discussion, faunal remains have proven to be a unique and ubiquitous window into lifeways of these hunter-gatherer groups. The zooarchaeological and taphonomic analysis plays a pivotal role in elucidating human behaviors and gaining insights into the subsistence and adaptation strategies used to exploit diverse ecological environments.

In this session, we aim to provide a podium for presenting works focused on faunal remains dating to the mentioned period. This encompasses remains of both macro and mesofauna, mammals categorized as "small game", as well as avian, fish, and mollusk remains. We welcome studies with a zooarchaeological and taphonomic approach, offering data on hunting, processing and consumption techniques, and diet composition, alongside experimental approaches. We also invite contributions based on biomolecular analytical techniques such as isotopic and proteomic studies e.g., ZooMS, and the analysis of amelogenin, which can provide fresh and new perspectives on different paleoenvironmental and economic aspects.

The ultimate objective is to foster discussions on the disparities and similarities in the daily economic activities of Neanderthals and AMH, as well as the environmental factors influencing their changes. Additionally, we aim to serve as a starting point for consolidating the latest research findings on animal remains and the future prospects offered by emerging analytical techniques.

ABSTRACTS

1 REVIEW OF THE FAUNAL ANALYSIS FROM MIDDLE TO UPPER PALAEOLITHIC TRANSITION IN SOUTHERN EUROPE

Silvestrini, Sara (Department of Cultural Heritage-Ravenna campus, University of Bologna, Italy) - Real, Cristina (Departamento de Prehistoria, Arqueología e Historia Antigua, Universitat de València, Spain) - Vidas, Lia (Centre for Applied Bioanthropology, Institute for Anthropological Research, Zagreb, Croatia) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main, Germany; Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia)

The Middle Palaeolithic (Neanderthals) and Early Upper Palaeolithic (Anatomically Modern Humans) human groups occupied different habitats across southern Europe. Despite their distinct cultural characteristics, both groups demonstrated the ability to exploit all available animal resources and incorporate them into their diets based on availability and necessity. However, it is yet to be determined whether their subsistence patterns were consistent or varied, and the reasons for any discrepancies between them are still unknown.

Therefore, this work provides a critical evaluation of the results of archaeozoological analyses done in recent years in this region. This assessment covers the archaeozoological and taphonomic study of macro- and mesofauna assemblages, as well as other smaller prey. The review concentrates on hunting patterns, diet composition and processing techniques. Furthermore, it includes information obtained from biomolecular analysis techniques, such as (stable) isotope analyses, proteomics (e.g. ZooMS) and radiocarbon dating. These approaches aid in gaining a deeper understanding of the faunal assemblage and hunting strategies of the studied human groups (including the identification of hunted animals and the treatment of carcasses). Additionally, these techniques play a crucial role in precisely reconstructing the climate and environment. The analysis of amelogenin to determine the sex of animal samples, is still a relatively underdeveloped area that requires further exploration to unlock its full potential.

The aim of this work is to provide a broad overview of the economic and paleoenvironmental aspects related to the management of animal resources by both human groups. This will aid in establishing whether common patterns existed across southern Europe or if there were significant differences in the behaviour of Neanderthals and anatomically modern humans (AMH).

2 NEANDERTHAL SUBSISTENCE STRATEGIES WITHIN THEIR HUNTING GROUNDS AT TEIXONERES CAVE (SPAIN) AND PIÉ LOMBARD ROCK SHELTER (FRANCE)

Uzunidis, Antigone (Paris 1 Panthéon-Sorbonne university; Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA)) - Blasco, Ruth (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA)); Departament d'Història i Història de l'Art, Universitat Rovirai Virgili) - Brugal, Jean-Philip (CNRS, Aix Marseille University, Minist. Culture, UMR 7269 LAMPEA) - Fourcade, Tiffanie (Archéosciences Bordeaux, UMR 6034, Université Bordeaux Montaigne - CNRS - EPHE; Environnements et Paléoenvironnements Océaniques et Continentaux (EPOC), UMR 5805, Université de Bordeaux) - Ochando, Juan (Department of Plant Biology (Botany Area), Faculty of Biology, University of Murcia; Sapienza University of Rome, Department of Environmental Biology) - Rosell, Jordi (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Departament d'Història i Història de l'Art, Universitat Rovirai Virgili) - Roussel, Audrey ('Archaeology of Environments and Resources', ASM laboratory, UMR 5140, 'Archaeology of Mediterranean Societies', Université Paul Valéry-Montpellier 3) - Rufa, Anna (ICArEHB - Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour, Universidade do Algarve; PACEA UMR 5199, Univ. Bordeaux) - Sanchez Goni, Maria (Environnements et Paléoenvironnements Océaniques et Continentaux (EPOC), UMR 5805, Université de Bordeaux; Ecole Pratiques des Hautes Etudes, PSL University) - Rivals, Florent (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Departament d'Història i Història de l'Art, Universitat Rovirai Virgili; ICREA)

Issues about Neanderthal subsistence behaviours are often disconnected from their complete environmental setting, especially when considering animal communities and vegetation structures. Their hunting strategies, however, are closely related to those factors. Our aim is to link the hunting grounds operated by Neanderthal to their prey acquisition patterns within three distinct habitats. Two middle Paleolithic sites have been analysed: Teixoneres Cave (TX; MIS 3, Spain) and Pié Lombard (PL; MIS 4, France). According to marine core pollen, dental mesowear and microfauna, TX-Unit IIIa corresponds to a mosaic landscape and TX-Unit IIIb was probably more forested, when PL 'ensemble II' biotope was divided between mountainous and forested areas. Dental microwear allows to reconstruct

within the regional environmental settings the habitats that were favoured by predators for prey selection. This aspect was discussed both in term of frequency (NISP/MNI) and in term of potential meat intake. At PL, Neanderthals relied on diverse taxa (mainly two ungulate species: red deer and ibex as well as rabbits and birds) exploited in semi-open hunting grounds. At TX, Neanderthals focused on large gregarious ungulates in open areas. Large herds of herbivores found in open spaces environments may have enabled Neanderthals to select only few species (here: red deer, aurochs and horse). However, they developed distinct hunting strategies. In Unit IIIa, they do not appear to have made any selection within the most abundant species while in Unit IIIb, they mostly focused on aurochs and opportunistically predated very young red deer. Thus, Neanderthal subsistence strategies are indeed diverse and partially related to the biome they lived in. Prey behaviour and habitat are decisive in Neanderthal strategies but other socio-economical factors are involved in determining specific procurement objectives for prey acquisition patterns.

3 NEANDERTHALS AND MODERN HUMANS IN COMPARISON: HUNTING STRATEGIES AND CARCASS EXPLOITATION BETWEEN THE MIDDLE AND UPPER PALAEOLITHIC IN CENTRAL-SOUTHERN ITALY

Boschin, Francesco (Università degli Studi di Siena, DSFTA; Accademia dei Fisiocritici, Siena, Italy; Centro Studi sul Quaternario ODV, Sansepolcro, Italy) - Paolo, Boscato (Università degli Studi di Siena, DSFTA; Accademia dei Fisiocritici, Siena, Italy) - Ronchitelli, Annamaria (Università degli Studi di Siena, DSFTA) - Moroni, Adriana (Università degli Studi di Siena, DSFTA; Centro Studi sul Quaternario ODV, Sansepolcro, Italy) - Spagnolo, Vincenzo (Università degli Studi di Siena, DSFTA) - Jacopo, Crezzini (Department of Biology, University of Florence; Università degli Studi di Siena, DSFTA; Accademia dei Fisiocritici, Siena, Italy)

This study compares the results of zooarchaeological analyses conducted on faunal assemblages from different sites in central-southern Italy: Grotta di Santa Croce, Riparo l'Oscurusciuto, Grotta del Cavallo, Grotta Paglicci (Apulia), Grotta di Castelcivita (Campania) and Grotta dei Santi (Tuscany). These contexts refer to both Mousterian and Upper Palaeolithic technocomplexes (MIS 4-3), giving us the possibility of identifying similarities or behavioral differences between Neanderthal and MH populations. Although both Middle and Upper Palaeolithic populations hunted roughly the same large mammal prey, substantial differences were found in the killing-age of the individuals, showing changes in the exploitation of ungulate herds. Hunting by Neanderthal groups was focused on adult and senile individuals, rather than juveniles and sub-adults. Furthermore, it was possible to highlight a specific treatment of carcasses during the Mousterian: some anatomical elements, such as basipodial and acropodial bones and epiphyses of long limb bones, were found to be very rare, as well as spongy bone fragments in the taxonomically unidentified sample. Taphonomic analysis of the bones exclude the alteration of the assemblages due to scavengers (large carnivores) or post-depositional phenomena. The selection of a restricted range of age-classes by Neanderthals, along with the methods followed in the treatment of the ungulate carcasses can be related to a peculiar exploitation of animal resources based on nutritional needs and/or specific adaptations to the environment.

4 HUMAN DIET AND ECOLOGY DURING THE MIDDLE TO UPPER PALEOLITHIC TRANSITION IN PORTUGUESE ESTREMADURA: THE CASE FROM LAPA DO PICAREIRO

Carvalho, Milena (Interdisciplinary Center for Archaeology and Evolution of Human Behaviour) - Ellis, Grace (Dept. of Anthropology and Geography, Colorado State University; Interdisciplinary Center for Archaeology and Evolution of Human Behaviour) - Benedetti, Michael (Department of Earth and Ocean Sciences, University of North Carolina Wilmington; Interdisciplinary Center for Archaeology and Evolution of Human Behaviour) - Friedl, Lukas (Department of Anthropology, University of West Bohemia; Interdisciplinary Center for Archaeology and Evolution of Human Behaviour) - Cascalheira, João (Interdisciplinary Center for Archaeology and Evolution of Human Behaviour) - Bicho, Nuno (Interdisciplinary Center for Archaeology and Evolution of Human Behaviour) - Haws, Jonathan (Department of Anthropology, University of Louisville; Interdisciplinary Center for Archaeology and Evolution of Human Behaviour)

Identifying continuity or change in human behavior through time during the Middle to Upper Paleolithic transition is critical for understanding the processes which led to the disappearance of Neanderthals and dispersal of modern humans on both local and regional scales. Portuguese Estremadura (central Portugal), though typically an understudied region in Paleolithic research, has several key Middle and Upper Paleolithic sites, some of which have demonstrated the ecological plasticity of Neanderthals in their hunting strategies. However, little is known about the subsistence of the earliest Upper Paleolithic humans in Iberia, and this is in large part due to the small number of early Aurignacian sites on the Peninsula. Lapa do Picareiro is one such rare site on the Iberian Peninsula, a cave site with a deep stratified sequence of late Middle Paleolithic (~45-42ka cal BP) and Upper Paleolithic deposits containing evidence of early Aurignacian (~41-38ka cal BP) occupations. With large and well-preserved faunal assemblages, Picareiro offers the opportunity to assess Neanderthal and modern human diet and ecology in a stratified and well-dated site with a growing number of paleoenvironmental records. Here, we present new zooarchaeological, taphonomic, and spatial

data from terminal Mousterian and early Aurignacian deposits (Levels KK-GG) from Picareiro. When utilized with taphonomic and zooarchaeological data, spatial analyses, like hot spot analysis and density-based clustering, highlight important human and nonhuman activity patterns at the site, allowing us to draw comparisons between the Paleolithic occupations and their taphonomic histories. Using these data, we reconstruct human diet and ecology during the Middle to Upper Paleolithic Transition in Portuguese Estremadura and assess whether human behavior changed or continued during this important transitional time in human evolution.

5 HOW TO TAKE SEASONALITY ANALYSIS A STEP FURTHER? A COMBINED ZOOARCHAEOLOGICAL AND GEOARCHAEOLOGICAL APPROACH

Roussel, Audrey (Paul Valéry University of Montpellier 3; UMR 5140 ASM) - Vandeveld, Ségolène (University of Québec at Chicoutimi; CERM/LHASO) - Gourichon, Lionel (Côte d'Azur University; CNRS, UMR 7264 CE-PAM) - Brugal, Jean-Philip (Aix Marseille University; CNRS, UMR 7269 LAMPEA)

In this presentation, we propose a new methodological approach combining the study of archaeofauna with fuliginochronology, which allow to precise temporality of occupation events. These high-resolution approaches were successfully applied to two levels (E & D) of the Mandrin middle Palaeolithic site (Drôme, France, OIS 3).

The first approach combines classical ageing methods (based on tooth eruption and wear) with dental cementum analysis for providing biological age and slaughter season of the main ungulate animal preys. Data from the archaeofauna allow to determine the composition of the animal groups hunted and their season of acquisition.

The second, the fuliginochronology, is a method that uses microscopic observation of the soot deposits recorded in speleothems (broadly defined, including thin wall carbonate crusts). The speleothems of Mandrin Cave are annually laminated, similar to tree rings, with a micritic lamina formed during dry season and a sparitic lamina formed during wet season. By recording the position of soot deposits regarding there calcite annual doublets, we can determine the season of each occupation event. Each method complements the other and provides details that could not be attained using just one of these approaches. Indeed, archaeofauna provides information about 4 solar seasons and the seasonality information is much more precise than with fuliginochronology. Microtaphonomic analysis, especially on cementum also supplies information on the conservation of signals. On the other hand, fuliginochronology provides information about the hydric seasonality for each occupation event and offers a way to “decumulate” data. This presentation will show how, by cross-referencing the results obtained, we were able to determine the seasonality of occupation of the shelter (hydric & solar), to perceive the rhythmicity, continuity and/or changes in function of the site over time and, ultimately, approach the mobility of human groups in the late Middle Palaeolithic in the Rhône Valley.

6 AMELOGENIN ANALYSIS OF FAUNAL DENTAL SAMPLES IN EL SALT'S STRATIGRAPHIC UNIT XA (ALACANT, SPAIN): DECIPHERING NEANDERTHAL SUBSISTENCE APPROACHES

Egüez, Natalia (University of California Davis; Universidad de La Laguna) - Parker, Glendon (University of California Davis) - Pérez, Leopoldo (Universitat de Valencia; Institut Català de Paleoecologia Humana i Evolució Social IPHES) - Hernández, Cristo (Universidad de La Laguna) - Eerkens, Jelmer (University of California Davis) - Mallol, Carolina (Universidad de La Laguna)

Over the past decades, researchers have characterized neanderthal subsistence strategies as intricate processes encompassing controlled procurement of raw materials and extensive utilization of plant resources. This includes the use of fire and their adeptness in hunting prey of various sizes.

Distinguishing between males and females within zooarchaeological collections can yield insights into sex-specific animal exploitation strategies, offering vital information directly relevant to hominin planning depth, anticipatory skills, mobility, and land utilization. However, obtaining details about foraging efficiency and ungulate mortality patterns is often challenging, with a significant dearth of gender-specific data in many Middle Pleistocene bone assemblages. While aDNA sequencing is a viable approach, its limitations encompass elevated costs, time constraints, and the potential for failure owing to the compromised quality of residual DNA. Recent evidence underscores the indispensability of proteomics in estimating sex for osteological and shotgun-genomic analyses.

Situated in Alcoi (Alacant, Spain) at an elevation of 680 meters above sea level, the archaeological site of El Salt is an open-air rock-shelter characterized by a 38-meter-high travertine wall situated at the base of the excavated region. The site encompasses a stratified deposit divided into 13 stratigraphic units.

In recent years, the research emphasis at El Salt has centered on SU Xa, dating 52.3 ± 4.6 ky BP. This unit is distinguished by an abundant and varied archaeological assemblage featuring lithic artifacts, faunal remains, and well-preserved, flat, short-lived combustion structures. The faunal analysis suggests a focus on the utilization of medium-sized mammals: wild goats (*Capra pyrenaica*), deer (*Cervus elaphus*), and horses (*Equus ferus*).

Here, we report the results from enamel samples from the three main species present in SU Xa. Enamel samples were processed to identify AMELY and AMELX-specific peptides (i.e., the biomarkers of X and Y-chromosomes,

respectively), providing proteomic estimates of each individual's sex through nano-liquid chromatography-tandem mass spectrometry.

7 CUTMARKS AS KEYSTONE OF COMPREHENSION OF PAST BUTCHERING PRACTICES: THE CASE OF THE QUINA MOUSTERIAN BUTCHERING CAMP 'LES PRADELLES' (FRANCE)

Regis-Franzke, Enya (TRACES UMR 5608 - University of Toulouse (Jean-Jaurès)) - Soulier, Marie-Cécile (TRACES UMR 5608 - University of Toulouse (Jean-Jaurès)) - Costamagno, Sandrine (TRACES UMR 5608 - University of Toulouse (Jean-Jaurès))

Numerous ethnographic examples testify the importance of acquiring skin and fur for hunter-gatherer populations, especially those living in the northern areas. Skin removal and processing are valuable activities which are planned in advance on a seasonal basis to ensure sufficient stock for the manufacture of clothing, tent fabrics and other items. The use of the skin is widely codified both in terms of uses and sociology, and is intimately linked to the species and its anatomical origin. Indeed, depending on age and gender, people wear different types of skin or fur. The skin removal methods are also related to its final destination, as well as its quality.

In Palaeolithic contexts, the use of the skin is frequently documented through traceological analyses lead on lithic tools or more occasionally on bone tools, or through indirect evidence such as the spatial distribution of some archaeological remains usually associated with skinning activities. Even if these analyses can identify skin-related activities and sometimes specific steps in the skinning « chaîne opératoire », the cutting patterns (fully determined by the use of the skin) remain imperceptible.

Few years ago, a butchering reference-set providing data for identifying skin removal evidence on deer was published (Soulier and Costamagno, 2017; Costamagno et al., 2019). We applied this frame of reference on two Quina Mousterian bone assemblages of les Pradelles, Charente, France (layer 4a and 2b). Noticeable differences in skin removal have been perceived, and we explore the implications of these results in term of use, and also in term of site function. Finally, we discuss the importance of the skin for these Neanderthal populations.

8 A NEW EXPERIMENTAL PROGRAM TO UNDERSTAND THE EXPLOITATION OF RABBIT BY BOTH NEANDERTHALS AND ANATOMICALLY MODERN HUMANS

Real, Cristina (Departamento de Prehistoria, Arqueología e Historia Antigua, Universidad of Valencia, Spain) - Carvahlo, Milena (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour, Universidade do Algarve, Portugal) - Haws, Jonathan (University of Louisville, USA) - Rufà, Anna (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour, Universidade do Algarve, Portugal; PACEA-UMR 5199, Université de Bordeaux, France) - Sanchis, Alfred (Museu de Prehistòria, Servei d'Investigació Prehistòrica, Diputació de Valencia, Spain) - Pérez, Leopoldo (Departamento de Prehistoria, Arqueología e Historia Antigua, Universidad of Valencia, Spain; Institut Català de Paleoecologia Humana i Evolució Social IPHES, Spain) - Martínez, Abel (Departamento de Prehistoria, Arqueología e Historia Antigua, Universidad of Valencia, Spain)

Palaeolithic human groups in the Mediterranean and Portugal regions of the Iberian Peninsula consumed several small prey species. Leporids are an abundant small game in the archaeological assemblages, representing between approximately 50% (Middle Palaeolithic) and over 80% (Upper Palaeolithic) of the faunal remains. Neanderthals demonstrate the same hunting capabilities as Anatomically Modern Humans for this prey, but with different resource management. What are the differences in processing and consuming patterns between hunter-gatherer groups, and why do they exist? To answer this question, we propose an experimental program that involves testing various rabbit processing methods.

Currently, the program includes three models: 1. evisceration, dismemberment, roasting, defleshing, and consumption; 2. evisceration, drying, defleshing, and consumption; and 3. evisceration, smoking, defleshing, and consumption. Each processing model was applied to eight rabbits. For the final consumption phase, we tried to extract marrow from four of the eight individuals.

Here, we present the description and results of the first model, which involves roasting for meat and marrow consumption. This data is compared to the results of archaeozoological analyses applied to rabbit assemblages from Middle Palaeolithic and Early Upper Palaeolithic sites in the Mediterranean and Portuguese regions of the Iberian Peninsula.

The aim of this work is to expand our understanding of how rabbit management affected the diets of Palaeolithic hunter-gatherers, Neanderthals, and Anatomically Modern Humans. This research is situated within the context of human evolution and the changes that occurred in subsistence activities during the transition from the Middle to Upper Palaeolithic.

406 DOING GOOD WITH ARCHAEOLOGY?: SOCIAL SUSTAINABILITY AND ACTIVISTIC PRACTICES TO TRANSFORM PEOPLE'S LIVES AND SUPPORT FLOURISHING COMMUNITIES

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Ripanti, Francesco (Trinity College Dublin) - Sayer, Faye (University of Birmingham) - Dobat, Andres (Aarhus University) - Monckton, Linda (Historic England)

Session format: Regular session

This session addresses archaeology's role in supporting social sustainability, addressing inequalities and promoting human rights and dignity. It presents evidence of how archaeology can shape and have positive and negative effects on wider social and human capital. It addresses the transformative role that archaeology and archaeologists can have, and how by coming together as a collective archaeologists can reposition their work to impact and address wider sustainable development goals and global challenges.

There is a growing body of evidence on the potential of archaeology as a path to positively impact social fabrics and people's lives. Archaeology is increasingly being recognized as a potent tool to be applied in countering the growing global mental health crisis, and tackling sustainable development goals, including wellbeing inequality. The session explores the role archaeology can play in addressing and countering social issues and challenges; considering how it can benefit social and human capital, and how activist practices can support human rights and dignity, inclusiveness, equality, connection and cohesion. Pushing beyond public benefit measures, the session explores how archaeology can contribute to shaping better societies, at local to global scale; considering how and why archaeology can reconcile collective trauma, contribute to conflict resolution and appeasement, and be a medium of empowerment.

The aim of the session is to provide a safe space for self-critical reflection, promoting an open discussion of uncertainties, unresolved issues and even failures, in order to move beyond the proof of concept stage and explore the underlying mechanisms of archaeology as a social force to positively improve people's lives, and support communities to flourish.

The session aims for diverse theoretically and practice based presentations, as well as explorative reflections on the wider perspectives of socially activist practices in archaeology. We encourage experienced scholars and early career researchers with bold ideas to contribute.

ABSTRACTS

1 A BEHAVIOURAL SCIENCE-BASED APPROACH TO HERITAGE: IMPROVING VISITOR DIVERSITY AND ADDRESSING WELLBEING INEQUALITY AT BILTMORE ESTATE

Sayer, Faye (The University of Birmingham)

The application of behaviour change models to shape strategy and develop interventions to achieve high-level outcomes is an emerging field for heritage-based research. Owing to this, the value and effectiveness of the science of behaviour change to the heritage sector has been underexplored; the behaviour change wheel approach has been utilised extensively in health care settings, this research adds to the small but growing body of its applicability in more multidisciplinary settings. The study uses data collected in partnership with the Biltmore Estate (USA) to address this gap and examine if COM-B/BCW could provide an alternative for understanding visitor behaviours. Previous research at Biltmore Estate indicated individuals who were young, old, and part of minority groups were amongst the most disengaged local community members and experienced the highest levels of mental distress during visits. As such, modelling focused on a core behavioural outcome to 'increase visits to the Biltmore estate by members of the local community', specifically visits by young, old, and minority groups. Using the COM-B/BCW this research created interventions to remove barriers and provide enablers to build the capabilities, opportunities and motivations for diverse community members to visit Biltmore. The research demonstrated the potential of a behavioural science approach to understand visitor behaviour and experiences, to support heritage places to improving visitor diversity and reducing mental distress of these groups.

2 ARCHAEOLOGY AS HEALING MAGIC

Dobat, Andres (Department of Archaeology, Aarhus University)

The beneficial role of archaeology as a pathway to wellbeing and happiness is well documented and widely acknowledged; be it for mental health, social cohesion, or personal empowerment. But what is it that makes archaeology such a powerful force? And how do we best make use of the healing potential of our discipline?

Moving beyond the discussion whether there can be established clinical evidence for the beneficial effect of archaeology or whether any mitigating effect is only perceived as such by the practitioner, I want to argue that archaeology is a sort of healing magic. As such it is not only the magical invention of personal and collective origin myths. It is also a practice resembling traditional approaches to both physical and spiritual healing and recovery. I will come across practices such as chanting, trance, herbalism, meditation, fetishism, prayer, etc. and investigate their significance (or possibly uselessness) as an explanatory framework for the healing magic of archaeology. My paper is not meant to be understood as a presentation of conclusive wisdom, but more as a fumbling quest for new avenues towards a deeper understanding of what makes archaeology such a powerful therapeutic force – and what we can use it for.

3 TRANSFORMATIVE JOURNEYS: UNDERSTANDING THE SOCIAL DYNAMICS OF ARCHAEOLOGY-BASED WELLBEING INTERVENTIONS

Ripanti, Francesco (Trinity College Dublin)

Archaeology can contribute to address societal issues by actively engaging communities through a range of programmes. Among these are Archaeology-Based Wellbeing Interventions (AWIs), which explore how engagement with the past can make a difference to wellbeing, producing outcomes such as socialisation, happiness and self-esteem. AWIs aim to achieve a wellbeing impact on the participants by engaging them with a variety of programmes based on archaeology, including excavations, walks in the historic landscape, photographic sessions and other craft workshops.

This contribution proposes an in-depth reflection on the different forms and dynamics of interaction in AWIs and how they can impact on inclusiveness, equality, connection and cohesion. The analysis is based on the quantitative and qualitative data collected during the programme 'ArcheologicaMente', delivered in Vignale (Italy) in September 2023, and the 'Αρχαιολογικά' programme, delivered in the Xeros Valley (Larnaca district) between October and December 2023. The two case studies have been carried out within the framework of research project 'Linking community archaeology and wellbeing in the Mediterranean' (LOGGIA). Funded by the European Union as Marie Skłodowska-Curie Postdoctoral Fellowship, LOGGIA has worked with local communities and vulnerable groups on programmes based on the historic landscape and assessed how archaeology practices can contribute to community wellbeing.

4 WELLBEING IN HERITAGE AND WELLBEING THROUGH HERITAGE

Monckton, Linda (HE - Historic England)

This paper will provide a strategic overview of the issues facing the heritage and archaeological world in relation to the wellbeing agenda. Wellbeing might usefully be thought about in two key ways, direct: that is the subjective wellbeing of how a person or community is doing, and indirect: that is working with the social determinants of health and wellbeing. Where has this agenda come from and how is it being approached? Expanding this further one might articulate Wellbeing as an individual issue (how does one feel things are going), a collective issue (how well is a community or area doing), and a population level issue (how well are policies affecting change for the country as a whole). Each is focussed on what difference we can make and all are relevant to how we approach wellbeing. Each is related to life satisfaction and how one is affected by the social, economic and environmental context of daily life. Wellbeing is therefore a complex issue seeking simple solutions for implementation. The two most common questions appear to be 'what works' and 'how to measure it'. With these questions in mind this paper will provide examples from the UK and consider how this can be applied within commercial archaeology. Through these examples it will highlight the kinds of opportunities that exist for improving local wellbeing and the challenges and evidence that exist for measuring this in a meaningful way.

5 DOWN AND DIRTY WITH ARCHEOLOGICAL ARTEFACTS

Smith, Aja (Department of Archeology and Heritage Studies, Aarhus University) - Dobat, Andres (Department of Archeology and Heritage Studies, Aarhus University)

While a still young but growing body of literature has begun mapping the positive effects on mental health and general wellbeing which engagement in archeological activities is proving to have (see e.g. Everill and Burnell 2022; Sayer 2023), the literature on the positive effects of metal detecting as archeological practice is yet scarce. This scarcity stands in stark contrast to the self-reported positive experiences of practitioners in e.g. Denmark (Dobat et al 2022; Dobat and Dobat 2020) and the UK (Dobat et al 2020; Dobat et al 2022; Winkley 2016).

In this paper, we contribute to this burgeoning field through an ethnographic exploration of the Danish VETEKTOR Buddy program. The program engages military veterans in archeological metal detecting activities by providing them with the necessary gear and an experienced mentor from the Danish hobby archeology community. The paper hones in on the veterans' own experience of engaging in archeological activities by specifically exploring the relationship between their embodied sense of engaging in the hobby and their past military training, identity and bodily and in-

tellectual proficiencies and aspirations. We also explore how the sense of meaning and purpose, the veterans derive from the hobby is connected to their experience of being engage in “the world biggest archeological citizen science projects”, as several of them refer to the registrations system, DIME.

6 IF HERITAGE IS GOOD FOR WELLBEING, WHY ARE PROFESSIONALS SO MISERABLE?

May, Sarah (Arup)

Wellbeing has risen as an important contribution of heritage to society, a reason for governments to support heritage and as target for volunteering programmes. Over the last decade impressive research has demonstrated measurable improvements in wellbeing for many groups through engaging with heritage. Yet wellbeing among heritage professionals is not better than societal averages, and in many professional contexts it is worse. There are many contributors to this circumstance, including precarious employment and poor working conditions. How can a profession which struggles with its own wellbeing be expected to improve well being for those that engage with it? Bearing in mind recent research demonstrating that most ‘workplace wellness programmes’ have no benefit, this paper will address these issues in two ways. Firstly, drawing on data from sources such as ‘profiling the profession’ it will explore the wellbeing pressures on different parts of the sector, and consider where current wellbeing programmes sit within that. Secondly, it will consider if there are any lessons from our understanding of how heritage improves wellbeing in other contexts which would help professionals within the sector.

7 EMBEDDING SOCIAL IMPACT AND VALUE INTO A CLIENT'S PROJECT: THE SUCCESS AND CHALLENGES

Latham, Alexandra (Arcadis Consulting (UK) Ltd) - Brooks, Poppy (Arcadis Consulting (UK) Ltd)

The commercial cultural heritage team within Arcadis Consulting (UK) Ltd was commissioned to create and implement a heritage trail around a small town in Wales (UK). The client had announced their intentions for the trail in their Town Regeneration Master Plan.

Arcadis and our client recognise the importance of the social impact and value of connecting communities and visitors to local heritage. The effective communication and display of an area’s heritage can create positive perceptions and pride in a local area. It can add knowledge and understanding about the past and is vital to destination marketing and contributing to local economies.

The trail created several challenges including deciding on which heritage assets would be incorporated into the trail. This was achieved by engaging with local stakeholders and then planning a logical and accessible route to connect assets. Not all assets could be included, and this caused some controversy amongst local groups. Those that were included consisted of assets representing the medieval history of the town, its civic life and its links to rugby and brewing.

The challenges for the implementation of the trail included raising awareness about the trail and how and where it would be advertised. Previously, the client had created a heritage app which was unsuccessful but there was still a possibility that something similar could be used for the trail. It would be important that the technology used be easily maintained, was future proofed and user friendly. If it was to succeed, planning permission, and listed building consent, would be required for new heritage boards, signs and QR codes for the route.

The client welcomed our proposal and is now taking the ideas and trail route out to additional stakeholder engagement.

8 TRANSFORMING COMMUNITIES THROUGH DEVELOPER-LED ARCHAEOLOGY IN SCOTLAND

Johnston, Emily (The University of Edinburgh)

Developments and construction works can transform, reshape and create new communities in both urban and rural settings. The archaeological works associated with developments can also contribute to this impact on communities, especially in instances of significant archaeological findings. On the one hand, development-led archaeology can impact communities through a loss of heritage, to which there is a sense of belonging or ownership. Place attachment should be considered in these instances as the archaeology and archaeological engagement can present opportunities to help mitigate the loss. On the other hand, new archaeological discoveries can create new narratives and ties to the past. Engagement with the archaeological works can therefore help to build a sense of community and shared heritage for locals.

Whilst development-led archaeology has an obligation to provide public benefit, what constitutes meaningful engagement, and appropriate / proportionate techniques are only just being examined in this setting.

This paper will synthesis my doctoral research into community engagement in the Scottish developer-led archaeology sector, and consider how community engagement can impact national, European and global sustainable development goals. This paper will be composed of a variety of case studies and examples to demonstrate a breadth of activities across Scotland. In doing so, it becomes possible to explore how different engagement techniques can impact indi-

viduals and communities, and generate values such as (and not limited to) educational, social, health and wellbeing, and cultural.

Ultimately, this paper will explore rationales behind developer-led archaeological sites delivering community engagement, showing awareness of key legislation and policies for communities building. By framing the discussion from the communities’ perspective, this paper will highlight the benefits of community engagement in developer-led archaeology that can be derived for individuals and the communities themselves.

9 EMPOWERING CHANGE: SOCIAL ACTIVISM ON STANTON MOOR

Bowyer-Kazadi, Emily (University of Liverpool)

How can engaging with the archaeological landscape of Stanton Moor in the Peak District can positively impact social sustainability, well-being, and our human rights in terms of access, whilst also ensuring that sustainable conservation of the cultural and natural resources of the moor? To answer this, this paper will reflect on and explore the complex, and multi-faceted landscape which has a number of sites located across the moor, most of which date to the Bronze Age, the most important of which for this paper is Nine Ladies Stone Circle. It is simultaneously an area of recreation, a working agricultural area, and a place of spiritual significance. This led to issues arising when a local quarrying company wanted to reopen their sites on the moor. There was lots of vocal opposition to this, and a protest camp was set up at Nine Ladies Stone Circle in 2000 and was on the moor till 2009 by followers of the old religions to protect the area. Although a good example of social activism, there were some issues involving antisocial behaviour, drugs, and alcohol, some of which still occur around the solstices. Stanton Moor has the potential to be an empowering and inclusive place for a diverse range of people can freely engage with its archaeological, spiritual, and natural aspects, ultimately leading to a positive sense of wellbeing. However, improvements are ultimately regarding accessibility, engagement and sustainability as well as updating the 2007 management plan. After providing background on its importance and the quarrying, managing the moor and its assets in a sustainable and inclusive manner to protect its valuable elements whilst also enabling a diverse range of people to enjoy it will be discussed and compared with other relevant case studies to provide a sustainable path for the future.

10 A STOP ON THE JOURNEY. WHERE WE WANT TO GO? ARCHAEOLOGY AND ITS CAPACITY FOR ACTION IN THE RURAL WORLD

Delgado, José (University of Oviedo) - López, Pablo (University of Leon)

The power of Archeology as a politically and socially active science is unquestionable. Far from descriptive/analytical studies, Archeology is a tool of great action capable of entering into the debates of the present world.

Continuous, non-stop “progress” - new techniques, new analytics, specialisation within specialisation, impact indices - dominate much of the discipline, but at some point along the way, do we put the brakes on all this and stop to think about what direction we are going in or how far we want to go? Reflections that go beyond mere academic transfers or the safeguarding of a common heritage.

We study people, communities, elites, minorities, marginalised..., or at least the materiality/non-materiality left by these groups throughout history. So, we have a great responsibility on our hands. But does all this really have an impact on the communities living in the territories we research?

In this paper we intend to do our bit to our possibilities as a science based on what we have been doing in the framework of Agrarian Archaeology in the study of local/rural mountain communities in the north and south of the Iberian Peninsula. In our research we have focused on these communities as the protagonists of their own history, active agents with a capacity for agency who have deployed various strategies to face up to different historical challenges. These diachronic approaches lead us to work or live in rural spaces that are still inhabited. This interaction makes us militant in the face of the problems that these territories are going through, seeking an agency that allows us to counteract the dominant discourses, to generate actions of co-construction of knowledge by integrating ourselves into the very communities in which we live and of which we form part as human capital and socialising agents of the territory.

11 UNCOVERING PAST TENDENCIES FOR FUTURE INSIGHT: THE IMPACT OF RESEARCH ON GREENLANDIC INUIT REMAINS FROM ARCHAEOLOGICAL CONTEXTS

Elleskov, Sara (ADBOU – Unit of Anthropology, University of Southern Denmark)

Archaeology and biological anthropology have been involved in taking human remains from colonized groups, contributing to the “colonial project”, and impacting Inuit tangible and intangible cultural heritage as research has been and still is predominantly presented through Western eyes. I argue that research has focused on aspects of Greenlandic Inuit societies that past and contemporary Greenlandic Inuit communities did and do not consider crucial to their self-perception and identity. This raises the question of whether we can truly refer to the research of archaeological Inuit remains as Greenlandic Inuit prehistory in its present state. I attempt to address these issues through the inves-

tigation of previous Danish archaeological, anthropological, and natural scientific research tendencies, as well as the perspective of Indigenous knowledge. On behalf of this, I argue for archaeological research to partake in a responsible and active role in the contemporary world, supporting ongoing efforts towards decolonization and cultural revitalization.

12 GROWING GOOD WITH ARCHAEOLOGY

Birkelund, Kristina (Museum of Cultural History University of Oslo)

In my free time from my work at the museum, I am passionate about educating non-native-speaking children and teenagers about archaeology and related subjects focused on their native cultures. The idea is simple - to socialize and cultivate kindness through learning. With narratives, games, and practices from archaeology, kids are able to see themselves as part of an ongoing human story that connects them to their culture, heritage, and the wider world. I believe that introducing kids to the benefits of archaeology at an early age can have a positive impact on their lives and contribute to building better societies.

With the rise of conflicts like the Russia-Ukraine war, educating ourselves and others about archaeology has become more crucial. In my group, there are kids from countries with ongoing conflicts, and yet they come together and stay united for the purpose of learning. I am confident that learning about archaeology can contribute to shaping better societies. Through learning about archaeology and its implications for cultural identity and social cohesion, we can build a better world for current and future generations.

13 ARCHAEOINFORMATICS: TOWARDS A PUBLIC ARCHAEOLOGY

Megalooikonomou, Pavlos-Stylianos (National Technical University of Athens) - Chroni, Athina (Hellenic Ministry of Education, Religious Affairs and Sports; National Technical University of Athens)

Archaeoinformatics, as is determined the study of computational and digital technologies under the perspective of achieving and proposing holistic models for analysing, archiving, and disseminating archaeological data, show the way both for supporting a holistic cultural resource management, whether in the public or the private sector, as well as for the community of people's active participation.

As a result, the growing dynamics of new practices and procedures, for the participation of the wider society in issues of integrated cultural heritage management, as is crowdsourcing, has now clearly made the concept of public archaeology visible and real, thus constituting a leading scientific trend of our days.

As innovation spurs the creation of value to communities through the development of new experiences, services and processes, the museum sector has already shown the way towards this direction. In the post-covid era, museological approaches are determined by the rapid innovations that have taken place and have been accelerated under the COVID-19 conditions as a catalyst and consist of rapid changes in accepting and implementing digital innovations, thus redefining the experience as well as the creative participation of the public, and are crystallized in the latest achievements and challenges.

Are these the future trends for safeguarding collective memory?

14 ADVENTURE TIME, CULTURAL AWARENESS, AND PUBLIC ENGAGEMENT IN UKRAINIAN ARCHAEOLOGY

Hemberzhavska, Daria (Petro Mohyla Black Sea National University) - Radchenko, Simon (University of Stavanger)

Ukraine appears to be a bright, illustrative case for many discussions on the social impact of archaeology and cultural heritage studies. This is mainly due to the relevance and strategic importance of Ukrainian cultural heritage, as revealed by the ongoing war. However, other features of archaeological practice are also worth noticing as they shape Ukrainian society in many ways. Here, archaeology appears to be a romanticized adventure and a resort for many social groups. It has the power to bring social and cultural awareness, shaping a positive attitude toward our country and history. Paradoxically, it frames archaeologists and rarely societally respected and acknowledged experts and widens the gap between scholars and governmental institutions.

Introduction to archaeology often occurs in school or university clubs, serving as the first exposure to cultural history for many young people. These clubs provide a tangible connection to the past and form a behavioral model for protecting and preserving national heritage. They shape the relationships between professional archaeologists and their environment in a very special way. Following the work of youth archaeological clubs, NGOs often emerge, acting as intermediaries between the local and global archaeological communities and between public engagement efforts and academic scholarships. These platforms create opportunities for dialogue and collaboration among diverse communities. In areas with relatively unstable cultural support (such as Mykolaiv, Zaporizhzhya, Kharkiv, and Odesa), the study of archaeology holds particular value and is a space of freedom and cultural responsibility.

The significant number of professional archaeologists or individuals involved in archaeology within the military underscores the interconnectedness of cultural consciousness, heritage preservation, and national security. This talk aims to expand on intertwined features of public engagement, cultural awareness, social responsibility, and the romanticized image of archaeologists in the modern Ukrainian cultural background.

15 NEOZOIK FOUNDATION: EMPOWERING YOUTH IN UNDERDEVELOPED AREAS OF SERBIA THROUGH HANDS-ON ARCHAEOLOGICAL LEARNING

Bogojevic, Maša (Faculty of Tourism Studies - Turistica, University of Primorska)

The Neozoik Foundation is a non-profit foundation established in 2021 in Pančevo, Serbia with the mission to raise awareness about archaeology and cultural heritage to address educational and media disparities within the public sphere. Comprised of enthusiastic young experts and students of archaeology and related disciplines, Neozoik focuses on providing youth with accessible and free online and in-person activities. One of the primary initiatives involves organizing free workshops for elementary and secondary school students in underdeveloped areas of Serbia. These workshops, conducted in rural with limited cultural resources and low quality of life, offer children hands-on experiences in archaeological research. Neozoik has conducted five workshops in rural places across Serbia, including Bela Palanka, Blace, Starčevo, Zvezdan, and Donji Milanovac. These projects introduce participants to archaeological methodologies by analyzing materials sourced from nearby sites. Students engage in discussions about the importance of their local heritage, issues related to illegal digging, and the societal significance of archaeology, further developing a sense of pride and ownership in them and empowering them to advocate for the preservation of their local heritage. Additionally, the Neozoik team maintains ongoing engagement with participants through several social media profiles, providing the children with continuous support in deepening their interest in archaeology and its popularization. The scope of this paper is to reflect on these workshops as a means to address and surpass inequalities in the educational system and development of different areas of Serbia, simultaneously supporting several social development goals. This paper aims to examine the impact of these grassroots initiatives as a further exploration of how can archaeology and cultural heritage be used to positively impact and inspire children from underdeveloped areas, as well as promote inclusiveness, quality education, and community engagement.

16 20 YEARS OF ARCHAEOLOGY IN VIGNALE. AN EVALUATION OF A RESEARCH PROJECT BEYOND THE ACADEMY

Luppino, Luca (La Sapienza Università di Roma) - Scoz, Jacopo (La Sapienza Università di Roma) - Ripanti, Francesco (Trinity College Dublin)

Since 2004, the Meta3Lab of the University of Siena has been carrying out archaeological excavations at the site of Vignale-Riotorto (LI). Over the course of two decades, the research initiative has become a dynamic training ground that has shaped the expertise of numerous students.

In addition, the community archaeology project 'Uomini e Cose a Vignale' (People and Things in Vignale), started in 2009, has tried to go beyond the usual public outreach activities by carrying out evaluations of the project's impact on the area and archaeology-based wellbeing interventions. Students have always been actively involved in the design, delivery and evaluation of these activities.

However, the long-term impact of archaeological excavation experiences on the education and attitudes of former students has never been assessed. Can a university excavation be evaluated not only in terms of its scientific publications, but also in terms of the impact it has on its alumni? And how deep is its influence on the working practices of students now working as archaeologists or in other fields? This paper uses a mixed-methods analysis to explore the perspectives and experiences at Vignale of more than 80 students who participated in the project for more than one season.

17 TEACHING THROUGH ARCHAEOLOGY: SCIENCE TEACHING, CULTURAL HERITAGE, AND DEMOCRATIC FORMATION

Toftdal, Mia (Museum of Copenhagen) - Andersson, Marie (Museum of Copenhagen)

In the project 'Archaeology and Natural Science: science teaching and cultural history', the Museum of Copenhagen collaborates with teachers and students in elementary school to develop new methods in science teaching. The purpose of the project is to explore the potential of working with archaeology and natural science in 7th and 8th grade in elementary school to strengthen the students' STEM competencies and their scientific, general, and democratic formation, by involving them in professional archaeological and scientific work at the museum. The students work hands-on with authentic archaeological material and use scientific archaeological methods alongside the museum's professional archaeologists.

The project work with an interdisciplinary approach and emphasize involvement and co-creation with participants in the development process. The aim is to develop a well proven and sustainable teaching format in a reliable teaching environment, all with the purpose to encourage students interested in an education and a career within the natural science subjects, as we provide the opportunity to interact with, get inspired from, and learn from the archaeological methods and role models. Together, the authenticity aspects and the pedagogical methods create different, yet secure learning situations, where students who are not normally interested or actively participating in learning activities, are fully focused and immersed, and express enthusiasm for succeeding.

408 CRAFTING IRON AGE SOCIETIES: CAN CREATIVITY, TECHNOLOGY, OR TYPOLOGY HIGHLIGHT HUMAN PAST TRANSFORMATIONS?

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Rolland, Joëlle (CNRS, UMR 8215 Trajectoires) - Cicolani, Veronica (AOROC UMR 8546 CNRS-PSL) - Canovaro, Caterina (Università di Padova, Dipartimento di Geoscienze)

Session format: Regular session

Breaking habits, innovating, changing a gesture or a material may be a matter of moments, but change comes from maintaining the decision and persevering in that change. When it comes to studying the production of Iron Age societies, change is the defining feature of typological and chronological studies. Archaeology was built on the classification and ordering of change; it marks the time or different cultures. But with the development of methods, it is now possible to perceive other changes, technological changes in the chaîne-opératoire or the specialisation of craftsmen, changes in materials and their origins. From style to creativity, from technology to typology, how do we recognise the changes that Iron Age craftsmen chose or went through? And if we detect a change in production, how can we identify its causes and its impact on past societies?

By looking at changes in the production of iron, bronze, precious metals, textiles, glass, amber, ceramics, bone, ivory, lithics, wood or black stone, this session will shed light on the choices made by the men and women who made and wore artefacts, creating their cultural and social identity. Creativity, technology and morphological variations reflect a range of choices resulting from changes at different levels: at the level of craftsmen, workshops, consumers and sometimes the whole society itself. By combining technological, morphological and contextual analysis and their variability within a broad socio-anthropological gender perspective, we can highlight the minimal or invisible changes behind common traditions and, through this approach, examine socio-cultural idiosyncrasies and ideological legitimization.

By bringing together researchers working on production process during the Protohistory, we hope to compare our views on the transformations that shaped cultures and societies.

ABSTRACTS

1 CAUSE AND EFFECT: CHANGES IN THE IRON AGE THROUGH A HOLISTIC STUDY OF SIGNIFICANT TRANSFORMATIONS (3RD TO 2ND CENTURY BCE)

Bursak, Daniel (Institute of Archaeology of the CAS, Prague) - Danielisová, Alžběta (Institute of Archaeology of the CAS, Prague) - Kyselý, René (Institute of Archaeology of the CAS, Prague) - Čížmář, Ivan (Institute for Archaeological Heritage Brno) - Kertés, Samuel (Institute of Archaeology of the CAS, Prague) - Volf, Jan (Institute of Archaeology of the CAS, Prague)

In the 3rd and 2nd centuries BCE, significant changes on various levels took place in the territory north of the Alps. Initial indicators of transformation were gathered through the study of historical sources, typological analyses, and settlement structure research dating back to the 20th century. Growing agglomerations, the dawn of a monetary economy, the emergence of oppida, new expressions of artistic styles and changes in ritual practices leading to archaeologically indistinguishable burial traces are just some of the numerous transformations to mention. In the past, efforts were made to understand the blanket causality of these changes – something that is increasingly challenging in contemporary research full of new partial data, revisions, and approaches.

In our contribution, we would like to introduce new probes into the Iron Age technologies, subsistence, and agricultural aspects of the observed period. We base our approach in a series of archaeometric analyses of materials mainly from Central Europe. The study of metals reveals a flow of new materials and the expansion of technological processes with a plethora of innovations. Similarly, research on ceramic production highlights the great complexity and diversity of production. The latest analyses of archaeozoological material bring surprising specific patterns of handling livestock. In our contribution, we aim to subject this evidence to critical review in connection with known transformations in sub-Alpine Europe during the Iron Age, as well as discuss their causality, correlations, or even randomness and their relevance to macro- or microhistories.

2 NOTES ON THE COMPLEX THE PRODUCTIVE STRUCTURE OF THE CONTESTANIAN COAST DURING THE IRON AGE. BETWEEN DOMESTIC AND WORKSHOP PRODUCTION

Perdiguero-Asensi, Pascual (Universitat d'Alacant)

The coast of the south-east of the Iberian Peninsula has always been an interesting case of study for the non-canonical ways of interaction between the Mediterranean and the local population. Several sites in this area show a consolidated productive network during the Second Iron Age, and a strong connection with the Mediterranean markets that finds its roots in the Phoenician colonies settled in this coast during the 7th century BC.

In this paper we intend to defend the importance of local crafting, technology, and production in the colonial processes of trade and exchange and how its study can reveal the social structures behind them. Through the analysis of archaeological data, we reflect on this productive network whose role as a link between economic systems contributes to generate asymmetric socioeconomic relations, of varying degrees of complexity. In this sense, the archaeological data shows a strong dichotomy between the coastal fringe that concentrates the workshop production, and the interior regions with a strong domestic crafting economy. The study of these differences and its evolution in time is proving essential to understand colonial situations in the Contestanian region.

The concentration of amphorae kilns in the coastal settlements shows an intensive productive network destined mostly to the shipment of products and craft goods towards the Western Mediterranean but with a strong distribution towards the interior. We have been able to identify the presence of this amphorae in most of the closest economic and productive nodes. The way this trade is organized shows a very specific model of colonial interaction and proves the high value of products such as wine, olive oil, salted fish, and crafts like esparto rope through the 6th to the 3rd centuries BC in the Western Mediterranean.

3 ARCHAOMETRIC INVESTIGATIONS ON BRONZE ARTEFACTS OF CHERICI COLLECTION: PRELIMINARY RESULTS ON METAL SUPPLY STRATEGIES

Lucarelli, Chiara (University of Padua) - Angelini, Ivana (University of Padua) - Artioli, Gilberto (University of Padua) - Canovaro, Caterina (University of Padua) - Cicolani, Veronica (Centre National de la Recherche Scientifique)

The Chierici collection consists of more than 400 finds in copper alloy and the 145 objects conserved in the Musée d'Archéologie nationale et domaine national of Saint-Germain-en-Laye. A selection of 15 finds (VI-V century BC) from the excavations conducted by Chierici at S. Polo-Campo Servirola, now preserved in the Civic Museums of Reggio Emilia, were studied in the framework of the ANRJCJC Itineris project (<https://itineris.huma-num.fr/>). The results will be compared with those obtained on coeval artefacts from archaeological settlements in Piedmont region. The aim is to highlight changes in the choice of mineral supply sources and the strategies adopted. Chemical and microstructural characterizations were achieved through a multi-analytical approach, including reflected-light optical microscopy, scanning electron microscopy coupled with an X-ray energy dispersive spectrometer, electron probe micro-analysis, and metallographic analyses. Lead isotope analysis (LIA) was employed to determine the provenance of the metal. The objects are mainly made of tin bronze (Sn 4.1-10.5 wt%) or lead-bronze (Pb 2.5-11.8 wt%). Segregations or inclusions are observed in the δ -phase, mainly mixed sulphides, δ -phase, and lead. The developed database containing chemical and isotopic data of copper mineralizations (Artioli et al., 2020) is used to interpret the LIA results. The finds exhibit various and complex signals of copper or lead sources, principally Iberian Peninsula and Aegean. These preliminary results suggest a complex metal supply strategy in terms of time and location of possible sources, with respect to the simple model of exploitation of regional resources (Cicolani et al., 2023).

Artioli G., Canovaro C., Nimis, P., Angelini I., 2020. LIA of prehistoric metals in the central mediterranean area: a review, *Archaeometry*, doi: 10.1111/arcm.12542

Cicolani V., Huet Th., Artioli G., 2023 Modelling Ancient Bronze craft techniques in Italy. From ore to object and back. XXIVe colloque du GMPCA: Archéométrie 2023, Apr 2023, Nice, France <https://hal.science/hal-04084724>.

4 THE MAJOR IRON PRODUCTION SITE FROM THE LATE HALLSTATT AND EARLY LA TÈNE PÉRIOD OF DONNEMAIN-SAINT-MAMÈS (EURE-ET-LOIR, FRANCE)

Wassong, Rémy (Eveha; UMR7044 - Archimèdes) - Sarreste, Florian (Eveha; HeRMA) - Lacroix, Solène (Eveha; HeRMA)

The excavation of the site of Donnemain-Saint-Mamès took place from the 14th november 2022 to the 13th january 2023. The extensive investigations covered an area of 26000 square meters and revealed the presence of a significant iron production unit. Over fifty reduction furnaces were discovered, which is a remarkably high density for this period, spanning from the end of the Hallstatt and the beginning of the La Tène period. This finding emphasizes the importance of the settlement, potentially making it a prominent site in the region.

However, the origin of the iron ore used in the production process still needs clarification. The local rocks in the area contain insufficient concentrations of iron ore for effective reduction.

In the eastern part of the settlement, five heated stone pits were discovered. These pits measure between 1.3 and 2.5 meters in width and 5.2 to 6 meters in length. They were filled with a thick layer (40 to 50 cm) of various stones, including flint, sandstone, and limestone. At the bottom of the pits, a substantial layer of charcoal was found, containing carbonized wood elements such as logs, half-logs, wooden planks, and kindling. These pits may have been used for roasting the iron ore before initiating the reduction process. Alternatively, considering the limited amount of ore found in the local rocks, it is also possible that these pits served as communal cooking installations for shared meals.

The investigation of the Donnemain-Saint-Mamès settlement provides valuable insights into the creativity and technology of Iron Age societies. The study of slags and the organization of furnaces during this pivotal period sheds light on the iron production techniques employed at the time.

5 METALLURGY AS A NEW ECONOMICAL CHALLENGE? PARALLELS BETWEEN THE DEVELOPMENT OF AN ENCLOSED SETTLEMENT AND ITS METALLURGICAL ACTIVITY

David, Antoine (Eveha) - Lacroix, Solène (Eveha; UMR 7324 CITERES)

The excavation of a 3-hectare site carried out in 2021 in the commune of Saint-Varent (Deux-Sèvres, France) uncovered an enclosed settlement dating from late Iron Age. Each phase of occupation is associated with a metallurgical activity, the development of which is directly correlated with that of the settlement. Initially, in the 4th-3rd centuries BC, the site was mainly devoted to agriculture, but also show the existence of a smithy, meeting a specific local need. This activity took place on the outskirts of the enclosure, far from the dwellings. Around the end of the 3rd-beginning of the 2nd century BC, the settlement was transformed and enlarged, consisting of two nested enclosures whose occupation lasted until the middle of the 1st century BC. A smithy continued to operate, initially within the inner enclosure, opposite the dwellings, before being moved immediately outside the same enclosure when it was enlarged. At the same time, another metallurgical production area was established during this second phase, farther to the south-east, on the edge of the outer enclosure. A study of the metallurgical waste reveals a homogeneous production, of average size compared with other sites of the same period, and of good technical quality. This new forging activity undoubtedly played a major role in the economic strength of the settlement, and raises the question of the place of the craft - and the craftsman - in this change: did the occupants of the site see it, at a time when metallurgy was taking on an increasingly important role, as a genuine opportunity for development, or should it be seen as nothing more than a subsidiary factor in their power and wealth?

6 AMBER ROADS IN THE EARLY IRON AGE BETWEEN THE RHINE AND MORAVIA. METHODOLOGY, RESEARCH QUESTIONS AND FIRST RESULTS

Golec, Martin (Palacký University Olomouc) - Golec Mirová, Zuzana (Institute of Archaeology of the Czech Academy of Science Prague; Charles University Prague) - Chytráček, Miloslav (Institute of Archaeology of the Czech Academy of Science Prague) - Kučera, Lukáš (Palacký University Olomouc) - Mischka, Doris (Friedrich-Alexander University Erlangen-Nürnberg) - Hagemann, Katja (Friedrich-Alexander University Erlangen-Nürnberg) - Martínek, Jan (Palacký University Olomouc)

Amber Roads in the Early Iron Age between the Rhine and Moravia” is an international project of a Czech-German research team, supported by the GAČR and DFG for the years 2023–2026. The project is managed by the Czech Academy of Science in Prague, Palacký University Olomouc and Friedrich-Alexander Universität Erlangen-Nürnberg. The interdisciplinary research on amber studies amber as a strategic raw material for exchange in the Early Iron Age (800–370 BC). The project catalogues amber finds in Central and Southern Europe, identifies amber sources using natural science methods, reconstructs long-distance networks, and focuses on socio-economic and craft aspects. In 2023 and 2024, the team focuses on sampling (systematically Czech Republic and Germany). For questions on a broader spatial scale, selected sites are also sampled in Poland, Austria, France, Italy, Slovenia, Croatia, Serbia, Bosnia and Herzegovina, Bulgaria, or Greece. The current research direction in analytical chemistry is miniaturization and multi-instrumental approach. Both approaches have been applied in the current research. A 0.5 × 0.5 mm amber sample is placed on a modified microscope slide compatible with various analytical instruments. In this way, a single sample can be measured on different instruments. The most common method for determining the origin of amber is Fourier transform infrared spectroscopy (FTIR), but other instrumental techniques can also be used to identify the place of origin. One of these techniques is Raman spectroscopy, where the I1645/I1450 intensity ratio has been proposed as an indicator of the age of amber. The band intensity at 1645 cm⁻¹ belongs to C=C bond and the 1450 cm⁻¹ band belongs to simple C-H bond. In this process, the C=C bond disappears, so that the I1645/I1450 ratio decreases. This paper introduces the methodology, the main research questions and the first results of the analyses.

7 WOOL, LINEN, SALT - THE TEXTILE ARCHAEOLOGICAL ANALYSES OF THE IRON AGE TEXTILES FROM THE SALT MINE DÜRRNBERG, AUSTRIA

Lau, Ronja (Ruhr-University Bochum)

The organic preservation of archaeological artefacts in salt mines offer a basis for textile archaeological analyses. The rich variety of finds provide insight into craftsmanship, design concepts, as well as cultural and social status. The Iron Age salt mine at Dürrnberg near Hallein, Austria, offers these possibilities and is now part of a new research project.

In this presentation I would like to present an overview of the textile finds from the salt mine. The site itself now has more than 800 textiles, and a small selection is intended to show just how multifaceted Iron Age textiles can be. The main questions which I will address are: What is the quality of Iron Age textiles? What patterns and colours can we recognise? What differences do we see compared to earlier finds? And where did the resources come from?

With regard to the use of resources, the interdisciplinary approach of textile research will be demonstrated due to scientific analyses. With the help of chemical colour analyses and fibre determinations, we can track and compare textile technologies over the centuries.

Cultural differences are usually reflected in changes in the choice of colours and patterns in textiles. But also changes in the use of resources. After the overview, the main focus will be on direct comparisons between the Hallstatt salt mine and Dürrnberg. What has changed in the fabrics and how can this be recognised?

Not only the textiles themselves give an indication of the life of the people. Textile tools such as spindle whorls and weaving weights not only have a practical use, but often also a representative one. This is why these objects offer an insight into social structures.

Together with the textiles, the textile tools and the scientific analyses, we can create a socio-economic picture of the Dürrnberg.

8 HANDICRAFT ARCHAEOLOGY BASED ON INTELLIGENT TECHNOLOGY (HABIT)

Neiß, Michael (POSTDOC: Lund University (Department of Archaeology & Ancient History); GUEST RESEARCHER: Aarhus University (UrbNet - Centre for Urban Network Evolutions))

Thanks to new possibilities in natural and digital sciences, Viking Age scholarship is experiencing an unparalleled renaissance in material research. But when it comes to the question of cultural transformation, some important aspects of ancient metal crafting remain to be explored. The Viking Age saw many “tribal” societies transform into heterogeneous Christian realms with urban centres which sometimes would grow further on into medieval towns. This transformation can be likened to interlocking chains of events that involved a plenitude of agents with different incentives. But the key contributions of the craftspeople to this ideological transformation have long been bound to eschew our grasp – due to some outdated dichotomies that need to be overcome! Although, the scholarly debate on the Viking Era urbanisation process is gravitating towards the significance of different groups of craftspeople, it still remains to be connected with the similarly important debate on urban centres as meeting points for ideologies and religions. What sets Viking Age towns apart from antedating Iron Age central places is the ever increasing output in standardized utility goods that conveyed pictorial messages. Nowadays, artisans are envisioned as active creators of the cultural universe they inhabit. Many choices within the manufacturing process are culturally conditioned and express a mentality. Thus, an analysis of operational sequences might offer a key to the inner workings of Viking Period society. Certain changes in the artisan habitus that facilitated standardization were not likely caused by new selling opportunities alone, but also by the very gradual mental shifts that contributed to the emergence of a novel ideological superstructure that transformed Scandinavia into Christian realms. It is therefore imperative to analyze the interplay between this cultural change and the habitus of Viking Period artisans, their pictorial messages and how their output was received at different stages of the process.

9 TYPOLOGISTS MEET THE WORLD: AN EYE-TRACKING EXPERIMENT ON POTTERY STYLES FROM CENTRAL GERMANY, NORTHERN DENMARK AND NORTHERN SPAIN

Scholtus, Lizzie (XSCAPE Project on “Material Minds” (ERC 2020 Synergy Grant 951631); Christian Albrecht Universität zu Kiel) - Vindrola-Adrós, Bruno (XSCAPE Project on “Material Minds” (ERC 2020 Synergy Grant 951631); Christian Albrecht Universität zu Kiel)

Using typologies and the well-known love of archaeologists for classification systems, we are now able to determine the date of an object, how it was made and even where it comes from. Moreover, it is sometimes possible to link certain types to a specific part of the society or a specific cultural group.

However, it is still difficult to determine how different material culture types were perceived by past societies and what were the effects on the people using or seeing them, particularly at a time where the potter’s wheel was introduced. Are the social and economical changes (e. g. first agglomerations) or the innovations in production (e. g. potter’s wheel) that we see appearing as archaeologists during Iron Age affecting the way these objects are perceived or looked

at? And thus, does the material culture affect the way a given group would see and perceive the world? Until what point are our patterns of visual attention common to every human being and until what point are we influenced by our social and cultural background?

Through the novel use of eye-tracking techniques, in this paper we aim to characterise the stylistic changes in artefacts and the influence of those on people based on the visual behaviour of archaeologists and non-archaeologists. We conducted several experiments on around a hundred participants looking at 20 Iron Age pots (drawings, photographs and real objects) from central Germany, northern Denmark and northern Spain. We will particularly focus on how these people look at ceramic objects today, and how the task of free-viewing different types of European Iron Age ceramics have an effect on their patterns of visual attention (such as gaze positions, visual scan paths, fixations) and cognitive load.

409 OUT ACROSS THE SEA: BELL BEAKER MARITIME CONNECTIONS AND NETWORKS IN THE MEDITERRANEAN

Session theme: 6. The Mediterranean from Within

Session organisers: Derenne, Eve (Johannes Gutenberg University Mainz) - Ivanova-Bieg, Maria (Johannes Gutenberg University Mainz) - Sousa, Ana Catarina (University of Lisbon) - Câmara Serrano, Juan Antonio (University of Granada) - Giannitrapani, Enrico (Arkeos)

Session format: Session with keynote presentation and discussion

The late fourth and third millennium BCE saw the development of new long-distance maritime networks around the Mediterranean. During this late Chalcolithic phase, the 'mental mapping' of the Mediterranean as a maritime space reached a critical stage; the influx of new people and cultural traits, combined with a boom in seaborne exchange, meant that the western and central Mediterranean became integrated into a large maritime cultural area. Circulation routes seem to have expanded remarkably after 2500 cal BC, enabling large-scale cultural phenomena such as the Bell Beaker complex to spread across the Mediterranean and integrate a variety of local Chalcolithic groups, both on islands and in coastal or mainland areas. These large-scale networks of interaction foreshadowed the emergence of major Mediterranean civilizations in the next millennium. With this in mind, this session aims to examine the origins and dynamics of Bell Beaker connections across the Mediterranean, be it in terms of material culture, subsistence strategies, technology, human-environment relationships, absolute chronology, genomic ancestry, or isotopic provenance. We welcome presentations focused on mobility, cultural influence and exchange between islands and littoral areas during the fourth, third and early second millennia BCE. Discussions of Bell Beaker context integration in Chalcolithic societies and continued influence into the Bronze Age will be particularly appreciated.

ABSTRACTS

1 SEASCAPES: TRACING THE EMERGENCE AND SPREAD OF MARITIME NETWORKS IN THE MEDITERRANEAN DURING THE 3RD MILLENNIUM BCE

Ivanova-Bieg, Maria (University of Mainz) - Cramp, Lucy (University of Bristol) - Derenne, Eve (University of Mainz)

The 3rd millennium BCE witnessed a significant surge in maritime activity across the western and central Mediterranean, catalyzed by the dispersal of the so-called 'Bell Beaker complex.' The use of Bell Beaker pottery and associated archery gear, copper weapons, and distinctive personal ornaments, extended from the Iberian Peninsula in the west to the Tyrrhenian coast of Italy in the east, including the Balearic islands, the southern coast of France, Sardinia, Sicily, Morocco and coastal Algeria. Archaeological investigations seem to indicate a west-to-east spread of the Beaker complex by sea, related to seaborne mobility that expanded the geographic knowledge of prehistoric Mediterranean communities. However, our understanding of this early maritime world is impeded by the lack of precise temporal frameworks. To address this limitation, the SEASCAPES project conducts an extensive radiocarbon dating initiative for Mediterranean Bell Beakers and employs chrono-spatial modeling to uncover the origins, growth and decline of Bell Beaker maritime networks. This talk presents preliminary results, providing critical insights into the emergence and evolution of maritime connections during the 3rd millennium BCE.

2 EXCHANGE NETWORKS DURING THE CHALCOLITHIC PERIOD OF THE IBERIAN PENINSULA

Schuhmacher, Thomas (German Archaeological Institute - Madrid Department)

The studies on ivory objects from the Chalcolithic period of the Iberian Peninsula and Northwest Africa demonstrated that the consumption of ivory objects in the Iberian Peninsula began at the end of the 4th millennium BC, corresponding with the start of social complexity and a prestige-based elite. Especially in the biggest and more complex tombs of the end of the 4th and the 3rd millennium BC very sophisticated objects made in exotic raw materials such

as gold, ivory, ostrich egg-shells, rock crystal, variscite and amber, aside from ceramics and flint objects are coming together. Regional, inter-regional and even long-distance exchange over the Mediterranean of diversified raw materials and objects became a capital issue for the Chalcolithic societies. This implies also the movement of individuals. Several big settlements with an important agglomeration of people emerged as central places, production centers and gateways for the exchange of products and exotic goods.

By scientific analysis two different exchange networks of ivory during the Chalcolithic could be recognised, by which on one hand Asian elephant ivory, probably together with hippopotamus ivory and Sicilian amber, reached the South-east of the Iberian Peninsula and the Guadalquivir estuary. At the same time, from the Atlantic coast of what is today Morocco African elephant ivory reached the fortified settlements and/or ditched enclosures of the Atlantic coasts of Portugal and southwestern Spain by peer-polity interaction in exchange for painted pottery, metal objects and silex daggers during the Early Chalcolithic and for Bell Beaker vessels and other objects of the Bell Beaker complex during the Late Chalcolithic. Mainly raw material came to the Iberian Peninsula, where it was processed locally, redistributed and consumed in elite burials. We could also detect a complex network of regional and inter-regional exchange in the Iberian Peninsula related with the redistribution of ivory.

3 SARDINIA BETWEEN THE CHALCOLITHIC AND THE BRONZE AGE: THE RELATIONSHIP BETWEEN THE BELL BEAKER PHENOMENON AND INDIGENOUS CULTURES

Cicilloni, Riccardo (University of Cagliari)

In Sardinia, after the basic culture of San Michele di Ozieri, at the end of the Neolithic (4000-3300 BC), a series of cultural facies developed at the beginning of the Eneolithic, still strictly connected with the strong Ozieri heritage, at least until the appearance of a new cultural aspect, called the "Monte Claro culture" (2700-2200 BC), in which highly innovative elements appear, representing a clear break with the previous phases, so much so that some scholars see an arrival of populations from outside, linked to the broader phenomenon of the grooved ceramic cultures of the western Mediterranean. Although not everyone agrees with this hypothesis, there are surely strong elements of discontinuity, which still remain to be explained, as well as the origins of the phenomenon. The arrival on the island of the Bell Beaker culture, which chronologically joins the Monte Claro culture, would seem to be involved, in some way, with the evolution of the latter culture. Furthermore, understanding the relationship between the Monte Claro culture and the Bell Beaker culture could provide us with new data on the birth, during the middle Bronze Age (1900-1350 BC), of the subsequent Nuragic civilization, whose origins are still to be well defined, even if in a probable indigenous context.

4 ARCHAEOGENETICS ILLUMINATES BELL BEAKER FAMILY NETWORKS ACROSS WESTERN EUROPE

Olalde, Iñigo (Departamento de Zoología y Biología Celular Animal, Universidad del País Vasco; Ikerbasque - Basque Foundation for Science; Department of Human Evolutionary Biology, Harvard University, Cambridge, MA, USA) - Reich, David (Department of Human Evolutionary Biology, Harvard University, Cambridge, MA, USA; Department of Genetics, Harvard Medical School, Boston, MA, USA; Howard Hughes Medical Institute, Harvard Medical School, Boston, MA, USA; Broad Institute of MIT and Harvard, Cambridge, MA, USA) - Ringbauer, Harald (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, 04103 Leipzig, Germany)

The recovery of ancient genomes using Next-Generation Sequencing techniques is arguably the technological innovation with more impact on the study of the human past over the last decade. The crucial leap has been the move from single genetic markers such as mitochondrial DNA (mtDNA), that only informs about the strictly maternal ancestry lines and therefore about an extremely limited set of ancestors, to millions of genetic markers along the nuclear genome that inform about the whole set of ancestors an individual has at different points in the past.

The 3rd millennium BC in Western Europe is one of the most intensively sampled periods in the ancient DNA literature so far. These studies documented a clear demographic change linked to the arrival of groups from Eastern Europe and their admixture with local populations. In several regions within Western and Central Europe, the earliest attestation of this new ancestry strongly relates to Bell Beaker-associated individuals, pointing to the Bell Beaker Complex as a key actor for understanding mobility and interactions during the Chalcolithic.

Very recently, the development of novel analytical tools for detecting distant relatives in ancient DNA data makes it possible for the first time to draw direct genealogical links between individuals excavated across vast distances. These analyses are already revealing large-scale networks of interaction within Bell Beaker contexts and will substantially enrich our knowledge of the Bell Beaker expansion and integration into local societies.

5 HUMAN (ENVIRONMENT) INTERACTIONS IN THE MEDITERRANEAN DURING THE COPPER AGE: A FOCUS ON CENTRAL-SOUTHERN ITALY

Bernardini, Sara (Department of Cultural Heritage, University of Bologna, Italy; Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAREA) Centre, Sapienza University of Rome, Italy; Aix Marseille Univ, CNRS, Minist Culture, LAMPEA, Aix-en-Provence, France) - Farese, Martina (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAREA) Centre, Sapienza University of Rome, Italy) - Goude, Gwenaëlle (Aix Marseille Univ, CNRS, Minist Culture, LAMPEA, Aix-en-Provence, France) - Tafuri, Mary Anne (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAREA) Centre, Sapienza University of Rome, Italy)

During the 4th and 3rd millennia BCE in the Mediterranean, long-distance interactions are deducible from the archaeological record and in some communal cultural patterns. However, where present, the isotopic data show that displacements were more on an inter-regional or small scale. The study of isotopic analysis on human, animal and plant remains over a large area -the Mediterranean-, aimed at reconstructing dietary practices and mobility, is a complementary way to study group connections along with human-environment interactions on a large scale. Whereas, targeted multi-isotope analysis helps to better discriminate the area of exploitation. Here we present a case study on central-southern Italy during these millennia by integrating multi-isotope analysis and archaeological evidence. During the Copper Age, in the Italian Peninsula and islands, the material culture production and the funerary ritual show distinguishable regional traits parallel to a vast diffusion and reciprocal influence, hinting at a strong network of relations all along the Peninsula. This pattern is partly reflected by the results of this multidisciplinary study, with food choices seemingly mostly site-related and showing different strategies of land exploitation according to the funerary ritual, along with short-range mobility likely related to pastoralism and raw materials research. Profiting of this multidisciplinary session, we look forward to discuss to what extent cultural tradition -such as dietary practices- have influenced the Bell Beaker integration in Italy? Starting from the Italian case study, we investigated the available isotopic data from the Mediterranean through Bayesian modelling, trying to trace ecological and cultural tendencies in environmental exploitation and movement in these peculiar millennia. The use of the Bayesian model also permits to monitor data gaps present for these millennia in this large area, promoting future research in the perspective of understanding the puzzle of interactions emerging from the archaeological evidence.

6 ARCHER BRACELETS FROM THE LARGE ITALIAN ISLANDS, SARDINIA AND SICILY: DISTRIBUTION AND CIRCULATION

Spanedda, Liliana (University of Granada) - Pau, Claudia (University of Granada)

In the present work, typological and contextual data were collected on an important group of artefacts associated with the Beaker phenomenon, the so-called archer bracelets or brassards. The geographical distribution of these prehistoric objects in the two large islands of the western Mediterranean, Sardinia and Sicily, has been studied; creating a new, complete and updated inventory of this category of artefacts.

They were analysed morphologically and morphometrically, taking into account some fundamental parameters such as perforations, length, width and section. The artefacts were drawn, photographed and scanned, collected into groups and these, in turn, divided into subgroups, types and subtypes; highlighting the artefacts characterized by particular shapes, such as the brassard from Sbrivula cave (Noto, Syracuse, Sicily) that present perforations on the short sides and a wavy profile, or the example with a pseudo-lozenge shape from Cava Bernardina di Melilli (Syracuse, Sicily). Other specific cases of archer bracelets have been described, such as Anghelu Ruju (Alghero, Sassari, Sardinia) decorated with concentric circles around a central dot. Furthermore, though a careful analysis, information will be obtained on the raw materials used in the manufacturing of bracelets, mainly made in lithic materials but also in hard animal material (Gattolo brassard, Mazara del Vallo, Trapani, Sicily), ivory (Anghelu Ruju, Alghero, Sassari, Sardinia) and metal (Veneroso collection in Sicily). The main objective of this work is to research on the modalities of raw materials and objects circulation in the study area and the relationships with neighbouring regions of the Western Mediterranean.

7 THE MARITIME CONNECTIVITY OF MEDITERRANEAN AFRICA DURING THE 'LONG' THIRD MILLENNIUM BC

Broodbank, Cyprian (McDonald Institute, University of Cambridge) - Lucarini, Giulio (National Research Council of Italy, Institute of Heritage Science, Italy) - Bokbot, Youssef (Institut National des Sciences de l'Archéologie et du Patrimoine, Morocco)

The dramatic expansion of maritime interconnections within and between many regions of the Mediterranean during the 'long' third millennium BC (ca. 3500-2000 BC) is well-known. Recently, this has been given further impetus by aDNA results that, when interpreted in the framework of broader archaeological models of Mediterranean mobility,

can shed new light on the period's dynamics. To date, however, there has been one glaring absence. This concerns the people and communities of the Mediterranean's southern, African, shore. A surprising diminution in the data for this timespan within north Africa west of Egypt, even relative to the under-researched preceding millennia, has left this region's participation in wider networks only glimpsable through its raw materials (e.g. ivory and ostrich egg) abroad, and finds of European material in Africa (e.g. beaker sherds and metalwork in the northwest Maghreb). Three new sources of insight now enable Mediterranean African societies to take their proper place as active participants in these networks. First, configurational analysis of the coastal properties of the southern shore identifies likely areas for the emergence of indigenous African maritime activity, with striking archaeological correlates. Second, aDNA and other biological analyses have identified people of recent African ancestry in Iberia, Sardinia and Malta over this period. Third, and most vitally, new Anglo-Italian-Moroccan fieldwork at Oued Beht in northwest Morocco reveals a large-scale agricultural community of the later fourth to early third millennia BC, comparable in many ways to those of southern Iberia, with an abundant, locally made pattern-painted pottery hitherto best attested north of the Gibraltar strait. The Maghreb must now be acknowledged as a fully integral element of the complex inter-regional processes that created a Mediterranean world over these and succeeding millennia.

8 UNVEILING THE IVORY TRAIL: EXPLORING TRANS-REGIONAL CONNECTIVITY AND MOBILITY PATTERNS IN THE MEDITERRANEAN BELL BEAKERS THROUGH COMPUTATIONAL MODELLING

Morillo León, José Miguel (Christian Albrecht University of Kiel) - Kempf, Michael (Quaternary Geology, Department of Environmental Sciences, University of Basel) - Bilotti, Giacomo (Christian Albrecht University of Kiel)

Trans-regional connectivity between different groups is one of the most relevant aspects in the socio-cultural characterization of the Copper and Bronze Age. From a material culture perspective, the study of tracing raw material exchange has been a widely considered approach, especially after the normalization of archaeometric analysis.

During the Bell Beaker period, ivory appears to be one of the most important resources, at least for the Western Mediterranean communities, which required a relatively stable flow of this material, unavailable in the whole northern half of the Mediterranean Basin. However, tracing the flow of ivory has mostly been restricted to traditional theoretical models of raw material distributions deriving from socio-culturally centred considerations.

In this contribution, we focus on environmental and geographic conditions to explore the potential transportation networks and dissemination routes of ivory raw material from the African shores and the Eastern Mediterranean towards the Western Basin.

Implementing computational environmental and archaeological modelling, we present a fully reproducible quantitative approach to estimate potential communication and transportation networks based on environmental covariates. We deploy a Network Analysis model and a predictive model based on Least Cost Path density to propose a potential land- and sea-based movement corridor for the western Mediterranean Basin that could have enabled the cultural spread of ivory and other resources during the 3rd and 2nd millennia BC.

The results obtained show a significant parallelism with the expansion of the Maritime Bell Beakers, that characterizes the Mediterranean variant of this archaeological phenomenon. Particularly the model is shedding light on the physical patterns of transportation and mobility that contributed to the expansion of the Bell Beaker horizon, and establishes the probable paths of the expansion of this early global cultural phenomenon.

9 COPPER, GOLD, IVORY AND CINNABAR: POWER DISPLAY AND EXCHANGE NETWORKS IN THE BELL BEAKER TOMBS OF HUMANEJOS (PARLA, MADRID, SPAIN)

Garrido-Pena, Rafael (Universidad Autónoma de Madrid) - Paulos-Bravo, Rodrigo (Universidad Complutense de Madrid) - Flores-Fernández, Raúl (Independent Scholar (Madrid, Spain)) - Herrero-Corral, Ana (Austrian Archaeological Institute (Austrian Academy of Sciences))

The interior of Iberia shows one of the biggest concentrations of Bell Beaker finds in western Europe and has also seen the discovery of rich Bell Beaker cemeteries in the last decades, such as Humanejos, where just nine tombs display an extraordinary concentration of wealth. The grave goods documented are 56 complete vessels, 42% of them located in just two graves, both plain and decorated with Maritime and Late Beakers Ciempozuelos styles. There are also 4 stone wrist-guards, 34 metallic elements, both in copper (4 tanged daggers, 7 Palmela Points, 3 awls, a flat axe and an Atlantic halberd) and gold (18 small ornaments), concentrated in two tombs. The lead isotope analyses show different origins for the copper and this fact, together with the discovery of other grave goods made on exotic raw materials like ivory (8 V-perforated buttons and 44 necklace beads) or the presence of cinnabar, point to the connection of those individuals buried in the Beaker tombs of Humanejos with varied and widespread exchange and social networks. But even the genomic analyses made on 22 individuals, show wider connections. Amongst them three males had the steppe signal, as it has been widely documented in Bell Beaker male tombs in Iberia, but another man lacks this genomic trait. This contrasts with the general pattern, opening interesting lines of research for future samplings in

the site. Moreover, the strontium isotopes did not show female exogamy and patrilocality patterns, but a possible bilocal system, with the exception of a woman, probably the richest female Beaker burial in Iberia, who is a clear outlier.

10 THE COPPER'S SHINE. AN APPROACH TO PALMELA ARROWHEADS BASED ON THE COLLECTION FROM THE ALCOBAÇA CAVES (ALCOBAÇA, PORTUGAL)

Santos, Michelle (Independent research) - Delicado, Cátia (Faculdade de Letras da Universidade de Lisboa)

Among the metallic artefacts collected by Vieira Natividade in the interventions carried out in the caves of Carvalhal de Aljubarrota valley, the results of which were pioneered in a monograph of the same name (Natividade, 1901), several copper arrowheads «Palmela type» stand out. The morphological differences seem to be the best explanation for the typological variety and functionality of the tips, which seem to be a type of very standardized metallic artifact, which circulated widely and in a vast geographical area, with great expression in the Iberian Peninsula. The emergence of different typologies in different contexts (domestic, funerary, cultural and commercial routes), which coexisted at a given time, reaching an expressive geographical dispersion throughout Europe, constitute unavoidable references of the Bell Beaker phenomenon.

In this presentation, we seek to systematize the information produced about these artifacts and to better understand the impact of their geographical distribution on Western Iberia and the primitive metallurgical practices, their evolution and their influence on the daily lives of the communities of the 3rd millennium BCE.

The collection of V. Natividade, now part of the Museum of Alcobaça, demonstrates the importance of revisiting old collections. The careful observation of this collection allowed us to identify a new typology. Can we hypothetically point to a local/regional typological variant? Many other known specimens from the contexts of Portuguese Estremadura did not present this particularity. Are these two ends the result of an accident of production or of the will of the craftsman who produced them? Does the prismatic peduncle recorded in the two specimens with a rhomboidal leaf, a flat and elongated peduncle, means some technological evolution or later chronological phasing? These Palmela arrowheads collected by M. Vieira Natividade came from caves used as funerary spaces, possibly between the 6th and the 2nd millennium BCE.

11 PRODUCTION AND CIRCULATION: THE POTTERY FROM THE SITE OF EL CERRO DE LA VIRGEN (ORCE, GRANADA SPAIN) (2600/2500-2150/1900 BC)

Pinillos de la Granja, Paula (Universidad de Granada) - Dorado Alejos, Alberto (Departament of Prehistory and Archaeology (University of Granada)) - Cámara Serrano, Juan Antonio (Departament of Prehistory and Archaeology (University of Granada)) - Molina González, Fernando (Departament of Prehistory and Archaeology (University of Granada))

Technology is a social phenomenon identified by values and attitudes that condition the search for and extraction of raw materials, the obtaining and use of the finished product. Cerro de la Virgen (Orce, Granada) is an exceptional archaeological site serving to characterise southeastern Iberia's Chalcolithic pottery production as well as to delve into the role played by the Bell Beaker phenomenon in the cultural development of these human communities.

This proposal presents the results of the technological and typological analysis of ceramics (smooth and decorated Bell Beaker) from the middle of the Chalcolithic (2600/2500-2150 BC), to the transition to the local Early Bronze Age (2150-1900 BC). The main objective is to approach the origin, the degree of adoption and the meaning acquired by Bell Beaker pottery in the societies of the Iberian Southeast, focusing on a domestic context at a time when these societies were immersed in a process of growing social complexity.

The study will serve as a reference for the study of local integration and will allow us to approach the influence of the Bell Beaker phenomenon in the southeast of Iberia. It will also show that the symbolic value of this ware was not limited exclusively to the funerary context and will provide points of comparison with other archaeological contexts for future results of ceramic assemblages linked to the Recent Chalcolithic and Early Bronze Age.

12 THE ORANGE AND GREY VS. BELL BEAKER CERAMIC PRODUCTIONS AT LOS MILLARES (ALMERÍA, SPAIN). NEW BASES FOR THEIR SEQUENTIAL AND TECHNOLOGICAL INTERPRETATION

Castillo Gallego, Francisco (University of Granada) - Dorado Alejos, Alberto (Lab. of Archaeometry, Department of Prehistory and Archaeology, University of Granada) - Cámara Serrano, Juan (Department of Prehistory and Archaeology, University of Granada)

As is known, the studies of ceramic productions include a wide range of approaches from which we try to determine aspects related to their manufacture, function, meaning, etc. From this base, we are going to try to make a first approach to the so-called "orange", "grey" and Bell Beaker ceramic productions at the Los Millares site (Santa Fe de

Mondújar, Almería, Spain). On the one hand, the appearance of Bell Beaker vessels is a complex cultural phenomenon that implies profound relationships between Chalcolithic communities throughout the European continent. However, their integration into the preceding sets of material culture, which must have occurred around 2600/2500 BC, as well as the local evolution that developed in each community, is of great interest for understanding these societies in the process of hierarchisation. On the other hand, we consider that Los Millares, the occupation of which extends between 3200 and 2200 cal BC approximately, can be of great relevance, as it shows throughout its sequence different ceramic productions (common and fine) with formal and technological changes. Amongst the "fine" ceramics, we should highlight the "orange", "grey" and Bell Beaker productions. This proposal, therefore, aims to trace the formal and technical changes in these productions over time, to determine their distribution in the site and to investigate the role that all these ceramic classes may have had for these communities, paying special attention to the relationship of these fine ceramics with the rest of the ceramic production of the site.

13 THE BELL BEAKER LEVELS OF CAL CONDE (CABRERA DE MAR, SPAIN): PRELIMINARY RESULTS AND ARTIFACT ANALYSIS OF A MEDITERRANEAN SITE

Marín González, Lara (Universitat Autònoma de Barcelona) - Sanmiguel de la Fuente, Ana (Universitat Autònoma de Barcelona) - Monforte-Barberan, Andreu (Universitat Autònoma de Barcelona) - Molist Montaña, Miquel (Universitat Autònoma de Barcelona) - Bach Gómez, Anna (Universitat Autònoma de Barcelona)

The execution of preventive excavation in an open area, motivated by the development of public infrastructures or private promotions, often leads to unpublished results and unstudied collections. This is the case of Cal Conde, located in Cabrera de Mar (Spain), a site dug by the company ABANS Serveis Culturals S.L. between the years 2018 and 2020. This site presents a large stratigraphic sequence, including several Bell Beaker levels with evidence of metallurgical activities. In this context, we present a preliminary review of the site and the materials, that encompasses ceramic, metallurgical, lithic and macrolithic artifacts as well as a single ivory button. The ceramic collection stands out for its decoration, which includes international Bell Beaker, as well as common ware. These levels are characterized by numerous shards of pottery which have been highly taphonomically altered. Applying formal analysis on these materials, we aim to tackle the stylistic and technological development of all the aforementioned productions; as well as presenting this unpublished site and information that may contribute to the study of the Bell Beaker phenomenon in the Catalan coastal area and its Mediterranean connections.

411 WHAT ARE THE NEXT CHALLENGES FOR THE PROFESSIONAL ETHICS OF HUMAN REMAINS?

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Nilsson Stutz, Liv (Linnaeus University) - Tarlow, Sarah (University of Leicester) - Törv, Mari (University of Tartu)

Session format: Round table (without formal abstracts)

Over the past several decades, archaeologists, biological anthropologists, medical historians, and museum professionals have discussed the ethics of curating, exhibiting, and carrying out research on human remains. As part of these debates – often drawing on postcolonial critique and decolonization tropes, we have seen the formulation and implementation of new best practices, ethical guidelines, and sometimes even laws to regulate the field, but despite these changes, many fundamental ethical challenges remain unsolved. Ethics are multidimensional and not static. Many proposed solutions carry their own problems, and at the same time, the debates inside and beyond the field are creating pressures that may lead us to identify "quick fixes" rather than thought through processes. Adding to the persistence of fundamental ethical challenges, the debate is currently moving into new areas of concern. New categories of human remains emerge as problematic, new methods and new tools and practices (from DNA analyses to Open Access and Open Data), present entirely new challenges. The culture in which our work is situated has also changed, and we now need to carefully consider dimensions such as privacy and dignity of our subjects, in the new and often unregulated spaces of social media. In this roundtable we will move beyond the dominating debates about the ethics of human remains and explore these new and emerging challenges, and how they relate to fundamental dilemmas concerning human remains.

417 HISPANIA AND THE MEDITERRANEAN: NEW APPROACHES TO THE ANALYSIS OF SEA-AND-INLAND NETWORKS (3RD C. BC-7TH C. AD)

Session theme: 6. The Mediterranean from Within

Session organisers: Pina Buron, Maria Rosa (Universidad Nacional de Educación a Distancia) - Colom Mendoza, Enric (Universidad Nacional de Educación a Distancia) - Quaresma, José Carlos (Universidade Nova de Lisboa)

Session format: Regular session

From the 3rd c. BC onwards, especially after the end of the Second Punic War, the Iberian Peninsula became a growing pole of attraction for people, goods, and money, thus beginning a long period of intense commercial and cultural exchanges based on sea borne communications that lasted until the Late Antiquity. Accordingly, the center-periphery relations between Hispania and other regions of western Europe, as well as its major contribution to the economic growth of the Roman Empire, have capitalized on a large part of the research since the 1970s. The goal of this session is to offer an up-to-date and multidisciplinary overview to the mobility and connectivity between Hispania and overseas regions (including the Mediterranean basin and the Atlantic façade) from the 3rd c. BC to the 7th c. AD. We also aim to broaden the discussion to its methods of research, with special regard to the rigorous analysis of material culture.

The past decades research on fine wares, amphorae and other typologies has produced a watershed in our knowledge related to the main periods: Late Republic, High and Middle Empire and Late Antiquity. In addition to the geo-economic role of Mediterranean Hispania, with special emphasis on the Baetican olive oil and the Dressel 20 amphora, wine from the Mediterranean coast of Tarraconensis and fish sauces from the bay of Gades and Lusitania, a complex import-export network has linked the Mediterranean and the Atlantic, making Hispania a crucial pivot for our understanding of a globalising structure such as the Roman Economy.

General contributions and study cases on the following topics are welcome:

- Circulation of people, goods and ideas.
- Roman transport network analysis.
- Quantitative and big data analysis applied to distribution patterns.
- Stratigraphic approaches
- Interconnection between sea and land routes.
- Archaeometric studies.

ABSTRACTS

1 LATE REPUBLICAN LOCAL MONETARY NETWORKS IN THE SOUTHWEST OF THE IBERIAN PENINSULA

baeta, Alice (UNIRQ; University of Lisbon)

During the Late Republic, several cities on the Iberian Peninsula produced their own currency for local circulation to sustain their economies in everyday trade. Some with larger or smaller productions since based on the archaeological evidence, it was possible to have just one issue as the city of Ipses, or multiple series as Myrtilis. Being in the periphery of Rome's domain, this happened due to the lack of official Roman coins in circulation to supply the local demand, which was already adapted to a monetary economy.

We will therefore analyze the cities of Baesuris, Balsa, Cilpes, Ipses, Myrtilis and Ossonoba, which were all mentioned in the classical sources, meaning they had some structure and were known by the capital. The aim is to address the reasons these places needed to make their own coinage to maintain their trades, the size of these productions based on a dies study, and to create maps from finds with provenance to analyze the dispersion and therefore the reach of these local currencies. In this way, it will be possible to understand which cities were more important to the region, and to recreate the trade networks, and human and material flows.

2 TRACING THE FIRST ROMAN PRESENCE IN THE MINING DISTRICT OF SISAPO (2ND-1ST BC): ROAD AXES AND MATERIAL EVIDENCE

Nieto, Miriam (UNED) - Burón, M^a Rosa (UNED) - Prieto, Mar (UNED)

The mineral wealth of Spain was one of the incentives for Italian migration during the Republican period, as highlighted by ancient authors, and became a major catalyst for the early Romanization of its mining districts. In recent decades, archaeological research conducted in the mines and surrounding areas of both slopes of the Sierra Morena has revealed a significant presence of Italian people following the conquest of this space -the former land of the Oretani-,

as well as intense commercial traffic facilitated by land routes, resulting both in the proliferation of new settlements and a high dispersion of Italic imports between the 2nd and 1st centuries BC. The aim of this work is to provide a state-of-the-art overview of the connectivity of the mining district of Sisapo (La Bienvenida, Ciudad Real, Spain) with the Mediterranean basin through the analysis of two main sources of evidence: imported pottery assemblages coming from different sites related to mining activities (especially amphorae and tablewares) and the remains of Roman roads leading from this area to the main ports in the southern Iberian Peninsula (Corduba, Hispalis, Gades).

3 CERAMICS AND TRADE IN POLLENTIA (ALCÚDIA, MALLORCA, SPAIN): STUDY OF LATE REPUBLICAN AND HIGH IMPERIAL PHASES OF THE NORTHWEST HOUSE

Plaza Conesa, Paula (Equip de Recerca Arqueològica i Arqueomètrica de la Universitat de Barcelona (ERAAUB), Barcelona, Spain.; Institut d'Arqueologia de la Universitat de Barcelona (IAUB), Barcelona, Spain.; Universitat de Barcelona (UB), Barcelona, Spain.) - Guimarães, Raquel (Equip de Recerca Arqueològica i Arqueomètrica de la Universitat de Barcelona (ERAAUB), Barcelona, Spain.; Institut d'Arqueologia de la Universitat de Barcelona (IAUB), Barcelona, Spain.; Universitat de Barcelona (UB), Barcelona, Spain.; Fundação para a Ciência e Tecnologia (FCT), Lisboa, Portugal.) - Siclari, Patrizia (Equip de Recerca Arqueològica i Arqueomètrica de la Universitat de Barcelona (ERAAUB), Barcelona, Spain.; Departamento de Prehistoria y Arqueología, Facultad de Geografía e Historia, Universidad de Sevilla, Sevilla, Spain.) - Mas Florit, Catalina (Equip de Recerca Arqueològica i Arqueomètrica de la Universitat de Barcelona (ERAAUB), Barcelona, Spain.; Institut d'Arqueologia de la Universitat de Barcelona (IAUB), Barcelona, Spain.; Universitat de Barcelona (UB), Barcelona, Spain.) - Chávez-Álvarez, Esther (Grupo de investigación ARQHISPA, Tenerife, Spain.; Departamento de Geografía e Historia, Universidad de La Laguna (ULL), Tenerife, Spain.) - Cau-Ontiveros, Miguel Ángel (Equip de Recerca Arqueològica i Arqueomètrica de la Universitat de Barcelona (ERAAUB), Barcelona, Spain.; Institut d'Arqueologia de la Universitat de Barcelona (IAUB), Barcelona, Spain.; Universitat de Barcelona (UB), Barcelona, Spain.; Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain.; Chercheur Associé, Aix Marseille Univ, CNRS, CCJ, Aix-en-Provence, France.)

The Roman city of Pollentia is situated on the northern coast of the island of Mallorca in the Balearics and holds a privileged position for controlling both the land and sea territory of the area. According to classical authors, it was conquered in 123 BC by the consul Quintus Caecilius Metellus along with the rest of the island. The military intervention of this insular territory is justified by its strategic significance in the maritime routes of the western Mediterranean. This importance is reflected in the diachronic evolution present in the ceramic contexts, which are fundamental for understanding the commercial dynamics of the region during the Roman period.

The current research project has rekindled the excavations of the Northwest House, a building traditionally identified as a domus in the residential area of Sa Portella, in the northern part of the city. There, three buildings are known to be distributed axially around the Porticoed Street and the North-South Street. The best-known phases are the High Imperial ones, but it also presents a Late Republican phase and occupation prior to the Roman period, as demonstrated by the remains of possible indigenous structures found beneath the Northwest House and the Porticoed Street.

The stratigraphy of this building has yielded several ceramic assemblages from indigenous, Late Republican, and High Imperial layers. This contribution aims to present the results of the study of the ceramic materials, with special attention to the Late Republican to the Early Imperial phases up to the 1st century AD. The goal is to provide new data on the commercialization and consumption of ceramic products during this transitional period in this insular city.

4 CONNECTIVITY ANALYSIS BETWEEN TARRACO (TARRAGONA, SPAIN) AND ITS HINTERLAND DURING THE LATE REPUBLICAN AND EARLY EMPIRE PERIODS

Mateo Corredor, Daniel (University of Alicante)

This presentation explores the connectivity and integration between the Roman provincial capital, Tarraco, and its hinterland from the onset of Roman presence until the end of the Early Empire, with amphorae as a primary indicator. It analyses the information from archaeological contexts with quantitative amphorae data from ancient Tarraco, along with amphorae records from the rural surroundings, particularly the Camp de Tarragona area, mostly gathered through various survey campaigns since the 1980s. Two complementary levels of analysis are employed: a proportion analysis of quantitative amphorae assemblages and a distribution pattern analysis based on the presence/absence of specific containers. The results reveal significant shifts in the distribution of amphorae reaching the port area of Tarraco during the Early Empire compared to the Late Republican phase. The aim is to discuss the possible causes that explain the uneven penetration of foodstuffs in the ager Tarraconensis and, ultimately, the potential and methodological limits of this approach.

5 NEW EVIDENCES OF TRADE NETWORKS BETWEEN HISPANIA AND ROME

Colom-Mendoza, Enric (UNED-ICAC) - Járrega-Domínguez, Ramon (ICAC)

Since 2016 we have initiated a collaboration agreement between Institut Català d'Arqueologia Clàssica (ICAC) and Sovrintendenza Capitolina ai beni culturali di Roma, in order to analyze all the amphorae from Hispania stored in the Musei dei Fori Imperiali (Mercati di Traiano). This project, called "Les àmfors hispàniques del Castro Pretorio conservades als Mercats de Trajà. Aportació a l'estudi del comerç entre Hispania i Roma durant l'Alt Imperi", allowed us to study the important archaeological context of fossa aggeris ad castra praetoria, among another ones. During this years, we have been analyzed more than 200 amphorae found in Rome and stored at the Mercati di Traiano, all documented by photogrammetric techniques. All this amphorae and the enormous amount of data recollected allow us to draw a new approach to the economic relation between Rome and Hispania, specially oil and fish sauces from Provincia Hispania Baetica and wine from Provincia Hispania Tarraconensis. In this communication we want to present a short briefing to our study, wich will be published in a book at the end of 2024.

6 SPANISH IMPORTS TO THE PORT OF OLBIA (NORTH-EAST SARDINIA)

Nervi, Cristina (MIM)

The Roman port of Olbia is located along the coast of Northeastern Sardinia, approximately where the Phoenician port was.

The geographical location of the city gave it great importance. It was situated right in front of Rome and became the location of the Annona warehouses.

Goods from all over the Mediterranean were stored in Olbia, awaiting distribution.

The Spanish amphorae (Tarraconensis and Baetic) found during the excavation of the port of Olbia span a chronological range from around 140 B.C. to 600 A.D.

The Spanish amphorae make up 6% of the total amphorae amount.

The contacts with Spain began in 140 B.C. with very few specimens. But they started to increase around the second half of the 1st century B.C. A real increase occurred between the second quarter and the middle of the 1st century A.D. In the second half of the 1st century A.D., there is the true peak in the importation of Spanish amphorae. Imports decrease and stabilize in the 2nd century A.D. From the 3rd century A.D. until the middle of the 5th century A.D. the regression in imports continues. From 450 onwards, specimens are rare and sporadic.

The arrival of the Vandals in Sardinia marked the definitive decline of trade in the port of Olbia.

The most imported type is the oil amphora Dressel 20, along with the Tarraconensis amphorae for salted products, Dressel 7-11. Another product was wine, carried in Dressel 2-4 Tarraconensis.

The port of Olbia, with its amphorae, outlines the shipping routes from the ports of Spain to Rome over a chronological span of about five centuries, allowing for the reconstruction of the passage of Spanish goods in the Tyrrhenian Sea from Sardinia and the Lazio coast and between Sardinia, the Balearic Islands and the eastern coast of Spain.

7 BEYOND THE SLIP SURFACE. AN ARCHAEOMETRIC APPROACH TO THE MICROSTRUCTURE AND CHEMICAL COMPOSITION OF BLACK GLOSS POTTERY FROM POMPEII

Ortega Palacios, Clàudia (Cultura Material i Arqueometria UB (ARQUB, GRACPE), Dept. Història i Arqueologia, Universitat de Barcelona, Barcelona, Spain) - Madrid i Fernández, Marisol (Cultura Material i Arqueometria UB (ARQUB, GRACPE), Dept. Història i Arqueologia, Universitat de Barcelona, Barcelona, Spain.) - G. Sinner, Alejandro (Department of Greek and Roman Studies, University of Victoria, Victoria, Canada)

Late Republican Black Gloss pottery, traditionally called Campanian pottery, was the first mass-produced tableware in the Roman world, arriving in large quantities throughout the western Mediterranean since the 2nd c. BCE. In this paper, we are pleased to present a comprehensive exploration into the microstructure and the chemical composition of the layer coating 56 sherds of Black Gloss pottery recovered from Pompeii (Campania, Italy).

Employing chemical analysis and microstructural examinations through scanning electron microscopy (SEM), this research aims to elucidate the composition, thickness, adherence to the matrix, and the vitrification stage of the slip. Not only do these characteristics serve an aesthetic purpose, but also contribute significantly to the impermeability and protection of the vessel. Additionally, this study assesses whether the raw materials employed in the manufacture of the barbotine correspond to the fine fraction of the same illitic clay used in the elaboration of the ceramic bodies, as several researchers have assumed for many years.

The research is founded on the chemical analysis previously obtained over the ceramic bodies through X-ray fluorescence (WD-XRF). This analysis has enabled the identification of up to four representative compositional groups, including a large group corresponding to a local Pompeian product, as well as two groups manufactured from an area

between Etruria and Latium, and that are frequently found in several north-eastern sites in Hispania (e.g.: Emporiae and Tarraco).

Only by examining the microstructure, as well as the connections between the slip surface and the ceramic body, we are able to observe significant differences between these Pompeian products and those with an Etrurian-Latial origin, a relevant point towards improving the archaeological classification and to attribute different technological solutions to the different workshops involved in the elaboration of this popular pottery.

8 NEW PERSPECTIVES ON LEVANTINE EASTERN SIGILLATA A REVEALED THROUGH ARCHAEOMETRY

Madrid i Fernández, Marisol (University of Barcelona) - Regev, Dalit (Israel Antiquities Authority) - Ortega Palacios, Clàudia (University of Barcelona)

Eastern Sigillata A (ESA) is the first red gloss fine ware distributed throughout the Mediterranean from the 2nd century BCE onwards. Their abundance documented in various Mediterranean sites from the east to the west (from the Levant to the Iberian Peninsula) allows us to hypothesise that multiple ceramists and workshops would have been involved in its production to supply all these markets. The intention to manufacture the same product with similar characteristics poses great difficulty for archaeologists to visually differentiate the products of those possible different workshops. However, this poses no problem at the archaeometric level.

Considering those issues, a first archaeometric approach to ESA in the Levant, supposed to be the origin of this pottery, has been carried out. Despite the lack of workshops at the archaeological level, the relationship between Eastern Sigillata A and Phoenician pottery made it worthwhile to propose the analysis of three sites dated to the 2nd century BCE: Akko Ptolemais, located along the northern coast of the southern Levant, Marisa, an inland administrative and trade centre, and Beit-Shean, which is in the northern Jordan valley.

The analytical study includes items characterised chemically and mineralogically using X-ray fluorescence and X-ray diffraction and microstructurally using Scanning Electron Microscopy. Provenance aside, archaeometric studies enabled us to identify technical characteristics related to the application of gloss and its features, as well as firing processes related to the temperature, atmosphere and the type of kiln used by the potters. All of this provides a complete insight into the level of knowledge of the ceramists involved in the production of this pottery and the flow of knowledge that circulated along with the materials themselves.

9 TWO CONTEXTS BETWEEN THE 4TH AND 6TH CENTURIES AD FROM MÉRIDA: STUDY OF THE CERAMIC AND GLASS TAXONOMIES IN STRATIGRAPHY

Lopes, Martim (University Rovira i Virgili; CHAM - Centro de Humanidades)

This work presents the full assemblage from two previously partially published contexts from Mérida, namely the stratigraphical units of waste dump from the excavations of Calle Muza nº38 and Calle José Ramón Mérida nº 37, where worked from a quantitative and statistical point of view.

Mérida, then Augusta Emerita, as the capital of the roman province of Lusitania was a central point for the comercial networks of the province, although its location could favour intra-provincial commerce such as with the Hispanic sigillata in determent of the products commercialized in the Mediterranean/Atlantic circuits.

The assemblage here analysed is composed of diversified ceramics with a particular emphasis on the terra sigillata with African D, Late Roman C and Late Hispanic Sigillata and on the coarse wares.

For the last category, various typologies were identified alongside different modulations and fabrics with the presence of some slow wheel, a phenomenon that this paper intent on quantify and compare with other examples from the province, namely from the region of Olisipo, one of the main portuary cities of the Atlantic façade of Lusitania.

10 A NEW AMPHITHEATER DISCOVERED IN AMMAIA (PORTUGAL): A PROVINCIAL MODEL

Barrero Martín, Nova (Museo Nacional de Arte Romano) - Basarrate, Trinidad (Museo Nacional de Arte Romano) - Fabião, Carlos Jorge (Universidade de Lisboa) - Viiegas, Catarina (Universidade de Lisboa) - Carvalho, Joaquim (Fundação Cidade Ammaia) - Guerra, Amílcar (Universidade de Lisboa)

The ancient Roman city of Ammaia is located next to the small town of São Salvador da Aramenha (Marvão, Portalegre). It constitutes one of the landmarks the Roman Province of Lusitania.

Ammaia was founded in the time of Emperor Augustus, towards the end of the first century B.C. and the beginning of the first century A.D. It was named Civitas around 44/45 A.D., obtaining the title of Municipium during the first century A.D.

The urban planning of the city is generally known thanks to the Radio-Past Project which, through geophysical surveys, generated a model of the city. The layout of its wall delimits the urbs, which may have had a perimeter moat.

There were at least four large entrance gates to the city, following the cardinal axes. Similarly, the forensic area is known, with the podium of the Temple raised.

Since 2018 the Foundation of Roman Studies and the National Museum of Roman Art joined the integral project of the city together with the City of Ammaia Foundation itself and the University of Lisbon. The geophysical surveys carried out on the perimeter of the city, outside the wall, where there were already signs of an area dedicated to public spaces, has allowed to recognize the fifth amphitheater of Lusitania. It is a construction perfectly adapted to the topography of the site, since one of the minor axes takes advantage of the steep slope of the hillside, previously used as a quarry, to seat part of the cavea. On the opposite axis, the boundary wall (muro limítrofe) is made of masonry and the main door through which the gladiators entered the arena has been excavated. Two small rooms have also been identified, with access only from the amphitheater arena, which could have auxiliary or religious functions.

426 WHEN GEOPHYSICS MEETS ARCHAEOLOGY: EXAMPLES FROM CULTURAL HERITAGE TO RESCUE ARCHAEOLOGY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Barone, Pier Matteo (American University of Rome; Forensic Geoscience Italy) - Petersson, Håkan (University of Gothenburg, Department of Historical Studies; Sydsvensk Arkeologi Ltd) - Capizzi, Patrizia (Università di Palermo; Associazione Italiana del Georadar) - Tencer, Tomáš (Masaryk University, Department of Archaeology and Museology) - Moëll Pedersen, Grethe (University of Stavanger; Museum of Archaeology Department of Cultural Heritage)

Session format: Regular session

The session wishes to discuss the precision of knowledge achievable through geophysical investigation, with a specific focus on GPR and Magnetometry. Two different sub-topics are addressed. The first sub-topic delves into what degree geophysics can be adopted within development-led investigations (rescue archaeology), which varies considerably between countries. There is no universal agreement on the usefulness of the method within our time and cost-driven sector where reliable results are crucial. We (want) to host a methodological discussion about geophysical archaeology and large-scale development-led excavations. Our goal is to attract both proponents and sceptics, encouraging everyone to exchange experiences and initiate a productive dialogue. Both critical and positive opinions are most welcome in dialogue within this sub-session. What expectations should we have? Could geophysics be complementary to other traditional methods to increase our knowledge and have a more comprehensive picture and better understanding in advance of our time-driven decision-making? Or has it proven to be too unreliable for being used within time-cost-driven rescue archaeology?

The second sub-topic delves into the significance of advanced studies in Ground Penetrating Radar (GPR) specifically, exploring its current applications, potential future outcomes, and inviting a diverse array of presenters to contribute their expertise to archaeology and cultural heritage preservation. To enrich the discourse on advanced GPR studies, this sub-session calls upon a diverse array of presenters, including archaeologists, geophysicists, engineers, and technology developers. Contributions may span from successful case studies applying GPR in different cultural contexts to presentations on cutting-edge technologies that push the boundaries of current capabilities. By fostering interdisciplinary collaboration, this session seeks to create a dynamic platform for knowledge exchange, encouraging a holistic approach to the challenges and opportunities presented by GPR in archaeology and cultural heritage.

ABSTRACTS

1 SEEING WITH OTHER(S) EYES. GEOPHYSICS AND DEVELOPMENT-LED ARCHAEOLOGY FOR SECTION 3 OF SIBIU - PITESTI (A1) MOTORWAY CONSTRUCTION IN ROMANIA

Asandulesei, Andrei ("Alexandru Iona Cuza" University of Iași, Romania) - Borș, Corina (National History Museum of Romania) - Florea, Mihai (National History Museum of Romania) - Ștefan, Maria-Magdalena (National History Museum of Romania) - Șuteu, Călin (Gigapixel Art S.R.L.)

The incorporation of a non-intrusive assessment phase into the methodological framework of archaeological research should no longer be viewed merely as an exotic or optional desire expressed by archaeologists. Such interventions are increasingly essential, particularly in the context of extensive preventative research projects where the excavation of archaeological sites must proceed efficiently, very often amidst time or budget constraints.

It is important to note that this does not entail abandoning established sequences integral to the archaeological assessment process in a given area (such as surface surveys and intrusive diagnostics), but rather emphasizes their complementary nature. This approach aims to develop the most accurate understanding of the archaeological landscape.

Non-destructive techniques, including aerial photography, photogrammetry, and geophysical surveys, represent proven methods for identifying archaeological structures and assessing their planimetric complexity. Using extensive, high-resolution magnetometer surveys constitutes an essential aspect of cultural heritage management, providing a complementary method to trial trenching surveys for the detection and precise delineation of archaeological sites.

The case studies under our investigation were initially identified during the commencement of construction activities for a significant stretch of highway-type road infrastructure, namely Section 3 of the A1 highway in Romania, which is part of the IV Pan-European Transport Corridor. A total of 8 archaeological sites and 9 areas of interest were distinctly delineated as a result.

In general, we observe a significant correlation between the anomalies detected and those documented during preventive research, supporting the recommendation to incorporate this prospecting sequence into similar methodologies. Furthermore, we plead for the use of a combination of intrusive and non-intrusive methods during the diagnostic phase, not only as a methodologically sound approach but also as a necessary one. This approach ensures the reliability of the resulting data with a high level of precision, including clear site boundaries, spatial distribution of features, typology.

2 HERITAGE ASSESSMENT AND GEOPHYSICS: CHALLENGING 'RESCUE ARCHAEOLOGY' IN CONSULTANCY

Brooks, Poppy (Arcadis) - Latham, Alexandra (Arcadis)

In our role as private sector Heritage Consultants, the use of geophysical survey to better understand the archaeological and heritage baseline of a client site is often suggested as the first step of further assessment beyond desk-based assessment. The aim of our heritage assessments is to categorise archaeological sites, as part of the consenting process, to know its character and significance and propose appropriate mitigation measures. Having an awareness of the below-ground baseline at the beginning of the project can benefit us as consultants - we can provide better advice when we know what is there - and our clients as they can use this knowledge to help their budgets, scope, and design.

In this paper, we'd like to challenge the concept of 'rescue archaeology' and propose that during developer-led projects geophysical survey plays a part in our understanding of any below ground archaeological remains that may be present. Geophysics, alongside other work such as trial trenching, supports the reduction of risk for identifying unknown archaeological remains at construction avoiding the need for rescue excavation. As part of this paper we would like to discuss an Arcadis project, Otterpool, to demonstrate our points. The project used a combination of geophysics techniques to support heritage assessment, build on understanding of individual sites whilst feeding into the master plan to de-risk construction activities and enhance the historic environment through design.

3 LARGE SCALE MAGNETOMETRY SURVEY FOR MAJOR TRANSPORT INFRASTRUCTURE DEVELOPMENT - THE UK HS2 CASE STUDY

Carver, Jay (4AD Consultants Ltd)

Reconnaissance and site detection for UK High Speed 2 Rail Project Phase 1 involved commissioning of magnetometry surveys for all suitable land within a linear development area of several thousand hectares, between the cities of London and Birmingham. This paper will address the results of these surveys with reference to the subsequent ground truthing via archaeological trial trench and then detailed excavation areas. This enables an analysis of the effectiveness of the surveys and opportunity to identify regional variations in geology, superficial soils, and the types of sites detected and not detected, to corroborate a detection model for the regions assessed. The model will compare survey interpretation and classification of anomalies with the actual features detected via physical site investigation during the trial trenching and area excavation to establish a quantitative report on the effectiveness of surveys. Local conditions, in particular geology, superficial soils and recent land use are indicated to be a significant factor in determining detection/non detection of sites and this data it is analysed to provide some basis for developing local predictive models for site detection.

4 EARLY MEDIEVAL HILLFORT PRAGUE-VINOŘ: GEOPHYSICAL SURVEY AS A PART OF THE ARCHAEOLOGICAL INVESTIGATION

Fajta, Martin (Department of Archaeology, Faculty of Arts, Charles University)

Prague-Vinoř is a polycultural hillfort mainly associated with the early medieval Přemyslid domain in central Bohemia, Czech Republic. The Department of Archaeology of the Faculty of Arts of Charles University has been systematically investigating the site since 2013 using a combination of non-destructive methods and archaeological excavations.

Geophysics has played a significant role in the research of the site, with a wide range of applied methods including magnetometry, GPR, DEMP and ERT. Many measurements have been made over the years with different objectives and with varying interpretative value. Geophysics is not only used as a preliminary method, but measurements are

often carried out during time-limited excavation season to supplement the picture of the specific situations under investigation. Different geophysical methods are applied in the verification of extension of archaeological situations and in decision-making processes related to the organisation of fieldwork.

This paper summarizes the results of various geophysical surveys that have been conducted over many seasons and uses them to present the potential of different methods to complement ongoing excavations. Although the excavations in Prague-Vinoř are systematic and planned, this comparison can be applied to a variety of situations and may also be useful in development-led investigations.

5 COVERING NEW GROUND: GPR AND DEVELOPMENT-LED ARCHAEOLOGICAL SURVEYS IN ROGALAND, SOUTHWEST NORWAY

Pedersen, Grethe (Museum of Archaeology, University of Stavanger) - Gil Bell, Theo (Museum of Archaeology, University of Stavanger)

This presentation will discuss the current use and future potential of geophysical prospection techniques (ie. GPR) in pre-development archaeological surveys within the culture resource sector in Rogaland County, southwest Norway. We present an overview of the results of work conducted by the Arkeological Museum, University of Stavanger to address key questions regarding survey design and the integration of results into the planning processes as well as research agendas.

An extensive GPR survey carried out within the corridor of the proposed E39 motorway improvement scheme will be used as a case study. An area of 37000 m² was investigated in Moi, January 2020. However, due to delays and complications, arising because of the global pandemic, the results of the GPR survey were unable to be integrated into the planning of invasive archaeological surveys (ie. test-trenching) within the corridor.

By analyzing the results of the test-trench surveys and comparing them with the GPR data, we will propose a strategy that could have been recommended to the county municipality if the GPR data had arrived on time.

6 ADVANCING ARCHAEOLOGICAL CONSERVATION PRACTICE: GEOPHYSICAL SURVEYS IN MANTUA

Strapazzon, Guglielmo (Independent Researcher) - Marastoni, Chiara (Soprintendenza Archeologia, Belle Arti e Paesaggio of Lodi and Mantova) - Kainz, Jakob (University of Vienna) - Betto, Andrea (ArcSAT snc di Valente Vincenzo e C.)

The archaeological landscape of Italy's Po Valley faces threats from industrial agriculture and modern infrastructure development. While traditional excavation methods have long prevailed in archaeological practice, recent years have seen a notable shift towards non-invasive techniques. However, the integration of geophysical surveys has been slow until recently.

To address this challenge, the Archaeological Soprintendenza of Cremona, Mantua, and Lodi initiated a project focused on the province of Mantua. The primary objective is to establish "best practice guidelines" tailored to the sub-regional area, aiding authorities and professionals in evaluating the effectiveness of geophysical techniques concerning specific geomorphology, pedology, and archaeological deposits.

This extensive undertaking encompasses 12 sites spanning from the Neolithic to the post-medieval era, identified through remote sensing analysis, field surveys, and metal detecting.

To better understand the archaeological potential of the sites, geophysical surveys have been conducted over 30 hectares, primarily utilizing magnetometry and ground-penetrating radar, supplemented by soil sample analysis. Geophysical data have been validated through targeted test trenches, enhancing understanding of the preservation levels of archaeological features.

The integration of surface surveys, aerial photography, and geophysical surveys with stratigraphic excavation strengthens archaeological heritage protection, enabling a comprehensive assessment of site extension and archaeological potential. Guided by legislative frameworks, this interdisciplinary initiative strives for sustainable conservation, preserving Mantua's archaeological legacy as a replicable model for neighboring provinces.

7 STRATEGIC USE OF GPR SURVEYS WITHIN CONTRACT-ARCHAEOLOGY. EXPECTATIONS AND EVALUATION OF POTENTIAL IN SWEDEN

Petersson, Håkan (Department of Historical Studies, University of Gothenburg; Sydsvensk arkeologi Ltd)

In Sweden geophysical surveys, mostly GPR, in connection with rescue-archaeology have mainly been small-scale endeavours targeting limited areas, often within an urban context. Such projects have typically resulted in difficult to interpret data-sets, or in other instances data used to precisely locate structures known from written sources, such as building remains, stone walls etc. The aim has been helping the rescue archaeologists predict when excavating, or

where exactly to dig to find specific target objects known in advance. Another aspect has been to contextualise results from an excavation site, which within cities often is rather limited in space, by analysing a larger area of interest around the excavation. In those cases, it has been a high success rate.

In my talk however, I will present some results from our trial of large-scale multi-channel GPR surveys on arable land in rural areas. The aim of our approach has been to investigate the potential of geophysical methods in areas designated for archaeological excavations. Our approach is to collect GPR data, study and analyse it and then compare the result of the GPR surveys, along with our interpretations, to the findings from the excavations. From this I will briefly discuss the potential of the method within Swedish contract archaeology in the outset of the demands from our legislative system, from early planning, pre-investigations and test-trenching to the final rescue-excavation before the site is removed.

8 INTEGRATING GEOPHYSICAL AND GEOCHEMICAL DATA IN ARCHAEOLOGY - EXPERIENCE AND PRELIMINARY RESULTS FROM SEVERAL PROJECTS

Horak, Jan (University of Hradec Králové, Department of Archaeology) - Fišer, Jan (University of Hradec Králové, Department of Archaeology) - Milo, Peter (Masaryk University, Department of Archaeology and Museology) - Tencer, Tomáš (Masaryk University, Department of Archaeology and Museology) - Goláňová, Petra (Masaryk University, Department of Archaeology and Museology) - Parma, David (Institute for Archaeological Heritage, Brno) - Tichá Bambasová, Sylva (University of Hradec Králové, Department of Archaeology) - Soltészová, Kitty (University of Hradec Králové, Department of Archaeology) - Holas, Matouš (Museum of Eastern Bohemia in Hradec Králové) - Kindelmann, Petr (Osina Archo)

The data integration in archaeology and especially in archaeological prospection is a very often used term. However, it is not defined absolutely. We define the integration as a method where the input data from various methods are manipulated and influenced mathematically among datasets. We focused in our research to find methodological approach and workflow how to integrate geophysical and geochemical data. We use XRF spectrometrical geochemical data (elemental content) and magnetometric data in our example, but the workflow can be applied on any point and raster datasets.

Our results show, that it is a useful approach for archaeology, although questions still dominate over the answers, as the approach is quite new. We present several examples from various researches in various conditions: Iron Age enclosure with sunken features, not excavated prehistoric hillfort, La Tène period oppidum Bibracte with stone architecture and big area highway excavation with datasets ranging from lower hundreds to thousands of soil cores and areas covering several hectares.

This research activity is a part of our research initiative called IMAP – Integrated Multi-Methodological Archaeological Prospection.

This research initiative originated in the activities of the COAST action CA 17131 SAGA: The Soil Science & Archaeo-Geophysics Alliance (www.saga-cost.eu). The geochemical datasets were obtained during the project "Geochemical insight into non-destructive archaeological research" (LTC19016) of subprogram INTER-COST (LTC19) of program INTEREXCELLENCE by Ministry of Education, Youth and Sport of the Czech Republic. It was also supported by the Czech Science Foundation [Project: Mobility of materials and life cycles of artefacts: archaeometry of metals and glass of the La Tène and early Roman period; project number: 18-20096S]. Some datasets were obtained by activities of the Archaeo-Environmental Laboratory (<https://uni.uhk.cz/archeologie/envilab>) during rescue excavations of Czech highway infrastructure due to willingness of the Centre for Fieldwork Archaeology, Department of Archaeology of University of Hradec Králové.

9 USE OF GROUND-PENETRATING RADAR FOR ARCHAEOLOGICAL EXCAVATIONS AND CULTURAL HERITAGE MANAGEMENT IN THE CZECH REPUBLIC

Tencer, Tomáš (MUNI - Ústav archeologie a muzeologie) - Vágner, Michal (MUNI - Ústav archeologie a muzeologie) - Milo, Peter (MUNI - Ústav archeologie a muzeologie) - Šálka, David (MUNI - Ústav archeologie a muzeologie) - Havelka, Jan-Apač (MUNI - Ústav archeologie a muzeologie) - Rekemová, Anna-Mária (MUNI - Ústav archeologie a muzeologie) - Dejmal, Miroslav (MUNI - Ústav archeologie a muzeologie)

In recent years, geophysical surveys have become a standardised methodological tool in modern archaeology, offering a rapid, efficient, and affordable way to map hidden subsurface features. The information thus obtained not only provides an essential basis for scientific research but is also becoming an important source of knowledge both in the preliminary stages of rescue archaeological excavations as well as in the field of cultural heritage preservation and during the restoration of various immovable monuments. The increasing trust in the method by field archaeologists, investors, and cultural heritage management institutes slowly leads to their wider use and the discovery of their benefits and disadvantages for heritage management and rescue archaeology.

Exploring the applications of the geophysical methods in monument care within the Czech Republic, this contribution examines instances of their practical use in cultural heritage, especially in planning rescue archaeological research and during the revitalisation of immovable cultural monuments. The spotlight of this contribution will be focused on several examples of the excavation and renewing of historical monuments such as churches, castles, and chateaux, where the ground-penetrating radar was used and where acquired information not only played a pivotal role in uncovering long-lost historical features but also significantly contributed to the delicate process of sensitive restoration of these cultural landmarks.

10 GEOPHYSICAL SURVEYS REVEAL THE HIDDEN CITYSCAPE OF VULCI

Ullrich, Burkart (Eastern Atlas) - Meyer, Jess (Eastern Atlas) - Franceschini, Mariachiara (Albert-Ludwigs-Universität Freiburg) - Pasieka, Paul (Johannes Gutenberg-Universität Mainz)

In our paper, we show how large-scale geophysical investigations at Vulci, a long-known and protected site, can lead to new, sensational discoveries. The decisive factor here is to apply the concept of preventive archaeology and operate on a broad spatial scale to cover the entire accessible area and to gain a comprehensive overview of the city.

The broader Vulci Cityscape project (<https://vulcityscape.hypotheses.org/>), based at the German Universities of Freiburg and Mainz, aims to achieve a new understanding of the Etruscan-Roman city of Vulci combining non-invasive geophysical prospections and stratigraphical excavations. In 2020, geophysical surveys using magnetometry and ground-penetrating radar (GPR) were carried out by Eastern Atlas in the area north of the so-called decumanus. Stratigraphical excavations, ongoing since 2021, have made it possible to verify and complement the data from the prospections. Further non-invasive investigations are planned from 2024 to 2027.

An interdisciplinary team of geophysicists and archaeologists collaborated on the geophysical investigations and their archaeological interpretation. The results led to a new and more complete plan of this part of the city, identifying different functional areas and street systems in order to reconstruct the complex historical palimpsest of the urban structure. Among the functional areas, a new sacred district to the west of the Tempio Grande stands out, including a hitherto unknown monumental, late Archaic Temple.

11 NECROPOLIS IN MOKRIN – A GEOPHYSICAL CASE STUDY

Pentic, Jugoslav (TTC TOP TRAVEL CENTAR)

This paper presents the results of several years of geophysical research conducted on a Early Bronze Age necropolis site of Mokrin (Lalina humka). We discuss the benefits received from the combined approach to site survey, using both GPR and magnetometry methods for the assessment of the necropolis's extent and complexity. Despite somewhat disheartening results in mapping archaeological structures, charting contemporary changes that made a – substantial – impact on the site integrity has proven to be a valuable support in providing legislative protection to the site (in terms of local heritage management practices). We briefly discuss the methodology used to maximize the detection of expected burial structures, pitfalls and successes of the approach, as well as the – unexpected – results that extended the site activity far past the EBA range. Further discussion is directed toward the impact that geophysical methods provided on the perception of the site, the extent of site intrusion, and the effect of geophysical surveys in local practices in Cultural Heritage Management.

12 GPR IN NORWEGIAN CULTURAL HERITAGE MANAGEMENT - RESEARCH PROJECTS AND MAPPING OF KNOWN ARCHAEOLOGICAL SITES

Hillesland, Kristoffer (University of Stavanger) - Sæther, Øyunn (University of Stavanger)

This paper connects with two other presentations from the Museum of Archaeology in Stavanger which explore the increasing importance of GPR in Norwegian cultural heritage management. The primary focus is to highlight the role GPR-based research projects can play in the management and protection of vulnerable cultural landscapes.

The utilization of GPR technology has significantly enhanced our ability to explore and interpret historical landscapes, shedding new light on known archaeological localities such as cemeteries, grave mounds, church sites, and other culturally significant areas. Many of these sites are at risk of damage and destruction due to a lack of care and maintenance. GPR has proven to be a valuable tool in managing these sites.

The presentation will showcase compelling case studies where GPR has been employed to unveil hidden dimensions of known or previously excavated archaeological sites, with examples including the medieval churches at Hylestad and Hundvåg, as well as grave mounds and other monuments from the Avaldsnes region in Norway. By conducting systematic surveys and generating detailed subsurface maps, we have gained renewed insights from archaeological sites that were previously thought lost or damaged. This approach not only refines our understanding of our cultural heritage but also offers a non-invasive methodology that preserves the integrity of these delicate historical environments.

Key topics to be covered include the methodology employed in the GPR surveys, data interpretation techniques, the integration of GPR findings with other archaeological evidence, and the results this approach has yielded for our cultural heritage management. The session aims to foster discussions on the challenges, successes, and future directions of using GPR for mapping known localities, providing a platform for collaboration and knowledge exchange among archaeologists, geophysicists, and technology specialists.

13 CHURCHES AND HISTORICAL BUILDINGS: A CULTURAL PATRIMONY HIDDEN AMONG US

Persico, Raffaele (University of Calabria)

In this contribution a summary of results and potentialities referred to the GPR prospecting in historical churches and ancient monuments will be proposed. The peculiarities of this kind of prospecting will be discussed and some specific possible future developments will be stressed too. The discussion will be back-upped with results coming from different case histories related to my past professional experience.

Indeed, we have a cultural patrimony hidden under the thousands historical churches (let say dating back to the beginning of the 19th century or before) spread all over Europe (does not matter whether Catholic, Orthodox, Protestant or Anglican), and of course another meaningful heritage is hidden under the Hebraic synagogues and the Muslim mosques. Such a patrimony might be easily explored and understood, at least partially, by means of noninvasive geophysical prospecting and in particular by means of GPR prospecting, but this has been done up to now sporadically rather than systematically.

Through some concrete examples, this contribution will propose a possible protocol, that might be worth considering for future works.

14 THE AVENTINUS MINOR PROJECT: REMOTE SENSING FOR ARCHAEOLOGICAL RESEARCH IN ROME (ITALY)

Wueste, Elizabeth (The American University of Rome) - Facchin, Giulia (The American University of Rome) - Barone, PierMatteo (The American University of Rome; Geoscienze Forensi Italia; ANCRIM (Associazione Nazionale Criminologi e Criminalisti).)

This paper presents preliminary results from a central urban area of Rome, Italy obtained from both desktop and remote sensing surveys and archaeological excavations within a community archaeological excavation project: the Aventinus Minor Project (AMP).

AMP designed a research plan to answer specific academic research questions in collaboration with multiple community partners, including The American University of Rome, St. Stephen's School (whose campus directly borders on the site), the Istituto Santa Margherita (the landowners of the field and a Catholic convalescent home), and the Archaeological Superintendency of Rome (Concessione DG-APAB, prot. 20027, 10/06/2021, Decreto 609).

The application of geophysical and remote sensing approaches (such as NDVI, VARI, and GPR) and the creation of a GIS platform lay the foundations for correct and georeferenced reporting of all collected data. This further provided a nuanced understanding of the urban archaeology in the dense topography of Rome, potentially correlated with visible ancient remains, including the Republican Servian Walls and the Christian Church of Santa Balbina.

Geophysics, and GPR specifically, was a very important resource in AMP's design, as it offered the possibility of assessing the archaeological potential of a central, though under investigated, area of Rome in a timely manner. The archaeological excavation, so-called "ground-truthing", was able to verify the results of the geophysical survey during excavations carried out in subsequent seasons (2022-24).

The combination of the scientific methodology employed and the potential and usability of the geophysical results positions AMP as a promising research project within both the larger region and the more immediate local community. However, beyond the quality and usability of the scientific results, AMP's further novelty lies in having been able to successfully carry out its multi-faceted work by including several community collaborators within the complex urban environment of Rome, one of the world's capital archaeological cities.

15 EXPERIENCING GPR AT THE CASTELLO SFORZESCO IN MILAN: BETWEEN HISTORY AND DIGITIZATION. MULTIDISCIPLINARY APPROACH FOR A CULTURAL HERITAGE

Biolo, Francesca (Politecnico di Milano, Department of Architecture, Built Environment and Construction Engineering) - Porcu, Maurizio (Codevintec Italiana s.r.l.) - Guzzetti, Franco (Politecnico di Milano, Department of Architecture, Built Environment and Construction Engineering)

The idea to develop a complete and comprehensive 3D information model of the Castello Sforzesco emerged with the collaboration between Politecnico di Milano and the Municipality of Milan, recovering and including information from historical sources as well as surveys performed with contemporary technologies.

To achieve this objective, underground spaces were meticulously surveyed using terrestrial laser scanner, and the acquired data have been integrated with digital photogrammetry. A 3D model was crafted leveraging this dataset and the available historical documents. The digital twin was stratified according to various levels of geometric information, based upon the intrinsic characteristics of the initial data and its degree of precision.

Such a digital model framework facilitates evaluations on the coherence of numerous historical hypotheses, thereby enabling conjectures regarding existent underground spaces and pathways. The collaboration between the working group at the Politecnico and Codevintec Italiana s.r.l. stemmed from these ideas, evolving into an extensive 3D survey campaign using high-resolution gpr, yielding remarkable discoveries.

The radargram vividly reveals and locates remnants of the Spanish bastions along with their corresponding buttresses. For sure, additional pathways exist beyond those currently explored. In fact, various closures and evidentiary indications substantiate the presence of connecting passages to these unknown subterranean environments.

Even though their depth is known, it would be intriguing to additionally validate their current condition, assessing whether they are still unobstructed or they are partially occluded.

Notably evident from the radargram is the drainage conduit of the water from the two moats that encircled the Castle during its military tenure. Furthermore, numerous other indications of subterranean elements emerge, some of which are reminiscent of Leonardo da Vinci's designs.

Experience has shown how the study of historical sources, traditional and modern surveys, integrated and supported by geophysical technologies, together contribute to developing knowledge of the built heritage.

16

GPR - IMPACT OF USE IN DEVELOPMENT LED ARCHAEOLOGICAL PROJECTS

Eilertsen, Krister (Museum of Archaeology, University of Stavanger)

The use of geophysical methods within archaeological projects in Norway has been increasing in recent years. The Archaeological museum - University of Stavanger, has been using GPR as a part of our projects in Rogaland county since 2018/2019 and it has provided vital information that has been incorporated into the planning phase of archaeological excavations.

The diversity of the landscape and differing sub-soil conditions in southwest Norway present challenges to the use of GPR in our region. By collecting data from across a variety of different landforms we have gathered valuable knowledge which has allowed us to incorporate the results of our GPR surveys into subsequent excavation projects. In this paper I will present two case studies representing substantially different conditions and landscapes which illustrate how GPR data has influenced our archaeological projects. The detailed knowledge of layers, features and other contexts from the two sites has guided project planning and excavation strategies providing an opportunity to investigate contexts that would normally be lost during topsoil removal. GPR data has also allowed us to tailor the size and location of excavation areas improving the overall efficiency of projects.

17

3D GPR MODEL OF A FLOOR MOSAIC OF THE LATOMIA DEI NICCOLINI (MARSALA, SICILY)

Carollo, Alessandra (Department of Earth and Marine Sciences, University of Palermo) - Capizzi, Patrizia (Department of Earth and Marine Sciences, University of Palermo) - Martorana, Raffaele (Department of Earth and Marine Sciences, University of Palermo) - Abrignani, Alessandro (Freelance Researcher) - Castiglia, Angelina (PROPER-ART Cooperative Company, Enna) - Griffo, Maria Grazia (Lilybaeum-Marsala Archaeological Park) - Lo Brutto, Mauro (Department of Engineering, University of Palermo) - Occhipinti, Anna Vincenza (Lilybaeum-Marsala Archaeological Park)

The Latomie dei Niccolini archaeological complex is situated on the side of the Punic and Roman necropolis of Lilibeo (Marsala, Sicily). As a result of quarrying activities in the area, the construction of the modern cemetery along the eastern side of the Latomia and a long period of neglect, the state of conservation of the tombs was seriously compromised and precious frescoes were destroyed.

An essential element of this funerary system is the floor that gives access to three arcosoli, consisting of precious polychrome mosaics. At the time of the discovery, this mosaic had a large lesion that extended diagonally to the length of the mosaic. High-frequency Ground Penetrating Radar (GPR) was used to improve understanding of the causes of the fracture and differential subsidence found throughout the floor mosaic structure. The georadar uses the physical phenomena that an electromagnetic wave can undergo when it encounters discontinuities within an investigated medium (such as reflection, diffraction, and refraction). These physical phenomena are determined by variations in the magnetic and electrical properties of the materials passed (such as cavities, lithological variations, and buried bodies) and, in particular, the variation in the permittivity.

A three-dimensional GPR model of the variation of the subsurface's electromagnetic reflectivity was constructed to define the primary fracture's geometric effect and map the geometry of the void area below the mosaic floor.

430 CURRENT TRENDS AND FUTURE DIRECTIONS IN QUARRIES AND ROCK-CUT SITES STUDIES: THEORY, METHOD AND DISSEMINATION

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Doperé, Frans (KU Leuven Research Group Archeology) - Whitaker, Katy (Historic England) - Sciuto, Claudia (University of Pisa) - Morleghem, Daniel (La Sapienza University) - Liboutet, Marion (État de Fribourg/ARTEHIS)

Session format: Regular session

Stone quarries and rock-cut sites are places of stone extraction which, although created for differing purposes, share numerous common features. These include, for example, varied techniques of stone removal and working, tools, embodied action and gestures and know-how. They may be co-located in rocky landscapes, they are found globally and they have a deep time history as significant features of human lives for thousands of years.

Building on successful sessions at previous EAA meetings, this session aims to discuss the material record of quarries and rock-cut sites in terms of theory, methods and dissemination. It is not limited to particular regions nor periods. We also welcome contributions from interdisciplinary work and environmental humanities encompassing all researchers working with extractive landscapes. We invite papers that consider the following themes:

Theory:

Theorising relations between human and non-human actors in rocky environments at different times in the past; Placing them into their landscape, environmental, technical and social contexts.

Methods:

Designing methodological approaches that enable the testing of theoretical frameworks; Understanding strengths and weaknesses of interdisciplinary research to create robust narratives.

Dissemination:

Identifying roles for digital methods that go beyond mere data collection and how to apply FAIR data principles; Communicating research results in engaging ways to a range of audiences, including to people making decisions about the future of such sites in their locality.

ABSTRACTS

1

QUARRYING, PROCESSING AND DISTRIBUTION OF THE JIZERA MOUNTAINS TYPE METABASITE (CZECH REPUBLIC). ARCHAEOLOGY OF MAIN LBK RAW MATERIAL SOURCE

Trampota, Frantisek (Institute of Archaeology of the Czech Academy of Sciences, Prague) - Burgert, Pavel (Institute of Archaeology of the Czech Academy of Sciences, Prague) - Kachlík, Václav (Department of Geology and Paleontology, Faculty of Science, Charles University) - Šída, Petr (Department of Archaeology, Philosophical Faculty, University of Hradec Králové) - Přichystal, Antonín (Department of Geological Sciences, Faculty of Science, Masaryk University)

Metabasite of the Jizera Mountains type is the main raw material source for the production of polished tools throughout Central Europe during the LBK period. Its outcrops are located on the edge of the Jizera Mountains (Northern Bohemia, Czech Republic). This rock was extensively quarried and processed into semi-finished products in the quarry during the Linear Pottery Culture (LBK; ca 5400–4900 BC). The excavated material was processed by knapping directly and cut or polished in secondary workshops on settlement sites.

In the Jistebsko quarry there was used both surface and deep pit quarrying, which is well preserved on an area of more than 25,000 m². Further, we will present the state of art of the site. Key questions include the extent of distribution of raw materials in the Neolithic. We focus at the current state of art showing the maximum known range of distribution of Jizera Mountains type metabasites in Europe.

2

THE QUARRYSCAPE OF ITANOS: MAPPING THE STONE ECONOMY OF A CRETAN CITY-STATE

Vanden Broeck-Parant, Jean (UCLouvain (Université catholique de Louvain)) - Viviers, Didier (ULB (Université libre de Bruxelles)) - Tsingarida, Athéna (ULB (Université libre de Bruxelles))

The ancient harbour town of Itanos likely developed from the 9th century BC onward near the northeastern tip of Crete, on a peninsula previously occupied during the Minoan period. A trade-oriented city, it mainly resorted, by contrast, to local resources of its close hinterland for stone construction. The geological substrate of the area is varied with, notably, schist, hard blueish limestone, sideropetra and ammoudopetra being the most widely used in buildings and monuments. The new research project at Itanos aims at mapping the main quarries exploited for construction

(both monumental and domestic), using legacy data of past surveys and new recording strategies, with the objective of establishing a typo-chronology of stone consumption in the city itself and its territory. The recording of the geometry of the deposits and the layouts of the quarries allow exploring the extraction strategies and the socio-economic organization of the craftsmen. Labour costs are also estimated for the extraction of various types of stone in accordance with the quarry layouts, while the most likely terrestrial and maritime routes for the transport of stone are identified using DEMs and least-cost path analysis. This in turn allows gauging the energetic and economic investment made by the Itanian communities at various levels of organization and at different times in the history of the city-state. Overall, a new aspect of the economy of Itanos is revealed, which resorted mainly on local manpower and skills. This paper will present the first results of this research project and its future objectives.

3 QUARRY SURVEY AND BUILDING ARCHAEOLOGY, HOW TO ESTABLISH A MEANINGFUL LINK IN CLASSICAL ARCHAEOLOGY?

Doperé, Frans (Research Group Archaeology KU Leuven)

Quarry Survey and Building Archaeology are usually practiced as separate disciplines, whereby the archaeological link between both often proves difficult to establish. This is due to the difficulty to provide appropriate chronologies to surveyed quarries, while buildings and masonries can easily be subject to archaeological excavations and soundings. This question was tackled as a case study during five campaigns, between 2018 and 2023, at Sagalassos, an Hellenistic/Roman city site in South-Western Anatolia, Pisidia, in the Taurus mountain chain. The monumental city center groups a total of forty buildings/masonries, erected in limestone quarried locally, as determined by archaeometry. Quarries and smaller extraction points were identified and analyzed in the necropolei, immediately surrounding the monumental center, others are situated at distances of maximum 5 km. The following questions formed the backbone of this research. How to define a chronology for the quarrying activities? Can the owner of a quarry be identified, even without epigraphy? How to establish a relationship between the extraction technology in the quarries and the stone-carving techniques as observed on the individual monuments? Was the quarrying activity, observed in the necropolei, intended for the production of stone blocks for the building sites or rather for funeral features only? Was regular stepwise quarrying using extraction trenches and wedging always practiced for the production of building stones? Were extracted stones carved up to finish in workshops near the quarry or rather near the building site? Which technological observations may shed some light on the activities of quarry workers and/or stonemasons? The preceding questions were generated during the research at Sagalassos. They will be presented in this lecture as a potential basis for broadening the research to other sites and other research groups.

4 CONTEXTUALIZATION OF LATE ANTIQUE AND EARLY MEDIEVAL SCULPTURE ON THE ISLAND OF KRK (CROATIA) BASED ON MINERALOGICAL-PETROGRAPHIC ANALYSIS OF STONE

Belošević, Nikolina (Faculty of Humanities and Social Sciences, University of Rijeka) - Šprem, Katarina (Independent researcher)

It is a common opinion of the profession that the island of Krk, unlike other Adriatic islands, lacks quality stone as raw material for making sculpture and liturgical furniture, and since a significant amount of sculpturally processed stone fragments were found on numerous localities of the island, it is assumed that the stone blocks or finished stone products in antiquity and the Middle Ages were procured in some other area. One of the goals of our project was to determine the exact provenance of the stone raw material, in order to determine the direction of material import, the exchange of cultural influences and artistic templates, and possibly the migration of stonemasons in Kvarner region. This presentation will show the results of mineralogical-petrographic analysis of samples of late antique and early medieval stone sculpture, which was made for the first time for the island of Krk. Most of the samples were Cretaceous in age, with one exception. The obtained results of the analysis of sampled material from the island of Krk were compared with previously known data on the geological composition and age of rocks in the surrounding area, in order to determine, in accordance with the geological maps, possible exploitation fields or quarries from which the limestone identified in the analysed samples originates. Considering the position of the source quarry, we tried to determine the nearest ports from which the stone could be transported to Krk. The corpus of sculptures from certain localities in island of Krk whose fragments were sampled were compared with contemporary sculpture from the area from which the stone originates using the historical-artistic methods. This was done in order to determine possible similarities in use of templates, choice of motifs and methods of carving.

5 ANCIENT QUARRYING AND PROCESSING OF SILICATE SOFTSTONE IN EASTERN MADAGASCAR

Nitsche, Christoph (University of Fribourg) - Serneels, Vincent (University of Fribourg)

Eastern Madagascar hosts several zones with spectacular softstone quarries that were active from the 9th to 15th century CE. They mainly served for the production of cylindrical blanks that were crafted into polished pots, bowls and incense burners. The vessels were finished using a lathe-turning technique - a processing method for stone that

is unique for sub-Saharan Africa - and were both used in Madagascar as well as exported to the Comoros and the East African coast. Since 2017, over 35 quarries were visited and documented, many of which previously unknown to science, and two of the largest sites were excavated for the first time. The results provide interesting new insights into the chaîne opératoire of this industry, such as the use of a weighted metal bar for both carving and extraction of blanks. Coupled with petrographic studies on the raw material, it also allows a first comparison of extraction techniques between the different zones and how they were adapted to the characteristics of the different rock types.

6 THE CASTLE TOWN OF ARCONCIEL (CANTON OF FRIBOURG, SWITZERLAND). USE AND INSERTION INTO THE ROCK: METHODOLOGY AND MULTIDISCIPLINARY APPROACH

Liboutet, Marion (Service Archéologique de l'Etat de Fribourg; UMR 6298 ARTEHIS) - Bizri, Mélinda (Université de Bourgogne; UMR 6298 ARTEHIS)

The castle town of Arconciel, first mentioned in the 11th century, stands on a promontory fort overlooking the River Sarine. Protected on all sides by 50m-high cliffs, a deep ditch dug runs along its eastern side. The castle and its village blend into the landscape while irrevocably changing it. Topography, the use of rock and man-made constructions are intimately linked and give meaning to this site, which was once a settlement. The rock was used and shaped to perform specific functions within the castle town: it was used as a floor, urban features were carved into it, and the fortification and urban topography were inscribed in the bedrock.

In the middle of the promontory, a 4-metre-high molasse piton topped by a building has been shaped and appears to act as a gateway to ensure control. There are features on all 4 sides that bear witness to the structures that once leaned against them. On either side of the rocky outcrop, the structure of the habitat is different.

The aim of this paper is to report on the methods used to approach the rock features at the castle town of Arconciel and the results obtained. The aim is to test the methods applied to other sites and verify their effectiveness. Comparisons with French and Swiss sites will be sought.

7 CARVING A FUTURE: HBIM FRAMEWORK FOR CAPPADOCIA'S ROCK-CARVED ENVIRONMENTS

Kurcenli Koyunlu, Sena (Carleton University) - Fai, Stephen (Carleton Immersive Media Studio (CIMS), Carleton University)

This study is a critique of existing heritage data management principles in Türkiye and their applicability to carved stone environments. Given the multi-layered and complex nature of the historical carved environments, it is crucial to develop heritage data management principles that work for them. I propose a Historic Building Information Modelling (HBIM) framework for rock-carved environments by focusing on Cappadocia, Türkiye.

Cappadocia is a superimposition of archeological, urban, and natural heritage assets that inform the unique characteristics of the region. The rock-cut structures in Cappadocia can either be carved separately or integrated into masonry structures that are part of people's everyday life experiences. Despite the rock-carved environments being the subject of diverse research groups, in general, the documentation of them was often limited to case-by-case workflows. These workflows are notable, but the main problem of heritage data management is the hierarchical structure of the conservation plans, which focuses on the parcel as the smallest unit, which poses a challenge to documenting these environments. The two-dimensional nature of the parcel boundaries is not suitable to represent the rock-cut structures, resulting in them not being represented on cadastral maps or base maps. Thus, this study aims to establish an as-found HBIM workflow for rock-carved environments to develop heritage data management principles responding to the three-dimensional nature of these environments. It highlights the importance of the data collections and their management and accessibility, rather than the mass digitization workflows.

432 RESIDENTIAL BUILDING TECHNIQUES WITH WOOD AND DAUB IN PREHISTORY: WHAT WE FIND AND WHAT WE RECONSTRUCT

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Pusztaine Fischl, Klara (HUN-REN Research Centre for the Humanities Institute of Archaeology; University of Miskolc Institute of Archaeology) - Kienlin, Tobias (Universität zu Köln Institut für Ur- und Frühgeschichte) - Lie, Marian (Institute of Archaeology Iași, Romanian Academy) - Anvari, Jana (Universität zu Köln Institut für Ur- und Frühgeschichte)

Session format: Regular session

Architecture, or the practice of building houses, encompasses a range of related activities, such as the consensus reached of where and what to build, preparing the building site by felling trees and levelling the ground, supplying construction timber for crafting various parts of the house, excavating foundation trenches or postholes, obtaining and refining clay for the home's walls and other elements. After the structure was completed, it may have required repairs

to its walls and roof. The hearths or ovens would have needed periodic renewal in their original position or occasional reposition to another room or location. In temperate European regions during prehistory, wood and daub were primary construction materials. Prehistoric house-building techniques share common aspects with traditional, vernacular architecture, and therefore can enhance our comprehension of prehistoric building techniques and the remains of prehistoric houses and structures unearthed in excavations. The session will focus on the construction techniques and raw materials used for building in prehistoric temperate Europe. The aspects covered will include the evidence we have for the types of wood used, the traces and techniques of woodworking, the choice of raw materials and their preparation for building in daub. While the focus remains on direct evidence recovered during excavations, additional insights from vernacular architecture, ethnoarchaeology or scientific analyses of the building materials retrieved can be gleaned. We welcome a diverse range of contributions spanning from the Neolithic to the Iron Age, encompassing various forms of settlements and architectural styles. These may include, but are not limited to, flatland sites, settlement mounds and wetland sites, with a specific focus on building processes and techniques, as well as materials that were used. We invite contributions that consider relevant features from archaeological excavations, based on the scientific analysis of building remains, as well as a broader perspective including ethnoarchaeological approaches.

ABSTRACTS

1 UNLOCKING HIDDEN POTENTIAL IN A CAREFULLY ADDRESSED FIELD: RECONSTRUCTING LINEARBANDKERAMIK LONGHOUSES

Oross, Krisztián (Institute of Archaeology, HUN-REN Research Centre for the Humanities) - Mészáros, Nóra (Institute of Archaeology, HUN-REN Research Centre for the Humanities) - Jakucs, János (Institute of Archaeology, HUN-REN Research Centre for the Humanities) - Marton, Tibor (Institute of Archaeology, HUN-REN Research Centre for the Humanities)

Large-scale excavations between the 1930s and late 1970s revealed a series of settlements established by the first food-producing communities across central Europe. Traces of timber-framed longhouses became the hallmark of the entity called Linearbandkeramik (LBK) in the cultural concept. Following emblematic field discoveries, countless investigations were carried out on house typology and building techniques. Calculations on structure and on required labour force shaped the processing, so that problems concerning the architecture of the first Neolithic groups in temperate Europe seemed to have been solved once and for all.

However, there was still little evidence of LBK architecture in western Hungary. Southern Transdanubia between Lake Balaton and the Drava river was a blank spot in terms of architectural traces, although the LBK settlement of the region was recognised long before. Thousands of features belonging to longhouses have been uncovered during development-led rescue excavations since the 1990s. Some settlements at Lake Balaton provided house plans particularly suitable for further evaluation. A precise comparative record became available from more southerly lying micro-regions like the Tolna Sárköz and the Southern Baranya Hills. It is now also obvious that the central European type of longhouse architecture largely exceeds the region dominated by LBK-style material culture.

Core source of our assessment is the architecture of the Balatonszárszó-Kis-erdei-dűlő settlement. The presented research includes structural calculations and reconstructions using architecture software programs. These are less focused on visual display while strictly follow the archaeological record. We are seeking answers whether the buildings were as regular in all details, as suggested in some of the earlier studies. If not, how can we cope with irregular features and asymmetric elements? Precise reconstructions highly impact the interpretation of house clusters and that of the social dynamics in the settlement.

2 SIMILARITIES AND DIFFERENCES IN THE LATE NEOLITHIC HOUSE BUILDING TECHNIQUES OF GREAT HUNGARIAN PLAIN

Bittner, Bettina (Hungarian National Museum National Institute of Archaeology)

Reconstruction of Late Neolithic houses has generally focused on the parameters of post holes and the ground plan of the buildings. However, if we study the burnt daub remains of the period, the imprints of structural elements preserved on them can provide us with detailed answers about the building techniques. In the presentation, daub fragments are studied from 5 Late Neolithic sites of the Great Hungarian Plain: Polgár-Csőszhalom, Polgár-Bosnyákdomb, Öcsöd-Kováshalom, Hódmezővásárhely-Kökénydomb and Szegvár-Tűzköves. These sites are tell or tell-like settlements that existed between 5000–4500 BC and their archaeological remains include several buildings that were destroyed by fire. The buildings of the 5 sites certainly showed both similarities and differences. All of them were erected by wattle-and-daub constructions but with different architectural solutions due to their different size and layout. Construction techniques may differ in the wattle and daub weaving, the placement of the bracing, the orientation of the wall bracing and the slab design.

3 IDENTIFYING CONSTRUCTION TIMBER WITH DIGITAL SCANNING TECHNIQUES - IDJOŠ GRADIŠTE EXAMPLE

Maric, Miroslav (Institute of Balkan Studies SASA) - Mirković Marić, Neda (Međupštinski zavod za zaštitu spomenika kulture Subotica) - Jončić, Nenad (Narodni muzej Srbije)

The site of Idjoš Gradište is a multiperiod prehistoric site located near the town of Kikinda in Banat region of north-eastern Serbia. First settled in the mid Neolithic period, around 5300 cal BC it remained in occupation until the beginning of the Iron Age, with a telloid Neolithic settlement on the southwest edge of the Tisza River Pleistocene terrace it occupied, overshadowed by a late Bronze Age and transition to Iron Age settlement of over 20 hectares to the northeast of it.

Archaeological research on the site was conducted on several occasions throughout the 20th century, with the first systematic excavations, preceded by a large scale magnetometric survey, took place in 2014 and lasted until 2023. In the course of the excavations, several wattle and daub structures were excavated, either partially or to the full extent, yielding a significant amount of intensively burnt daub in the process.

Photogrammetric and LIDAR scanning enabled the creation of detailed 3D models of individual fragments of daub, that enabled the analysis of wood bark imprints on the fragments. The same methods were also applied on the bark of trees domestic to the region that were also available in the Neolithic period to provide for direct comparison of imprints. Additional comparison was made possible by creation of silicon casts from the daub. We present preliminary results and conclusions of this pioneering technique in Serbian archaeology.

4 RECONSTRUCTION OPTIONS FOR BRONZE AGE HOUSES G AND H IN BORSODIVÁNKA-NAGYHALOM (HU)

Pusztaine Fischl, Klara (HUN-REN Research Centre for the Humanities Institute of Archaeology; University Miskolc) - Pusztai, Tamás (Hungarian National Museum, Castle Museum Esztergom) - Kienlin, Tobias L. (Universität zu Köln Institut für Ur- und Frühgeschichte) - Balázs, Ádám (University Miskolc) - Gucsi, László (HUN-REN Research Centre for the Humanities Institute of Archaeology)

During the excavation of the Bronze Age tell site in Borsodivánka-Nagyhalom (H) as part of the BORBAS (Borsod Region Bronze Age Settlements) project, we uncovered fascinating details about two houses within a 5x6 m trench. House G in the mid sequence of the tell, which was preserved due to a fire, provided insights into the unique interior structure and decorative elements of the walls. The decoration elements found here are similar to those known from the “Dealul Vida” (RO) site in Sălacea/Szalacs. On the other hand, House H, located across a narrow street from House G, also experienced a fire, but the Bronze Age community had cleared away the rubble. Both houses were constructed using a horizontal foundation beam, but different masonry techniques and building materials were employed in each case. This presentation will outline the architectural reconstruction of these two contemporaneously-standing buildings, as well as the alterations made following their demise.

5 BUILDING AND DECORATING: A CHAÎNE OPÉRATEIRE APPROACH FOR ANALYSING THE BURNT REMAINS OF A BRONZE AGE STRUCTURE AT BORSODIVÁNKA (HUNGARY)

Drunagel, Eva (University of Cologne) - Mancini, Nico (University of Cologne)

The building ‘house G’ from the Bronze Age tell site of Borsodivánka is an example for a complex wattle-and-daub structure of the Hungarian Bronze Age. The different architectural features show a careful selection of material and techniques regarding the construction of walls, the partition of space and the design of surfaces. Elaborate wall decorations, including spirals and undulating lines, have been unearthed in various positions. Their condition varies from fragmentary to in situ conserved remains of adjoining ornaments on plastered wall-surfaces. The exceptional preservation of the burnt daub permits the analysis of strategies and choices in the process of building and decorating house G. This chaîne opératoire approach investigates the selection and preparing of building material and the process of constructing walls and subsequently preparing and decorating their surfaces. Macroscopic observations as well as analyses on microscopic level have been used for this purpose. Our results emphasize the considerable potential of analysing decorated walls to provide information on the intentional design of social space and the role of creativity in Bronze Age households.

6 SO MANY HOUSES, SO MANY CUSTOMS. HOUSE CONSTRUCTION PRACTICES DURING THE LATE EARLY BRONZE AGE IN THE CENTRAL CARPATHIAN BASIN

Bodnár, Csaba (Museum of Fine Arts (Budapest))

The material culture of a community incorporates not only the tangible artefacts they produce and use, but also structures and monuments they create through the manipulation and transformation of their physical environment.

The practices followed when erecting a building are affected by a number of factors. The choice of location, the raw materials (timber, stone, etc.) and building techniques applied can depend to a large extent on environmental and economic conditions and the intended function of the building. However, the decisions made during the construction process may also be heavily shaped by cultural customs and norms of the building community.

In this paper I will examine the house-building practices of people living in the central part of the Carpathian Basin, along the middle reaches of the Danube and Tisza rivers, at the end of the Early Bronze Age (2300-1900 BC). These communities showed many similarities in terms of their material culture, particularly in their pottery traditions, which once led archaeological research to classify their remains as part of a distinct archaeological culture (Nagyrév culture). After critically reviewing the archaeological evidence available on house construction techniques and methods from this region and period, various sites (mainly settlement mounds, e.g. Tószeg-Laposhalom) associated with the „Nagyrév” archaeological unit will be compared in terms of a number of architectural aspects (e.g. site selection, plan, orientation, internal layout, raw materials, wall structure, floor, roof, installations, renewal, etc.). The paper seeks to answer the question of how much variation can be observed among these „Nagyrév” communities in their house-building practices, and, eventually, to what extent their choices during the various phases of the building process may have been determined by cultural and social norms as well as environmental conditions, practical needs and other factors.

7 ARCHITECTURAL TECHNIQUES IN THE BRONZE AGE TELL SETTLEMENT OF BAKONSZEG-KÁDÁRDOMB

Balázs, Ádám (University of Miskolc)

In the Bronze Age Ottományi/Otomani tell-type settlements, we can examine the building solutions of several centuries. In my presentation, I would like to review the buildings excavated in the Bronze Age tell-type settlement of Bakonszeg-Kádárdomb, based on the different solutions used in their construction. My work is based on the drawings and diaries of an excavation carried out by Márta Máthé Sz. in 1974. Despite the small size of the 5x5 m trench, it provides a lot of valuable information about the different construction techniques. The walls, structures and floors of the buildings were constructed using several different methods. My aim is to evaluate the data within a coherent framework in order to obtain a more complete picture of the interior of Bronze Age settlements. In my presentation, I would like to try reconstructing the buildings excavated at different levels of the tell settlement on the basis of ethnographic examples and archaeological data.

8 MODELLING HOUSES AND HOUSEHOLD STRUCTURES. MIDDLE BRONZE AGE BUILDING MATERIAL AND CONSTRUCTION TECHNIQUES FROM NORTH-WESTERN ROMANIA

Gyurka, Orsolya (Babeş-Bolyai University, Cluj-Napoca) - Molnár, Zsolt (Babeş-Bolyai University, Cluj-Napoca)

The study of Middle Bronze Age settlement structure and buildings offers new levels of understanding and interpreting the evolution of communities. Heterogeneity, observed also in buildings, is a general feature of self-organizing sociocultural systems. There are no universal explanatory models, because of the different territorial, group structural and organizational levels of societies, which are defined by a number of specific principles. Therefore, we need to refer to the internal logic of the latter groups in order to better understand their settlements, the use of material culture or the construction of social space.

The prehistoric house-building and other wood and daub constructions reflect several aspects of the analyzed communities: the technological knowledge possessed, the use of natural resources and the sociocultural choices taken. The role and value attributed to a household or a building depends on the community's sociocultural and economic characteristics. The design, size and complexity of the constructions reflect how socioeconomic preferences and practices have been adapted.

Past tendencies have focused predominantly on the evolution of central sites, neglecting research of single-layer settlements, although these sites can still provide significant information to build up a comprehensive picture. Our presentation focuses on the construction processes and techniques of building types revealed at the tell settlement from Carei-Bobald (Carei Plain, Satu Mare County), in the context of the surrounding landscape. The results of the investigations are compared with new data from the undertaken archaeological excavation of the single-layer settlement from Biharea (Eriu Valley, Bihor County) and the existing macro-regional paleoenvironmental data.

9 MATERIAL CHOICES AND BUILDING TECHNIQUES IN THE OUTER SETTLEMENT OF THE BRONZE AGE TELL IN TOBOLIU (ROMANIA)

Gavan, Alexandra (Institut für Ur- und Frühgeschichte Universität zu Köln) - Lie, Marian (Institute of Archaeology Iași, Romanian Academy) - Kienlin, Tobias (Universität zu Köln Institut für Ur- und Frühgeschichte)

Toboliu is a multicomponent Bronze Age settlement located in the Eastern Hungarian Plain, in present-day western Romania. The site consists of a tell enclosed by two concentric ditches and an extensive outer settlement. Through geophysical and surface surveys conducted between 2015 and 2019, we were able to determine that the outer settlement covered an area of about 84 ha. In order to gain insights into the domestic architecture of the outer settlement of the Toboliu tell, we carried out targeted excavations of two off-tell households between 2021 and 2023. The aim was to gather data on their chronology, construction techniques, diet, and subsistence practices. This presentation will discuss the results of the above-mentioned excavations and provide an overview of the off-tell domestic architecture at Toboliu, focusing on building materials and construction techniques. A comparison of on-tell and off-tell houses will also be made in order to explore the different household configurations at this complex site. All the houses excavated at Toboliu to date have been rectangular wattle-and-daub buildings with at least one hearth. While there are similarities in house inventories and construction techniques, there are also some differences in construction details, individual design or choice of raw materials for flooring. Nevertheless, there seems to have been a common notion of what materials and techniques should be used to build the walls of a house or to construct hearths, although there are variations in individual designs.

10 REVISITING THE BRONZE AGE “TEMPLE” FROM SĂLACEA AFTER MORE THAN HALF A CENTURY

Lie, Marian (Iasi Institute of Archaeology) - Fazecaş, Gruia (Criş County Museum)

Between 1964 and 1969, within six campaigns, systematic archaeological excavations were conducted at the Bronze Age tell settlement at Sălăcea Dealul Vida (Bihor County, Romania). From the start, the leading archaeologists, Ivan Ordentlich and Nicolae Chidioşan, planned an exhaustive excavation of the entire mound. Some information that resulted from these campaigns was published in a few articles at the time, but a more comprehensive analysis of the site was only made in Ivan Ordentlich's PhD thesis, defended in 1973 but never published. Throughout the text, several domestic architectural remains are mentioned, but none benefited from a proper description or any archaeological documentation available to us. However, a single architectural find caught the excavators' attention as it presented some unique particularities. This layout benefited from proper documentation and description at the time and was interpreted by Ivan Ordentlich as a megaron temple (sanctuary). The find and the publication of the so-called temple caught the attention of several European archaeologists in the second half of the 20th century, but the megaron interpretation didn't hold for too long.

The current presentation of this Bronze Age structure at Sălăcea tries to focus on architectural patterns and offer new insights based on the current knowledge of domestic architecture of the Otomani-Füzesabony communities. Also, new information will be analyzed that was acquired from Ivan Ordentlich's PhD manuscript and from the collection of the Oradea Museum. In light of these new insights, we are trying to emphasize the importance of this architectural structure within the Bronze Age communities of the Carpathian Basin and finally offer the European archaeological community an English-written article about this important archaeological feature.

11 HOUSES OF THE LATE BRONZE AGE GÁVA CERAMIC STYLE: A CASE STUDY FROM POROSZLÓ-APONHÁT

Kósa, Polett (Szent István Király Museum)

When thinking about the classical Gáva culture (1100-900 BC), little concrete information about the houses of the period comes to mind. Since the early 2000's, there have been few publications on the settlements of the Gáva (HaA2-HaB1) period and almost none on the excavated houses. However, after the complete evaluation of the find material and the excavation documentation of Poroszló-Aponhát (Heves County, Hungary), a new and much more detailed picture of the houses can be drawn.

The communities of the period lived in complex and well-designed settlements, where houses could line up in a certain direction and order. These houses were made of wood and clay, the construction features of which can be reconstructed, including the scattered post-holes and the impressions of the daub material.

The buildings were equipped with several types of outdoor and indoor fireplaces and other built structures. Further presumed arrangement of the house equipment can be drafted by the scattering of loom weights and grinding stones. And last but not least, we have more information about the decoration of the houses than previously thought. In addition to structural information, we also have data on renewals.

Besides Poroszló-Aponhát, it is also important to examine and compare the material from other settlements of the period. Only by using all these data together can we form an almost complete picture of the houses of the period.

12 **DUST TO DUST: ON THE PROBLEM OF DETECTION AND INTERPRETATION OF BRONZE AGE SOLID CLAY BUILDINGS IN EUROPE**

Wehrheim, Ruben (Freie Universität Berlin)

Solid clay buildings are among the most neglected feature types in the Bronze Age archaeology of Europe. The reasons for this are diverse, but the primary is the assumption that this was an unsuitable and unstable type of building for the climatic conditions in Europe. At the same time, clay is an omnipresent substance which is easy to process. In particular in the poorly forested (forest-steppe) and loess-rich regions of the Pannonian Plain, such as the Banat. In addition, both the traditional massive clay buildings, still in use today, recent publications and the results of the excavations in Cornești-Iarcuri outline that such building types were probably more widespread in Central and Eastern European Bronze Age than supposed. These latest insights do show that the reason for the mentioned neglect is primarily the status of conservation.

Unlike the climate conditions in southwestern Asia, where whole palaces made of clay have been preserved, erosion by humidity, wind and rain in Europe can destroy abandoned buildings of this type within a few months.

The result is a pile of Dust that is nearly impossible to find or analyse using traditional archaeological methods.

In this study, I will discuss the problems, preconditions and conditions necessary for the investigation of massive clay buildings and further the most suitable methods for their detection.

For this purpose, soil types, recent palynological results, the excavation from Cornești-Iarcuri and building records of traditional types of construction in the Banat, moreover the specific properties of the possible building material will be presented.

These evaluations will show that, even if this building type seems lost to European archaeology, there are fast, effective and significant methods for examining such buildings. In addition, another approach has been developed based on the previous information acquired, which increases the knowledge gained many times over.

13 **LATE BRONZE AGE BRESTO (SOUTH-WESTERN BULGARIA) - EXCITING SITE, EXCITING DAUB**

Fries-Knoblach, Janine (LMU München) - Leppek, Maleen (LMU München)

Burnt daub is a thrilling building material, in the best case reflecting both the resources used and the architecture behind it, and thereby also temporal and spatial patterns and changes. A multi-disciplinary research project by Bogdan Athanassov (New Bulgarian University, Sofia), Iliia Kulov (Museum Blagoevgrad) and Philipp W. Stockhammer (LMU Munich, Germany) recovered tons of well-preserved daub with architectural imprints from the LBA settlement of Bresto near Bansko in south-western Bulgaria (two phases, ca. 13th and 12th c. BCE). In our presentation, we will give an overview of the site, its stratigraphy, architecture, and main evidence and then focus on the rich evidence for daub from several stone-timber houses with daub-clad features. The daub contained virtually none of the organic tempering so typical of this material in most contexts, but natural mineral tempering that made it extremely hard and heavy. Also, we discovered a technological shift in time as to the wooden components, while the mineral matrix stayed unaltered. A previously undescribed feature of phase 1 was daub pieces resembling small fluted half-columns. They are interpreted as remains of wattle woven across two stakes each in a twill-like fashion possibly paralleling the surge of this weave in Bronze Age textiles. It allowed for more wall stability without increasing flexion on rods, and thus perhaps for the use of tree species less prone to basketry. For phase 2, there is evidence for walls partly ornamented with stamps, some of which were covered by plain daub later. We will present the rich corpus from a qualitative and quantitative perspective and tentatively reconstruct part of the architecture of Late Bronze Age Bresto. This is highly relevant, since few sites have such well-preserved evidence, and Bresto is situated in a blind spot between the mud-brick-focused architecture of the Aegean and further north.

14 **HOUSES OF THE LATE BRONZE AGE IN NORTHERN GERMANY. WOOD, DAUB AND STONES BETWEEN TYPOLOGY, STRUCTURE AND CONSTRUCTION DETAILS**

Heske, Immo (University of Göttingen) - Schopper, Franz (Brandenburg State Authorities for Heritage Management and State Museum of Archaeology)

Northern Germany reaches from the coasts of the seas to the Harz Mountains. Various excavations in the area during the last 25 years brought up an assembly of new house plans. Different regional building styles are detectable. There are in discussion about the construction details as well as the possible usage as livestock stables. Constructions with postholes are widespread distributed, but some areas present in the same timeframe wall ditches. Mostly, the sandy soils are not useful for preservation of wooden remains. Some excavations nevertheless open up the possibility to take a deeper look at building details, like using a range of building material: timber in the context of local forest use, daub

and grass for thermal insulation and the usage of stones as element of construction. A special feature is the recently excavated "King Hinz Meeting Hall" (30.5 m x 10 m) in directly connection to the richly equipped monumental burial mound near Seddin. The talk has to discuss the possibility of wooden floors in the context of a ground level stone hearth. Also, the use of stone structures within wooden or wattle and daub walls has to be addressed.

Late Bronze Age houses in Lower Saxony open-air museums reconstructed on the basis of actual excavated house plans, as well as recent digital models, reflect construction methods influenced by knowhow of late 19th and early 20th century building techniques.

15 **TRESTLES AND WALL POSTS - ARCHITECTURAL DIVERSIFICATION IN BRONZE AGE SOUTHWESTERN SWEDEN**

Nordvall, Linn (Göteborgs universitet)

Empirical studies of longhouses and settlement structure in Scandinavia show local irregularities in longhouse construction and typological variabilities, yet a general longhouse tradition is discernable in the Nordic Bronze Age. Three-aisled longhouses are introduced around 1600 BCE in Scandinavia, creating an architectural diversification encompassing size differences, variabilities in trestle placements, presence of hearths, stalls, and other construction features. Differences in building techniques and materials used for constructing longhouses have been discussed by scholars and explored through reconstructions of prehistoric buildings. An overall tendency in settlement archaeology in Scandinavia is the implication of the use of wattle-and-daub or bole-walls. However, evidence of building materials is scarce although some evidence of charred remains of posts or burnt clay from wall constructions do occur. Interpretations of building techniques is therefore based on the placement of the trestles, entrances, and the placement and distance between the postholes. By studying the existing evidence of wattle-and-daub, placements of wall posts and other construction elements from Bronze Age house remains in the province of Halland, Southwestern Sweden, this paper aims at presenting problems and challenges in connection to architectural building techniques in the Nordic Bronze Age.

16 **RURAL SETTLEMENTS FROM THE BRONZE AGE AND IRON AGE IN FLANDERS (BELGIUM)**

Heirbaut, Elly (LAREs) - Vandenbussche, Vanessa (LAREs)

What can we learn from post-built houses when all that is left are discolorations in the soil?

The basis of our contribution is an extensive study into post-built houses dating from the Neolithic to the Middle Ages in rural settlements in Flanders (Belgium). The aim of this study was to understand typology, regional and chronological variation, as well as building techniques and more.

In this paper, we will focus on these timber houses dating to the Bronze Age and Iron Age. Over 300 (nearly) complete house plans were analyzed. Most of them were excavated during commercial fieldwork, leading to a non-consistent quality of data. Therefore, we decided to re-examine and interpret all data from scratch. This has resulted in an extensive, and unprecedented dataset for the southern Low Countries.

Although organic building material (wood, loam, straw) is not preserved in the sandy soils of Flanders, the study has provided many new insights into timber constructions. Conclusions can be drawn about typology, dimensions, internal layout, construction techniques, dating and location within the landscape. Regional and chronological differences can be distinguished in vernacular architecture. Construction types are singular for particular regions and show some evolution throughout time. There is hardly any evidence for general characteristics between different regions. Different choices regarding site topographies, locations, and farm in site organization (internal layout) can be recognized. Construction features (such as entrances, internal layout, structure of the walls, possible presence of an attic, extensions to the building etc.) can be derived from post positions and a thorough analysis of the depths of the postholes. Renovation, reparation, and deconstruction phases show in postholes and the remainder/removal of posts.

17 **HOUSES ON THE MOUNTAINSIDE: HOUSE ARCHITECTURE IN THE EARLY AND MIDDLE IRON AGE FORTIFIED SETTLEMENT OF DÉDESTAPOLCSÁNY-VEREBCE-BÉRC**

Barcsi, Marcell (Eötvös Loránd University, Institute of Archaeological Sciences)

During the Late Bronze Age and Early Iron Age, high-altitude fortified settlements of various sizes and topographic features appeared in the mountainous areas of Northern Hungary. The difficult accessibility and the forest environment make research on the sites a complex task, therefore little is known about the internal layout of the settlements, and the structure, quantity and location of the buildings on their territory.

In 2022 and 2023 – within the framework of the research project on Early Iron Age crises – the staff of the Institute of Archaeology of Eötvös Loránd University carried out excavations at Dédestapolcsány-Verebce-bérc (Borsod-Abaúj-Zemplén county), a high-altitude fortified settlement, which was besieged and destroyed in the 7th–6th centuries BC. The research was undertaken at the south-western part of the 140-hectare site, known as the „Pados”,

which is covered by an artificial terracing system. On two of the investigated terraces, remains of buildings of different structures were observed: one had stone foundation and the other had a wooden construction and clay plastered walls. The excavated houses provide new information about the architectural methods of the period and the region.

The aim of this presentation is to provide a more accurate theoretical reconstruction of the Early and Middle Iron Age houses and their building process by examining the objects and artefacts excavated at Dédestapolcsány-Verébce-bérc. This will be aided by the remains of charred beams and planks, as well as daub fragments bearing the impressions of structural elements.

433 ENCLOSED SOCIETIES: PREHISTORIC DITCHES OF SOUTHEAST EUROPE AND THE ADJACENT AREAS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Naumov, Goce (Einstein Center - Chronoi) - Nikolova, Nikolina (National Institute of Archaeology & Museum, Bulgarian Academy of Sciences)

Session format: Regular session

Ditches are common feature in the European prehistory, widely spread from the British Isles to Southeast Europe. Initially recognized more than a century ago in Central and West Europe they became eponymous for the enclosure phenomenon. Named as rondels, kreisgrabenanlagen, causewayed enclosures, enceintes à fossés, they are comprehensively studied with the established methodology and terminology. The enclosures have been thoroughly explored in the western parts of the continent, but they are a recent frequent fieldwork feature in the Southeast European archaeology (although ditches were detected and excavated many decades ago). The number of recorded ditches in the Balkans increased sharply in the past decade due to the application of current technology and methods in the archaeological detecting such as remote sensing analysis, geophysical and LiDAR surveys. As a result of these methods and excavations, it is now evident that many Neolithic and Chalcolithic sites were surrounded by a single or multiple ditches, or by more than one set of ditches.

Ditched enclosures arouse a vivid debate in the Balkans and correlates with the ongoing one in the Central and West Europe in regard to their interpretation. There is a variety of perspectives proposed for the motives of the prehistoric societies to construct ditches, as well as the theories about their purpose concerning their defensive, social, economic, symbolic or ritual character.

We welcome contributions dealing with the prehistory of Southeast Europe and the adjacent areas to discuss ditched enclosures within a palette of perspectives ranging from research strategies to theoretical approaches:

- Social, economic and ritual aspects of the enclosures;
- Depositional practices and funeral activities within ditches;
- Regional features and the chronology of enclosures;
- Territoriality and boundaries as a spatial concept;
- Ditches layout evidenced by digging and backfilling processes;
- Particular case studies from the Southeast Europe.

ABSTRACTS

1 THE EARLY NEOLITHIC DITCHES IN THE BALKANS: WHAT DO WE KNOW SO FAR?

Nikolova, Nikolina (National Institute of Archaeology & Museum, Bulgarian Academy of Sciences)

The beginning of the new century came with the wide recognition of ditch enclosures throughout the Balkans. We are now aware of nearly 100 Early Neolithic ditches at about 40 sites, which cover the timespan roughly between the last quarter of the seventh and the mid-sixth millennium BC. And although ditches are detected many decades ago – mostly in the southern part of the peninsula – they are still a relatively new aspect of the Southeast European prehistory. The rapid accumulation of data raises numerous questions, hinted in brief dig reports. The early Neolithic ditches – their plans, dimensions, materials and mechanics of infill, labor and time invested in their excavation, maintenance, reuse, and etc., provide an extensive field for studies. The research history of the enclosures, however, indicates gaps both in the publishing state and the analyzing strategies.

In this presentation, I will try to summarize the available data so far regarding ditch enclosures from the beginning of the Neolithic in the Balkans. The time and space distribution of the ditches allows the distinguishing of some regional patterns and/or interregional similarities. It appears that the ditch-digging is widely practiced, although the various societies used their ditches in different ways. Moreover, the appearance and function of a ditch changed over the course of its 'life'.

2 EARLY NEOLITHIC DITCHES IN SOUTH-WESTERN BULGARIA THEIR CONCEPT AND PECULIARITIES

Kulow, Malgorzata (Regional Museum of History-Blagoevgrad)

A small number of Early Neolithic settlements have been recorded in the Middle Struma River valley, South-western Bulgaria, but almost all contain evidence of the surrounding concentric enclosures. In Early Neolithic settlements Kovachevo and Ilindentsi they have been investigated very detailed, but on the other two settlements Brezhani and Drenkovo II the concentric structures have been attested only through geomagnetic measurements, though the excavations undertaken in Brezhani in 2023 starts to give interesting data.

The ditches from Ilindentsi and Kovachevo have a very similar construction, which can be explained by the proximity of the two settlements and consequently close contacts between them. On the other hand, both constructions differ significantly from contemporaneous ditches unearthed on the sites Yabalkovo, Nova Nadezhda and Aşağı Pınar in the Thracian Plain. They have a wide flat bottom, a stone wall in the middle of the ditch and an additional wooden construction (a kind of palisade) along the inner border. These elements convincingly point towards their interpretation as sophisticated protective/defensive constructions.

3 ENCLOSING EARLY FARMING VILLAGES IN THE EASTERN BALKANS: DETERMINANTS, STRATEGIC CHOICES, AND SOCIAL IMPLICATIONS

Bacvarov, Krum (National Institute of Archaeology and Museum, Bulgarian Academy of Sciences)

It seems that most Early Neolithic villages in the Eastern Balkans were enclosed by walls and/or ditches whose construction, upkeep and reconstruction required the investment of substantial amounts of time and labor. The enclosures varied in terms of type, size, and layout, and were obviously paid much attention to throughout the early farming settlements' lifecycles.

Based on evidence from extensively investigated early sixth millennium BC sites in Thrace and the Struma River valley, this presentation will compare the enclosure types identified at different Early Neolithic settlements in their environmental contexts focusing on what determinants could have affected the choices that early farmers made when deciding to build – or to rebuild – certain enclosure types and how these choices, in turn, might have predetermined the social implications for these communities. The accent will be placed on longer-lived sites as they better demonstrate the conservative aspects of the enclosures as well as the changes that occurred in their reconstructions and use.

4 THE PREHISTORIC ENCLOSURES OF PELAGONIA

Naumov, Goce (Einstein Center - Chronoi)

The tell sites have been highlighted as the most common settlement feature of the prehistoric Pelagonia. Most of them were established in the Neolithic and some were continuously occupied until the Bronze Age, while few were inhabited only in one of these three prehistoric periods. Approximately 15 of tell sites were excavated with research predominantly focused on the stratigraphy, buildings and material culture that gave the substantial information about their chronology, architecture and cultural features. It was not until the first implementation of the geophysical scanning performed on the Pelagonian tells when the research interest was more broadly concentrated on the spatial organization of these prehistoric sites. Initiated in the beginning of 2010's by the Center for Prehistoric Research these noninvasive surveys on dozens of tells gave entirely new perspective of their architectural features. It was for the first time detected that majority of them were enclosed by one or several ditches which was not recorded before during their excavation. Since then, they are thoroughly studied and their variations along with the spatial disposition of buildings have been systematized. In this occasion the major focus will be on the Neolithic and Chalcolithic tells sites in Pelagonia and the variety of enclosures recorded on them. The Early Neolithic site of Vlaho will be particularly highlighted as it disposes a remarkable setting of dozens of ditches throughout the entire settlement. They were recently excavated and therefore an updated knowledge on its ditches and their relationship will be elaborated in this presentation.

5 RONDELS GO SOUTH: EXPLORING TYPES AND CHRONOLOGY ON THE EDGE OF THE CARPATHIAN BASIN

Kalafatic, Hrvoje (Institute of Archaeology) - Šiljeg, Bartul (Institute of Archaeology) - Šošić, Rajna (Faculty of Humanities and Social Sciences Zagreb)

In the rich archaeological landscape of Eastern Slavonia, an array of Middle and Late Neolithic sites has been uncovered through aerial reconnaissance and satellite image analysis. Leveraging aerial reconnaissance and satellite image analysis, the majority of Middle and Late Neolithic sites in Eastern Slavonia were identified, with subsequent field surveys confirming their attribution through surface finds. In the vicinity of Đakovo, Croatia, magnetic surveys have

been conducted on five confirmed sites, revealing extensive Middle and Late Neolithic settlements characterized by complex spatial organization and enclosures. Through a multidisciplinary approach incorporating archaeological methods, the research aims to unravel the types and chronology of rondels found on the southern periphery of the Carpathian Basin. This investigation extends beyond typological analysis, employing advanced dating techniques to elucidate the temporal dynamics of rondel formation and usage in this region. The findings not only contribute to regional archaeological understanding but also offer broader insights into the diffusion of material culture and cultural exchanges, enriching our comprehension of prehistoric communities in this transitional zone. The spatial complexities and cultural implications of these extensive settlements challenge conventional notions of settlement patterns, emphasizing the need for comprehensive study and protection.

6 DITCH FEATURES AT THE LATE NEOLITHIC – EARLY CHALCOLITHIC SETTLEMENT NEAR BATA, PANAGYURISHTA MUNICIPALITY, SOUTHERN BULGARIA

Boyadzhiev, Kamen (National Archaeological Institute with Museum at the Bulgarian Academy of Sciences) - Boyadzhiev, Yavor (National Archaeological Institute with Museum at the Bulgarian Academy of Sciences)

The presentation focuses on a specific case study: the Late Neolithic and Early Chalcolithic (5150 – 4700 cal. BC) settlement in the “Varbishi dol” area, Bata village, in the southern part of the Sredna Gora Mountains. It is situated on a slope above small river, on a total area of around 180 000 sq. meters. Rescue excavations covered an area of 220x20 m in its eastern periphery.

Three parallel ditches, running NW to SE, mark the northern border of the settlement, on the higher part of the slope. To the south of them, a stone base of a wall was found. All of these features are linear and probably did not enclose the whole site. The width of the ditches varies between 2 and 4.5 m and their depth between 0.20 and 1.50 m. The depth of the ditches is not regular. Their most shallow part is in the middle of the excavated area, their depth increases both to the NW, and to SE. The fill is uniform, with no evidence of deliberate deposits. The specific shape, position and direction of the ditches suggest that they were mainly designed to protect the settlement from water and earth sliding down the slope after heavy rains. However, they may have served other defensive functions, as well.

In the southern part of the settlement, down the slope, two other ditches were attested, next to each other and parallel to the northern ones. Parts of these ditches were covered with piles of stones, animal bones and fragmented pottery. The archaeological situation suggests that they possibly had different purpose than the northern ones.

The features from Bata show that despite common characteristics that prehistoric ditches from the region share, they may have also served different, site-specific functions.

7 ALTERING LANDSCAPES, SHAPING COMMUNITIES: ARCHAEOLOGICAL INVESTIGATIONS AT THE LATE NEOLITHIC SITE OF CSÖKMŐ-KÁPOSZTÁS-DOMB

Riebe, Danielle (University of Georgia) - Dani, János (University of Szeged / Déri Museum)

Late Neolithic tells on the Great Hungarian Plain are well-known for being enclosed by single or multiple ditches, but the purpose and meaning behind these ditches have been widely interpreted. Scale, both geographic and temporal, has played a factor when interpreting the role that ditches played, with most archaeological attention given to the tell itself with little to no contextualization with the rest of the site or how the role of the tell may have changed for the community over time. In the Berettyó valley there are many contemporaneous Late Neolithic sites fortified with ditches (e.g., Berettyóújfalú-Herpály; Berettyóújfalú-Szilhalom; Berettyóújfalú, Berta-domb), but for the past 5 years, the Prehistoric Interactions on the Plain Project (PIPP) has conducted surface collections, magnetometric surveys, and excavations the Herpály tell site of Csökmő-Káposztás-domb. Taken together, the data collected from fieldwork endeavors illustrates the complex and evolving interactions between prehistoric people and their landscape. Radiocarbon dates illustrate that the site developed between c. 5000-4300 BC and over the course of that time, the construction and use of ditches changed in both form and function. These transformations to the broader environment reflect the life-history of the site through monumental community building efforts and human-induced landscape changes.

8 THE COPPER AGE ENCLOSURES AT STAMBOLIYSKI IN BULGARIAN THRACE: FROM DITCH DIGGING TO DEPOSITION AND INFILLING

Katsarov, Georgi (National Institute of Archaeology & Museum, Bulgarian Academy of Sciences) - Nikolova, Nikolina (National Institute of Archaeology & Museum, Bulgarian Academy of Sciences) - Tsurev, Atanas (National Institute of Archaeology & Museum, Bulgarian Academy of Sciences) - Bacvarov, Krum (National Institute of Archaeology & Museum, Bulgarian Academy of Sciences)

In advance of a gas pipeline construction in 2019, large-scale rescue excavations were carried out at the early Copper Age site of Stamboliyski in Bulgarian Thrace (early fifth mill. cal. BC). Three successive enclosure ditches were uncov-

ered as well as the remains of several palisades that are closely comparable – both chronologically and typologically – to the Central European rondels. Nearly 50 pits of various shape, size, and deposits were uncovered in the area enclosed by the ditches.

This presentation will focus on the construction, maintenance, and infilling of the ditches. Throughout the ditches' life cycles, their maintenance included multiple cleaning, repair, and recut. As a result, they went through at least two major phases of use that are clearly visible as distinct backfills or new cuts. Moreover, various depositional practices were associated with the use of the enclosure features. Structured deposits were identified mostly around the enclosures' entrances but also in different places on the ditches' bottoms. Deposits usually consisted of burnt house debris, disarticulated human remains, animal skulls and horn/antler cores, whole and fragmented pots and grindstones. Based on the deposits' position, it seems possible to identify events that mark the beginning or the end of the enclosure's use.

9 CUCUTENI-TRIPOLYE ENCLOSED SETTLEMENTS IN THE MOLDAVIAN SUBCARPATHIANS (ROMANIA). SOCIAL AND ECONOMIC IMPACT, PRACTICAL AND SYMBOLIC ROLE OF THE DITCHES

Preoteasa, Constantin (Neamț National Museum Complex) - Mischka, Carsten („Friedrich-Alexander” University of Erlangen-Nurnberg)

As a result of the scientific cooperation between Neamț National Museum Complex - Cucuteni Culture International Research Centre - Cucuteni Eneolithic Art Museum „Gheorghe Dumitroaia” in Piatra-Neamț (Romania) and „Friedrich-Alexander” University of Erlangen-Nurnberg - Faculty of Philosophy and Department of Theology - Institute of Pre- and Protohistory (Germany), in 2017-2024 interdisciplinary non-invasive archaeological research has been made on the Cucuteni-Tripolye sites (from Chalcolithic - ca. 5000-3500 BC) in the Neamț Depression (Ozana-Topolița Depression) of the Moldavian Subcarpathians (Northeastern Romania).

The results of the geophysical surveys and archaeological excavations confirm the presence of ditches (single or multiple, of different shapes and sizes) in most of the investigated settlements. Some settlements have developed over time and the inhabited area has expanded beyond the ditches.

From our point of view, the role of the ditches, whose creation involved a considerable socio-economic effort, was both practical (protective / defensive) and symbolic (delimiting the inhabited space, implicitly the sacred from the profane, such as the famous sacred furrow by which Romulus delimited the city of Rome).

As a result of our recent investigations, the Neamț Depression (Ozana-Topolița Depression) of the Moldavian Subcarpathians (Northeastern Romania) is currently the only fully investigated geographical area in Europe from a non-invasive interdisciplinary archaeological point of view (geophysics, UAV, DTM) for an entire epoch (Chalcolithic) and civilization (Cucuteni-Tripolye).

10 DIGGING DEEP INTO PREHISTORIC PERSONHOOD: DITCHES AND HOUSES ON TRYPILLIA MEGASITES

Chapman, John (Durham University) - Gaydarska, Biserka (Historic England)

In the last 15 years, we have seen major investigations of Trypillia megasites – the largest sites in 4th millennium cal BC Europe and claimed to be the world's first urban congregation centres. These programmes have been complemented by studies of the frequent smaller Trypillia and Cucuteni sites. Although ditches have been found by geophysical prospection in roughly half the sites, little attention has been paid to these significant features. Three familiar explanations have been posited for such enclosures – defensive, a planning guide to settlement layout and a materialisation of the conceptual division between inside and outside. Yet it is hard to relate the ditches to the other parts of a settlement without a detailed consideration of time/space relationships between the ditch, its segments and causeways, household neighbourhoods and those public buildings dubbed Assembly Houses. It is also vital to insert the ditch-diggers into the analysis and to consider the impact of ditch-digging on their personhood.

In our presentation, we report on such a detailed analysis of the Trypillia megasite of Nebelivka. The ditch is placed in three different contexts according to the Distributed Governance Model, the Assembly Model and the Pilgrimage Model. In our analysis, we seek to explain the number of causeways and their spacing, the labour force required to dig the ditch and to which neighbourhoods ditch segments were related. We also consider the ways in which ditch-digging was used to construct 'local' identities proper to those outside communities whose residence or visits built the megasite itself. It turns out that, just as with Trypillia persons, ditches, their segments and causeways embodied the tension between their dividual and individual identities.

11 "ROLLING IN THE DEEP": SMALL CLAY ARTIFACTS FROM EARLY AND MIDDLE BRONZE AGE DITCHES IN BULGARIA

Minkov, Petar (NAIM-BAS)

The aim of this study is to discuss the known so-far small clay artefacts originating from the Early and Middle Bronze Age ditches in the present-day Bulgarian lands. The locations represent both rondels and ditches surrounding settlement mounds and open-air sites. Amongst the finds discovered in ditches are clay anthropomorphic and zoomorphic figurines, clay models of wheels, and clay models of axes. The main question related to the research is whether the presence of these ceramic objects within ditches a consequence of accidental circumstances is, or it can be associated with use activities, ritual practices and infilling of the enclosures. The primary context in which such objects were usually found is in dwellings, rather than of pits and ditches. Thus, it can be assumed that some of the mentioned clay artefacts found themselves within the fill of ditches as the result of various ritual activities that have taken place there.

438 IN SPE RESURRECTIONIS. THE MULTIDISCIPLINARY APPROACH TO CRYPT BURIALS IN EARLY MODERN EUROPE

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Slusarska, Katarzyna (University of Szczecin) - Majewski, Marcin (University of Szczecin) - Rennwanz, Joanna (Joanna Rennwanz Institute of Archaeology and Ethnology of the Polish Academy of Sciences) - Grupa, Małgorzata (Nicolaus Copernicus University) - Ströbl, Regina (Forschungsstelle Gruft)

Session format: Regular session

Deeply rooted in Christianity, crypt burial in early Modern Europe became a status marker and a way to ensure a regular income for parishes and churches. Burial in the church was perceived as a right entitled to those of noble birth or have achieved high economic status. However, it was also a way of manifesting their/their families' remarkable role and place within society, especially crucial for all aspiring to a higher status.

A sumptuous funeral needed many complex and time-consuming preparations. And so, the deceased awaited a substantial amount of time for the burial ceremony. And thus, the dead also needed special treatment to be preserved in decent condition until the right time.

As a complex phenomenon, crypt burials need multidisciplinary approaches. We would like to suggest an in-depth and open discussion on the various aspects, approaches and research problems, with emphasis of social practice associated with crypt burial. We believe that the international platform, facilitated by EAA, will support developing the best practices within crypt burial researches.

We encourage contributions which address general questions and a case studies presenting multidisciplinary research on crypt burials.

ABSTRACTS

1 IT CAN ONLY BE DONE TOGETHER - THE NECESSITY OF INTERDISCIPLINARY COLLABORATION IN CRYPT RESEARCH

Ströbl, Regina (Forschungsstelle Gruft, Lübeck) - Ströbl, Andreas (Forschungsstelle Gruft, Lübeck)

The complete understanding of the complex of crypt burials requires many different scientific disciplines. In the time between the death of a nobleman and his final burial in the crypt, many different processes are necessary. On the one hand, the dead person must be washed, possibly preserved, clothed and placed in the coffin. On the other hand, the funeral service is planned with the entire process from the announcement, the invitations of the guests, the funeral procession, the decoration of the church and the service. To reconstruct all this, archaeologists, folklorists, anthropologists, botanists, chemists, theologians and historians have to work together.

The situation is very special for nobleman who die far away from their homeland and have to be preserved for transport back to the family crypt.

For example, the first evidence of a method for preserving corpses from the 16th century was made on to princes from Schleswig-Holstein-Gottorf, who died on their cavalier's tour. In the lecture, some examples of interdisciplinary cooperation will be presented.

2 WOODEN COFFINS FROM CRYPTS - EXEMPLIFICATION OF RESEARCH METHODS IN POLAND FROM WORLD WAR II TO THE PRESENT

Majorek-Lipowicz, Magdalena (University of Lodz; Institute of Archaeology)

It would seem that with the post-war dynamic development of Polish archaeology, when the number of researched sites of a sacral nature increases, and research work within churches with crypts provide huge amounts of data, the descriptions of discovered coffins containing human remains will find their place in the literature on the subject. This happened to some extent, but the data were often cattered, incomplete, limited to information regarding the presence or absence of a coffin, its shape in horizontal projection, possibly metric features, occasionally containing additional data.

The preliminary search of archaeological publications published until the end of the 20th century shows that fragments of post-medieval coffins were found only at a few sites. A breakthrough in research occurred in the second decade of the 21st century with better financing of investments in sacral buildings, new challenges and research questions emerging in relation to post-medieval archeology and, consequently, the implementation of interdisciplinary projects. The archaeological and anthropological teams were joined by, among others: costume specialists, archaeobotanists, microbiologists, conservators. The combination of knowledge and skills of representatives of many disciplines resulted in the publication of many monographs and articles dealing with the researched sacral sites, in which - more than in previous years - focus was placed on coffin finds. Attention was drawn to the informative, identification and functional potential of coffins. The coffin was somehow separated from the collection of grave goods, and for the first time chapters were devoted to it in monographs.

There has been a change - from the 20th century's poor descriptive narrative (metric data of the coffin, raw material) --> to a more complete form (+ decorations, inscriptions, reconstructions).

In my speech, I will present the changes that have occurred in the research methods used over several decades in relation to coffins from crypts.

3 INTERDISCIPLINARY RESEARCH OF CRYPT BURIALS IN SOUTHWEST FINLAND

Paasikivi, Sofia (University of Turku) - Moilanen, Ulla (University of Turku)

Burial crypts are unique archaeological contexts. In addition to their enormous cultural and religious significance, they are enclosed spaces, surrounded by physical walls. Fieldwork conditions inside crypts may be challenging, from the sensitivities involved in working with dead individuals to conditions ranging from cramped spaces and possibly low oxygen levels, the difficulty of working with collapsed coffins and limited access to human remains. This paper explores the challenges, methods, and ethical considerations associated with the archaeological study of crypts in Finland. Our ongoing research of the crypt at Seili Church in southwestern Finland is an interdisciplinary project combining archaeology and scientific methods, like proteomics, archaeobotany, entomology, ancient DNA and isotope analysis. In this paper, we discuss the challenges encountered in our work, the lessons learnt, and how our experiences can be applied to similar studies in larger churches, such as the prestigious Turku Cathedral, which is the burial place of several prominent historical figures, not least the Swedish Renaissance queen Catherine Månsdotter (1550–1612) and her daughter princess Sigrid Vasa (1566–1633).

4 SACRED BURIAL STRUCTURES DURING THE EARLY CHRISTIAN PERIOD IN THE TERRITORY OF KOSOVO

Hoxha, Zana (Institute of Albanology)

This paper focuses on the complex landscape of early Christian burial structures in the Territory of Kosovo, encompassing: crypts within churches, standalone crypt buildings, and martyriums. These sacred buildings offer valuable insights into the religious beliefs, social practices, and architectural design of the early Christian period in Kosovo.

Through an interdisciplinary approach drawing on archaeological evidence, historical records, and architectural analysis, this study examines the distinct characteristics and roles of each type of burial structure. Crypts within churches served as intimate spaces for interring the faithful, while standalone crypt buildings often confused with martyriums provided dedicated sanctuaries for burial rites and commemoration. Martyriums, while holding the remains of martyrs also held special significance within the early Christian landscape of Kosovo.

By exploring these diverse forms of early Christian burial structures, this paper aims to deepen our understanding of the architectural characteristics, and spiritual, social, and cultural dimensions of death and commemoration in Kosovo during the early Christian period. Through critical analysis and comparative study, it seeks to illuminate the rich tapestry of religious practice and belief that shaped the sacred landscape of the region.

5 THE FAMILY BURIAL VAULTS AT ST PATRICK'S ROMAN CATHOLIC CHURCH, LIVERPOOL IN THE CONTEXT OF THE 19TH-CENTURY URBAN BURIAL CRISIS

Fairley, Anna (University of Liverpool) - Mytum, Harold (University of Liverpool)

To date, only Protestant vaults have been archaeologically studied in England, so the investigation of the contents of family vaults within the crypt of St Patrick's Roman Catholic Church, Toxteth, Liverpool, offers new opportunities. St Patrick's Church opened on the outskirts of Liverpool in 1827 and included a small burial ground, but also a large crypt beneath the church with room for four private vaults as well as large charnel pits. Utilising the limited documentary sources contextualised the families able to commission a vault, but archaeological survey combined with the burial registers indicate how this was a tiny minority option. This paper describes the contents of the vaults and their distinctive features and discusses whether these reflect regional or religious traditions as most vaults. The use of vault burial is also compared with the alternative interment options at St Patrick's, and how other churches in Liverpool also used a combination of vaults and crypts alongside earth burial. The paper concludes with a review of similarities and differences in mortuary behaviour according to denomination.

6 BURIAL OF BISHOP STEFAN WIERZBOWSKI AND THREE SETS OF LITURGICAL VESTMENTS, GÓRA KALWARIA, MASOVIAN VOIVODSHIP, POLAND

Grupa, Małgorzata (Nicolaus Copernicus University) - Grupa, Dawid (Archaeologist)

In 2019, the metal sarcophagus of Stefan Wierzbowski in the crypt under the presbytery of the Church of the Exaltation of the Holy Cross in Góra Kalwaria was examined. Visible defects on the surface of the metal led to the decision to preserve it. Consequently, archaeologists were called in to preserve the mummified remains of the priest. It seemed that all these activities could be carried out quickly and without surprises but it became clear that there were more layers of clothing than there were arrangements for the burial of priests. It was clear from the first inspection that it was mainly the elements of the silk robes that had been preserved. Three sets of robes were discovered, which came as surprise to the archaeologists. They were looking for an answer to the question: under what circumstances were more robes worn? Before the layers of robes were removed, a CT scan was taken.

7 FUNERAL DRESSES FROM THE CRYPT OF THE WEJHER FAMILY IN THE PARISH CHURCH IN PUCK

Grupa, Dawid (Archaeologist) - Blusiewicz, Karolina (University of Warsaw) - Grupa, Małgorzata (Nicolaus Copernicus University in Toruń)

During the refurbishment of the floor in the parish church of Sts. Peter and Paul in Puck, access to the Wejher family tomb was uncovered. This family was among the most prominent in the Gdańsk Pomerania region in the late 16th and early 17th centuries. The tomb was founded as the burial place of the patriarch of the Wejher family, Ernest, and served as the family tomb in the early 17th century. Intervention surveys were undertaken to secure the remains of burials, which showed signs of previous openings of the crypt and various interventions. Interdisciplinary research methods, including bioarchaeological, archaeobotanical, dendrochronological, and costumeological analyses, were employed to gather information about the individuals interred in the crypt and the circumstances of their burial.

During the excavations, numerous silk textile fragments were found and identified as remains of funeral attire and other grave goods, such as pillows and padding of coffins. It was possible to identify a female dress, a child's dress resembling of a doublet, a żupan, a delia, and a sacklike funeral dress of an adult person. The remaining textiles were scattered and seriously damaged. The majority were disposable funeral dresses for children. The archaeological funeral attire from Puck provided new insights on the clothing worn in the Polish-Lithuanian Commonwealth. These clothes exhibited formal characteristics of both Western and Polish origin, reflecting the situation of families in which the West encountered the East.

8 18TH-CENTURY CHILDREN'S FUNERAL FASHION - ANALYSIS OF RESEARCH POSSIBILITIES BASED ON OBJECTS FROM THE CRYPTS IN THE CHURCH IN SZCZUCZYN

Grening, Danuta (Nicolaus Copernicus University in Toruń, Institute of Cultural Studies) - Dobek, Mikołaj (Nicolaus Copernicus University in Toruń, Institute of Archaeology)

Research of the crypts in the church of The Name of Blessed Virgin Mary in Szczuczyn turned out to be very important for the history of funeral fashion in the modern period. The unique conditions in the crypt contributed to the preservation of the full spectrum of grave clothing. A particularly unusual find is the collection of linen and woolen clothing. Analyzes of materials discovered in Szczuczyn made it possible to expand knowledge about grave clothes made of these fabrics, as well as to verify their role. It was established that less durable materials were also present in the rich burials of the local elite. The analysis of artefacts during fieldwork also allowed us to check to what extent the

secular community in 18th-century Poland complied with the rules imposed by the church regarding the use of grave clothes.

During works in the crypts under the presbytery, 96 burials were inventoried. This number also included children's burials, which were subjected to detailed in situ analysis. As a result of these works, the burials of two children of Stanisław Antoni Szczuka, the founder of the church and the owner of Szczuczyn, were identified. Children were usually buried in linen dresses decorated with silk ribbons, but there were also some unique and richer forms of grave clothes among them. The first archaeological discovery of a linen Czechman was made in the Szczuczyn crypts, in addition to a dress with a printed floral pattern, which can also be considered an extremely unique burial. In some cases, analysis of clothing made it possible to determine gender of the child who died very young. Research on children's grave clothes from Szczuczyn allows us to present a reliable picture of the funeral fashion of the youngest children in 18th-century Poland.

9 NOT NECESSARILY LACE AND RUFFLES: ANALYSIS OF CLOTHES FROM BURIAL NO.2 FROM THE WESTERN CRYPT OF THE CHURCH IN SZCZUCZYN

Dobek, Mikołaj (Nicolaus Copernicus University in Toruń, Institute of Archaeology) - Grening, Danuta (Nicolaus Copernicus University in Toruń, Institute of Cultural Studies)

Grave clothes are elements of burial equipment with very diverse characteristics. Their form was influenced not only by local funeral customs, but also by social status and fashion trends prevailing in a given region. Research on grave clothing clearly translates into the general development of knowledge about the evolution of fashion. This issue is no longer only the domain of fashion history researchers, but also something concerning archeologists. This is clearly visible in the examples of analyzes of artifacts found during archaeological research conducted in the crypts of the church of The Name of Blessed Virgin Mary. Clothing items were discovered among the equipment of over a hundred burials, the collection of which constitutes the largest collection of modern burial clothing from the areas of the former Polish-Lithuanian Commonwealth.

This collection is characterized primarily by the excellent condition of individual elements of the costume. This is evidenced by, among others, clothing discovered in burial no. 2 from the western crypt A. The woman buried there was dressed in a green dress, which in itself may seem very simple. However, it is enriched by numerous accessories, such as: a scarf, gloves, bows, a cap and decorative footwear. The analysis of her outfit allows us to redefine what could indicate the wealth and luxury of clothing in the 18th-century.

10 FAMILY IN THE VAULT. THE WEST POMERANIAN NOBLES' CRYPT BURIAL STUDY PROGRAM - CASE STUDIES

Slusarska, Katarzyna (University of Szczecin) - Majewski, Marcin (University of Szczecin) - Rennwanz, Joanna (Institute of Archaeology and Ethnology, Polish Academy of Sciences, Poland) - Ogiewa-Sejnota, Monika (Archaeological and Historical Museum in Stargard)

Since 2020, an inter-institutional and interdisciplinary team has researched the crypts of the West Pomeranian nobility. So far, three sites dating to the mid-17th to mid-19th century have been investigated. These are crypts of three noble families: von Glasenapp in Białowąż (Balfanz), von Oesterling in Koszewo (Groß Küssow) and von Wedel in Bród (Braunsforth).

There are two main goals of such research. The first is to build a comprehensive knowledge of the funerary culture of modern times nobilities in Pomerania. The second goal is restoring the deceased dignity and order to their final resting places. We want to present the developed protocol we apply to this research, which comprises a thorough historical query, followed by an artistic and epigraphic analysis of the sarcophagi, osteological analyses of human remains and an inventory of the remaining material. Undisturbed human remains are sampled for DNA and stable isotopes. Well-preserved coffins are also tested for organic remains, such as mattress and pillow infill or herbs used for embalming, etc. Another element of the work is an attempt to reconstruct the layout of the burials and identify a programme for creating ancestral memory. Historical sources, epigraphical and art programs of sarcophagi compared with osteological analyses help to reconstruct family relations between the deceased. The West Pomeranian noble crypt, together with a commemorative complex in the form of tombstones, gravestones, and epitaphs in the churches, constituted a peculiar memorial which fitted perfectly into the narrative of the story of the family's 'ancient' history, its social position (including as owners of estates and patrons of the church) and the role it played. Plant remains analyses allow us to determine the meaning and symbolism of plants in the Protestant funerary rite.

After the work, each crypt is closed and protected from random entry and further degradation.

11 XYLOLOGICAL ANALYSIS OF STICKS FOUND IN COFFINS FROM CRYPTS IN KAZIMIERZ BISKUPI AND BYSZEWO (POLAND)

Michalik, Jakub (Nicolaus Copernicus University in Torun)

An inherent element of the funeral ceremony of the early modern period was a scrupulous observance of customs so that the deceased person could, in the opinion of their loved ones, pass away in peace. Archaeological and archaeobotanical research makes it possible to identify elements that may have been the aftermath of certain customs and to verify to what extent they agreed with information that was written down by ethnographers. One such item may be the simple, straight, and long wooden sticks that are occasionally found in coffins during archaeological investigations. Such items were found, among others, during archaeological research in 2017–2018 in Byszewo and in 2022 in Kazimierz Biskupi. According to the information gathered by ethnographers, the use of sticks, especially from elderberry (*Sambucus nigra* L.), was thought to be related to taking measures off the dead to prepare planks for the coffin. Finds from Kazimierz Biskupi and Byszewo show that every element placed in the coffin may be important, including small, inconspicuous sticks. Xylological analysis will allow for at least partial verification of ethnographic translations concerning customs that are largely difficult to observe during archaeological research.

12 "ANTI-PLAGUE AMULET FROM ARCHAEOLOGICAL RESEARCH OF THE PARISH CHURCH IN KOŃSKOWOLA (LUBLIN VOIVODESHIP, POLAND).

Openkowski, Rafal (Nicolaus Copernicus University in Torun) - Michalik, Jakub (Nicolaus Copernicus University in Torun)

Epidemics have accompanied humanity since ancient times, and the events that have taken place in recent years allow us to bring at least a little closer to the situation faced by societies of past eras. The biggest difference is the state of advancement of medicine, the lower level of which in the early modern period meant that the mortality rate during disease epidemics was much higher. This caused society to lose confidence in treatment methods then considered scientific. At that time, people turned to spiritual and magical methods of health protection. The consequence of this was the great popularity of devotional items and amulets, which were intended to protect their owner. One of such items is a small rhombus-shaped pendant, found during the examination of the crypts of the 18th-century parish church of "Discovery of the Holy Cross and Saint Andrew the Apostle in Końskowola". The paper will present an anti-plague amulet from the study of the crypts in Końskowola, as well as examples of items worn in the early modern period, which were perceived at that time to protect the health of the owner.

13 THE CANON'S GRAVE IN THE PARISH CHURCH IN BYDGOSZCZ (POLAND). IDENTIFICATION ATTEMPT

Nowosad, Wieslaw (Nicolaus Copernicus University in Toruń)

In 2017–2018, excavations were carried out in the Cathedral of St. Martin and Nicholas in Bydgoszcz within the presbytery. Several small crypts were discovered in this place in which remains were found, containing remains tentatively dated to the 17th and 18th centuries. Among them, archaeologists found a wooden chalice and fragments of a cassock, which suggested that one of the buried could be a canon associated with one of the several chapters existing in the area. This speech is devoted to an attempt to identify a buried figure based on historical sources. The source base that will be used in the identification attempt will be the own files of the parish church in Bydgoszcz, the files of the episcopal curia of the Włocławek bishops (record books, episcopal visitations) and the files of the courts operating in Bydgoszcz in the 17th and 18th centuries. Therefore, it is not an archaeological text, but a historical one and a look at material culture through the eyes of a historian and archivist.

439 INTERDISCIPLINARY AND MULTISCALAR APPROACHES TO BIOARCHAEOLOGY IN THE DANUBE PROVINCES OF THE ROMAN EMPIRE

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Szecsenyi-Nagy, Anna (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities) - Vulović, Dragana (Institute of Archaeology, Belgrade) - Miladinović-Radmilović, Nataša (Institute of Archaeology, Belgrade) - Bollók, Ádám (Institute of Archaeology, HUN-REN Research Centre for the Humanities)

Session format: Regular session

The Roman provinces along the Danube, renowned for being exceptionally well-explored, are pivotal to bioarchaeological studies. These regions underwent significant transitions during the Imperial and Late Antique periods in several areas, ranging from political shifts and military strategies to diverse cultural and economic interactions, largely driven by the Danube's strategic role in the Empire's policy.

This session seeks to enable and encourage a multiscale exploration of the civilian and military populations inhabiting these territories during these transformative times. We eagerly invite contributions from archaeology, anthropology, archaeogenetics, and isotope sciences to foster a multidisciplinary dialogue, synergizing archaeological and scientific perspectives.

In a synoptic approach, mortuary archaeology illuminates societal norms, beliefs, and the nuanced rituals surrounding death. Complementing this, anthropological data sketches a detailed portrayal of health status, diet, and daily challenges faced by these populations. Isotope analyses offer further granularity on dietary habits, mobility, and interaction with the landscape. Meanwhile, ancient DNA deciphers intricate tales of migrations, interactions, and ancestral lineages, often providing insights elusive to other methodologies.

Embracing these multifaceted strands of evidence, this session aims to delve into the life and death of the Danube provinces' inhabitants. Concurrently, it hopes to spotlight evolving methodologies and theoretical approaches in bioarchaeology. We welcome submissions spanning from meticulous case studies to overarching discussions on bioarchaeological practices within Roman archaeology.

ABSTRACTS

1 TWO LATE ROMAN CEMETERIES AT NAGYKANIZSA (HUNGARY) - ARCHAEOLOGICAL AND PHYSICAL ANTHROPOLOGICAL PERSPECTIVES

Bollók, Ádám (Institute of Archaeology, HUN-REN Research Centre for the Humanities) - Horváth, Friderika (Institute of Archaeology, HUN-REN Research Centre for the Humanities) - Szederkényi, Róbert (Institute of Archaeology, HUN-REN Research Centre for the Humanities)

The two late Roman cemeteries excavated at the Inkey-kápolna site in the northern outskirts of present-day Nagykanizsa (Hungary) are remarkable on several counts and thus require closer scrutiny. These burial sites constituted the necropolis areas of a Roman villa settlement located on the territorium of the Roman city of Salla (present-day Zalalövő). Since both cemetery sites have been excavated almost in their entirety alongside the material remains of the villa itself, we can not only carry out a comprehensive analysis of the burials and thereby reconstruct the mortuary behavior of the burial community who interred their dead in the two necropolises, but it is also possible to establish their standing in contemporaneous society and relate their mortuary habitus to their lifestyle and social position within third- to fourth-century CE Pannonia Prima. The results of the physical anthropological studies carried out on both burial sites further contribute to our reconstruction of the burial population's lifestyle, health conditions, and mortuary behavior. After presenting our conclusions based on insights of these two disciplines, our paper will point out a set of research questions to be addressed in the coming years by applying further bioarchaeological means.

2 „LIVIN' ON THE EDGE" - LIFESTYLE RECONSTRUCTION OF PANNONIAN POPULATIONS OF THE ROMAN EMPIRE BASED ON PALEOPATHOLOGICAL ANALYSIS

Kiss, Krisztián (MTA-BTK Lendület Momentum Bioarchaeology Research Group; HUN-REN Research Centre for the Humanities; University of Miskolc; Eötvös Loránd University; Hungarian Natural History Museum) - Mateovics-László, Orsolya (Archäologischer Dienst GesmbH) - Madai, Ágota (Hungarian Natural History Museum; University of Szeged) - Köhler, Kitty (Hungarian Natural History Museum) - Merczi, Mónika (Bálint Balassa Museum, Hungarian National Museum) - Láng, Orsolya (BHM Aquincum Museum and Archaeological Park) - Bernert, Zsolt (Hungarian Natural History Museum) - Mende, Balázs (MTA-BTK Lendület Momentum Bioarchaeology Research Group; HUN-REN Research Centre for the Humanities) - Vámos, Péter (BHM Aquincum Museum and Archaeological Park) - Szécsényi-Nagy, Anna (MTA-BTK Lendület Momentum Bioarchaeology Research Group; HUN-REN Research Centre for the Humanities)

The biological reconstruction of historical human populations is one of the main goals of bioarchaeology, for which the methods of paleopathology are powerful tools. With macromorphological analysis of oral pathologies, activity-related joint alterations and identification of skeletal signs of traumatic events we are able to draw conclusions on lifestyle differences between populations/groups distinguished by variables such like age, sex, spatial and temporal distribution, furthermore groups defined by archaeological and historical questions. Our presentation introduces an anthropological project related to a newly established HAS-RCH Momentum Bioarchaeology Research Group (Title: Life and death at the edge of the Roman civilisation: complex bioarchaeological analysis of Pannonian communities; PI: Anna Szécsényi-Nagy). The team of anthropologists is about to contribute to the reconstruction of the way of life of past populations' from the region of Aquincum (northeastern part of the former province of Pannonia). A classical anthropological and paleopathological analysis is carried out on osteological collections representing villa areas, civil and military towns deriving from the 2-5th centuries AD. The research plans and questions for the next years, altogether with the utilized methods and planned cooperations with another disciplines, as well as the preliminary results of the

current state of anthropological analysis will also be presented. This research was supported by the Hungarian Academy of Sciences through the MTA-BTK Lendület Momentum Bioarchaeology Research Group (LP2023-20/2023).

3 **BROKEN BONES: A CASE STUDY OF A MALE ADULT WITH A HEALED FRACTURE OF TIBIA AND FIBULA FROM NAISSUS, SERBIA**

Vulovic, Dragana (Institute of Archaeology, Belgrade, Serbia) - Miladinović-Radmilović, Nataša (Institute of Archaeology, Belgrade, Serbia) - Jeremić, Gordana (Institute of Archaeology, Belgrade, Serbia) - Manojlović, Nikolina (Homeland Museum Župa, Aleksandrovac, Serbia)

The necropolis in Naissus (Niš, SRB) in the city quarter of Jagodin Mala is one of the best-researched Late Antique necropolises in the territory of Serbia. From 2006 to 2022, more than 200 graves of various forms, with almost 300 skeletal remains, were excavated. In the Late Antiquity, Naissus was a multi-layered and multi-ethnic society with a population of different backgrounds. The city was the birthplace of two emperors (Constantine I and Constantius III), occasional residence of several 4th-century rulers, episcopal see, and the seat of important state military and imperial factories.

During archaeological excavations in 2012 on the site of Jagodin Mala – Benetton Factory, more than 70 graves were discovered. The anthropological analysis of skeletal remains from this site showed that fractures are uncommon in this population, but one skeleton drew our attention. In one of the brick-built graves (no. 46), the skeletal remains of an adult male individual were discovered with an estimated stature of about 171,2±5 cm. Numerous changes, such as caries, linear enamel hypoplasia, osteoarthritis, and osteophytes on vertebrae, were observed during the analysis. The most notable pathology were well-healed spiral fractures on the distal third of the left tibia diaphysis and the middle third of the left fibula diaphysis, followed by osteomyelitis on both bones. In this presentation, we will focus on this antemortem fracture and what this person's life might have been like after the fracture.

4 **CHILDHOOD SCURVY IN ANTIQUE BURIALS FROM SIRMIIUM, SINGIDUNUM, TIMACUM MINUS AND NAISSUS, SERBIA**

Miladinovic-Radmilovic, Nataša (Institute of Archaeology, Belgrade) - Vulović, Dragana (Institute of Archaeology, Belgrade)

Scurvy is a metabolic disease caused by insufficient intake of vitamin C (ascorbic acid), which can be the consequence of a wide range of different factors. Vitamin C is essential for the production of collagen in connective tissue, osteoid and the cement substance binding the endothelial cells of the blood vessels. It is a disease that is almost unique to the human species because most animals that require vitamin C synthesise their own. Causes of scurvy can be broadly grouped into four variables: reduced intake of vitamin C (e.g., resulting from socio-economic factors, natural or social disasters, such as long-term droughts or sieges, or caused by specific, culturally conditioned taboos against the consumption of certain foods or due to a longstanding diet with limitations regarding the number of ingredients, food storage and preparation), increased requirement for vitamin C (e.g., during infections), malabsorption of vitamin C (e.g., in some gastrointestinal diseases) and genetic predisposition to lowered vitamin C levels. The body can obtain the required amount of vitamin C from almost all types of diets, however, if it is not consumed in adequate amounts, humans of any age can develop scurvy. Humans are unable to store vitamins, hence, they require regular and continual sources from fresh fruits and vegetables.

In this regard, we conducted investigation on the presence of scurvy on children's skeletal remains from four Antique cities (Sirmium, Singidunum, Timacum Minus and Naissus), from three different Roman provinces (Pannonia Secunda, Moesia Prima and Dacia Mediterranea), in the hope that the results will shed light on some additional segments regarding the health condition and socio-historical circumstances in the Antique period.

5 **SEEKING FOR THE DACIAN DREAM. EXPLORING ANCIENT MOBILITY IN ROMAN DACIA**

Buzic, Ileana (Doctoral School of History, 1 Decembrie 1918 University, Alba Iulia, Romania; PhD Program in Evolutionary Biology and Ecology, Department of Biology, University of Rome Tor Vergata, Italy) - De Angelis, Flavio (Department of Biology, California State University, Northridge, USA; Department of Mental, Physical Health and Preventive Medicine; University of Campania, Italy) - Gligor, Mihai (History, Archaeology and Museology Department, 1 Decembrie 1918 University, Alba Iulia, Romania) - Bolog, Adrian (Archaeology-Research Department, National Museum of Unification Alba Iulia, Alba Iulia, Romania) - Timofan, Anca (Archaeology-Research Department, National Museum of Unification Alba Iulia, Alba Iulia, Romania) - Amorim, C. Eduardo (Department of Biology, California State University, Northridge, USA)

The province of Dacia, now part of modern-day Romania, was annexed into the Roman Empire by Trajan in 106 AD, drawing people from ancient Italy and other areas, attracted by the prospect of enhancing their livelihoods. Apulum was strategically selected by the Romans as the site for a legionary fort where the Legio XIII Gemina was stationed until the withdrawal of the Roman administration around 270 AD. Initially, a civilian settlement emerged near the cas-

trum. The transformation into one of the most prominent Romano-Dacian settlements featuring two urban centres, still requires in-depth examination in terms of social and demographic change from a bioarchaeological perspective. This interdisciplinary research examines a sample of individuals buried in the Pitchforks Hill (Dealul Furcilor, ADF) biritual necropolis of the Roman Apulum, which is the largest identified in Dacia so far with its over 1000 burials, being utilised throughout the Roman rule. Teeth samples from 34 Roman-era individuals from ADF necropolis were collected for Whole Genome Sequencing (WGS) analysis. After applying rigorous quality controls, 21 samples were chosen for the downstream analyses, with their genetic variants being filtered using the 1240K SNP panel. PCA, F statistics, and Admixture modeling were utilised to assess the genome-wide variation of the ADF group in relation to coeval and current-day populations. The genetic diversity within the ADF group aligns with the broader European genetic landscape. However, it is possible to distinguish two primary clusters: the majority of the samples share genetic similarities with Mediterranean populations, while a minority shows closer ties to Eastern European groups. These findings significantly enhance our understanding of the Romanisation in the region, revealing the genetic imprints left by legionaries and other Italic peoples who settled in Apulum compared to those who migrated from nearby regions, whose genomic makeup is anticipated to be markedly distinct.

6 **BIOARCHAEOLOGICAL INVESTIGATION OF COMPLEX POPULATION DYNAMICS IN THE ROMANIZED EASTERN ADRIATIC AND HINTERLAND**

Loewen, Tisa (SUNY Cortland)

Applying a multidisciplinary inclusion of scholarship from archaeology and classical studies, in conjunction with bioarchaeological research, I examined population continuity in the Eastern Adriatic and hinterland during the transition between the end of the Iron Age and Roman Empire. Biological distance analyses using dental morphology demonstrate regional population continuity, but also admixture between Pannonians, Eastern Adriatic groups, and Italic Romans. Considering the historically established clashes between these populations, the regional transformations, interpreted here as biological imperialism, highlight the complex interplay of local and Roman influences.

Scholarship has increasingly recognized the complexities of population interactions and group social construction in the past. However, Roman studies still deliberate over two-dimensional perspectives, as if discussing power and conflict preclude focus on local agents. By integrating bioarchaeological data with classical perspectives, we gain a richer understanding of the multifaceted dynamics Adriatic and hinterland descendants navigated. These individuals embodied the negotiation of local and Roman during this transformative period, affording us insights into scholarly dissonance around imperialism.

446 **THE GRAND TOUR BETWEEN TRADITION AND TRANSFORMATION: NARRATIVES, PRESENTATIONS, AND REPRESENTATIONS**

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Martins, Ana Cristina (IHC - Polo Universidade de Évora / IN2PAST) - Dross-Krüpe, Kerstin (Ruhr-Universität Bochum – Alte Geschichte) - Mora, Gloria (Universidad Autonoma de Madrid) - Manzetti, Maria Cristina (University of Cyprus)

Session format: Regular session

From the middle of the 17th to the 19th century, European (mainly male) elites embarked on the Grand Tour: a transformative journey complementing their classical education. This expedition led them through diverse landscapes, rich in heritage, ultimately culminating in their much-anticipated destination: Rome, and for some, even South Italy and Greece. During the Grand Tour travelers not only experienced antiquity through the explorations of ruins, museums, and collections but also by attending opera and theatre performances, featuring ancient themes. These spectacles brought the ruins visited by the European elites to life on stage, establishing vivid images and concepts of the past in their minds.

Guided by tutors, the Grand Tour travelers documented their experiences in letters, diaries, and illustrated notebooks, which sometimes evolved into travel literature. The travelers ignited their passions, encompassing the beauty of landscapes, architecture, ruins, cultural traditions, socio-political structures, social gatherings, collecting, museums, the art market, and reproductions. They also bought artifacts to decorate their homes, both scientifically and artistically. This phenomenon thrived as transportation and accommodations improved, resulting in the social proliferation of the Grand Tour. Furthermore, it laid the foundation for a unified European culture with a strong scientific underpinning, notably through antiquarianism and archaeology.

The Grand Tour's lasting influence is evident in how we study, preserve, and present history today. This impact is seen in narratives, collections, education, aesthetics, and tourist options. However, ongoing efforts aim to diversify and modernize this tradition by expanding geographic focus, amplifying marginalized voices, and utilizing new technologies for more inclusive cultural practices.

We welcome contributions exploring various facets of the Grand Tour, comprising collecting, museums, art markets, archaeology, the fusion of Arts and Letters, itinerary design, identity formation, local development, and its contemporary relevance in both tangible and intangible realms. We also encourage submissions using digital technologies.

ABSTRACTS

1 A WORLD MADE BY TRAVEL: INTRODUCING THE GRAND TOUR EXPLORER FOR A DIGITAL STUDY OF THE GRAND TOUR

Ceserani, Giovanna (Stanford University)

What can digital humanities do for the study of the Grand Tour? What can we learn from looking at thousands of travelers at once about this voyage of cultural and symbolic capita, that contributed to a massive reimagining of politics and the arts, of the market for culture, of ideas about leisure, and of professional practices for archaeologists, artists and architects? This talk will introduce *A World Made by Travel: the Digital Grand Tour* - a new online and open access publication from Stanford University Press Digital - which synthesizes multidimensional data about the lives and journeys of 6,007 travelers with original research in a dynamic and interactive online format.

Through the datafication of *A Dictionary of British and Irish Travellers in Italy, 1701-1800* (compiled from the Brinsley Ford Archive by John Ingamells), *A World Made by Travel* introduces more than a thousand new figures, including hundreds of women, servants, workers, and Italians not previously represented among the Dictionary's primary headings. This digital Grand Tour is more representative, addressing and inviting vital questions about a historical phenomenon whose study has tended to focus on the most elite and well-known of travelers.

Through its Grand Tour Explorer, an interactive database with raw downloadable data, visualizations, and documentation; chapters on the project's history, rationale, and meaning; a collection of original essays produced by scholars working with the Explorer; and resources to bring this material to the classroom, *A World Made by Travel* shows the historical and continuing significance of eighteenth-century travel to Italy in a new light and with unprecedented granularity. And it showcases the possibilities of digital-history approaches for producing original research that is equally accessible to researchers, students, and the general public.

2 THE TRANSFORMATIONS OF THE GRAND TOUR: FROM CULTURAL TRAVEL TO MASS TOURISM

Mora, Gloria (Universidad Autónoma de Madrid)

The Grand Tour, as a journey of intellectual training and immersion in the classical world, aimed at the young members of the European aristocracy, developed from its beginnings at the end of the 17th century, when the Grand Tour became an exclusive form of travel, to the 19th century when advances in communications facilitated access for the emerging bourgeoisie to the representative destinations of Western civilisation. An exclusive form of travel was opened up to new pilgrims who, in many cases, did not have the classical training necessary to appreciate, value and enjoy the ancient landscapes and productions of Greece and Rome, but who wished to imitate the customs of the aristocratic class. This opening was accompanied by a transformation of the traditional antiques market: the collection of original antiquities or copies by prestigious sculptors such as Piranesi, Cavaceppi or Thorwaldsen, something reserved for an elite that could afford to display these pieces in their residences as true museums, gradually gave way to the acquisition of copies and reproductions of the most famous statues of antiquity made on a smaller scale, souvenirs easily accessible to bourgeois travellers who could thus display such ornaments in their homes as a testimony to their social advancement. This proposal will also address the impact of this transformation on the conservation of the archaeological heritage, a problem that is very relevant today.

3 GRAND TOURS AND ANTIQUARIANISM IN 18TH CENTURY FINLAND

Kunnas, Liisa (University of Helsinki)

The first university in the area of Finland was founded in 1640 by Queen Christina of Sweden, while Finland was under Swedish rule. This university, the Royal Academy of Turku was the center of Finnish cultural and scientific life, especially in the latter part of the 18th century and the beginning of the 19th century. Classical archaeology, history, art and literature was studied and taught in the Academy and some scholars also traveled and studied abroad. Nevertheless, Finland was a northern periphery in Europe with only few scholars and aristocrats who were able to take actual Grand Tours. In my presentation I will discuss these travelers and their interests in Roman and Greek Antiquity, especially in relation to artefacts brought from these travels to the collections of the Academy of Turku. Since most of the collections of the Academy were destroyed in a great city fire in 1827, it is remarkable that some of these artefacts still exist in the collections of the National Museum of Finland.

4 J.-P. HOUËL: ENGRAVINGS AND TRAVEL NOTES FOR THE RECONSTRUCTION OF THE ANCIENT LANDSCAPE OF THE AEOLIAN ISLANDS

Giuliano, Francesco (Scuola Superiore Meridionale)

Between the 17th and 19th centuries, the need to complete their classical education led numerous scions of the European aristocracies to investigate little-known or partially unexplored lands. Among the European intellectuals eager to satisfy their desire for discovery through direct observation of landscapes and monuments was Jean-Pierre Houël who, having reached Sicily in 1776, stayed there for approximately four years. During his stay, he spent a short period on the Aeolian Islands. He kept a diary to note down his itineraries and his impressions of the archipelago, as for the rest of his journey. Back in France, he engraved his pictures and published *Voyage pittoresque des îles de Sicile, de Malte et de Lipari*. The twelve plates dedicated to the Aeolian archipelago frame his work in the artistic current defined by Giuliano Briganti as "vedutismo dei pittori viaggianti", in which the study of landscapes and natural phenomena is combined with that of surviving antiquities. Houël repeatedly depicted the craters of Vulcano, Vulcanello, and Stromboli, surrounded by bucolic scenes or the rough sea. In Salina and Lipari, it represents some monuments of considerable historical value that are no longer visible, enriching them with vivid textual descriptions. The engravings depicting archaeological remains not only help to preserve memories of structures that have almost completely disappeared but also to reconstruct portions of the surrounding ancient landscape when cross-referenced with archaeological data and topographical reconnaissance. This reconstruction is also supported by the artist's travel notes, which, as evidence of the 18th century, provide information now lost.

5 TOUR À TOUR. THE CHANGING IMAGE OF RAVENNA THROUGH THE DRAWINGS OF CULTURED TRAVELLERS

Emaldi, Elisa (Museo Nazionale di Ravenna - Ministero della Cultura) - Novara, Paola (Museo Nazionale di Ravenna - Ministero della Cultura)

Ravenna represents an anomaly in the panorama of Italian Grand Tour cities. Over the centuries the perception and importance attributed to its heritage changed: some recurring elements in the descriptions of Romantic tourists, notably the mosaics decorating the interiors of late antique monuments, were almost ignored by visitors of the century of the Grand Tour. During the 18th century and part of following century, the primary interest was in the Roman architectural and sculptural heritage, understood as classical, in historical and epigraphic evidence, or "whatever appeared curious and worth drawing", i.e. the most spectacular features of late antique buildings, such as the monolith covering the mausoleum of Theodoric or the dome of the church of St. Vitale, made of clay pipes. With the growing interest in post-classical monuments and works of art, fuelled by factors such as the take-off of academic Byzantine studies and the 'train revolution', the traveller's eye is drawn deeply towards mosaic art, in a trend that still influences modern tourists' perceptions.

The selection of sketches offers the possibility of analysing the travel drawing as a means of approaching knowledge: an essential action not to fix memory or experience, but to complete the study and provide first-hand documentation.

Thus, to give a few examples, in the 18th century Robert Adam and Charles Louis Clérissseau sketched the monuments of Theodoric, while John Talman recorded 'liturgical treasures' that would be lost with the suppression of the monasteries, while in the 19th century Johann Anton Ramboux reproduced mosaics from life to augment his *Museum* and John Ruskin wished to draw "every bit of St. Mark's and Ravenna". Antiquarians, connoisseurs, pensionnaires or art enthusiasts, over a period of almost two centuries, confirm the written sources and reveal interesting aspects of the changing perception of Ravenna's millenary heritage.

6 UNDER THE GUIDANCE OF GEROG ZOEGA. THE EXPERIENCE OF RUINS AT THE DAWN OF ARCHAEOLOGICAL SCIENCE

Cabula, Gianluca (Tor Vergata University of Rome)

A number of manuscripts preserved in the National Library in Copenhagen, together with many letters from his public and private correspondence, enlighten us about George Zoega's role as a special guide for grandtourists and scholars visiting Rome and its surroundings in the late 18th and early 19th century. These people were not only his Danish compatriots, towards whom Zoega had duties of protection and assistance due to a public office, but a vast social and intellectual network that gravitated around the famous antiquarian and for whom the knowledge of Roman monuments was formed under his suggestive guidance. Particularly intense were the exchanges between Zoega and Wilhelm von Humboldt, who was involved in the archaeologist's habitual surveys around Rome. In particular, one of Zoega's rare manuscripts in German, informs us of the accuracy of a tentative mapping of the territory on the slopes of the Alban hills. While this was certainly a sign of an increasingly scientific approach to the study of topography, the experience of ruins remained ambiguous, in the fear that erudition could be at the expense of imagination.

7 FRANZ I. OF AUSTRIA AND HIS JOURNEY THROUGH ITALY 1819 – AN IMPERIAL GRAND TOUR?

Ertl, Claudia (Universalmuseum Joanneum) - Modl, Daniel (Universalmuseum Joanneum)

Looking back over a long tradition of imperial family members traveling to Italy incognito and visiting the traditional sites of the Grand Tour, it was undoubtedly more difficult for the ruling Austrian Emperor Franz I. (1768-1835) to leave his government business behind and spend almost six months doing something considered mandatory for a young nobleman since the 17th century. So, some official duties and bilateral talks with the Pope in Rome were scheduled into the travel itinerary, together with pleasures such as listening to several operas and being present at archaeological excavations, e.g. in Cumae and Pompeii. Next to official court records, this journey is exceptionally well documented by the emperor himself in his personal diaries from 1819. Day by day one can follow Franz I. and his intense sightseeing program in cities like Venice, Florence, Rome or Naples. The emperor was well prepared, having read numerous guidebooks ahead of the journey, but he also had his own personal tour guide, the director of the coin and antiquity cabinet in Vienna, Anton Steinbüchel von Rheinwall (1790-1883). The journey as well as ancient monuments were illustrated in several sketchbooks by the Austrian artist Thomas Benedetti (1797-1863), who accompanied the travel party. In combination, text and illustration do not only display an extraordinary look at the beginnings of archaeology as a science, but also show Franz's personal interest in ancient monuments and antiquities and are therefore unique records.

8 POMPEIAN NARCISSUS IN CENTRAL EUROPEAN COLLECTIONS: COPIES OF ANCIENT ANTIQUITIES AND ARCHAEOLOGICAL AUTHENTICITY IN THE 19TH CENTURY COLLECTORS' MARKET

Petreková, Eliška (Masaryk university)

When the bronze statue of Narcissus was discovered in Pompeii in 1862, excavations near Naples were no longer a novelty. Nevertheless, copies of this specific statue are found in many noble residences in Central Europe. The interest in Southern Italy had never completely waned, the tradition of the Grand Tour persisted and with the expansion of the railway, it became easily accessible. Moreover, during this time, the antiquity market opened up to numerous tourists and collectors. Previously, antiquities were restricted to the chosen few; the King claimed ownership of finds and was reluctant to share discoveries and knowledge. The strict rules and prohibitions, however, gradually loosened over time. In the 1840s, the king allowed selected workshops to create precise copies for wealthy patrons. Prestigious Fonderia Chiurazzi, in collaboration with the Royal Museum, produced over 1000 plaster casts, which were later used to create archaeologically accurate and precise copies, including surface treatment to imitate ancient patina.

The discovery of the Pompeian Narcissus itself occurred at a very opportune time. In the 1860s the Royal Bourbon Museum transformed into the National Archaeological Museum, and the exclusive right to produce copies shifted to unrestricted permission for any artist interested in creating their reproductions. This resulted in a massive boom in foundries and workshops, offering affordable copies of discovered antiquities. However, not all artists aimed for archaeologically accurate reproductions; they altered size, and surface, and added embellishments to appeal to a new type of customer. These often sought not an archaeologically precise citation of the ancient original but an idealized and affordable replica.

Several versions of the Narcissus statue found in Central European noble collections will be presented, showcasing the diverse practices of Neapolitan workshops in the second half of the 19th century, considering the level of authenticity and the pursuit of archaeological precision.

9 "I DON'T UNDERSTAND HOW THE GENTLEMEN OF MY COUNTRY DON'T COME TO ROME..." THE GRAND TOUR TRADITION IN SPAIN

Sánchez, Jorge (Universidad Complutense)

The aim of this conference is to question the cliché concerning the lack of interest of the Spanish aristocracy in carrying out formative European travel, especially in Italy, between the 18th and 19th centuries. The paper will explain the reasons why the literature has traditionally ruled out the existence of a Spanish Grand Tour of Europe, including: the diversity of the fields of research to which the specialists who have undertaken these studies belong; the lack of research in Spanish archives, which has meant that many of these journeys are still in manuscript form; the confusion between the different variants of travel to Italy (artistic trips, scholarly trips, etc.); in quantitative terms, the evident lack of a collecting tradition similar to that of other European contemporaries (of Roman artefacts preserved in Italy); and the very late edition or publication of diaries, correspondence and travellers' accounts, as well as the poor publishing success of some of these writings.

This conference will not, of course, provide a detailed analysis of any specific Grand Tour of Spanish nobles. But we will try to provide a "catalogue" (also still non-existent in the Spanish bibliography) of some of the individuals who started their European Grand Tour; we will take a look at this cosmopolitan custom from a gender perspective; and

we will also provide some useful sources for the further research, in order to encourage the interested public to delve deeper into this field.

10 THE GRAND TOUR, THE FRENCH WRITER FERDINAND DENIS (1798-1890) AND THE DEFINITION OF A PORTUGUESE ARTISTIC IDENTITY

Rodrigues, Paulo (University of Evora; CHAIA - Centre For Art History and Artistic Research)

Between the end of the 18th century and the beginning of the following century, Portugal was one of the frequent destinations of the Grand Tour. Consequently, it was also the protagonist of the literary descriptions of these journeys, in which the authors emphasised the aspects that had been worthy of their attention and that they considered to be of interest to their readers. These aspects consisted of the most distinctive and original features of the territory described, those that were the most picturesque and exotic in relation to the places of origin of the authors, usually those associated with landscape, climate, ways of life, social and cultural practices, the past and the arts. The arts and, in particular, architectural monuments, were seen as having the ability to demonstrate how local populations had related, over time, to the space they inhabited. The uniqueness of their history and the specificities of their geography found plastic expression in artistic and architectural forms. With regard to Portugal, the travelling writers focused mainly on medieval art, especially Gothic and late Gothic art (14th-16th centuries), to demonstrate how the configuration of objects and buildings created in these artistic periods manifested the particularities of the country's history, namely the Muslim presence on the Iberian Peninsula (8th-15th centuries) and the contacts with non-European cultures resulting from the overseas expansion of the 15th and 16th centuries, endowing it with a marked artistic identity. Focusing on the figure of the French literary scholar, writer and historian Ferdinand Denis (1798-1890), the trip he made to Portugal around 1820-1823 and the book that resulted from it (*Le Portugal Pictoresque*, 1846), we intend to demonstrate how the impressions of the Grand Tour travellers contributed to the definition of a Portuguese artistic identity, anticipating factors and characteristics later formalised theoretically by historians and archaeologists.

11 JOURNEYS OF ENLIGHTENMENT: EXPLORING ARCHAEOLOGICAL PERSPECTIVES THROUGH THE 19TH-CENTURY DIARIES OF MARIA CONSTANÇA DA CÂMARA, MARCHIONESS OF FRONTEIRA

Urbano, Pedro (IHC - NOVA FCSH / IN2PAST) - Martins, Ana Cristina (IHC - UÉ / IN2PAST)

Maria Constança da Câmara (1801-1860), Marchioness of Fronteira by marriage, was a Portuguese aristocrat who left us one of the few known examples of Portuguese nineteenth-century diaries written by women. Written between 1826 and 1842, it covers the Portuguese and European revolutionary periods. The couple's attachment to constitutional ideas led to their forced exile between 1823-1826 and 1829-1833, during which time they travelled around Europe, in territories now belonging to the United Kingdom, France, Switzerland, Austria, Germany and Italy.

Although these journeys did not formally constitute a Grand Tour, as they were usually undertaken by unmarried men up to the age of 21, they nevertheless have some similarities. In addition to the social origins of those involved, the trips of the marquises of Fronteira, apart from the usual socialising with other members of the international aristocracy - dinners, soirées, attending the opera houses - included various visits to places of heritage, artistic, scientific, and archaeological interest, such as palaces, churches, museums, and factories. The contact with new realities and the visits to these places are, like other forms of sociability, a characteristic element of the European aristocracy, as a social group, regardless of their geographical origin, especially at a time when there was an intense migratory flow caused by political instability in many of the southern European kingdoms. Analysing these visits to museums and other places of heritage interest, allows us to deepen our knowledge of various subjects in non-formal educational contexts and permitting us to see the existence of the production and reproduction of a transnational aesthetic and shared cultural and artistic consumption.

12 GRAND TOURS IN REVERSE: ANTIQUITIES TOURISM IN GREEK SATIRICAL FICTION OF THE 1840S

Jotischky, Christopher (Brown University)

Discussion of the Grand Tour has focused on Western Europeans travelling south and east to Italy and Greece. But what of the inhabitants of these so-called ancient lands themselves? The unfinished novel *Xouth the Ape* (Ο πίθηκος Ξουθ, 1848) by Iakovos Pitsipios (c.1800-1869) turns this situation on its head. Although the novel's treatment of the attempts of Greek high society to adopt a Western European habitus (Yagou 2009) and the resulting instability of Greek identity this creates (O'Neill 2003) have been documented, its attitudes towards the museumification of Greek antiquity within Greece inspired by the activities of Grand Tourists collecting ancient artefacts have yet to be examined in full.

Pitsipios satirizes nouveau riche Greek society in the early years of independence, with one character travelling to Egypt and desecrating its ancient monuments, just as Grand Tourists had treated the physical remnants of Greek antiquity. The central figure, Kallistratos, stoops to the point of collecting forged Greek antiquities such as 'Homer's eyeglasses' or 'Perikles' tobacco pouch' purchased in Paris, fashioning a private museum Pitsipios implicitly contrasts with the Western-style public museums which were being created throughout Greece for the scientific display of antiquities. This aping of Western Grand Tourism is contrasted with the fate of the real-life Prussian travel writer JLS Bartholdy, who has in the novel been transformed into the eponymous ape several years after penning a mendacious account of his journey to Greece.

Pitsipios cautions that homegrown Greek understandings of antiquity are being effaced through an over-reliance on the greater scientific standards reached in Western philology, with Modern Greeks losing their national identity by attempting to perform a Western ideal of Ancient Greece. He thus asks vital questions provoked by Grand Tourist activities about the ownership of classical antiquity and how Greeks can best embody their heritage.

452 COASTAL TECHNOLOGY AMONG STONE AGE HUNTER-GATHERERS AND EARLY AGROPASTORAL COMMUNITIES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Calvo-Gómez, Jorge (CNRS - University of Rennes) - Schülke, Almut (Museum of Cultural History - University of Oslo) - Berg-Hansen, Inger (Museum of Cultural History - University of Oslo) - Macane, Aija (Latvian History Institute - University of Latvia)

Session format: Regular session

During the Early Holocene period, coastal environments were occupied and exploited by human groups, both hunter-fisher-gatherers as well as the first agropastoral communities. Much of the previous research in these contexts has been based on a theoretical perspective from which human technology and tools would have been fundamental actors in the exploitation of coastal and marine resources. For example, fishing, collecting seafood, hunting marine mammals, or navigating along the seashore are some of the activities developed by coastal human groups that would have required specific techniques and knowledge. However, to understand the lifeways of the coastal prehistoric groups, many technological perspectives still need to be explored. Can we identify technological features specific to the coast and the exploitation of coastal and marine resources in the archaeological record? Are the tools produced or used differently in the coastal areas compared to those in inland environments? To what extent can we consider these technological features as a socialized perception of the coastal environment? We invite contributors to present theoretical and methodological perspectives to the study of the coastal techniques, as well as new study cases, including contributions comprising technological, functional, or raw material studies of Mesolithic and Neolithic coastal groups.

ABSTRACTS

1 THE CHAÎNE OPÉRAIRE OF THE SOAPSTONE 'COFFEE BEAN' SINKERS OF STONE AGE NORWAY

Adegeest, Mette (University of Stavanger) - Radchenko, Symon (University of Stavanger)

In the Norwegian Late Mesolithic and (pre-agriculture) Early Neolithic, the stable and abundant supplies of fish were a vital food source and probably played a role in the development of semi-sedentary settlements. Fishing equipment must have played an important role in the hunter-fisher-gatherer societies of this time, but not all fishing technology has received much archaeological attention. Soapstone 'coffee bean' sinkers in particular have gone underappreciated. These small, sometimes decorated, soapstone sinkers are a common find along the West-Norwegian coast and are presumed to have been used in line fishing during the Late Mesolithic and Early Neolithic. Previous studies have investigated their distribution and forms, but little attention has been paid so far to the technology of their manufacture or use. This paper will focus on the chaîne opératoire of making these sinkers. I will present the preliminary results of actualistic experiments with crafting and ornamenting sinkers and of provenance studies to gain insights into raw material acquisition. I will further discuss the traceology study we are currently carrying out to build on the experiment results. This study utilizes Structure from Motion photogrammetry as a flexible and controllable technological solution for the highly detailed image-based 3D-modeling of the experimental replicas as well as original sinkers with submillimetre accuracy, to document and compare the traces left by different tools and to reveal techniques and peculiarities of the manufacturing process.

2 TRACKING MESOLITHIC MOBILITY IN SOUTH SCANDINAVIA: LITHIC TECHNOLOGY AND ISOTOPIC PROVENANCING OF FAUNAL REMAINS FROM NORJE SUNNANSUND AND LJUNGAVIKEN, SWEDEN

Kjallquist, Mathilda (Lund University)

The extent of regional and local mobility among hunter-fisher-gatherers during the Mesolithic period in Scandinavia has long been a source of scientific discussion. In recent years, methods like $^{87}\text{Sr}/^{86}\text{Sr}$ isotope analysis have widened the knowledge of mobility in the past. However, only a few studies have been able to elucidate details, and few studies have been done on faunal remains to explore the provenance of prey and thereby draw more precise conclusions about human mobility patterns. In this multidisciplinary study, two different approaches were combined to investigate local and regional mobility and social contact networks. We analyzed strontium isotopes in animal teeth as well as lithic technological traits and regional lithic raw material use from two coastal Swedish Mesolithic sites, Norje Sunnansund (7000 cal. BC) and Ljungaviken (6500 cal. BC). The detailed strontium isotope analyses were performed using laser ablation-multi-collector-inductively coupled plasma mass spectrometry. In combination with an extended baseline for the region, probable areas of origin for a range of terrestrial and marine fauna were identified. The lithic raw material choices and technological traditions from the sites had many similarities, but with some interesting variations that may further contribute to a more nuanced picture of local and regional Mesolithic mobility during the period. The study contributes to the understanding of Mesolithic mobility and emphasizes the dynamics between technological choices, social networks and resource utilization among hunter-fisher-gatherers.

3 IS THE TECHNOLOGICAL (AND SOCIAL) ORGANIZATION IN EARLY MESOLITHIC NORWAY REALLY UNIFORM, IF WE BREAK IT DOWN, LITTLE BY LITTLE?

Dugstad, Sigrid (Museum of Archaeology, University of Stavanger) - Eigeland, Lotte (Museum of Archaeology, University of Stavanger)

It is generally agreed that the archaeological record from the Early Mesolithic period in Norway is rather uniform, and it is securely placed on the microscale level. The settlement pattern is highly mobile, and each site reflects single core families or task groups. The proposed uniformity is especially visible when comparing lithic assemblages and distribution patterns from different sites. They often have a similar size and composition, but the similarities between the sites are first of all reflected in a selected set of artefacts: blades, cores and tools. Other artefacts, such as flakes and fragments, are rarely studied in any detail, only sorted and counted. However, how similar are activities at different sites when inspected through a meticulously detailed technological analysis? Can we also get a glimpse of demographic diversity by identifying individual knappers? If we dig deep, will uniformity prevail?

The Early Mesolithic people were predominantly coastal hunter-gatherers-fishers. However, settlement sites in the mountains also provide evidence of seasonal exploitation of other ecozones. In this paper the results from a study of lithic assemblages from three mountain and two coastal sites in southwestern Norway will be presented. The selection of sites provide ground to detect differences in strategies when it comes to technology, group composition and demography. An important aim is to demonstrate the potential in assessing the entire lithic material - what do this really consist of and why, and are there differences between coastal and mountain sites?

4 TO THE QUESTION OF THE GENESIS OF THE NEOLITHIC COMPLEXES OF THE NORTHERN ARAL SEA REGION

Rakhimzhanova, Saule (Margulan Institute of Archaeology, Kazakhstan) - Aminova, Rimma (Margulan Institute of Archaeology, Kazakhstan)

The archaeological sites of the Northern Aral Sea had an episodic researches and the question of the cultural and chronological affiliation of the materials remains open to this day.

In 2021-2022, the Aral Expedition, led by A. Ongar, conducted archaeological reconnaissance, during which the settlements of Akespe 4, Kosaman, Kulandy 1-2, and Saksaulskaya 1, located in the Aral District of the Kyzylorda Region, were re-surveyed. A total of 185 artifacts were studied.

In collections attributed to the Neolithic era, two groups distinguished by raw materials have been identified: one is made of flint of various colors, rarely chalcedony and translucent quartzite, while the other consists entirely of products made from transparent quartzite. Dating markers in the collection among tools include horned and symmetrical trapezoids, symmetrical and asymmetrical points on blades, chisels, and serrated tools, which correspond to the Daryasay stage of the Kelteminar archaeological culture of the Akchadaryin Delta (6th millennium BC) (Brunet, 2014, pp. 39-40). Leaf-shaped arrowheads with notches at the bases and willow-leaf arrowheads with straight bases, inserts, asymmetrical points on medial blades, processed with abrupt retouch, find their analogies in the Oyukly archaeological culture of the Mangyshlak Peninsula (Astafyev, 2014). Thus, the genesis of this artifact complex is linked to components of two cultures - Kelteminar and Oyukly - which coexisted synchronously at these sites.

Another complex from the Neolithic era, represented by artifacts made of translucent coarse-grained quartzite, differs in size and the character of retouching on blade-like flakes. Because of this, we hypothesize that it is either an indigenous local population group (since sources of this raw material are present in the region), or an adaptation of incoming populations to new local resources. The tool assemblage of these two population groups is similar. The functionality of the tools was confirmed through traceological analysis.

5 FUNCTIONAL ANALYSIS OF THE MACRO-TOOLS OF THE LATE MESOLITHIC SHELL MIDDEN SITES IN MORBIHAN (BRITTANY)

Dehurtevent, Alexanne (CReAAH)

The macro-tools discovered in a coastal context provide an insight into raw material supply strategies and the activities carried out, helping to interpret the type and duration of occupation of a site. A technological study integrating a first level of functional analysis was carried out on the macro-lithic corpus of the three Second Mesolithic sites of Beg-er-Vil (Quiberon), Port-Neuf (Hoedic) and Téviéc (Saint-Pierre-de-Quiberon), all three located on the Morbihan coast (France). Our goal was to understand the functionality of these tools through the analysis of use-wear traces and to be able to integrate them into fields of activity. The sites established on the seashore, in comparison with continental sites, have a greater diversity of raw materials, particularly on the Armorican coast, and a diversity of pebble morphologies allowing a reduction in the technical investment to obtain blanks for the purpose of its use.

We have twelve types of tools, the majority of which were used in thrusting percussion, such as the different sub-types of percussion tools, cutting tools and bevelled pebbles. We also have resting percussion with abraders and smoothers, indirect percussion with intermediate pieces, thrusting and resting percussion with pestles and tools that function without percussion such as weights and discs. These tools were used in various activities, the traces of which are imperceptible to us today, such as food preparation activities or the working of animal materials. From the different activities recorded at each site, a dichotomy emerged between the macro-tool assemblages, showing a certain divergence in the mode of occupation of the sites, whereas the results provided by other fields of expertise would rather indicate a similarity in their mode of occupation.

6 TECHNICAL SYSTEMS OF MESOLITHIC COASTAL GROUPS AROUND THE BAY OF BISCAY: A FUNCTIONAL APPROACH THROUGH USE-WEAR ANALYSIS ON KNAPPED TOOLS

Calvo-Gómez, Jorge (University of Rennes - CNRS) - Cuenca-Solana, David (Instituto Internacional de Investigaciones Prehistóricas de Cantabria - Universidad de Cantabria) - Gutiérrez-Zugasti, Igor (Instituto Internacional de Investigaciones Prehistóricas de Cantabria - Universidad de Cantabria) - Marchand, Grégor (University of Rennes - CNRS)

The occupation and exploitation of the coastal environments by human populations has been long time discussed by the archaeologist as a process in which the technology would have played a major role. While many Holocene contexts along the Atlantic European seashores have delivered data related to the exploitation of marine resources, the functioning of the technological system remains rather poorly understood. Around the Bay of Biscay, in the shell middens of Brittany (France) and Asturias (Spain) the production of knapped tools is part of the technical standards of the Mesolithic. While these traditions in lithic knapping are not restricted exclusively to marine environments, the function and functioning of tools could reflect technical traditions specific to these coastal contexts. In this work we have sought to deepen the characterisation of the technical system of coastal populations through the functional study of the knapped tools from three shell middens from Brittany (Beg-er-Vil, Téviéc and Port-Neuf) and two from Asturias (El Mazo and El Toral III). The final objective is to address the question of a potential specificity of techniques in the coastal sphere. The study of the use-wears revealed that there is a certain functional consistency in both study regions. However, the functioning of the identified tools cannot be undeniably associated to specifically coastal techniques. In some cases, the functioning of the tools arises from technical traditions known at a supra-regional scale, transversal to various geographical areas, both terrestrial and coastal. On the other hand, the use of certain tools could respond to specific technical choices, but which seem to respond to essentially cultural realities.

7 TECHNOLOGICAL DEVELOPMENTS IN THE LATE MESOLITHIC AND NEOLITHIC WETLANDS OF THE RHINE MEUSE DELTA: A VIEW FROM THE MICROSCOPE

van Gijn, Annelou (Faculty of Archaeology, Leiden University) - van den Dikkenberg, Lasse (Faculty of Archaeology, Leiden University) - Verbaas, Annemieke (Faculty of Archaeology, Leiden University)

In the last decades a number of sites have been excavated that provide a glimpse of daily life in the Rhine/Meuse delta of the coastal western Netherlands. People lived on river levees and coastal dunes, but were always, to various extent, within the influence of the sea. These sites date from the Late Mesolithic (the Hardinxveld-Giessendam sites) to the Late Neolithic Vlaardingen culture (e.g. Hekelingen, Den Haag-Steynhof), encompassing a period of c. 3000 years

of intermittent occupation of this wetland area. Usewear studies were done for many of these sites, including not only the flint implements, but also tools made of bone, antler, and non-flakeable stone, enabling us to reconstruct the toolkits for various activities. In all of these sites a variety of craft activities was carried out, from woodworking, hide working, making bone and antler tools, to making ornaments. We also have found evidence for various subsistence activities, such as fishing. Which activities were carried out, and which kind of tools were selected for these tasks, varies somewhat between the various sites. We will discuss these differences, and relate them to other lines of evidence as well as to their specific landscape setting. Last, we will address the issue of a possible continuation of Mesolithic lifeways into the Neolithic of the coastal Netherlands, especially in the light of recent evidence from the analysis of Late Neolithic Vlaardingen tools (www.puttinglife.com).

8 TEETH AS TECHNICAL TOOLS? ANALYSING DENTAL WEAR AS AN INDICATOR OF SUBSISTENCE-RELATED ACTIVITIES IN ISLAND INHABITANTS FROM NEOLITHIC NORTHERN GERMANY

Boensch, Victoria-Luise (Kiel University) - Jantzen, Detlef (State Agency for Heritage Service of Mecklenburg-Vorpommern, Schwerin, Germany) - Fuchs, Katharina (Institute of Clinical Molecular Biology, Kiel University, Germany)

The use of one's own teeth as tools in performing daily tasks is a well-documented practice in ethnological and osteoarchaeological studies. It can be recognised both macroscopically and microscopically by microfractures and dental modifications that are indicative of certain activities, such as chipping, interproximal grooves, or occlusal notches. Chipping and occlusal notches have been observed to be a possible indication for fishing-related activities due to their increased occurrence in coastal communities and their potential role in processing fibres e.g., for net-making.

The excellently preserved flat grave cemetery on the island of Ostorf-Tannenwerder in Lake Ostorf near the north-eastern German coast has been subject to one of the first tooth-tool use case studies in Germany. The cemetery had its main period of use in the Middle Neolithic from c. 3200 to 2900 BC but exhibits grave goods and anthropological findings that hint to a lifestyle more akin to that of Mesolithic hunter-fisher-gatherers than that of early agriculturalists. Isotope studies have shown that the Ostorf people consumed a high proportion of fish, but tools that could have been used for fishing are significantly underrepresented among the cemetery's grave goods.

Following a macro- and microscopic assessment for identifying and recording dental modifications related to the habitual use of teeth, we could gain important insight into this population's activities and social organisation against the background of their aquatic environment. Furthermore, we offer an alternative approach to detect the possible presence and use of technologies related to fishing activities in the archaeological record of Ostorf-Tannenwerder.

460 ALTERNATIVE PATHS TO COMPLEXITY: NEW PERSPECTIVES ON LATE BRONZE AGE AND IRON AGE CENTRALISATION IN THE MEDITERRANEAN

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: de Vos, Marcello (Sapienza University of Rome; University of Groningen) - Zamboni, Lorenzo (University of Milan) - Attema, Peter (University of Groningen) - Monti, Dario (Université catholique de Louvain) - Scarsella, Elena (University of Cambridge)

Session format: Regular session

The Late Bronze Age and Iron Age Mediterranean (ca.1300-500BCE) saw the transformation of society from small, loose communities into complex and organised polities. When it comes to the study of this transformation, much emphasis has been placed on concepts such as 'state' and 'urbanism'. These terms have proven difficult to define and can only be measured in relative terms. Recent research has shown that in many cases the trajectory toward more complex societies is not linear and that many variations occur in different landscapes. A universal definition of the term "urbanisation" is therefore difficult to formulate and misses the opportunity to explore intermediate and alternative phenomena, such as the emergence of other nucleated centres and the challenges posed by fragmented landscapes, such as mountainous areas or wetlands. This session aims to step away from state and urbanism as fixed concepts and ultimate societal models. It rather approaches society's pathway to complexity as a multi-linear process, the diverse character whereof reflects an adaptive strategy to environmental and historical necessities.

This session welcomes papers that take a different approach to increasing complexity in the Late Bronze Age and Iron Age Mediterranean, including non-linear perspectives, such as deurbanisation, and alternative forms of nucleated agglomerations.

1 THE ARCHAEOLOGY FROM THE BIRD'S EYE VIEW. THE TRANSITIONS IN SETTLEMENT PATTERNS BETWEEN BRONZE AGE, IRON AGE IN CENTRAL ANATOLIA

Hordecki, Jędrzej (Polish Academy of Science)

The history of the Bronze Age, Iron Age Anatolia is often seen from a historical viewpoint. The main narrative is based on historical sources and excavations conducted in the major administrative centers. This presents an intriguing but fairly one-dimensional perspective with well-defined political actors. However, archaeological research offers more insights than excavation alone.

Hundreds of sites in Central Anatolia have been identified as a result of archaeological investigations done over the previous forty years. They provide a major opportunity for the study of the Bronze Age and Iron Age transitions. The emergence and decay of settlements can be observed using an archaeological technique rather than a historical one.

The transitions encompassing the emergence and decline of archaeological sites will be examined through the prism of two primary perspectives: the decline of Bronze Age states and the advent of the inaugural Iron Age states within the region, both of which have significantly influenced these changes. This paper will explore the natural factors that have impacted settlement configurations during this period. Nonetheless, while the people responsible for these settlements remain elusive, their decisions resonate through the shape of the settlement.

The research outlined in this paper aims to redirect focus towards the analysis of settlement patterns during the Iron Age and Late Bronze Age. The principal objective is to delineate the evolving dynamics of settlements, which served as catalysts for the emergence of embryonic states.

As a result, we may track changes in settlement localization, geographical differentiation, and the level of organization and grouping rather than the political entities standing behind them. This perspective reveals an unknown picture of Central Anatolia's relatively undiscovered archaeological region.

2 COLONIAL ENCOUNTERS: GREEK ARCHAIC SETTLEMENTS AND ECO-CULTURAL ADAPTATION IN THE WESTERN BLACK SEA

Bivolaru, Alexandra (Ca'Foscari University)

This paper focuses on Greek colonization (7th-5th c. BC) along the western Black Sea coast, examining the interaction between colonists and the colonised environments. The newly founded settlements adapted to local conditions, which differed significantly in climate and environment from Anatolia, where the mother-city was located, leading to the development of distinct landscapes through land management practices. In the construction of these settlements, both agrarian territory (chora) and harbors played pivotal roles, influencing land use patterns, the movement of goods and people, and the distribution of terrestrial infrastructure. However, efforts to comprehensively integrate traditionally separately studied contexts (such as paleo-environment, harbors, roads, and hinterland) for examining the occupation and structuring of ancient colonial territories in the Black Sea region have been limited. This study seeks to address questions such as the dimensions of the chorai and how settlement structures adjusted to local environmental conditions and ergonomic limitations. Furthermore, it investigates whether the distinctive steppe-wetland landscape of the western Black Sea, coupled with the impact of land cadasters and the influence of export trade, led to the development of a distinct communication system and settlement pattern. Lastly, we shall ask the question of interactions with autochthonous communities. These Greek settlements played a pivotal role as centres of commerce and connectivity, fostering trade networks and facilitating interactions between the Greek settlers and local Getae communities. This brings to fore the question of Greek colonies of the western Black sea shore undergoing a process of assimilation between local environments, Getae customs and Greek traditions in the construction of their communities.

3 ANOTHER LOOK AT MYCENAEAN DIMINI: ALTERNATIVE CENTRALISATION IN LATE BRONZE AGE COASTAL THESSALY

Zeman, Piotr (Institute of Archaeology and Ethnology of the Polish Academy of Sciences) - Lis, Bartłomiej (Institute of Archaeology and Ethnology of the Polish Academy of Sciences)

The paper focuses on the site of Dimini, located in coastal part of Thessaly. During the Late Bronze Age (LBA), this region was subject to a process of Mycenaeanisation, so the gradual adoption and adaptation of various Mycenaean cultural markers. Dimini started to show presence of Mycenaean characteristics already during 15th c. BC, together with two other important local centers – sites of Kastro/Palaia (Volos) and Pefkakia, which testify to the contacts of the local communities with the elites of central and southern Greece. However, the historical trajectory of the development of LBA Thessaly did not follow that of the inherently Mycenaean regions, where during the 14th c. BC the

emergence of palatial centers led to the formation of urbanized and strictly hierarchical settlement networks. Instead, all the main settlements of the region co-existed during this period, experiencing recognizable phases of development and decline which may suggest shifts of power. Both a heterarchical model of cooperation and competition, and a model of a nucleated agglomeration were proposed in the literature as interpretations of this regional network not fitting the patterns recognized elsewhere. Moreover, even though it seems that there was a proper Mycenaean palace at the site of Kastro/Palaia, it is clear that Dimini, located only 3 km away and clearly a center of major regional importance, developed differently. During this period Dimini formed a large open settlement, organized along a central road and centered on an administrative and ritual complex of quasi-palatial nature, separated from the rest of the settlement only by a formal propylon. The paper gathers data from the excavated parts of the site, in an attempt to reinterpret it as a unique example of an alternative, local form of a Mycenaean urbanized settlement and seeks to understand its position in the regional settlement network.

4 INTEGRATING EVIDENCE: AN HOLISTIC SYSTEMS APPROACH TO CENTRALIZATION IN CENTRAL ITALY

de Vos, Marcello (Sapienza University of Rome; University of Groningen)

The process of centralization in Central Italy is a rapid transformation that must have greatly impacted society. In the past, many studies have been dedicated to this subject, mostly from economic and regional perspectives that focus on the long term development of urban centers. Although we gained great insights from such approaches, it is susceptible to teleological biases and tends to overemphasize the role of the economy. When considering centralization as the turning point that leads up to urbanism, the complex and multifaceted nature of the process is overlooked. Furthermore, the focus on economic development, often inspired on Marxist theory, tends to neglect that such crucial transformations involve and impact all domains of society including the social and cultural. To gain a better understanding of this phenomenon, therefore, it is necessary to take centralization as the focal point without the evolutionary connotation of urbanization and to incorporate all aspects of society. In this paper, a new conceptual social systems framework will be presented that will serve to do so. This framework is based on the action systems approach developed by sociologist Talcott Parsons. Contrary to conventional archaeological applications of systems theory, this framework does not consist of a top-down differentiation model, but rather of a bidirectional cybernetic order of subsystems that encompass the different environments of social action and their relations. This framework allows to integrate archaeological evidence relating to various domains of society and takes into account the influence of the landscape. Finally, the cybernetic orders provide directions that help to understand how change, in this case centralization in Central Italy, impacts society in a non-linear way.

5 THE PIEDILUCO BASIN IN THE CONTEXT OF THE GENESIS OF PROTOHISTORIC COMMUNITIES IN CENTRAL ITALY.

Zanini, Alessandro (Independent researcher) - Virili, Carlo (Department of Science of Antiquities, Sapienza University in Rome) - Jaia, Alessandro M. (Department of Science of Antiquities, Sapienza University in Rome)

The data from the research still underway on the proto-historic site of the Paduli wetland area constitute a useful starting point for a re-reading of the evidence in southern Umbria. It is difficult to perceive a unitary overview of this territory on the threshold of the first millennium B.C., the time of general definition of the structures of future historical communities, both Etruscan and Central Italic.

The central-northern part of the present region is better defined in late protohistory, both from the point of view of archaeological aspects and territorial arrangements. Further south, different dynamics must be identified and clarified that cannot yet be traced back to a unitary cultural model that seems to be innervated by Tyrrhenian models. The reading of the emergencies that have been accumulating in the Piediluco lake basin, mainly around the multi-layered site of Paduli, through researches conducted by the Sapienza University of Rome, could provide one of the possible keys to interpreting the evolution of the peopling between the Final Bronze Age and the beginning of the Iron Age. Is this the time of maximum development of the settlement lake related-system of the Velino area, capable, in a socio-economic and political framework of village communities with a tribal structure, of bringing out elites included in a network of continental and indirectly Mediterranean trade and of managing a large metallurgical production such as that represented by the Piediluco deposits with notable Tyrrhenian affinities. After the ancient phase of the Iron Age the Velino lake-related system collapsed, showing the inability to transform this cluster into proto-urban outcomes, perhaps more potentially activatable in the nearby Terni basin, which sees in PF1 the crystallisation of the great funerary area of the Acciaierie.

6 A MOUNTAIN PATH TO COMPLEXITY: THE CASE STUDY OF INNER SABINA BETWEEN THE IRON AGE AND THE ROMAN CONQUEST

Monti, Dario (Université catholique de Louvain)

Even though mountainous areas represent around 35% of Italy's national territory, they have been archaeologically under-studied over time. Although there has been a trend reversal in recent decades, especially in the Apennines this gap is still far from being bridged. Moreover, there is also a lack of recognition of the particularity of this environment, which is often evaluated based on criteria that are alien to it. This is particularly evident in relation to the phenomenon of (proto-)urbanisation. Scholars attribute a fundamental role to this process in the complexification of society on the peninsula. This perspective relies on the great complexity achieved for example by Etruscan cities as well as the pivotal role played by the city (the Urbs) par excellence, Rome, in subsequent Italian and European history. This led too often to defining the process of complexification of societies on a teleological evolutionary basis, in which the urban phenomenon is a necessary step. Because of its absence, the mountainous communities have for long time been considered as isolated, marginal, and backward. An increasing number of studies in the last decades, on the contrary, is showing instead the adaptability to local geographical contexts, the dynamism and cultural elaboration of mountain communities. In other words, their own path to complexity.

The paper wants to highlight these latter characteristics through the case study of Nursia territory (south-eastern Umbria) between the Iron Age and the Roman conquest (290 BC). The first aim is to show the vitality of the area in pre-Roman times, through the analysis of the new data from survey research, as well as the study of unpublished material from local deposits. The second is to underline how this settlement pattern did not change even following the Roman conquest and colonisation of the territory, demonstrating its adaptation to the local context.

7 ALTERNATIVE PATHS TO EARLY CENTRALISATION IN NORTHERN ITALY

Zamboni, Lorenzo (University of Milan)

For several years, early urbanism in northern Italy has been an underrated phenomenon, often viewed through antiquated cultural-historical mechanisms of colonisation and acculturation from supposedly more advanced Mediterranean civilisations. However, recent fieldwork and polythetic studies have revealed evidence for early and potentially independent nucleation processes in the regions south of the Alps. This led to a significant expansion of our understanding of site agglomerations in the study area, including potential cases of instability, ephemerality, low-density population, and seasonality.

Yet, I argue in this paper that previous archaeological studies have placed excessive emphasis on the elites and the exchange of prestige goods, overemphasizing the role of coercive authorities who alone promoted and ruled the urbanisation process. A comparative perspective could help disentangle the simplistic equation between urbanism and pyramidal social hierarchy. By examining collective forms of cooperation, egalitarianism, and alternative strategies of wealth-sharing, a more nuanced understanding of urbanisation can be achieved.

463 METHODS OF ANALYSING SUBSISTENCE RESOURCES, LANDSCAPE MANAGEMENT AND EXPLOITATION PRACTICES BETWEEN THE BRONZE AGE AND IRON AGE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Sotgia, Agostino (RUG - University of Groningen) - Debandi, Florencia Ines (Alma Mater Studiorum - University of Bologna) - Cattani, Maurizio (Alma Mater Studiorum - University of Bologna)

Session format: Regular session

The significant demographic growth and extensive land occupation that greatly increased in Europe during the Bronze Age can be explained by a different approach to resource exploitation and, more importantly, a different organization of agricultural and animal production methods. Agriculture is one of the most comprehensive and rational forms of resource utilization within communities' landscapes. Together with pastoralism, it has always held a prominent place in historical reconstructions and archaeological analyses, both in terms of landscapes and the ancient societies that inhabited them. This is particularly true for the period between 2200 BC and 800 BC, where agro-pastoral systems played a pivotal role in the development of communities, affecting their internal socio-political dynamics and inter-community relations on a large scale. Traces of ploughing, field partitioning, possible fertilization or manuring interventions, along with crop rotation, suggest meticulous planning of agricultural production. Furthermore, effective livestock management, involving the selection of animals, the choice of grazing areas, and precise breeding strategies, should not be underestimated.

Numerous interdisciplinary studies have addressed these topics, establishing reference criteria, explaining analytical methods, and providing general reconstructions of subsistence forms. However, there have been limited opportunities for scholars to come together to clarify various hypotheses and propose common guidelines. This session is aimed

at archaeo-zoologists, archaeo-botanists, geo-archaeologists, as well as archaeologists studying the productive and subsistence processes of ancient communities. The goal is to understand how to approach the analysis of archaeological data related to agricultural and livestock resources, stay updated on archaeological contexts where traces of agricultural landscapes are discernible, and delve into the scientific aspects related to the results of micro-archaeological analyses of ancient agro-pastoral contexts. In this way, we can develop a common "toolbox" necessary to address this important and fascinating theme.

ABSTRACTS

1 "A PLACE IS ALWAYS THE PLACE OF SOMETHING": EXPLORING HUMAN-ENVIRONMENT INTERACTIONS THROUGH MAXENT-BASED MODELLING

Lucci, Enrico (University of Bari - DIRIUM; Istituto Italiano di Preistoria e Protostoria)

The mutual influence between the physical components of the environment and human activities was the core of the process that led to the emergence of places within the landscape for prehistoric communities. On this matter, agricultural and pastoral practices stand out as key components of the socio-economic sphere of late prehistoric societies, shaping social organisation as well as the physical landscape of their surroundings.

An integrated approach based on the combination of archaeological, palaeoeconomic, and paleoenvironmental data represents the key way to explore the places to which prehistoric communities were tied, what type of activities they performed there, and how much such practices physically impacted on those places. Within this interdisciplinary framework, the application of state-of-the-art machine learning methods significantly enhances our capacity to integrate and explore diverse datasets, characterised by varying nature and quality.

The ModLand project, funded by the Next-Generation-EU program, aims at reconstructing the ties between people and places, unveiling their diversity across space and time, through the use of the ecoinformatic MaxEnt modelling technique. The project focuses on communities from the 3rd and 2nd millennia BCE in Southeastern Italy, where a progressive emergence of differentiated settlement patterns occurred across diverse ecological niches. This process ranged from the development of long-lasting settlements, primarily along the coast, to the persistence of small and dispersed settlements in the inland and the occurrence of seasonal sites in the uplands.

Based on specific case studies, this presentation will provide an overview of the ModLand project's methodology and key outcomes, with a particular focus on the modelling processes of locations potentially associated with agropastoral practices. Moreover, it will explore how these models enable us to reconstruct changing interactions between prehistoric communities and their surroundings.

2 NEW DATA ON BRONZE AGE CEREAL CULTIVATION FROM CENTRAL AND MARGINAL AREAS OF THE TERRAMARE TERRITORY

Carra, Marialetizia (Bologna University; ArcheoLaBio, Centro di Ricerche di Bioarcheologia) - Miari, Monica (Soprintendenza Archeologia, Belle Arti e Paesaggio per la città metropolitana di Bologna e le province di Modena, Reggio Emilia e Ferrara) - Tirabassi, James (Museo del Po di Revere (MN); Postumiae Antiquarium di Piubega (MN)) - Lamanna, Leonardo (Soprintendenza Archeologia, Belle Arti e Paesaggio per le province di Cremona, Mantova e Lodi) - Cattani, Maurizio (Dipartimento di Storia, Culture, Civiltà, Alma Mater Studiorum, Università di Bologna) - Cavazzuti, Claudio (Dipartimento di Storia, Culture, Civiltà, Alma Mater Studiorum, Università di Bologna) - Mazzieri, Paola (Soprintendenza Archeologia, Belle Arti e Paesaggio per le Province di Parma e Piacenza) - Boccuccia, Paolo (Museo delle Civiltà, Roma) - Scacchetti, Federico (AR/S Archeosistemi Società Cooperativa, Reggio Emilia) - Bonometti, Paolo (AR/S Archeosistemi Società Cooperativa, Reggio Emilia)

Cereals are one of the main food resources of the Terramare settlements of the Bronze Age. Previous archaeobotanical studies have highlighted many remains of cereals, in all the settlements examined (Santa Rosa di Poviglio, RE; Montale MO; Monte Castellaccio, BO; Pilastrini di Bondeno, FE; etc.)

This project intends to provide new data on cereal cultivation in the Terramare area through the study of new contexts, recently excavated or in progress. Standardized sampling and uniform sample processing techniques are the starting point of the analysis. Obtaining more easily comparable data is the aim of the work.

The different geographical location of the sites is a further point of interest: a central area of the Terramare space (Terramara di Pragatto, Crespellano - BO); a site closer to the area of pile-dwelling influence (Terramara della Bellanda, Gazoldo degli Ippoliti - MN); a border area with the North Western world (Rovere di Caorso - PC) and a more eastern area but with Terramare characteristics (Solarolo, Via Ordiera - RA).

The persistence of traditional Neolithic wheats (*Triticum monococcum*, *Triticum turgidum* ssp. *dicoccon*, *Triticum timopheevi* type) and their relationship with the typical innovations of the Bronze Age (significant increase of *Triticum spelta*, introduction of *Panicum miliaceum*) is one of the main focuses of the research. The statistical weight of barley

(*Hordeum vulgare*) and the possible use of other cereals (*Avena fatua/sativa*, *Secale cereale*, *Setaria* sp.) are the further elements for comparison between the sites.

Given the large quantity of samples (still being processed), the comparison between the sites is carried out by type of structure (pits, stratigraphic units near the ditches, piles of ash, etc.). A further element of discussion is given by the relationship between the different composition of the soils and the statistical weight of the various types of cereals.

3 CROP MANAGEMENT AND CORRELATES IN THE DEMOGRAPHIC BOOST OF NORTHERN ITALY IN THE BRONZE AGE

Cattani, Maurizio (University of Bologna) - Debandi, Florencia (University of Bologna)

The analysis of ancient productivity is helping to understand the process of settlement expansion and demographic increase that characterized several regions in Europe during the Bronze Age. The well-known case study of Northern Italy can be considered the best example of investigating the exploitation of resources and assess the relationships among settlements, agricultural production, water management and food transformation.

Following different approaches, the paper will propose the evaluation of crop productivity, the complete reconstruction of the operational chain of cereals management, from the sowing to food transformation, and the interaction between settlements and the correlates in the landscape and in the daily practices of Bronze age communities.

Starting with experimental cultivations, dealing with ancient climatic conditions, passing through the basic and fundamental characters of ancient cereals, a different vision of agricultural production in the Po plain emerges, confirming a unique moment in the history of mankind that made possible a cultural tradition of a strong link between the farmers' habits and the features of the landscape.

A discussion on irrigation, crop rotation, manuring, field management and crop processing, will conclude the presentation aiming at a complete reconstruction of ancient farming practices that allowed a general prosperity and food availability, presumably at the base of the population growth.

4 THE (GEO)ARCHAEOLOGICAL EXCAVATION OF THE MBA SITE OF LA MURAIOLA DI POVEGLIANO (ITALY): FROM DOMESTIC SPACE TO AGRO-PASTORAL SYSTEM

Nicosia, Cristiano (Università di Padova) - Breglia, Francesco (Università di Padova) - Dal Corso, Marta (Università di Padova) - Dalla Longa, Elisa (Istituto di Scienze del Patrimonio Culturale (ISPC) - Consiglio Nazionale delle Ricerche (CNR)) - D'Aquino, Silvia (Università di Padova) - Manfrin, Maria Sofia (Università di Milano) - Piazzalunga, Giorgio (Università di Padova) - Polisca, Federico (Università di Padova) - Putzolu, Cristiano (Alma Mater Studiorum - Università di Bologna) - Rabitti, Chiara (Alma Mater Studiorum - Università di Bologna)

The excavations at the site of La Muraiola di Povegliano Veronese (NE Italy) were part of the ERC project GEODAP (Geoarchaeology of Daily Practices). The site saw the diffusion on the Veneto plains of embanked settlements connected to active watercourses – the Terramare – that started in Middle Bronze Age 1. This diffusion was accompanied by the establishment of complex agricultural and husbandry systems that entailed a strong impact on the environment. At La Muraiola, geoarchaeology was employed in every step of the excavation, right from the field operations and not just as an 'ancillary' technique or as laboratory practice relegated to the post-excavation. Soil and sedimentary characteristics were at the base of the identification, documentation (using SFM photogrammetry and orthophotomodels for the vectorization of each unit), and interpretation of the site's stratigraphy. Emphasis shifted from the artifacts alone, as it is often the case, to the sediments encasing the artifacts. Sediments were in fact 'squeezed' to extract microscopic inclusions – charcoal, macroremains, phytoliths, coprolites – from them. They were analyzed under the microscope to reveal traces and structures invisible to the naked eye. These included stabling floors, charred dispersions of cereals, garden soils on former dwelling areas, and earth-based floors revealing geotechnical knowledge of local substrates. The geoarchaeological excavation approach, therefore, built a 'bridge' between the intra-site space and the surrounding anthropic landscape. Information about choice of crops and fuel, husbandry practices, and land management traveled along such bridge. Overall interpretation was corroborated by – and not based solely on – material culture. With this presentation we would like to discuss the potential of a geoarchaeological approach to the excavation of a bronze age settlement to provide information about agro-pastoral and landscape systems, especially in areas where local high-resolution pollen sequences are not available due to the geological context.

5 ANIMAL EXPLOITATION AT THE TERRAMARA SANTA ROSA DI POVIGLIO (ITALY) IN THE LIGHT OF 40 YEARS OF ZOOARCHAEOLOGICAL RESEARCH

Maini, Elena (Sapienza - University of Rome) - Cremaschi, Mauro (University of Milan)

The presentation aims to provide a comprehensive examination of the relationship between humans and animals at the Terramara Santa Rosa di Poviglio site, specifically focusing on how zooarchaeological research, alongside both

traditional and innovative methodologies used to investigate animal bones over forty years of research, has shed light on this topic.

Regarding the farming economy of the Bronze Age sites, it strongly emphasizes the importance of sheep and goats. These animals at the Terramara Santa Rosa di Poviglio not only represent the majority of those raised by the inhabitants but also serve as major providers of both final and lifetime products due to their triple vocation. The herds were composed of a significant number of sheep and a relatively limited number of goats, which probably permit to maximize the exploitation of all types of meadow-pasture or forage.

Recent osteometric evaluations confirm the small size of the main domestic animals bred in the village during the Middle and Recent Bronze Ages. Consequently, the little dimensions, particularly noticeable in pigs and cows at Poviglio, result in a reduction in meat production, which is compensated for only by numerous and large herds of sheep. Cattle were exploited as beasts of burden, while the production of dairy products and beef must have been limited, as well as the consumption of pork, testified by an unusually low number of pigs compared to coeval sites.

A well-consolidated and dynamic pastoralism was probably one of the reasons for the expansion of the Poviglio village during the 13th century BCE. Movements of people and beasts can now be highlighted through new approaches to evaluating the trade routes, not only linked with shared material culture with other Bronze Age sites located along the rivers distributed in the Po Plain and the nearby Apennines.

6 SOPHISTICATED LAND MANAGEMENT IN THE MIDDLE-RECENT BRONZE AGE: PALYNOLOGICAL EVIDENCE FROM THE TERRAMARA SANTA ROSA DI POVIGLIO (NORTHERN ITALY)

Mercuri, Anna Maria (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia) - Florenzano, Assunta (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia) - Zappa, Jessica (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia) - Clò, Eleonora (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia) - Zerboni, Andrea (Dipartimento di Scienze della Terra "A. Desio", Università degli Studi di Milano) - Cremaschi, Mauro (Dipartimento di Scienze della Terra "A. Desio", Università degli Studi di Milano)

The integrated palynological and geoarchaeological study provides increasingly detailed knowledge of the subsistence and productive economy of prehistoric cultures. The Terramara Santa Rosa di Poviglio Bronze Age site (Northern Italy) was characterised by a complex system of silvo-agricultural economy and a multifunctional land use as happened in most of prehistoric sites. The site consists of two dwelling areas - 'Villaggio Piccolo' (VP) and 'Villaggio Grande' (VG) - dating back to the Middle Bronze Age and to the Recent Bronze Age, respectively. During the exploration of the hydraulic facilities of the site, a stratigraphic sequence 4 m deep was identified in the moat dividing the VP and VG part of the settlements. The high-resolution VP/VG stratigraphic record provided a ten-year resolved pollen stratigraphy that preserves evidence of environmental changes happened in the Po Plain during the Late Holocene. Pedosedimentary features and biological records (aquatics pollen and algal remains) show that shallow water was permanent at the bottom of the moat at the beginning of the formation of the sequence, while the water level dropped significantly during the last phase of existence of the settlement. Along the trajectory of the settlement, pollen curves show significant trends and short oscillations representing coppicing and crop rotation practices. In the last phases of site occupation, an increased climatic aridity and intensive land use may have had a combined negative effect at the expense of plant cover. Cereal cultivation continued during the late Recent Bronze, but the main traits of the landscape became pasturelands. The study of the final part of the infilling of the moat indicates that the regeneration of the forest did not occur immediately after the abandonment of the village (dated at ca. 3200 years BP), but in the early Middle Ages, when the area turned into a swamp.

7 CULTIVATING COMPLEXITY: UNVEILING BRONZE AGE COMMUNITIES THROUGH RESOURCE STORAGE'S DYNAMICS. THE CASE STUDY OF PYLA-KOKKINOKREMOS (CYPRUS)

Porta, Francesca (Alma Mater Studiorum - University of Bologna) - Sotgia, Agostino (RUG - University of Groningen)

Agriculture played a fundamental role in the development of Bronze Age communities.

This is because using the surplus generated, it is possible to transcend the dimension linked to the mere subsistence of groups and to promote articulated economies and complex networks of exchange between communities.

Even more, the quantity of primary goods produced and the generation of surplus, have often been considered an essential starting point for the emergence of increasingly complex forms of organisation and social inequality.

Through the analysis of agro-pastoral production patterns and resource accumulation, it is therefore possible to describe in detail the organization of ancient societies. Despite this assumption, only a few studies have attempted to combine these two different classes of evidence organically and coherently.

Building upon these premises, the present work presents an analytical methodology capable of reconstructing the practices of production and storage of agricultural resources, as well as how these processes could inform us about socio-economic organization. To achieve this, a combination of landscape carrying capacity analysis surrounding the site and a volumetric study of storage evidence within it will be used. This will enable us to articulate the historical reasoning just mentioned on a quantitative basis, seeking to substantiate the general assumptions with precise figures. Pyla-Kokkinokremos (Cyprus), once the assessment of the territory is completed, will provide us with a perfect case study due to the presence of a rich deposit consisting of hundreds of well-preserved storage vessels. This integrated methodology will allow us to discuss the themes of production and resource management, tackling longstanding issues such as demographic trends and socio-economic organization – crucial aspects in the historical reconstruction within our discipline.

8 PALAEOENVIRONMENTAL EVIDENCE FOR CHANGING LAND-USE PRACTICES DURING THE BRONZE AND IRON AGE FROM NORTHERN GERMANY

Feeser, Ingo (Institute for Pre- and Protohistoric Archaeology, Kiel University) - Filipović, Dragana (Institute for Pre- and Protohistoric Archaeology, Kiel University) - Schaefer-Di Maida, Stefanie (Institute for Pre- and Protohistoric Archaeology, Kiel University) - Kneisel, Jutta (Institute for Pre- and Protohistoric Archaeology, Kiel University)

This paper is focussing on palaeoenvironmental investigations carried out in an interdisciplinary research project (“CRC1266 Scales of Transformations”, www.sfb1266.uni-kiel.de). One aim was to identify quantitative and qualitative land-use changes on different spatial and temporal scales. In order to differentiate site specific (local) from larger-scale (regional and over-regional) developments, the adopted approach involved a comparison of well dated records from archives with different spatial significance. On one hand, near-site palaeoenvironmental investigations were carried in wetlands in direct vicinity of archaeological sites investigated within the overall project. On the other hand, this involved off-site investigations on annually laminated lake sediments from larger lakes within the wider study region. Based on a first case study from the western young moraine area of Northern Germany, local and regional changes in land use activities could be inferred, including local phases of increased pastoral activities and a more general shift from woodland to grass/heathland pasture at around 1200 BCE, i.e. the transition from the Older to the Younger Bronze Age in Northern Germany. New results of a second ongoing case study in the eastern young moraine area of Northern Germany support the idea of this being the local/regional reflection of a more wide spread (over-regional) development in agropastoral activities and woodland exploitation. At the same time, archaeological and archaeobotanical evidence indicate changes in burial practices and settlement organisation as well as a diversification of the crop spectrum. This suggests that the inferred shift in landscape management and woodland exploitation was part of a more fundamental socio-environmental transformation during the Bronze Age in the area of Northern Germany.

9 BETWEEN THE LAKE AND THE MOUNTAINS: SOCIOECONOMY OF EARLY IRON AGE HILLTOP SITES IN THE OHRID LAKE AREA

Šmolková, Markéta (Institute of Classical Archaeology, Faculty of Arts, Charles University Prague, Czech Republic; Institute of Archaeology of the Czech Academy of Sciences, Prague, Czech Republic)

The question of socio-economic changes at the turn of the Late Bronze Age and Early Iron Age in the southwestern Balkans has not been satisfactorily addressed yet, either because of the character of the research conducted on this subject or the lack of relevant material. The current project of the Czech-Macedonian team in the Lake Ohrid region (North Macedonia) builds on previous research activities in this area, which have been mainly devoted to the investigation of the lakeshore areas and its characteristic type of settlements, the so-called Palaffite sites, whose structure and functioning were strongly disturbed by a massive earthquake that took place around 1200 BC.

The new phase of research focuses on the hilltop sites where settlement moved after this catastrophe and the economic and subsistence changes that were associated with this new settlement strategy. This paper aims to present the site of Dolno Lakocherej, which is the first of this type systematically studied in the region. Preliminary results of the three seasons of field research so far and results of some sub-analyses (anthracology, osteology) carried out so far will be presented.

The environmental focus of the research aims to reconstruct the landscape in the immediate vicinity of the settlement, describe the way of its exploitation and the related type of subsistence strategy (with the focus on presumed transhumance activities).

Understanding the forms of economic strategies is an important part of the characterization of early Iron Age society, which was transformed during the so-called Transition period (ca. 1000-700 BC) into a form from which significant social changes emerged in the Archaic period. These changes were manifested primarily through the new burial phenomenon of rich elite graves, the so-called Princely Graves, witnessed by the nearby famous site of Trebenishte.

10 BEYOND GRAZING: A MULTI-ISOTOPE APPROACH TO INVESTIGATE SHEEP FEEDING STRATEGIES IN THE IRON AGE IBERIAN PENINSULA (3RD C. BC)

Messana, Chiara (Department of Prehistory, Autonomous University of Barcelona (UAB), Bellaterra, Spain (ES); Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain (ES); Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Tarragona, Spain (ES)) - Tornero, Carlos (Department of Prehistory, Autonomous University of Barcelona (UAB), Bellaterra, Spain (ES); Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain (ES)) - Colominas, Lúdia (Institut Català d'Arqueologia Clàssica (ICAC-CERCA), Tarragona, Spain (ES))

During the Iron Age, the principal sources of subsistence for Iberian communities in the north-east of the peninsula were cereal agriculture and livestock husbandry. The latter was mainly focused on caprine, with sheep being the most exploited species due to its excellent adaptation to the Mediterranean climate and environment. Despite the pivotal role of sheep in livestock husbandry, there is limited information on the feeding strategies adopted by Iberian communities for this species. Investigating livestock feeding habits is crucial to comprehend the economic and subsistence requirements of each community. Furthermore, animals' diet could be directly related to regional features and the environmental characteristics in which the settlement was located.

To address this lacuna, this study investigates the sheep feeding habits at four Catalan sites dating to the 3rd century BC: Mas Castellar de Pontós, Tossal de Baltarga, Sant Esteve d'Olius, and Turó de la Rovira. Bulk $\delta^{13}C$ and $\delta^{15}N$ analyses of bone collagen and sequential $\delta^{13}C$ and $\delta^{18}O$ analyses of dental enamel were performed on 74 remains (43 bones, 31 teeth) from 51 sheep. Additionally, other domestic and wild species (153 bones) from the four sites were analysed to establish the local isotopic baseline of $\delta^{13}C$ and $\delta^{15}N$ values.

The results reveal that Iron Age Iberian herders adopted complex and adaptive livestock feeding strategies. The sheep's diet, primarily consisting of C3 plants, displays minimal variation across the four sites. Nevertheless, their feeding habits changed seasonally depending on the pasture availability and the livestock requirements of each settlement.

This study provides the first data on livestock feeding strategies for the Iron Age in the north-eastern Iberian Peninsula. The Iberian communities possessed advanced zootechnical knowledge and employed a significant specialised workforce, suggesting that animal husbandry played a significant role in their economy.

11 INSIGHTS INTO SUBSISTENCE DYNAMICS: EXPLORING ANIMAL HUSBANDRY IN PRE-ROMAN GETAE COMMUNITIES.

Venetatou, Ismini (Freie Universität Berlin)

Exploring subsistence dynamics during the pre-Roman Iron Age in the Eastern Carpathians remains a significant yet underexplored realm of zooarchaeological inquiry. This study focuses on Horodca Mică and Horodca Mare, fortified settlements inhabited by the Getae people in present-day Moldova. Utilizing a multidimensional methodology, taxonomic identification, bone element analysis, and MNI calculations are incorporated. Furthermore, a comprehensive examination of mortality profiles, butchering techniques, and fragmentation patterns is conducted to investigate animal utilization and husbandry practices. Findings reveal a diverse subsistence strategy characterized by a mixed economy. Domesticated animals, notably cattle (48%), pigs (22%), and sheep/goats (15%), played pivotal roles in sustaining ancient communities. Moreover, the presence of wild animals underscores the adaptability of Getae societies, augmenting dietary needs with local wildlife resources. Age-at-death analysis further elucidated patterns of animal husbandry, with peak slaughter ages ranging from 8 to 18 months for cattle and up to 27 months for pigs. The discovery of neonatal pig bones underscores the importance of local breeding and emphasizes the adaptability of Getae subsistence strategies. Overall, this study contributes to our understanding of the intricate interplay between agriculture, animal husbandry, and hunting in pre-Roman Iron Age societies. By contextualizing faunal data within broader socio-economic frameworks, it offers valuable insights into the diverse and adaptable approaches to resource exploitation practiced by the Getae communities of Horodca Mică and Horodca Mare.

466 FACILITATING PUBLIC ENGAGEMENT AND PARTICIPATION IN DEVELOPMENT-LED ARCHAEOLOGY

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Oldham, Mark (NIKU - Norwegian Institute for Cultural Heritage Research) - Watson, Sadie (MOLA - Museum of London Archaeology) - Faccia, Kate (MOLA - Museum of London Archaeology) - Benetti, Francesca (Historic Environment Forum)

Session format: Regular session

This session aims to delve deeper into how we as archaeologists facilitate public engagement and participation within development-led archaeology. We take as our starting point the acknowledgement that archaeology is a social action

and inherently political, and that as a result there are power imbalances in our work. These power differentials are often most clear when aiming to work with the public. How do we try to overcome these discrepancies, and do we succeed in making lasting changes? Is it possible to achieve a more equal and equitable archaeology within current frameworks?

This session will be a Pecha Kucha with speakers allowed six slides and six minutes to present their paper. We would like speakers to present case studies or opinions within the following sub-themes:

- Project design and financing
- Safeguarding and Health and Safety
- Collaboration with constructors and the authorities
- Reaching new audiences

The aim of the session is to stimulate discussion, inspire with good examples, and share ideas and best practice.

ABSTRACTS

1 FACILITATING PHYSICAL AND DIGITAL ACCESS TO SITE

Oldham, Mark (NIKU - Norwegian Institute for Cultural Heritage Research)

In the session abstract, we mention specifically the idea of power imbalances as a factor in facilitating public engagement and participation within development-led archaeology. A significant element of this relates to access to our work, and in this paper I will discuss means of enabling both physical and digital access to archaeological investigations using case studies from our work in Oslo: site visits and dissemination using social media.

When it comes to physical access, health and safety is one of the main factors that we have to consider. It is important that we are safe at work, but it is also important that the public get to engage with what we are doing – and site is a key arena for this. Hence, in dialogue with developers, we need to discuss ways of minimizing risks and mitigating consequences to a level that enables the general public to visit, allowing them to engage with the site in a safe manner and give them a good experience. In terms of digital access, social media is a good means of reaching many more people than just those who can visit in person, and can be an easy means of – somewhat passively – engaging with an audience.

This paper will discuss how both forms of access have strengths and weaknesses in terms of the level of engagement and real involvement they allow for, and the extent to which they change power imbalances.

2 METHODOLOGIES FOR ENGAGING COMMUNITIES IN RESEARCH ON THE MEMORIALISATION OF DIFFICULT PASTS IN WHITECHAPEL

Wolferstan, Sarah (UCL)

UCL's Archaeology South-East (ASE) ran commercially funded excavations at a large site on Stepney Way, Whitechapel 2015-19, in advance of a major redevelopment for L&Q Homes. The site has a long history of occupation: London's largest-known Iron Age settlements; a medieval manor; and its first Tudor playhouse 'The Red Lion'. With a few exceptions, these stories were incorporated into the on-site interpretation and design during the construction phase. However, in the final stages of post-excavation analysis, a new discovery was made that required a different approach due its links with the difficult and painful aspects of Briain's role in the slave trade, colonialism and 18th century prejudice and racism. With an annual festival planned for the site, the context for memorialisation and place-making is at the fore. This talk will highlight the roles of the key influencers, describe the opportunities that were provided to ASE for influencing the site's design in the project's early phases. I will then describe how as a university unit we are making the most of opportunities to apply for seed-funding to build partnerships as well as the creative methods used for engaging new audiences during the post-excavation phase of the project including: commissioning storytellers, bringing on board BAME engagement experts, scoping for socially engaged research partners in areas that may have parallel interests and focusing on co-created research and project design and educational outcomes that allow student-staff partnerships to decolonise the production of knowledge. This case study is an example of an archaeological unit that sits within a Higher Education research setting using storytelling to co-produce the language and an evaluation framework to describe social value together with members of the community.

3 NAVIGATING THE CLIENT-CONTRACTOR-COMMUNITY DYNAMIC

Watson, Sadie (MOLA)

Often the most challenging aspect of providing meaningful participation and engagement as part of a developer-funded archaeological project is the developer themselves, and the expectations they bring, putting their needs first in their role as the ultimate client. These can include common issues such as outputs, budget, and access, all of which are wrapped up in the power dynamic of a commercial arrangement wherein the archaeological specialist is

usually a sub-contractor. Commonly encountered alongside these is the general feeling that the power over design and implementation is not in the hands of the people 'on the ground', despite attempts to share power, collaborate on design, and include the wider public. This short paper will propose some ways through this, some cynical, others not so much! This is likely to be partly a communication issue, so I will also discuss how a reduction in control over outcomes and outputs can be articulated to the client without raising alarm.

4 THE FUTURE PAST: ARCHAEOLOGY AND SOCIAL INNOVATION

Pedersen, Unn (Department of Archaeology, Conservation and History, University of Oslo) - Sontum, Kaja (Department of Archaeology, Conservation and History, University of Oslo) - Bukkemoen, Grethe (Museum of Cultural History, University of Oslo)

The Future Past has used a development-initiated excavation run by the Museum of Cultural History at the University of Oslo to demonstrate how knowledge of the past is transformed with the arrival of new empirical evidence and new thoughts. Inviting youths from schools in Oslo and Viken to follow an archaeological excavation from the outset, the project aimed at providing an in-depth opportunity to learn, understand and partake in knowledge production. The Future Past aims to tap into the power of a globally oriented generation, by involving school students between 13 and 17 years old in shaping future knowledge about the past and reflecting on the interplay of the past, the present and the future. Another aim of The Future Past has been to establish a model for cooperation between public administration, universities and schools to secure swift sharing of knowledge and bottom-up influence. The paper will present the challenges and gain of the pilot project, funded by a social innovation programme.

5 DEVELOPMENT-LED ARCHAEOLOGY AS APPLIED ARCHAEOLOGY

Beck, Anna (Museum Southeast Denmark)

The building of a new neighbourhood north of Køge, Denmark has led to extensive archaeological excavations. Typically, the information gathered from such excavations would go into excavation reports and then into the archive with very little – if any – contact with the following development process at the site. However, in the case of Køge Nord, we have explored ways to strengthen the dialogue between archaeological excavation and the building process by inviting the local public to participate in the archaeological process.

In Køge Nord, this experiment has taken various forms: 1) qualifying keywords from the visions of the new neighbourhood by mirroring them in the local archaeological record and discuss their meaning and content; 2) conducting citizen science driven investigations and using walking as a heritage practice that has learned us about the area and the challenges that meet the new building project; 3) exploring ways to present the archaeological knowledge that discusses themes related to the challenges created by the current development. The aim is to create a more open development-led archaeology that contributes constructively to the context where the development takes place.

Most of these activities lie beyond what normally can be done within the narrow framework of development-led archaeology. However, this form of Applied Archaeology has led to a constructive dialogue with the developer, the City Council of Køge, where the archaeological knowledge has become an active ingredient in the formation process of the future neighbourhood. Based on what we have learned from the project so far, I want to discuss the role of development-led archaeology in the building process and how we can better exploit the privileged position development-led archaeology has as a concrete link between past, present, and future.

468 THE RELATIONSHIP BETWEEN RURAL SETTLEMENTS AND THE TERRITORY DURING THE ROMAN PERIOD AND LATE ANTIQUITY.

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Bouzas Sabater, Marc (Universitat de Girona) - Frigola, Joan (Museu Arqueològic de Banyoles) - Turchetto, Jacopo (Università di Padova)

Session format: Regular session

For some years now, studies on the rural world of the Roman and Late Antique periods have ceased to focus exclusively on the built parts of the sites and have also begun to investigate the environment in which they were located. The results provide significant data to investigate a relationship that must be understood as bidirectional: on the one hand, the environment, with its specificities, conditioned many of the economic strategies of the rural establishments, such as, for example, the way the land was cut, and organised, or the suitability for certain activities, while, on the other hand, the intense pressure they exerted on the environment had a direct impact on the configuration and transformation of the landscape.

Issues to be discussed and analysed are multiple: models and types of settlement (villae, vici, figlinae, nundinae, and other lesser rural settlements), structuring and management of rural areas, adaptation and environmental impact,

commercial and productive strategies, economic dynamics, infrastructure, relation between town and rural world and many others. The review and sharing of these and other points will allow us to draw a clearer picture of the rural world of ancient times and to verify the differences and similarities that exist between very different territories and contexts.

ABSTRACTS

1 RURAL SETTLEMENTS IN ROMAN ALGERIA: NUNDINAE AND FUNDI, BETWEEN THE AURÈS AND LES ZIBANS

Turchetto, Jacopo (University of Padova) - Zanovello, Paola (University of Padova) - Meleri, Andrea (University of Padova)

Rural markets of Roman Numidia played a fundamental role within the context of the spread of latifundia and the increasingly capillary taxation, practiced especially in the final stages of the empire. Situated at focal points along road axes and, generally, near sources of water supply, they were certainly areas of commercial exchange, but above all controlled and managed meeting points between nomadic and sedentary populations. The periodic, indispensable passage of flocks, which were transferred to higher locations in summer, with a milder climate and the presence of water and food, required control and prevention of inevitable conflicts between farmers and shepherds.

As is well attested in epigraphic and literary documentation, landowners often requested from the state authority the permission to set up periodic markets within their own estates, generally in peripheral areas closer to road networks, with a dual advantage: for the landowners, as an increase in profits through trade, and for the state, as reference points, through landowners, as a guarantee of control over transactions and collection of tax levies.

The link between nundinae and fundi appears well documented in Numidia, particularly in those places where, as Pol Troussset recalled, "le limes est un instrument d'échange et d'intégration" and in the Tobna valley, between the Aurès Mountains and Les Zibans, which was "un lieu de symbiose nécessaire entre populations et régions écologiquement complémentaires".

This contribution will attempt to investigate the intertwining among these rural agglomerations, the agrarian organisation of the territory and the road system, within the broader framework of the relations between nomadic and sedentary populations.

2 CHANGING LANDSCAPES AND IDENTITIES IN THE NW OF HISPANIA BETWEEN LATE IRON AGE AND LATE ANTIQUITY

Machado, Diego (Unidade de Arqueologia da Universidade do Minho; Laboratório de Paisagens, Património e Território; Laboratório Associado para a Investigação e Inovação em Património, Artes, Sustentabilidade e Território; Fundação para a Ciência e Tecnologia) - Martins, Manuela (Unidade de Arqueologia da Universidade do Minho; Laboratório de Paisagens, Património e Território; Laboratório Associado para a Investigação e Inovação em Património, Artes, Sustentabilidade e Território) - Folgueira Ríos, Francisco (Universidade de Santiago de Compostela) - Dias, Bruno (Universidade do Minho)

The end of the Roman conquest of the NW of the Iberian Peninsula, in 19 BC, ushered in an important set of changes in the organization of the indigenous communities that occupied the territory, perceptible in a new ordering of the settlement, which suited the new political and legal framework designed for Roman Hispania, based on its division into provinces and *conventus iuridici*. The capitals of the *bracaraugustanus* and *lucensis* *conventus* were *Bracara Augusta* and *Lucus Augusti*, cities founded *ex nouo* in strategic locations in relation to the territory occupied by the *Gallaeci bracaraugustani* and *lucensi*, names that included different pre-Roman ethnic groups at the origin of the *populi* and *ciuitates* that shared those *conventus*.

This communication seeks to characterize the social and cultural framework of the populations that occupied the territory of the two *conventus* in the Iberian northwest, before and after their integration into the Empire, in order to understand the changes that took place and the specificities of their settlement and organization. This overview will also allow us to look at the changes in settlement that seem to have resulted from the events that characterized Late Antiquity, a period in which the region was integrated into the province of *Gallaecia* (4th century), the *Suebi* kingdom (5th and 6th centuries) and, finally, the *Visigoth* kingdom (6th-8th centuries), experiencing significant changes. Taking into account the available data, it seems possible to accept that the development of the territories under analysis presents its own internal dynamics, as a result of different interactions between the local substratum and the Roman world, giving rise to new identities that continue to evolve with the generalization of Christianity and the end of Roman rule.

3 URBAN AND RURAL - NEW INSIGHTS INTO THE SURROUNDINGS OF ROMAN SISCIA

Brkic Drnic, Kristina (The Centre for History and Culture of Sisak-Moslavina county)

The Roman colony of Siscia presents one of the most important Roman towns on the territory of the province of Pannonia. In the course of the division of the province of Pannonia Superior by Emperor Diocletian, Siscia became the capital of the province of Pannonia Savia. While the area within the city walls has been the subject of numerous archaeological excavations, the state of research on Siscia *extra muros* and its countryside is still scarce.

Archaeological rescue excavations were carried out between 2021 and 2023 as part of the construction of the Zagrreb-Sisak highway. In the Stupno and Sela sectors, about 4.5-6 km from the modern town of Sisak (ancient Siscia), traces of Roman rural settlements have been found, including remains of wooden architecture, kilns, canals, pits, well and possibly a section of the road from Andautonia to Siscia. In addition to the explored archaeological structures, various small finds of pottery, glass, metal and stone were collected, which provide an insight into the everyday life of their inhabitants.

The aim of this paper is to discuss the morphology and chronology of the rural settlements, the location of the sites in the surrounding landscape, the environmental and communication context, and their physical and economic connections with Roman Siscia.

4 THE VALUE OF DOLIA IN THE ASSESSMENT OF THE ROMAN RURAL ORGANIZATION. A CASE OF STUDY FROM NORTH-WESTERN HISPANIA

Rueda, Maria (Institut Català d'Arqueologia Clàssica (ICAC)) - Járrega, Ramon (Institut Català d'Arqueologia Clàssica (ICAC))

The aim of this communication is to show how the study of *dolia* can help in defining the organization of the rural settlements, specifically those related to the production of wine and, in a lesser degree, those producing olive oil. Not only it shows the areas dedicated to that production, but also it provides evidence for the productive capacity of some of the settlements, particularly those with capacity markings or preserved vessels.

With all this data, we aim to trace the evolution of the rural territory of the northeast of Hispania, and the wine production, from the late second century BCE to the fifth century CE. Moreover, we give us information to evaluate the accumulation of production centres, or the lack of them, and compare it with the current conception of the rural organization of the Roman Hispania. The study of the hypothetical production could also help us in the classification of the settlements in order to define if all of them engaged with the Mediterranean trade.

This study derives from the PhD investigation done by the author, which examines *dolia* from the northeaster area of Hispania (now Catalonia), in the Roman period. This research attempts to create a new typology for this kind of containers, but more importantly intends to provide a new framework to study wine production in Hispania, considering the distribution of settlements with *cellae unariae* and their hypothetical productive capacity.

5 EVOLUTION OF THE PRODUCTIVE ORGANIZATION IN THE RIVER VALLEYS OF THE TERRITORIUM OF DIANIUM (DENIA, ALICANTE) IN THE ROMAN EMPIRE

Álvarez Tortosa, Juan (University of Alicante) - Mateo Corredor, Daniel (University of Alicante) - Molina Vidal, Jaime (University of Alicante)

The introduction of the villa model in the *Tarraconensis* province during the time of Augustus brought about a profound restructuring in the productive organization of the rural environment. This transformation manifested as a significant intensification in both cultivation practices and agricultural processing. However, recent investigations conducted in the river valleys of the *Dianium* territory have revealed the coexistence of different landscape exploitation models and resource utilization, surpassing the conventional villa model. In this framework, a synthesis of the most relevant results obtained is presented as a basis for the discussion of the nature of these rural centres, as well as their relationships with other production centres in the surrounding area and with the urban area of *Dianium*. The research focuses on the context of surplus production of agricultural products, particularly in the realm of viticulture and, to a lesser extent, olive oil production. Ultimately, the aim is to deepen the understanding of agrosystems and the socio-economic dynamics of this territory during the Early Roman Empire.

6 RURAL LANDSCAPE & LATE ANTIQUITY ON THE AGER TARRACONENSIS: NEW APPROACHES

Carrasco López, José (Universitat Autònoma de Barcelona)

In the last few years, the study of Late Antiquity has become more interdisciplinary. A detailed approach to the fields of study has largely been dictated by the heterogeneity of the period. In this sense, the structure and use of the Roman landscape was fundamentally determined by Late Roman rural settlements. Agricultural locations on the fertile plains, as in the case of the *villae*, have been the subject of many studies. However, other settlements, which were

also at the centre of the exploitation of the resources of their territories, such as mining, fishing, etc., have often been overlooked. Also, compared to those on the plains, research on highland settlements is scarce. This paper aims to establish a dialectic between the archaeological sources that can tell us about sites located in the Highlands and those located in the plains. For this purpose, we will use the rural landscape of Tarraco, the provincial capital of Hispania, as a case study.

7 THE STUDY OF THE LATE ANTIQUE SUBURBAN CONTEXTS IN IBERIAN PENINSULA: AN APPROACH TO THE SETTLEMENT PATTERNS

Urbina, Isabel (CSIC) - Castro Priego, Manuel (Alcala University) - Diarte-Blasco, Pilar (CSIC)

This study is an approximation to the homogenisation of the archaeological documentation available on three of the rural areas whose origin is established in the vicinity of the urban foundation of Reccopolis between the 6th and 8th centuries AD. These suburban settlements, La Paeriza, Loma del Badujo and Los Arroyuelos, offer a holistic view of the immediate surroundings of the city, which justifies a process of social and spatial transformation with its own characteristics and different from the rest of the rural areas spread throughout the peninsular territory in the early Middle Ages. The possibilities offered by this work are based on the use of combined archaeological, environmental, geographical and textual data, including those relating to road systems, settlements and the agrosystem. The definition of the suburban settlement pattern is proposed, as well as the characterisation of the structures and materials that make it up, as an instrument for research and heritage management, in order to generate the necessary interpretation and contextualisation of these landscapes in transformation.

8 THE ROMAN VILLA OF COLLET IN THE CONTEXT OF THE COASTAL VILLAS OF THE NORTHEASTERN END OF HISPANIA CITERIOR

Moner, Elisabet (Universitat de Girona) - Bouzas, Marc (Universitat de Girona) - Burch, Josep (Universitat de Girona) - Vivó, David (Universitat de Girona)

The Roman villa of Collet is located in the municipality of Calonge i Sant Antoni (Catalonia), on a rocky spur that rises some twenty metres above the surrounding plains, which in ancient times were occupied by marshes. The great scenographic value of the site made it an ideal place to build an otium villa in Roman times, as well as to exercise control over the surrounding territory.

The site shows different phases of continuous occupation. The first of these consists of a rural settlement with a wine cellar. This was followed by a villa from the Republican period, of a markedly productive nature, the ground plan of which was used in the Augustan period to carry out a number of alterations. Finally, the last phase shows the existence of a villa from the High Empire period.

The imperial villa has residential rooms, in several cases paved with mosaics. The structure of the villa, organised around one or more courtyards that occupy a large area, only confirms the sumptuousness of the site. This villa already fits into the patterns defined for a coastal villa, villas of a stately character, with a large fundus to control and with various luxuries such as mosaic pavements, opus sectile, balnea, etc.

This presentation establishes a comparison between the Roman villa of Collet and other coastal villas in the territory studied, such as Pla de Palol and Els Ametllers. The analysis will make it possible to establish similarities between them, bearing in mind that all three belong to the typology of coastal villas, but also to define the characteristics that differentiate them. The contrast between them will allow us to deepen our knowledge of the coastal villas of the extreme north-east of the Iberian Peninsula, taking into account the new archaeological finds documented at the sites.

9 THE ROMAN VILLA OF CAN RING OR "DELS POMPEU": AN AGRICULTURAL SETTLEMENT ON THE AGER BISULDUNENSIS

Frigola Torrent, Joan (Universitat de Girona; Grup de Recerca Arqueològica del Pla de l'Estany) - Castanyer Masoliver, Pere (Grup de Recerca Arqueològica del Pla de l'Estany) - Tremoleda Trilla, Joaquim (Grup de Recerca Arqueològica del Pla de l'Estany)

The archaeological research carried out in recent years in the Roman villa "dels Pompeu" (Besalú, Catalonia) has allowed us to gain a much better understanding of the territory in which it was located and its relationship with the rest of the surrounding sites, especially with the vicus of Bisuldunum, which was the main settlement in the area.

This paper will analyse the factors that must have been taken into account when founding the villa (location, visual domain, proximity to watercourses, presence of communication routes...), will determine the resources of the territory that were exploited (quarries, forests...) and will make a proposal for the extension and limits of the estate. The environmental impact of the villa and the transformation of the surrounding landscape through the introduction of new crops and agricultural strategies will also be discussed.

Finally, the economic and commercial role of the villa will be examined, both in terms of the local products it acquired (which ones and from where) and in terms of the distribution of its surplus production, mainly centred on wine.

10 NEW INSIGHTS OF WOOD MANAGEMENT AND ARBORICULTURE PRACTICES IN THE ROMAN SETTLEMENTS OF VILAUBA AND CAN RING (GIRONA, SPAIN)

López Castillo, Eva Maria (Univesitat Autònoma de Barcelona) - Berrocal Barberà, Anna (Departament de Prehistòria Universitat Autònoma de Barcelona) - Castanyer Masoliver, Pere (Museu d'Arqueologia de Catalunya-Empúries; Grup de Recerca Arqueològica del Pla de l'Estany (Banyoles, Girona)) - Frigola Torrent, Joan (Grup de Recerca Arqueològica del Pla de l'Estany (Banyoles, Girona)) - Limier, Bertand (ISEM, Institut des Sciences de l'Evolution-Montpellier, Université de Montpellier/CNRS/IRD/EPHE; INRAE, Centre Occitanie-Montpellier) - López-Bultó, Oriol (Museu d'Arqueologia de Catalunya) - Piqué Huerta, Raquel (Departament de Prehistòria Universitat Autònoma de Barcelona) - Terral, Jean-Frédéric (ISEM, Institut des Sciences de l'Evolution-Montpellier, Université de Montpellier/CNRS/IRD/EPHE) - Tremoleda Trilla, Joaquim (Museu d'Arqueologia de Catalunya-Empúries; Grup de Recerca Arqueològica del Pla de l'Estany (Banyoles, Girona))

The aim of this research is to approach the practices of wood management and arboriculture in the north-east of the Iberian Peninsula (from the 1st century BC to the 7th century AD), based on the study of archaeological wood and charcoal remains from the site of Vilauba (Camós, Catalonia, Spain). The study focuses on the remains recovered from inside a well, which are contextualized in the frame of this rural settlement that spans from Roman times to Late Antiquity. A reference collection of the anatomical and other morphometric features of cultivated, managed and unmanaged trees of the species identified at the site has been made in order to obtain comparative materials to analyse the archaeological remains. The main characteristics observed in the reference material are presented here and compared with the archaeological material. The analysis of both type of samples, modern and archaeological, is based on the application of a tried and tested methodology, the roundwood method (Out et al.). The results are contextualised with those obtained in other archaeobotanical studies, such as from the analysis of fruit and charcoal remains, carried out at the site, and in the historical context of the region. The results obtained have provided information on arboriculture practices in *Prunus* sp. and *Vitis vinifera*, and possible management practices in taxa such as *Sambucus nigra* and *Salix* sp.

470 BRIDGING THE WALLS: COMPARATIVE PERSPECTIVES ON FORTIFIED SETTLEMENTS

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Lucci, Enrico (University of Bari Aldo Moro, Dipartimento di Ricerca e Innovazione Umanistica) - Fontana, Giacomo (University College of London, Institute of Archaeology) - Migliavacca, Mara (University of Verona, Department of Cultures and Civilizations) - Črešnar, Matija (University of Ljubljana, Faculty of Arts Department of Archaeology; Centre for Interdisciplinary Research in Archaeology) - Fernández-Götz, Manuel (University of Edinburgh)

Session format: Regular session

The period between the 3rd and 1st millennia BC in the Mediterranean and Temperate Europe saw the rise of militarised communities and the significant increase of extra-domestic economies, such as long-range exchange of prestige goods and raw materials. In this framework, the emergence of fortified settlements was of particular significance, embedding new rising ideological, political and socioeconomic aspects, but also signifying a profound transformation of human interactions with the landscape.

From a social perspective, the construction of monumental defensive structures necessitates significant and repeated collective efforts, reflecting a stronger internal cohesion of communities. However, archaeological data concerning the spatial arrangement of domestic spaces also reveal increasingly complex forms of internal community organisation, with both examples of hierarchical and heterarchical structures. On the other hand, the prolonged occupation of strategically important locations could deeply affect the political structure of the landscape as well as the environment, due to intense exploitation of soil and natural resources.

In recent decades, fortified settlements have attracted a wide array of interdisciplinary research efforts, spanning from traditional artefact and bioarchaeological studies to geoarchaeology, GIS, geospatial, and remote sensing analyses. While these efforts have significantly expanded our understanding, the development of this research field has followed uneven trajectories across the investigated periods and geographical areas. Persistent gaps remain in the theoretical frameworks, methodologies, and data linkages within archaeological research.

This session aims to transcend regional and chronological boundaries to offer a comparative analysis of the varied phenomena related to the rise of fortified settlements in the Mediterranean and Temperate Europe between the 3rd

and 1st millennia BC. We invite contributions at different scales of analysis, from intra-site studies to regional and macro-regional approaches, thus helping to enrich interdisciplinary and comparative debates on the topic.

ABSTRACTS

1 SOCIETIES BEHIND FORTIFICATIONS: MIDDLE BRONZE AGE MULTI-LAYERED SETTLEMENTS IN CENTRAL HUNGARY

Jaeger, Mateusz (Adam Mickiewicz University in Poznań) - Niebieszczański, Jakub (Adam Mickiewicz University in Poznań) - Kulcsár, Gabriella (Hungarian Academy of Sciences)

One of the most characteristic forms of archaeological sites dating back to the Middle Bronze Age in central Hungary is fortified settlements. Many of these sites exhibit complex stratigraphy resulting from several hundred years of habitation and various modifications of economic and living spaces. Their fortifications commonly consisted of a simple combination of a wall and ditch, although in exceptional cases, these elements formed more complex structures. The aim of the presentation is to present the current results of the Polish-Hungarian project focused on the microregion of Kakucs. In this area, five settlements surrounded by various forms of fortifications are known. The main goal of the research is to establish the absolute chronology of the ditches and, consequently, to answer the question about possible relationships connecting the inhabitants of individual settlements in the first half of the second millennium BC. The authors will present the results of excavation research, non-invasive surveys, and geological drilling (including vibra-coring), which were used to construct chronological models.

2 THE ABANDONMENT OF FORTIFIED SETTLEMENTS DURING THE TRANSITION OF THE HUNGARIAN MIDDLE AND LATE BRONZE AGE

Szabó, Nóra (Research Centre for the Humanities)

The Middle Bronze Age (2000/1900-1450 cal BC) settlement network went through a complete transformation by the beginning of the Late Bronze Age Tumulus culture in the Carpathian Basin. The reasons for the changes that affected all aspects of life and occurred at the boundary between the two periods are still not fully understood: in addition to the transformation observed in the archaeological record, new types of solutions, relationships, and ideas emerged in the economic systems and social arrangements. The abandonment of the existing system transformed the former standardized worldview at the community level, including how to idealize a settlement in its environment. The fortified settlements evaluated as central settlements in the Middle Bronze Age can be seen in several types, however, their multi-level subordination to each other is not clear. But the communal spirit and the practice of cooperation (voluntary or forced) that created these settlements can be assumed. The development of community spaces and structures of fortification that transform the environment requires organization and a lot of time and energy. This is why it is surprising the abandonment of this hard-constructed system and the use of other types of settlements in the late Bronze Age. The land use of settlements is also changing, the former places are no longer or rarely used. The appearance in the landscape of the settlements in Budapest and its surroundings and the quality of the connections between them can be analyzed at several levels. Trends can help not only to understand the settlement structure and the role of fortified settlements but also to explore the relationship of communities to the landscape.

I will present the role of fortified settlements through the analyses of the settlement structure and modeling of road networks in the region around Budapest during the Middle and Late Bronze Age.

3 A MIDDLE BRONZE AGE HILLFORT WITH A MEGALITHIC-'CYCLOPEAN' WALL NORTH OF THE ALPS. NEW EXCAVATIONS ON THE STÄTTEBERG, BAVARIA

Metzner-Nebelsick, Carola (LMU Munich) - Nebelsick, Louis (UKSW Warsaw)

This lecture presents the results of a research project carried out since 2019 on the Bronze Age hillfort on the Stätteberg near Neuburg on the Danube in Bavaria. The results of our ongoing excavation campaign are as surprising as they are spectacular. They demonstrate that the site, which is located on a spur rising directly above the Danube, was surrounded by a fortification covering an area of 86 hectares beginning in the Middle Bronze Age. The 5.5-hectare tip of the plateau, the hillfort's acropolis, was crowned by an extensive burnt offering sanctuary and defended by an imposing two-phase fortification. Its massive inner ring comprised a 3.30 m wide double-shell 'cyclopean' stone wall built of hewn limestone blocks, filled with smaller stones, and tamped clay. The limestone part of the wall is still preserved up to a height of 1.80 m (originally over 2 m). It was the stone plinth for a much higher pisé/stamped earth wall. The great limestone blocks of this structure were systematically extracted directly in front of this wall. It is the oldest stone quarry yet known in Central Europe.

¹⁴C dating makes it likely that this fortification was erected in the Middle Bronze Age in the early 15th century BCE. It was burnt down along its entire length and systematically razed around 1200 BCE.

4 EARLY IRON AGE HILLFORTS OF THE SOUTH-EASTERN ALPINE REGION AND HOW WE APPROACH THEM

Crešnar, Matija (University of Ljubljana) - Vojaković, Petra (University of Ljubljana, Faculty of Arts, Department of Archaeology, Centre for Interdisciplinary Research in Archaeology (CIRA); Arhej d. o. o.) - Mušič, Branko (University of Ljubljana, Faculty of Arts, Department of Archaeology, Centre for Interdisciplinary Research in Archaeology (CIRA); Gearh d. o. o.) - Gruškovnjak, Luka (University of Ljubljana, Faculty of Arts, Department of Archaeology, Centre for Interdisciplinary Research in Archaeology (CIRA)) - Prijatelj, Agni (University of Ljubljana, Biotechnical Faculty, Department of Soil and Environmental Sciences) - Horn, Barbara (University of Ljubljana, Faculty of Arts, Department of Archaeology, Centre for Interdisciplinary Research in Archaeology (CIRA); Gearh d. o. o.) - Grčman, Helena (University of Ljubljana, Biotechnical Faculty, Department of Soil and Environmental Sciences)

During the early first millennium BC, distinct regional cultural characteristics developed in the south-eastern Alpine region (i.e. present-day Slovenia and its surroundings). One of these was the emergence of monumental hillforts, which became the centres of the Early Iron Age. Although the research of antiquarians initially focused on the burial mounds, which contained the most valuable artefacts, the first excavation campaigns of hillforts took place before the end of the 19th century. Given this long history of research, one might think that we know everything there is to know about the hillforts, their fortifications, their internal organisation, their role in the settlement patterns etc. In most cases, however, only the (preliminary) chronological framework has been established. Nevertheless, things are changing! The wide range of research methods integrated in the investigations of Early Iron Age hillforts and their surrounding landscapes has undergone significant development in recent years. Rather than simply collecting extensive data or focusing on individual features or sites, our main aim was to create a 'methodological toolbox' which, due to its systematic nature, could be applied (almost) anywhere under similar environmental and archaeological conditions.

Our first research step aimed at using remote sensing data (e.g. ALS) to understand the wider environment of the area. The next steps involved multi-method geophysical surveys followed by minimally invasive ground-truthing (including coring and shovel pits) to determine the most suitable areas for intensive geophysical surveys, geochemical mapping and further invasive investigations, i.e. excavations. The latter is importantly being supported by the micro-geoarchaeological research, which quickly became one of the most important parts of our investigations delivering eye-opening results.

5 MILITARISATION OF SOCIETY AND FORTIFICATION OF TERRITORIES IN IRON AGE GAUL

Krausz, Sophie (Université de Paris 1 Panthéon Sorbonne; UMR8215 TRAJECTOIRES)

Militarisation is the process that structures the organisation of a society or territory and gives it a military character. It expresses a series of security standards, of which the concept of fortifications is an essential component. Militarisation can be both a factor of peace and a factor of war, with elites constantly engaged in maintaining one and preventing the other. It makes it possible to create an armed peace whose permanence is guaranteed by the constant control of the social body.

The ideology of war and peace was able to evolve with the complex political systems that emerged in the last millennium BC. During these changes, political mutations altered the configuration of territories and led to the construction of monumental fortifications on several occasions. At the end of the Iron Age, civitates were gradually emerged in Gaul, representing more or less stable political and juridical entities that Caesar was able to establish in the middle of the 1st century BCE.

The development of fortifications in Gaul during the Iron Age could be symptomatic of the militarisation that accompanied new political systems. The aim of this paper is to investigate the connections between the development of fortifications and political models involving the militarisation of society in the Iron Age. It draws on several criteria: a five-stage theoretical classification of militarisation processes (Krausz 2023), ancient textual sources attesting to states of war in Gaul, the way in which military actions were carried out and of course archaeological data on fortifications in the Late Iron Age.

6 SEEING THINGS: CONFRONTING SUBJECTIVE NARRATIVES ON VISIBILITY WITH COMPARATIVE METHODS

Whitefield, Hans (LeiZA Center for Baltic and Scandinavian Archaeology; Freie Universität Berlin)

The invocation of visibility as an essential element of prehistoric enclosures is one of a number of a-priori characteristics used to describe their function and purpose. In light of this, viewshed analyses have proliferated drastically in the past two decades due to the availability of GIS tool systems, however, this implementation has been noted as theoretically problematic from the beginning. While most criticisms focus on the implementations of digital tools and the reliability of digital models, a much more perfidious problem is present in the practical theory. Visibility studies are frequently designed to validate subjective observations about prominence and surveillance in the landscape. These studies regularly neglect negative outcomes and by doing so are only used in order to validate the anachronism of a militarized viewshed. The projection of our modern teleological conceptions of landscape into the past need a thorough reexamination with empirical methods.

This paper presents both standard observational methods and newer quantitative methods for the analysis of visibility as a motive for the construction and function of prehistoric enclosures. This is done by comparing a large contiguous dataset from Lithuania, Poland and Russia with smaller comparative data groups from Britain and Western Europe. Furthermore a number of observational and experimental methods are presented to test whether or not prehistoric enclosures cooperated or competed.

7 WORK IN PROGRESS AT MONTE PALAZZO, A STRATEGIC HILLFORT IN THE VENETO PRE-ALPS

Migliavacca, Mara (Department Cultures and Civilization University of Verona) - Balasso, Alberto (PETRA) - Bandera, Silvia (Department Cultures and Civilization University of Verona) - Donadel, Valentina (Department Cultures and Civilization University of Verona) - Maltese, Giuseppe (Department Cultures and Civilization University of Verona) - de Neef, Wieke (Institute of Archaeology, Heritage Science, and Art History (IADK) Otto-Friedrich-Universität Bamberg)

Since 2022 the University of Verona has been working with an archaeological fieldwork at Monte Palazzo di San Tomio (Malo, Vicenza), in north-eastern Italy, after some surveys done in the previous years. In the 1930s a brief investigation and a following excavation by Soprintendente Ghislanzoni and Ghellini count had already discovered the traces of the protohistoric occupation without specifying the chronology and nature of the settlement.

The site occupies a small hill facing the underlying plain; several remains of walls have been discovered all around the top of the hill, as well as along the slopes and at the bottom of the hill. The function and building technique of these walls are among the core issues that the research team is facing, looking for comparisons with similar situations. The finds discovered to date certify a prolonged occupation of the settlement, from the Recent Bronze Age to the Late Iron Age, and there are hints of a change in use of the hill through time. These data suggest the importance of human interactions with the landscape, and a bioarchaeological investigation has been undertaken in agreement with the CNR of Torino. Moreover, the typology of the findings suggests an important contact between the hillfort and the surrounding areas, especially the neighbouring Alpine Trentino one, so the hillfort occupied a strategically important location, probably controlling long-range exchange of goods.

8 CASTEL DE PEDENA (SAN GREGORIO NELLE ALPI, BELLUNO): A HILLTOP SETTLEMENT ALONG A BORDER AREA

Donadel, Valentina (University of Verona) - Angelini, Anna (Fondazione G. Angelini - Centro Studi sulla Montagna) - Leonardi, Giovanni (Università di Padova)

The paper focuses on the Castel de Pedena site: a hillfort located in the north-eastern Alps, with a long life span dated from the Ancient Bronze Age to Early Iron Age, with a non-continuous occupation. The excavations on the site were carried out by the protohistoric team of Padua University from 2006 to 2012 and focused mainly on the eastern slope of the hill, which was the most preserved area. The paper will present the main structural characteristic of the hillfort, especially the terraces and fortification walls along the slope and the blockbau structures built on the summit. Another theme that will be analysed is the cultural characterisation of the settlement and its changes through time, since the site is located in a border area, between the Veneto and Trentino regions, that was characterised by the presence of the Alpine Luco/Laugen culture in the Late Bronze Age. Finally, a series of archaeometric studies carried out on both pottery and bronzes can shed light on the supply system of raw materials as well as on cultural and trade relations.

9 THE PREHISTORIC “CASTELLIERI” OF TRIESTE: A NEW CRITICAL OVERVIEW OF THE ARCHAEOLOGICAL LANDSCAPE WITH THE SUPPORT OF REMOTE SENSING TECHNIQUES

Berti, Eleonora (University of Udine; University of Trieste; Ca' Foscari University of Venice)

Between the late 3rd and the 1st millennium BC a surprising number of hillforts – known as “Castellieri” – spread across the north-western corner of the Balkans, i.e. in the Istrian peninsula and in the Karst territory up until the Isonzo and Vipava valleys. Within this wide region, evidence found in the area of the current Italian province of Trieste present several interpretative problems, due to a lack of extensive field investigations and scientific publications. The definition of local hillforts is still mainly based on the work of Carlo Marchesetti, who discovered a large number of sites in the late 19th century, and the majority of the alleged “Castellieri” has never been analysed by recent studies with a critical perspective.

In the present contribution, we aim to reevaluate the past bibliography regarding the Trieste Karst in order to clarify the real quality of current available data. To do so, we have also taken advantage of the help of some remote sensing analyses: in particular, we have examined data collected with airborne LiDAR technology, provided by the Friuli Venezia Giulia Region. This tool gave us the opportunity to verify the presence of the archaeological evidence mentioned in bibliography and to discover some possible new ones in parts of the province that had never been studied before, giving us the idea that the territory was intensely exploited, even more than once thought.

Many problems remain concerning the historical and sociological interpretation of the distribution observed, mostly because of the lack of thorough chronological definitions of our hillforts, for which new researches will be necessary. Nevertheless, our contribution highlights the most critical points of the area and offers an updated topographical representation of the “Castellieri”, from which future studies can start.

10 BUILDERS OF WALLS IN BRONZE AGE SOUTHERN ITALY: THE CASE OF COPPA NEVIGATA

Cazzella, Alberto (Former Sapienza University, Department of Antiquities) - Recchia, Giulia (Sapienza University, Department of Antiquities) - Lucci, Enrico (University of Bari A. Moro, DIRIUM)

The massive fortifications defending some Bronze Age settlements in the Central Mediterranean are the result of collective and repeated efforts by individuals composing a community. These structures could be interpreted as a significant level of social cohesion. This, coupled with the lack of a distinct presence of centralised and institutionalised political powers, has led scholars to generally characterise such societies as a single body, potentially underestimating the impact of existing internal divisions—such as social or kin groups—on the community's life, from domestic production and consumption processes to the social mechanisms through which pluralities, inequalities and fractures emerged and were managed.

The Bronze Age fortified settlement of Coppa Nevigata, which is one of the most extensively excavated sites of Southern Italy, constitutes a pivotal key case study for exploring such topics. This settlement provides notable information on the transformation over time of both its fortification lines and the spatial organisation of dwelling and productive areas. Such evidence can be analysed and interpreted from the Marxian – collective Agency perspective, which aims at highlighting the role of collective actions as triggering factors in socio-economic transformations.

In this presentation, we will discuss the theoretical and methodological approach to recognizing internal groups within the community of Coppa Nevigata and explore their potential range of relationships. We will present diverse interdisciplinary analyses conducted over the past years and ongoing studies, combining and discussing them in order to shed new light on the changes in the social organization of Bronze Age societies in the Central Mediterranean.

11 EARLY MYCENAEAN FORTIFICATION AND COMMUNITY BUILDING AT MALTHI, GREECE

Worsham, Rebecca (Smith College) - de Raaff, Yannick (University of Gothenburg)

The fortification wall at Malthi, in southwestern Greece, has generated much discussion in the scholarship of Middle and Late Bronze Age Greece for its apparently early date, and as far as its relationship to the later, much more substantive fortifications of the Mycenaean world. While the fortification is significantly later than suggested by its original excavator, the revised date of construction of about 1600 BCE places it in a time of major social change on the Greek mainland, the so-called Shaft Grave period. This paper builds on new work carried out at the site under the aegis of the Swedish Institute at Athens to discuss the social context of the construction of the fortification at Malthi, its range of possible meanings at this particular historical moment, and the broader consolidation of labor that it must have represented. We argue that the appearance of the fortification wall at Malthi was the result of the aggregated labor of the populace of the surrounding area, suggesting a shift away from social definitions based on household membership toward the creation of settlement-based (and even supra-settlement) communal identities. The investment of time, labor, and resources represented by the fortification extends also to a concomitant reorganization of the interior space of the settlement, including the construction of rooms lining the fortification, a clear emphasis on agglutinative building, a terracing project within (and outside of?) the village, and paths of movement through the

settlement guided by a fairly robust gate system. As is the case with other town walls, the fortification at Malthi must serve both practical functions (i.e., defensive, terracing) and more symbolic functions—here, a visual statement of social belonging and exclusion, as well as perhaps hegemonic aspirations.

12 DEFENSIVE SYSTEMS IN THE SOUTHERN LEVANT DURING THE MIDDLE BRONZE AGE II-III

Berti, Bianca (Sapienza University of Rome)

The paper will examine the evolution of fortification systems in the coastal and hinterland areas of the Southern Levant during the Middle Bronze Age II-III (1800-1550 BC) through a number of illustrative case studies. In fact, in the context of the evolution of defensive systems, the period between the 18th and the end of the 16th century BC represents a remarkable moment for the Levantine area, in connection with an important period of urban development but also with a significant destruction caused by the Egyptian campaigns which changed not only the political and socio-economic situation of the region but also its defensive strategies. For each site, in addition to the identification of types and construction techniques employed, of primary interest is to trace and contextualize those elements of continuity and discontinuity that occurred in the development of defensive solutions at an intra-site and regional scale and that can be differentially understood as a witness of innovation or rooting in tradition. Thus, the synchronic and diachronic analysis carried out on the basis of the defensive typologies recognized will make it possible not only to investigate the evolution of individual settlements but also the relationships between each site and try to find the reasons behind keeping the same form or changing it during the use of these systems over the centuries.

13 A MULTISCALE QUANTITATIVE APPROACH TO SAMNITE FORTIFIED LANDSCAPE AND ITS POTENTIAL FOR CROSS-REGIONAL AND CROSS-CULTURAL ANALYSIS IN OTHER HILLFORT SOCIETIES

Fontana, Giacomo (University College London)

The 5th and 4th centuries BC witnessed rapid development of a fortified landscape in the region anciently known as Samnium, in central southern Italy. The inhabitants, the Samnites, organized themselves in markedly different ways from their urban neighbors. Instead of cities, they constructed hundreds of hillfort sites that research increasingly reveals as remarkably empty. The non-urban organization of the Samnites, along with their remarkable resistance to Roman expansion, has been the subject of ongoing debate that still lacks a clear explanation.

This presentation adopts a quantitative approach to address the debate on Samnite society. LiDAR was utilized to develop a new dataset of hillfort sites across south-central Italy. This dataset enabled the exploration of site categories through multivariate cluster analyses and a novel labor-cost model for polygonal masonry. Building on this, geospatial statistics were employed to analyze the spatial and political structure of the Samnite landscape. Fieldwork conducted during the Ancient Hillforts Survey provided empirical validation of the computational approach.

The presentation discusses how adopting a comparative theoretical framework was instrumental in shedding new light on Samnite society while avoiding the region-centric views that have dominated past debates on Samnite organization. In doing so, the Samnite case was aligned with recent studies on hillfort societies in Temperate Europe and elsewhere, revealing remarkable similarities in the ways different societies organized themselves. Furthermore, it discusses the potential of the multiscale computational approach developed for comparative cross-regional and cross-cultural analyses on hillfort societies.

14 A FORTIFIED LANDSCAPE: LANDSCAPE AND IDENTITY IN THE ARCHAIC ATERNO VALLEY (ABRUZZI)

Scarsella, Elena (Independent Researcher)

During the Archaic period (mid 7th to mid 5th century BC), central Apennine was part of a larger network, connecting the Tyrrhenian and the Adriatic coasts of Italy. The mountains themselves were indeed the grand stage of a mosaic of interactions (not always peaceful) that eventually gave origin to the wide ethnic groups known from the classical literary tradition.

In this complex framework, the mountainous landscape of the Apennines plays a major role not only in defining territorial compounds but also in dictating necessities of defence and control of economic resources. Indeed, the harshness and the difficulties of a mountainous environment ensure a general scarcity of resources and it also creates the basis for a strong competition over the few exploitable land and resources. Hence, pivotal assets such as grazing land, mining ores and trade routes became the focus of an intricate system of hillforts and outposts that covers, visually and strategically, the entire Apennine route network.

This paper, through the case study of the settlements of the Aterno Valley (Abruzzi), focuses on the possibility of defining one or more fortification systems and to lead them back to cultural and/or political entities active at the same time in the area under examination. Indeed, an enhanced warrior ideology is highlighted by the widespread presence of

weapons in grave assemblages and testifies the necessity to display (if not practice) violence in order to assert control over borders. The role of war and of its display, then, becomes a pivotal one in defining not only territorial authority, but also in keeping together the delicate and dynamic network of Central-Italian Archaic multiple identities.

15 BETWEEN MOUNTAINS AND SEA. PRELIMINARY DATA FROM THE SURVEY OF THREE PROTOHISTORIC FORTIFIED SETTLEMENTS IN SOUTHERN ALBANIA

Carbotti, Federica (University of Bologna; University of Salento)

Enclosed between the ancient Acroceraunian mountains and the Ionian Sea, southern Albania shorelines seems unwelcoming at a first glance. Steep mountain slopes just up against the coast make landings barely accessible and entrances to canyons that provide inland connections difficult. Despite this, uplands are marked by a dense population consisting of small and medium-sized settlements and fortified sites in strategic locations, often controlling landings and communication routes. The geomorphological features of the territory make archaeological research often very challenging in these places, resulting in a lack of fitting and up-to-date documentation that can shed light on the internal organization and role of fortified sites in their territorial context.

This paper focuses on three of these sites, Badhra, Karos and Kukum, located between the modern centers of Himara and Borsh. Traditionally dated between the Early Bronze Age and the Early Iron Age, they are considered as fortified settlements or shelters for shepherds and represent some of the few fortified sites to have been covered by archaeological excavations and other non-systematic research in the past. These are the starting point for the new activities of the FortNet Project, which from 2023 aims to review the available documentation and implement it with non-invasive methodologies to better understand the function and development dynamics of fortified sites on the coast of ancient Epirus from a diachronic perspective. Preliminary data drawn from the first campaign of fieldwalking and topographic survey by drone and GNSS, along with the resulting spatial analysis, were used to highlight the role of these sites in relation to supply basins and local resources and to highlight possible connections with the Mycenaean world whose presence is simultaneously attested further south along the coast of Greek Epirus.

16 HOW DEPTH IN TIME AND FAR IN SPACE: MULTIPROXY PROSPECTION OF THE IRON AGE HILLFORT OF IRULEGI (ARANGUREN VALLEY, NAVARRE)

Aiestaran, Mattin (Aranzadi Science Society; EHU/UPV) - García-García, Ekhine (Aranzadi Science Society; SOT) - Ruiz-Gonzalez, Daniel (Aranzadi Science Society) - Narbarte-Hernandez, Josu (Aranzadi Science Society) - Mendizabal-Sandonis, Oihane (Aranzadi Science Society; EHU/UPV) - Agirre-Mauleon, Juantxo (Aranzadi Science Society) - Mujika-Alustiza, Jose Antonio (EHU/UPV) - García, Jesús (Gobierno de Navarra) - Sesma, Jesús (Gobierno de Navarra) - Iriarte, Eneko (UBU)

The archeological survey works carried out in the Irulegi site, located on top of the Irulegi mountain (Aranguren Valley, Navarre), indicate that it is one of the most prominent examples of protohistoric fortified villages in the vasconic territory in the western circumpyrenean area due to its long diachrony and the good preservation of its remains.

This site has been prospected in an intra-site interdisciplinary approach, using different geophysical and direct methods. Geophysical prospections, geo-archaeological surveys, chemostratigraphic analysis, test-pits and excavations have been made in the area.

From the surveys carried out, it is inferred that the hillfort was erected for defensive purposes and for control of the surrounding territory in the Middle Advanced Bronze Age, between the 15th and 11th centuries BC, in the context of the rise of fortified settlements in the nearby areas. Since then, and throughout the Iron Age, it has been occupied until the first third of the 1st century BC, when it was abandoned after an attack by the Roman troops in the context of the Sertorian wars.

This continuity in the archaeological record, together with the excellent quality and preservation of the archaeological evidences that were found, makes Irulegi a reference settlement for the knowledge of the emergence of fortified settlements in strategically important locations as the Irulegi mountain and the socio-economic evolution of the protohistorical populations in the circumpyrenean area.

17 HILLFORTS IN CENTRAL-WESTERN IBERIA. INTERPRETATIVE BIASES AND NEW APPROACHES IN THE STUDY OF HILLTOP SITES

Menéndez-Marsh, Fernando (University of Groningen)

The 2nd Iron Age (4th century BC-1st century BC) in central-western Iberia is associated with the presence of fortified settlements located on hilltop locations. The most characteristic feature of these sites is the presence of defensive elements enclosing the elevated location. Despite being the most representative archaeological site of this period in Northern Alentejo (Portugal) and Western Extremadura (Spain), knowledge of these sites is unfortunately limited.

The preponderance of classical sources over archaeology and ideological uses of the 'indigenous resistance' discourse against Rome have provoked an absence of an Iron Age archaeological tradition and the focus on certain topics such as ethnicity. Consequently, the interpretations of the hillforts have been subjected to be fitted within the descriptive structure set by the classical authors who wrote about the indigenous communities from etic points of view. Moreover, the interpretations of these sites are affected by generalisation (features identified in one hillfort are assumed to be present in others), an excessive focus on functional interpretations of the enclosures, and of erroneous chronological interpretations derived from their assumed condition of index-fossils of the pre-Roman period. Additionally, the narratives surrounding their abandonment are influenced by the traditional 'romanisation' framework producing unsatisfactory and Romano-centric perspectives.

In this proposal, a Landscape Archaeology study of hillfort location will be presented which attempts to go beyond the issues presented previously and propose alternative interpretations derived from their spatial setting within the territory.

18 SAME HILL, DIFFERENT CLIMB? A MACROREGIONAL COMPARATIVE ANALYSIS OF FORTIFIED HILLTOP SETTLEMENTS

Davies, Kelly (Cardiff University)

Fortified hilltop settlements, or 'hillforts', have been built by different societies around the world for millennia. They are often a dominant feature within their landscapes, archaeological interpretations, and public perceptions of heritage. There are up to 30,000 later prehistoric hillforts across Europe, as well as numerous examples of comparable earthen constructions in Asia, Africa, Oceania, and North and South America.

This ongoing PhD research aims to transcend regional, chronological, and disciplinary boundaries to offer a macro-regional analysis of fortified settlements. Utilising case studies in New Zealand, Japan, and the USA, and a mix-methods approach combining archaeological, ethnographic, and experiential data, the research aims to understand why these unconnected societies chose to build and use 'hillforts'? What difference(s) and repetition(s) can be seen between these societies and their fortified settlements? And moreover, by conducting a comparative analysis of these case studies, what insights might we gain for our understanding of European Iron Age hillforts?

19 FORGING IDENTITY: EXPLORING THE CULTURAL IMPACT OF WALL CIRCUITS IN THE TARANTO REGION

Rizzo, Raffaele (University of Bari Aldo Moro)

The construction of wall circuits represents a process through which a community builds its own identity, alters the surrounding landscape, and creates its own "landscape of memory". The period between the end of the Bronze Age and the arrival of Greek settlers in southern Apulia represents an excellent example of these dynamics, which can be investigated through GIS. Spatial analyses such as visibility, accessibility, catchment or network analysis help reconstruct the impact of walls on the territory and on different communities, reconstructing communication networks among various settlements or assessing their recognizability in the territory. In the specific case, furthermore, the study of fortifications can help reconstruct and evaluate settlement dynamics in the area of Taranto before and after the arrival of Greek colonists. Within the communities of Salento, indeed, the construction of walls can be interpreted as an action of the community, coordinated by an emerging elite that channels the workforce. In the moment following the arrival of the colonists, however, the walls allow the definition of a new and dynamic border area or middle ground and the reconstruction of the expansion of colonists into the chora.

20 FORTIFIED LANDSCAPES IN ANCIENT EPIRUS: NEW RESEARCH IN THE HELLENISTIC SITE OF ÇUKA E AJTOIT (ALBANIA)

Bogdani, Julian (Sapienza University of Rome)

Fortifications are a very well-known and paramount feature of the archaeology of ancient Epirus, and as such, have been made objects of many studies in the last century. On the other hand, stratigraphic data has been for many decades very scarce, only limited to major centres and never directly related to defensive structures. If we add to this the often-inaccessible nature of the minor fortified sites, it becomes clear why stylistic analysis is traditionally the only methodology available in dealing with these infrastructures.

The recent generalised availability of affordable technologies capable of documenting remote areas with accurate metric precision, such as photogrammetry from drone-captured images or LiDAR, is slowly changing our perspective. The study case of the hilltop site of Çuka e Ajtoit, a fortified site of the Late-Classical and Hellenistic period is highly significant in the context of coastal Epirus. The circuit of the fortifications is fully integrated into the natural slopes and cliffs and provides a detailed overview of different masonry techniques used in the region, from irregular polygonal to trapezoidal, and finally to ashlar, challenging the traditional chrono-typological model used so far. Trenches excavated

in different areas of the site are providing additional stratigraphic evidence to call into question chronologies of contexts based uniquely on masonry styles, at least at Çuka e Ajtoit.

While data collected with new protocols are still statistically limited and style-based dating remains for the time being the main recourse we have for regional-scale analysis, it is possible to start a broader methodological discussion based on our enhanced capability of collecting and analysing highly precise and detailed data from the field.

21 THE ROLE OF ARCHITECTURAL TRANSFER IN THE PRE-ROMAN DACIAN LANDSCAPE OF POWER: THE CASE OF HELLENISTIC TOWERS

Dragan, Andreea (Institute of Archaeology and Art History Cluj-Napoca, The Romanian Academy) - Ferencz, Iosif (The Museum of Dacian and Roman Civilization Deva, Romania; West University of Timișoara, Romania) - Rogobete, Carmen (Independent researcher; Yardi Systems) - Gál, Ágnes (Babeș-Bolyai University)

The architectural landscape of pre-Roman Dacia witnessed a specific convergence of Mediterranean influences and local adaptations, particularly evident in the construction of stone towers as part of fortified sites. These towers emerge starting with the 1st c. BCE as a distinct architectural phenomenon within the regional context of fortified settlements. They introduce in the local built landscape a new type of construction, using new types of materials, which prove an intimate understanding of Greek architecture either from the part of the commissioner or architect and, at the same time, mirror a stark distance from the local architecture of buildings through size, sturdiness and even colours. However, while Dacian towers owe their genesis to Hellenistic architectural paradigms, their development reflects indigenous agency in the choice of materials, function and spatial configuration, thereby infusing the architectural landscape with hybrid expressions.

Starting from the idea that the built landscape has the capacity to activate specific behaviour and attitudes of those interacting with it, this paper aims to explore the potential of Late Iron Age towers from pre-Roman Dacia in instrumentalising social, economic and political strategies. The complexity of factors that intertwine towards an architectural choice and its realisation will be explored through a comparative lens focusing on the roles and spatial arrangements of Dacian towers vis-à-vis Hellenistic structures. Ultimately, the study will examine how the reference to cosmographical distant places of political and cultural prestige could have been used by the leading actors of pre-Roman Dacia as social and ideological content, inferring their integration into broader networks of cultural and political prestige, yet anchored in a local set of exigencies and aspirations.

472 ARCHAEOLOGIES OF CLIMATE CHANGE?: CURRENT ISSUES AND FUTURE DIRECTIONS

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Heitz, Caroline (University of Bern, Institute of Archaeological Sciences; University of Bern, Oeschger Centre for Climate Change Research) - Riede, Felix (Aarhus University, School of Culture and Society, Department of Archeology and Heritage Studies; Aarhus University, iCLIMATE Aarhus University Interdisciplinary Centre for Climate Change) - Bogaard, Amy (University of Oxford, School of Archaeology) - Hafner, Albert (University of Bern, Institute of Archaeological Sciences; University of Bern, Oeschger Centre for Climate Change Research) - Ruiz-Giralt, Abel (Culture, Archaeology and Socio-Ecological Dynamics, Universitat Pompeu Fabra)

Session format: Regular session

Global warming is currently one of the biggest societal challenges that also affects scientific disciplines like archaeology. This was emphasized by the 'EAA 2021 Kiel Statement on Archaeology and Climate Change'. The effects of climatic changes on ancient civilizations have been studied since the early 20th century, but the range of research topics regarding climate change and archaeology has expanded considerably in recent years. In this session we seek to gain a deeper understanding of the thematic interdependencies among the many contemporary 'archaeology of climate change' by mapping these fields of research and their diversity. This involves a broad range of topics, from new, interdisciplinary approaches to research on the impact and social response to climate change in the past, over threats to archaeological heritage due to climate change today and the relevance of insights from archaeologies' unique long-term perspective for the present and future challenges of global warming. Not least, climate change communication is also becoming an acute topic in archaeological practice, from sustainable excavation methods to public outreach, from carbon-reduction in conference organization to museum exhibitions. We invite scholars from all archaeologies and adjacent disciplines to present their latest theoretical, methodological as well as case study-based work to discuss the following questions:

- How do current experiences and societal debates influence our hypothesis and narratives of the past regarding climate change?
- What terminology and interdisciplinary methodologies need further development to research climatic changes and climate related hazards in the past?

- How is global warming endangering archaeological sites and what measures could be taken to ensure their preservation?

- How can we translate archaeological research results to relevant publics, and what are major hurdles?

With these questions, we would like to carve out the current debates, to explore the future avenues for the 'archaeologies of climate change'.

ABSTRACTS

1 CLIMATE CHANGE RESILIENCE AND VULNERABILITIES OF WATERFRONT COMMUNITIES - MIXED METHODS RESEARCH ON 'PILE DWELLINGS' AROUND THE ALPS (4000-800 BCE)

Heitz, Caroline (University of Bern, Institute of Archaeological Sciences, OCCR) - Ismail-Meyer, Kristin (University of Basel, Integrative Prehistory and Archeological Science (IPAS)) - Aellen, Cyrielle (University of Bern, Institute of Archaeological Sciences, OCCR) - Roe, Joe (University of Bern, Institute of Archaeological Sciences, OCCR)

Exploring how waterfront communities coped with floods and long-term lake level changes in the prehistoric past is crucial for a deeper understanding of the vulnerabilities and resilience capabilities related to climate-driven hydrological hazards in the present and future. In this paper responses to climate change effects on lakeshore settlements during the Neolithic and Bronze Age in the Alpine region will be examined using high temporal resolution data from the UNESCO World Heritage pile dwellings. Rising lake levels repeatedly rendered former lakeshore settlement areas uninhabitable and led to temporary interruptions of local settlement activities. To omit pitfalls of environmental determinism and to critically assess the narrative of the causal influence of climatic variability, we apply a socio-archaeological mixed methods approach that combines qualitative and quantitative methods from archaeology and micromorphology with time series statistics on temporally highly resolved archaeological and paleoclimatic proxy data. First results show that Late Neolithic settlements were resistant to seasonal flooding but vulnerable to longer-term lake level rises of higher magnitudes. Settlement communities as such, however, were resilient to both, as spatial mobility and translocal socio-spatial configurations were an inherent part of their way of life. For the Bronze Age, however, these interrelationships are still poorly understood and subject of our current research project "RISE: Climate Change Resilience and Vulnerabilities of Bronze Age Waterfront Communities (2200-800 BCE)".

2 LEAPING INTO THE BRONZE AGE: UNDERSTANDING THE COMPLEX INTERPLAY BETWEEN CLIMATE AND HUMANS IN BELGIUM AROUND THE 3.2 KA EVENT

Leonard, Hannah (Archaeology, Environmental Changes & Geo-Chemistry Research Group; Vrije Universiteit Brussel) - Capuzzo, Giacomo (Archaeology, Environmental Changes & Geo-Chemistry Research Group; Vrije Universiteit Brussel; University Of Trento: Department Of Humanities; Bagolini Laboratory: Archaeology, Archaeometry, Photography) - De Mulder, Guy (Ghent University Archaeology Department, Research Group Protohistory) - Deforce, Koen (Royal Belgian Institute of Natural Sciences, Research Group Quaternary Environments And Humans) - Pincé, Possum (Royal Belgian Institute of Natural Sciences, Research Group Quaternary Environments And Humans) - Boudin, Mathieu (Royal Institute of Cultural Heritage, Radiocarbon Dating Laboratory) - Verheyden, Sophie (Royal Belgian Institute of Natural Sciences, Research Group Geological Survey Of Belgium) - Snoeck, Christophe (Archaeology, Environmental Changes & Geo-Chemistry Research Group; Vrije Universiteit Brussel)

Global concerns about climate change are ever-growing and an emphasis on how these events will impact contemporary societies has led us to look to the past to see how previous populations were affected, especially during the Bronze Age. The LEAP project (LEARNING from the Past) seeks to answer this by evaluating the impact of Rapid Climate Change events (RCCs) on pre- and protohistoric societies and the environment in Belgium through a multidisciplinary approach.

Palaeoclimatic, palaeoenvironmental and palaeomobility data are used to see potential repercussions of the 3.2 ka BP climate event on the transition from the Middle to the Late Bronze Age in Belgium. Statistical modelling applied to available radiocarbon data for Belgium shows a population contraction during the Middle Bronze Age, followed by a resurgence during and after the 3.2 event and a shift in funerary practice from cremation deposits under barrows to cremations in flat graves (urnfields). Strontium isotope analysis comparing populations before and after the 3.2 RCC provides an additional framework for investigation and highlights potential episodes of human mobility and changes in funerary rites, as well as changes in landscape use that can be correlated to climatic deterioration or improvement.

Through using this data, we can see how climate change can affect past communities and place today's climate change within this historical perspective. Through a consideration of the environmental and societal impacts, the LEAP project hopes to be able to inform policymakers on potential future scenarios and enhance public awareness.

3 DEMOGRAPHIC DYNAMICS BETWEEN 3550-1550 BCE IN SELECTED STUDY REGIONS OF CENTRAL EUROPE AND THE ROLE OF REGIONAL CLIMATE INFLUENCES

Großmann, Ralph (Pre- and Protohistoric Archaeology Kiel)

It is clear that environmental hazards recurred throughout the Holocene. Episodes of increased socio-environmental stress combined with resource scarcity are likely to have promoted demographic breakdowns and possibly triggered migrations.

Here, we test hypotheses of socio-environmental dynamics from a European perspective and present results on the impact of climate and environmental hazards on past societies.

Specifically, this project aims to calculate and compare human activity and demographic trends based on ^{14}C summed probability distributions (SPDs) for three Central European regions with a high concentration of archaeological sites and radiocarbon dates, which serve as a proxy for demographic trends. In addition to the published data, we present other proxies for human activity based on environmental or land openness data.

The study regions include: The Circumharz region, the Northern Alpine foreland, and the Czech Republic/Lower Austria. We focus our research on the Late Neolithic to Early Bronze Age.

In addition, the demographic results are correlated with regional climate data in order to assess the impact of environmental hazards, in particular climatic bond events.

The results show that demographic "booms" in one region were accompanied by "busts" in neighbouring regions, raising the possibility that regions prospered at the expense of their neighbours or that population shifted from one region to another. In addition, the results show statistical correlations between population fluctuations and hydroclimatic patterns. Thus, climate was at least partially responsible for demographic trends and may have had an impact on social inequality.

4 THOUGHTS ON CHRONOLOGY: CURRENT PROBLEMS AND POSSIBLE FUTURE DIRECTIONS FOR COMPARING PALAEOCLIMATOLOGICAL AND ARCHAEOLOGICAL DATA

Schirrmacher, Julien (Christian-Albrechts-Universität Kiel)

As highlighted by the 'EAA 2021 Kiel Statement on Archaeology and Climate Change' archaeological and palaeoclimatological research together offer the opportunity to learn from the past. However, the basis for this is precise and robust chronologies in both archaeological and palaeoclimatological data. A particular problem here is certainly the rather small number of precise age control points – especially in older archives. In palaeoclimatological datasets, this often leads to a vague temporal determination of climatic events. For archaeological datasets, the dependence on broad cultural epochs (e.g. Neolithic, Bronze Age etc.) is a crucial issue. A suitable solution to this is not only to increase the number of datings in future studies, but also to organize interdisciplinary fieldwork hand in hand. Furthermore, working with already available data can help us to avoid certain pitfalls for future studies.

In this talk I will present my personal thoughts on current problems of chronology when comparing palaeoclimatological and archaeological data. These problems will be illustrated using published and unpublished data. An updated aoristic approach will be presented as a possible methodological solution when working with existing data. In terms of future directions for the generation and comparison of palaeoclimatological and archaeological data, I will present our strategy for a recent fieldwork in Andalusia.

5 THE ARCHAEOLOGY OF CLIMATE: SEARCHING FOR RAINS IN THE THEBAN NECROPOLIS (EGYPT) IN THE 16TH CENTURY BC

López, Laura (CSIC, Madrid)

A Spanish archaeological mission, known as Proyecto Djehuty, has been working on the excavation and restoration of the tomb-chapels of Djehuty, Hery (TT11-12) and its surroundings at the north of Dra Abu el-Naga since 2001. In front of the open courtyard of TT 11, a relatively large mudbrick offering chapel and its enclosure wall was found, dating to the 17th or very early 18th Dynasty (ca. 1520 BC).

The excavations conducted around the mudbrick chapel and its surrounding wall uncovered evidence of substantial rainfall that is clearly preserved in the stratigraphic sequence. This rainfall led to the destruction of a portion of the chapel and the flooding of its shaft.

This talk aims to present an initial examination of heavy rains and their impact on the necropolis attested in the stratigraphy. Based on the consistency of pottery chronology, the decorated plaster fragments from the chapel, and wooden votive figurines found near the structure, it is proposed that the heavy rains occurred at the very beginning of the 18th dynasty (ca. 1520 BC). This climatic event can be associated with the incident described in the so called "Storm Stela" during the reign of King Ahmose.

6 IDENTIFYING RESILIENT CULTIVATION STRATEGIES IN RELATION TO CLIMATE CHANGE IN PREHISTORY

Bishop, Rosie (University of Stavanger)

Identifying resilience in relation to climate change in the archaeological record is not straight forward. There are challenges with identifying chronologically and spatially relevant climate shifts that would have affected past human communities, and in establishing causality between contemporary climate changes and human actions in the past. There is also a need to avoid environmental determinism when comparing archaeological and palaeoclimate data. Ultimately, to overcome these issues, sophisticated approaches which combine multiple strands of evidence from different disciplines and diverse theoretical approaches are required.

This presentation will discuss these issues using a case-study which explains current evidence for resilience and adaptation of cultivation strategies in Neolithic Scotland. The evidence for differences within and between regions with regards to agricultural and societal adaptations at this time, as well as for temporal change in agricultural practices highlights potential interactions between local short-term human decisions and the impact of longer-term climate change, although there are challenges with linking this evidence to climate change. The presentation will then outline a new interdisciplinary research project, which will build on this research, with the aim to develop the methodology for identifying resilient agricultural practices in the past in relation to climate change. Using a comparative approach focusing on Atlantic Scotland and Southern Norway throughout prehistory and by incorporating data from different disciplines, the project aims to provide a more sophisticated understanding of long-term human-climate interactions in the past.

7 QUANTITATIVE ETHNOARCHAEOLOGY AS A TOOL FOR EXPLORING HUMAN ADAPTATION TO CLIMATE CHANGE

Ruiz-Giralt, Abel (Pompeu Fabra University) - Biagetti, Stefano (Pompeu Fabra University; University of the Witwatersrand) - Lancelotti, Carla (Pompeu Fabra University; ICREA (Catalan Institution for Research and Advanced Studies))

Traditional ecological knowledge represents a rich reservoir of adaptive solutions for various environmental and climatic conditions. Traditional socio-ecological systems often emerge from long-term processes of adaptation at the local level, resulting in highly resilient systems that have endured for hundreds or even thousands of years. In this paper, we propose the utilization of computer modeling techniques to explore past-to-present food systems through time. To do so, we employ ethnographic information recorded over the last 200 years, retrieved from large online databases (such as eHRAF, D-PLACE). Unlike particularistic studies focusing on one or a few cases, this transcultural, cross-temporary approach can highlight patterns of human ecological behaviour shared among different communities regardless of time and space. As archaeologists, employing such a procedure allow us to enhance our understanding of the adaptive mechanisms shaping long-term socio-ecological systems in the past. This is extremely relevant in addressing the challenges that humanity is facing in relation to the ongoing ecological crisis, thereby showing the importance of including humanities and social sciences in the battle against climate change.

8 INSIGHTS ON TERRACE FARMING AND HUMAN ADAPTATIONS TO LATE HOLOCENE CLIMATE CHANGE IN NORTHERN APENNINES (ITALY)

Brandolini, Filippo (Massachusetts Institute of Technology ; Università degli Studi di Milano)

This study pioneers the utilization of Optically Stimulated Luminescence Profiling and Dating (OSL-PD) in the realm of Italian landscape archaeology. Focused on the Northern Apennines region, its primary objective is to unearth the origins of terrace farming systems. The findings paint a vivid temporal portrait, suggesting that the establishment of agricultural terraces predominantly unfolded during the 11th to 13th century CE. This pivotal period closely intertwines with intricate socio-economic dynamics, such as the “encastellation process”, and coincides with the climatic fluctuations characterizing the Medieval Climate Anomaly (MCA). Subsequently, the historical rural landscape witnessed continuous transformations in the centuries that ensued.

Notably, the main phases of reconstruction correspond to the coldest periods of the Little Ice Age (LIA), offering new insights into the historical interactions between human activities and the environment during the Late Holocene in this study area. Moreover, this research seeks to provide insights beyond the archaeological context, highlighting the enduring significance of terrace farming as a viable agricultural approach in response to the current changing environmental conditions posed by Current Global Warming (CGW) in Northern Italy.

9 FOOD PRODUCTION, CLIMATE ADAPTATIONS AND ECONOMIC INTEGRATION IN NE IBERIA: A MESSAGE FROM THE PAST TO THE FUTURE THROUGH BIOARCHAEOLOGY

Nieto-Espinet, Ariadna (Grup d'Investigació Prehistòrica (GIP), Departament de Geografia, Història i Història de l'Art, 2021-SGR-01607-ARQHISTEC, pl. Victor Siurana 1, University of Lleida, 25003, Lleida, Spain.) - Tarongi, Miguel (ISEM-UMR 5554, University of Montpellier, CNRS, EPHE, IRD, 2 place Eugène Bataillon, CC065, bat. 21, Montpellier, Cedex 5 34095, France) - Aguilera, Mònica (Dep. de Ciència i Enginyeria Forestal i Agrícola, ETSEA, Av. Alcalde Rovira Roure 191, University of Lleida, 25198, Lleida, Spain.) - Alonso, Natàlia (Grup d'Investigació Prehistòrica (GIP), Departament de Geografia, Història i Història de l'Art, 2021-SGR-01607-ARQHISTEC, pl. Victor Siurana 1, University of Lleida, 25003, Lleida, Spain.)

Since its implementation, the Common Agricultural Policy (CAP) has played a significant role in the transformation of crop and livestock farming in Mediterranean landscape areas. Through its subsidy and support policies, the CAP has encouraged the production of certain crops and livestock practices to the detriment of others, leading to a radical change in the agricultural and livestock structure of these regions. Priority has been given to intensive high-yielding crops, as well as intensive livestock with “improved” breeds. On the other hand, more sustainable traditional agro-pastoral systems adapted to the Mediterranean environment have been progressively abandoned. This has had a significant impact on biodiversity, agricultural landscapes, and has contributed to the loss of biological and cultural diversity across Europe.

With climate change and the energy crisis, an intense debate has emerged on the sustainability and impact of the current food production model, which relies heavily on non-renewable natural resources.

In this paper, we aim to address these questions from a diachronic and interdisciplinary approach that integrates archaeozoological and archaeobotanical data from the NE peninsula between the Neolithic and Medieval periods. The results provided warn, on the one hand, of the current disconnection between agricultural models and local ecosystems. On the other hand, they show the potential of bioarchaeological research to provide knowledge on the evolution of agricultural and livestock practices, as well as their adaptation and complementarity in different political systems. Bioarchaeology can provide key insights into which livestock and agricultural species that have been the most sustainable in Mediterranean landscapes over time. In this sense, knowledge transfer is crucial to establishing an effective dialogue between science and society, connecting the past with the present. We will reflect on how bioarchaeological research rooted in the territory facilitates the transfer of knowledge with citizens, producers, and local public administrations.

10 THE IMPACT OF CLIMATE CHANGE ON YORTA YORTA INDIGENOUS ARCHAEOLOGY IN THE MURRAY RIVER REGION, SOUTHERN AUSTRALIA

Bestel, Sheahan (Independent Researcher)

The Yorta Yorta people have lived along the banks of the Murray River for at least 20,000 years. Yorta Yorta lands flooded periodically throughout prehistory, so communities living here are used to regular flooding. Today, however, their cultural heritage is under threat from climate change, including from the ever-increasing floods that wash away or damage cultural heritage sites including mounds, middens, artefact scatters and ancestral remains. The introduction of weirs and locks on the river has attempted to control the floods, but climate change means the floods are becoming more and more erratic and sometimes the weirs overflow after heavy rains. Yorta Yorta staff including cultural heritage officers and archaeologists are now carrying out works to monitor and protect cultural heritage after recent devastating floods. I will discuss recent archaeological monitoring and cultural heritage protection works carried out by the Yorta Yorta which attempt to mitigate the effects of climate change.

11 FROM SATELLITES TO SHORES TO STAKEHOLDERS: DECODING CLIMATE CHANGE'S IMPACT ON AFRICA'S COASTAL HERITAGE - INSIGHTS FROM SENEGAL, KENYA, TANZANIA

Ochungo, Pamela (British Institute in Eastern Africa) - Akintayo, Akinbowale (University of York) - Athie, Adama (Institut Fondamental d'Afrique Noire) - Kabiru, Angela (British Institute in Eastern Africa) - Merlo, Stefania (McDonald Institute for Archaeological Research, University of Cambridge) - Michaut, Elias (McDonald Institute for Archaeological Research, University of Cambridge) - Ndiaye, Assane (Institut Fondamental d'Afrique Noire) - Nema, Victoria (Digital Earth Africa) - Sagna, Nicolas (Institut Fondamental d'Afrique Noire) - Lane, Paul (McDonald Institute for Archaeological Research, University of Cambridge)

For the past 40 years, research and action on the impact of climate change on archaeological sites has enormously benefitted from the use of remote sensing and spatial modelling. The advent of freely accessible satellite imagery, such as the Landsat archive provided by USGS and NASA, has facilitated longitudinal studies of past and more recent environmental changes, including forest dynamics and coastal lineaments and assisted in the prediction of future threats. In Africa, the impact of global warming on heritage at smaller scales has been relatively underexplored, pri-

marily due to limited availability of digital data on heritage sites and personnel to undertake threat assessments. At the same time, the predominant reliance on non-digital means of communicating of key stakeholders, such as National Authorities and other bodies that are mandated with the safeguard and monitoring of sites, is a challenge to the communication of results from computational analysis. In this paper, using the case study of coastal vulnerability mapping in Kenya, Tanzania and Senegal, we showcase a methodology developed by the Mapping Africa's Endangered Sites & Monuments (MAEASaM) project that combines the use of digital approaches (such as the systematic creation of digital data on sites and monuments and the use of remote sensing based multitemporal modelling) with conventional cartographic methods, (e.g., like printed maps/reports) to enhance information sharing's reach and efficiency while also accommodating the varied technological capacities and preferences of our stakeholders. Combining information on hundreds of coastal sites in the MAEASaM Arches database and leveraging Digital Earth's Africa Coastal Erosion Datacube, we evaluated shoreline evolution from 1985 to 2023 to identify sites most susceptible to coastal erosion. The results offer insights into the spatial dynamics of coastal vulnerability that we have presented to diverse stakeholders via a combination of static and dynamic presentations.

12 FIRE ARCHAEOLOGY: ASSESSING, MANAGING, AND PREVENTING FUTURE DAMAGE TO ARCHAEOLOGICAL SITES FROM INCREASING FIRE SEASONS DUE TO CLIMATE CHANGE

Swenson, Dain (Büro für Archäologie Neupert, Kozik, & Simm)

By the year 2100, climate change projections predict temperature increases on the European continent of 2.1 to as much as 5.7 degrees centigrade, depending on the long-term actions taken to thwart carbon emissions by national governments. This increase in temperature has broad implications for European ecosystems and regional climates. Already some nations in Europe have begun grappling with the consequences of the warming climate. In 2018, large forest fires swept through Sweden. In 2023 there were summer fires in Greece, Portugal, Spain, and Italy. Europe is being forced to adapt to summer fire seasons which are increasingly similar to those experienced in North America, and they will continue to grow as temperatures climb this century. As experience has shown archaeologists in North America, a strategy of disaster prevention planning and management has been successful in limiting damage to cultural heritage sites in vulnerable parts of the USA. A sub-discipline focused on the protection of cultural heritage in vulnerable areas during the wildfire seasons has developed. These "Fire Archaeologists" work closely with national park services, tribal governments, and fire fighters to identify and protect vulnerable sites such as rock art, historic buildings, or other areas susceptible to ongoing fires. This paper will briefly discuss projected regions on the Europe with high risk of seasonal fires according to current climate change predictions, provide an overview of the strategies used in north America by fire archaeologists, and conclude by discussing current readiness levels and strategies which archaeologists in Europe may consider moving forward, with the goal of planning for changing fire risk to cultural heritage in Europe.

Keywords: fire archaeology, climate change, risk mitigation, cultural heritage.

13 ARCHAEOLOGIES OF CLIMATE CHANGE: THE CASE OF THE ARCHAEOLOGICAL SITE OF OLYMPIA

Pateraki, Kleanthi (Currently Independent Researcher)

The archaeological site of Olympia in western Peloponnese, Greece has been a UNESCO World Heritage Site since 1989. It was included on the World Heritage List on the basis of criteria I, II, III, IV and VI. It is the second most visited archaeological site of Greece after the Acropolis.

The aim of this oral presentation is to examine the archaeological site of Olympia as a typical example of an archaeological site which has been strongly affected by climatic changes during the last 24 years.

Attention will be focused on the natural disasters and extreme weather phenomena, such as earthquakes, floods, fires, windstorms, and hail that have threatened to overwhelm the specific archaeological site since 2000.

In addition, the measures that all the relevant agencies (the Hellenic Ministry of Culture, the Ephorate of Antiquities of Iliia, the German Archaeological Institute of Athens, etc.) have taken, in order to protect the site when these phenomena occur, will be presented.

14 THE HISTORIC ENVIRONMENT AS AN AGENT OF CHANGE IN THE CLIMATE EMERGENCY: A COMMUNITY CENTRED APPROACH

Scardina, Audrey (Historic Environment Scotland)

Environmental change over time has always impacted the built environment; however, the combination of accelerating incremental change and increasingly frequent severe weather events triggered by the climate emergency have put increasing strain on the management of the historic environment. Our Past, Our Future, the Strategy for Scotland's Historic Environment (2023) states that, 'At its heart, therefore, the historic environment is about people... about our

connections with each other and with our places and planet; about the legacies we inherit and those we leave behind. The historic environment is Scotland's story. And it is Scotland's future'. How, then, can historic environment management and policy bring people to the forefront of the conversation, adapting to community needs to be flexible, yet resilient, in the face of climate change and loss? And, if we change our perspectives to see the historic environment as something that is active, ever-changing and defined by the people, connections, and stories it entails, how does that shift our capacity to engage with it?

This paper will present the initial findings of a two-year-long, Arts and Humanities Research Council funded postdoctoral research project at Historic Environment Scotland (HES) which has set out to answer these questions through the running community engagement events at historic and archaeological sites managed by HES. In it, I will present the methodology for grassroots engagement with communities, methods of data analysis used, and initial results of community perspectives on issues such as loss of the historic environment, how can these HES managed sites give back to communities, and other key topics related to the climate emergency.

15 ENDANGERED HERITAGE - CLIMATE CHANGE RISK ASSESSMENT AND MITIGATION TOOL WITHIN THE TRIQUETRA PROJECT (SMUSZEWO - CASE STUDY)

Byszewska-Lasinska, Agata (National Institute of Cultural Heritage, Poland)

The climate changes we are experiencing often have a negative impact on archaeological heritage. There are many factors caused by climate changes that pose a threat to archaeological relics - heavy rains, floods, periods of drought, changes in groundwater levels, changes in the nature of vegetation, erosion. The first step for countering the effects of climate change in the context of archaeological heritage preservation is to identify and assess the impact of individual factors on archaeological structures, and then to develop appropriate tools for assessing and mitigating the effects of threats. The project TRIQUETRA Toolbox for assessing and mitigating Climate Change risks and natural hazards threatening Cultural Heritage is dedicated to develop such tools. One of the planned results is the construction of a platform to assess the impact of various types of hazards on monuments. A systematic approach to identifying threats will be possible through the introduction and testing innovative technologies for their assessment, (Flash Lidar for 3D mapping of underwater relics and attempts to monitor erosion, a spectroscopic sensor for monitoring water quality and so on.

In my paper, I'd like to present various types of TRIQUETRA tools tested at an archaeological site - relics of a defensive settlement of the Lusatian culture in Smuszewo (Poland). The wooden structures, preserved underground and underwater, are threatened due to fluctuations in water levels and rising temperatures, algal blooms or local flooding caused by heavy rainfall, as well as agricultural practices (among other things, by associated chemical changes in soil and water). The solutions developed under the project will allow to assess the risks and develop a strategy to counteract the effects of climate change not only at this site, but will be applicable in similar situations, for other archaeological sites.

16 KEEPING UP WITH THE CORROSION: HOW CLIMATE CHANGE IS AFFECTING THE DETERIORATION OF METALLIC MATERIALS IN UNDERWATER CULTURAL HERITAGE SITES

Cesareo, Ludovica (Department of Geosciences, University of Padova, Padova, Italy) - Coletti, Chiara (Department of Geosciences, University of Padova, Padova, Italy) - Germinario, Luigi (Department of Geosciences, University of Padova, Padova, Italy) - Maritan, Lara (Department of Geosciences, University of Padova, Padova, Italy) - Demesticha, Stella (Department of History and Archaeology, University of Cyprus, Nicosia, Cyprus) - Martins, Flávio (Centre for Marine and Environmental Research (CIMA), University of Algarve, Faro, Portugal) - Ruberti, Fabio (IANDT S.R.L., Marina di Pisa (Pisa), Italy) - Michalis, Panagiotis (Institute of Communication and Computer Systems (ICCS), National Technical University of Athens, Athens, Greece) - Mazzoli, Claudio (Department of Geosciences, University of Padova, Padova, Italy)

In underwater archaeological sites, the metallic materials naturally undergo physical, chemical and biological changes determined by water, sediment and living organisms. But how climate change is influencing this deterioration process? This research, conducted within the THETIDA project (<https://thetida.eu>), focuses on identifying threats posed by climate change to underwater cultural heritage sites, with a specific emphasis on the diverse risks - both direct and indirect - that endanger metallic materials, such as anchors, cannons, and structural elements. Several climate phenomena have been documented in reports of the Intergovernmental Panel on Climate Change (IPCC): sea levels rising, ocean surface temperature increasing, ocean acidification, changes in ocean circulation, extreme wave events and deoxygenation. The objectives of the research are to investigate the deterioration effects associated with climate change, assess their evolution across different environments, and develop prediction models. Different pilot sites included in THETIDA offer varied historical backgrounds, construction materials, and biological ecosystems, enabling a comprehensive comparison: the US Army WWII PB4Y-1 bomber aircraft Liberator off the coast of Praia de Faro (Portugal), the sunken submarine chaser Equa near La Spezia, and an Ottoman shipwreck in Famagusta bay, Cyprus.

As first step of the project, the methodology involves monitoring variables such as temperature, salinity, pH, oxygen levels, and the intensity and direction of currents, alongside the depth and location of each site. In situ corrosion measurements analysis have been performed and mock-up samples of selected alloys have been also placed in the sites, to explore, as next step, the early stages of deterioration and biocolonisation.

Acknowledgement:

This research has been funded by European Union's Horizon Europe research and innovation programme under the THETIDA project (Grant Agreement No. 101095253) (Technologies and methods for improved resilience and sustainable preservation of underwater and coastal cultural heritage to cope with climate change, natural hazards, and environmental pollution).

17 A CHILD-FOCUSED APPROACH TO CLIMATE CHANGE EDUCATION IN THE CONTEXT OF CULTURE HISTORY MUSEUMS

Vestergaard Meyer, Mathilde (Aarhus University) - Riede, Felix (Aarhus University)

Children and playful inter-generational learning were central in how societies adapted to climate change in the past. Likewise, we also appreciate that children are vital when it comes to contemporary climate change adaptation. Yet, when searching for connections between children and climate change, most scholarly work has concerned itself with the psychological and physiological effects. The dominant approach to engaging publics in regard to climate in culture history museums, if present at all, has been limited to content exhibitions. We here assert the need for a new approach to climate change education that is child-focused. In general, culture history museums around Europe that both educate about climatic change and do so in a child-focused way are not many. This is also true for the Danish culture historical museums, where only few explicitly seek to educate children on environmental matters, highlighting the gap that needs to be filled. Working towards such a new approach, archaeology can offer evidence-based insights into the importance of children in the adaptation to climatic changes in the past. Then taking this knowledge into the present via the popular and trusted interface that museums represent will, we suggest, help to not only shed light on the importance of children's societal agency in the past but also empower them in the present. One way to communicate the, at times, challenging theme of climatic changes is via child-centred exhibitions and through gamification. Through gamified experiences, whether complete games or merely game elements, cultural learning in children will be supported in a playful yet impactful way. No matter the pedagogical methodology, bolstering the visibility of past climate change and its causal role in culture change is, we argue, essential for museums to become catalysts of positive social change in this domain.

18 ALTERNATIVE PRESERVATIONS IN THE TIME OF CLIMATE CRISIS

Cottom, Tyler (University of Amsterdam)

Climate change cannot be stopped, and will cause irreparable damage to heritage sites. In some places, it will be impossible to prevent the loss of cultural and natural properties of value. As climate changes, landscapes will also change, transforming the meaning and memories associated with them and allowing new narratives to form. There are options for dealing with this loss: to accept and forget or document and save. Archaeologists must utilise modern methods to save as much as they can in as little time as possible, using digital technology to investigate the past and salvage all viable material evidence in the digital world. As a result, digital preservation has become an essential method for the documentation of heritage resources during times of crisis. Traditionally, visitors would need to visit a site or a museum to receive historical messages, but the advent of 3D reconstruction and Virtual Reality changes that. Digital Preservation creates a new realm for research when the field is no longer safe or accessible. These preservation techniques preserve, promote, and complement heritage landscapes. Further, it allows people to revisit and lost heritage landscapes, reconnecting with cultural memories, emotions, and ties.

19 IS ARCHAEOLOGY READY TO ADDRESS THE CLIMATE HERITAGE PARADOX?

Holtorf, Cornelius (Linnaeus University)

In my paper I argue that for archaeology to address adequately the global challenges of climate change, it needs to overcome the Climate Heritage Paradox. This paradox consists of two apparent contradictions:

(1) At a time when humanity on Earth needs panhuman solidarity, trust, and collaboration to be able to face enormous global challenges together, archaeological and other forms of cultural heritage are still mostly managed and interpreted within frameworks of national governance.

(2) In contemporary society, when humanity anticipates and prepares for climate change and various associated transformations in the future, archaeological interpretation and cultural heritage management predominantly look backward and emphasize preservation and continuities.

There is, therefore, a need for developing new understandings of archaeology and cultural heritage that (a) express a need for humanity to collaborate globally and overcome national boundaries, and (b) are predominantly about stories of change and transformation rather than about preservation and continuity. I argue that such a change of framework will protect and enhance the societal benefits of archaeology and cultural heritage in the age of climate change. For as we are anticipating many transformations in the context of the climate crisis, we must rethink and transform even archaeology and cultural heritage so that it can meet contemporary and future needs.

482 "PAST IS NOT PAST": ENVIRONMENTAL EFFECTS OF PAST LAND USE ON PRESENT RESOURCES ECOLOGY. ENVIRONMENTAL ARCHAEOLOGY BETWEEN RESEARCH AND APPLICATION

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Pescini, Valentina (Catalan Institute of Classical Archaeology (ICAC), Tarragona, Spain) - Aniceti, Veronica (Consejo Superior de Investigaciones Científicas - Institució Milà i Fontanals (CSIC-IMF), Barcelona, Spain.) - Cevasco, Roberta (University of Gastronomic Sciences (UNISG), Pollenzo, Italy) - Gabellieri, Nicola (University of Trento (UNITN), Trento, Italy)

Session format: Regular session

The environmental effects of historical management and production systems are not confined to the past but persist in current resources ecology. Indeed, recent research is demonstrating how the present-day risk of uncontrolled fire, the loss of biodiversity and soil erosion are not solely attributable to climate change but also to changes in environmental management systems and the abandonment of agro-sylvo-pastoral practices that have occurred for centuries (or even millennia).

Past environmental management systems and land use have left specific geo- and bio-markers that are archaeologically identifiable in soils and sedimentary archives. These markers are the legacy of historical (and pre-historical) uses of environmental resources and serve as evidence of environmental effects that these management systems have had on the local ecosystem.

Studying these markers allows archaeologists to uncover the trajectory of environmental formation and transformation processes over time, contributing to a more comprehensive understanding of current environmental changes.

Dealing with historic environmental management involves addressing issues directly related to food production, and more broadly to foodways and their connections with local environmental resources ecology and situated landscapes (foodscapes).

How can these results be applied to improve environmental conservation and regeneration policies, promoting more sustainable management of resources?

How can these research findings be leveraged to raise social awareness about environmental issues related to food (e.g. food production/consuming/discard, food-taboos, food identities, food sovereignty)?

Our session welcomes Environmental Archaeology investigations embedded in interdisciplinary frameworks, where research results have been applied in the following areas: 1) improvement of environmental management policies 2) bio-cultural heritage enhancement 3) re-discovering of local gastronomic heritage and 4) foodways and foodscapes characterisation.

We invite contributions involving expertise from fields such as Historical Ecology, Geography, History, Anthropology, Ethnography, Gastronomy; we also encourage collaborations with non-scientific audiences, including policy-makers, local stakeholders, inhabitants and producers.

ABSTRACTS

1 DISENTANGLING THE SOCIOECOLOGICAL TRAJECTORIES OF MOUNTAIN OLD-GROWTH FORESTS IN THE FRENCH PYRENEES OVER THE LAST CENTURIES

Burri, Sylvain (TRACES UMR 5608 CNRS-Université Toulouse Jean Jaurès, France) - Saulnier, Mélanie (GEODE UMR 5602, CNRS-Université Toulouse Jean Jaurès, France) - Larrieu, Laurent (Université de Toulouse, INRAE, UMR DYNAFOR& CNPF-CRPF Occitanie, France) - Labbas, Vincent (IRPA-KIK/Université de Liège, Liège, Belgium) - Py-Saragaglia, Vanessa (GEODE UMR 5602, CNRS-Université Toulouse Jean Jaurès, France)

The key role of old-growth forests (OGFs) for biodiversity and the mitigation of global change is recognized worldwide. The European Biodiversity Strategy 2030 highlights the necessity of mapping, monitoring and strictly protecting the few remaining OGFs in Europe. Since European OGFs are not primary and fully natural ecosystems, but rather legacies of long-term socio-ecological trajectories, a prerequisite for achieving this objective is a detailed

characterisation of these OGFs from both an ecological and a historical perspective. This talk presents the results of interdisciplinary research on two old-growth fir-beech forests (Burat and Bois-Neuf, Haute-Garonne) in the French Central Pyrenees, carried out as part of the Bendys ANR project. Based on the cross-referencing of historical data on forest management, use and species and dendrological composition, and dendroecological data (from 95 fir and 56 beech), we have reconstructed the specific socio-ecological trajectories of these OGFs over the last 4 centuries and we assessed the impact of human management and use on their current species and dendrological composition.

2 "BROCCOLI OUT OF THE FOREST!" PERSPECTIVES AND ISSUES IN INTERPRETING HISTORICAL ALPINE WOODSCAPES AS FOODSCAPES

Lemmi, Francesca (University of Trento - UNITN, Trento, Italy) - Gabellieri, Nicola (University of Trento - UNITN, Trento, Italy)

In 1876, while traversing Val di Fiemme (Trentino), the English traveler Walter White amusingly observed local residents collecting cones from *Pinus cembra* to extract pine nuts consumed as food, which they referred to as "broccoli". Despite its implausibility in certain aspects, this unique testimony for the region raises the question of how to identify, characterize, and map historical practices of food production and collection in wooded environments, along with their environmental impact.

Interdisciplinary research has long sought to characterize the ecological effects of specific historical production practices, such as grazing, through the cross-utilization of documentary and field sources. However, it is more challenging to historically or archaeologically identify the consistency, prevalence, and consequences of collecting "wild" products like herbs or cones, as well as secondary resources integrated into agricultural and pastoral cycles, such as tree leaves.

In this regard, this contribution aims to explore applicable methods and sources by providing examples from the Alpine context of the current Province of Trento. Particular challenges arise from the lack of conventional archaeological evidence on the ground and the scarcity of archival documentation detailing non-taxable and loosely regulated activities. The proposal suggests rediscovering historical practices by examining current trees and vegetation cover, with a specific focus on two plant species, *Pinus cembra* and *Larix decidua*. This approach seeks a dialogue between environmental resource archaeology and historical geography to overcome the view of wooded landscapes solely as timber producers, revealing their connection to other agro-pastoral activities and a multiplicity of functions such as of "foodscape".

3 AN ARCHAEOLOGY OF GATHERING PRACTICES: TAKING ACCOUNT OF HABITAT HISTORICAL DYNAMICS

Cevasco, Roberta (Università di Scienze Gastronomiche di Pollenzo) - Pieroni, Andrea (Università di Scienze Gastronomiche di Pollenzo)

Adopting the historical approach to the gathering site/ecosystems wild food herbs and mushrooms species position could be rearranged with respect to the dichotomous categories "domestic" and "wild" in land use studies. The ethno-botanical-historical approach proposed here requires to spatially and socially contextualize local collecting practices using emic (and non-ethic) categories, recovering through multiple sources the past ecological knowledges of local gatherers/actors.

Different research carried out in North Apennines (NW Italy) has highlighted how wild food herbs and mushrooms are in a condition of semi-domestication as the presence and abundance of the collected species is the result of the activation of the ecosystem within cycles of practices of local agro-silvo-pastoral systems.

Examples relating to the collection of different mixtures of spontaneous herbs known as prebugiun and gatafin (including for example *Sonchus oleraceus*, *Hyoseris radiata*, *Reichardia picroides* - Cichorioideae sub-family), or single herb as crumbotti, a wild lactuce (*Lactuca perennis*) will be discussed in relation to their habitat history/variation in time. A special mention will be made to the collection of edible mushrooms known as spinaroli (*Calocybe gambosa*) observed directly in mountain pastures of the upper Aveto valley activated by dairy production practices.

The sources used in these researches, in addition to oral sources and historical ecology observations, are of a cartographic, iconographic and bio-sedimentary nature. To date, the results have not been applied in biodiversity conservation policies (e.g. in the management plans of the SCIs in Liguria and Piedmont, which yet include the historical gathering spaces mentioned here).

4 TRANSHUMANCE LANDSCAPES IN THE SOUTHWESTERN ITALIAN ALPS: THE CONTRIBUTION OF PALYNOLOGY IN ENVIRONMENTAL AND CULTURAL HERITAGE

Braga, Lorenzo (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia, Via Campi 287, 41125 Modena, Italy) - Rattighieri, Eleonora (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia, Via Campi 287, 41125 Modena, Italy) - Pescini, Valentina (ICAC - Instituto Catalán de Arqueología Clásica, Plaça d'en Rovellat, s/n, 43003 Tarragona, Spain) - Rellini, Ivano (Department of Earth, Environment and Life Sciences (DISTAV), University of Genoa, Corso Europa 26, 16132 Genoa) - Florenzano, Assunta (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia, Via Campi 287, 41125 Modena, Italy)

Past environmental management systems and land use are important factors determining the current environmental setting and changes in ecosystem structure and function over time. One such practice, transhumance, played a key role in forming and managing rural Mediterranean landscapes. Despite its inclusion in the UNESCO Intangible Cultural Heritage in 2019, transhumance is disappearing, negatively affecting biodiversity and increasing hydrogeological and wildfire risks. Understanding transhumance-influenced landscapes and biodiversity responses to pastoralism is vital to re-promote it as a virtuous management system. Its environmental impact over time can be fruitfully assessed through palynological investigations applied to biostratigraphical records from human-influenced contexts or to archaeological deposits.

This contribution presents palynological data obtained from two test-pits (T1S2, 1579 m a.s.l.; T1S3, 1742 m a.s.l.) excavated in the area of Pian Rosso-Monte Mongioie (SW Italian Alps), a historically documented transhumance area. As part of an environmental archaeological project on past transhumance practices, this work aimed to reconstruct the late Holocene plant landscape of the area, focusing on pasture indicators (pollen and non-pollen palynomorphs). In T1S2, pollen of herbs linked to pastoral practices, such as Cichorieae and other Asteraceae, and soil erosion-associated fungal spores suggest the local presence of pasture/grazing activities. Pollen deterioration typical of animal digestion was observed, further supporting this hypothesis. In T1S3, Poaceae and cereal pollen and coprophilous fungal spores were frequent, indicating local animal stalling with straw. The cross-checking of these records with radiocarbon, soil chemistry and documentary research will be discussed to untangle the complexity of past agro-silvo-pastoral practices and their effects over time. The first results of this research notably remark that, in interdisciplinary frameworks, palynological investigations provide high-resolution information on environmental changes linked to human activities. In reconstructing such a detailed environmental history, Palynology allows an assessment of historical sustainability, significantly enhancing our knowledge of past virtuous environmental management.

5 A PLEA FOR AN ENVIRONMENTAL ARCHAEOLOGY OF HUNTING RESOURCES: LOST FOODSCAPES IN THE LIGURIA MOUNTAINS (NW ITALY)

Moreno, Diego (University of Genoa)

Environmental Archaeology and Historical Ecology research carried out on a local scale (i.e. individual landscape) in the Ligurian mountains (NW Italy) have revealed how the present ecology/biodiversity (e.g. the herbaceous species composition of the ground cover) is directly related to complex historical land use practices, now completely lost. In the mid-19th century, most of the upper lands were shared in a common system of environmental resource use, the so-called "comunaglie". Through this management system, an important stock economy based on ovine transhumance was supported almost continuously since the late Middle Ages. The pastoral fire regime and general local grazing and foddering practices activated the landscape ecosystem producing several differentiated habitats that became highly suitable for game-keeping. These landscapes have now largely disappeared following over a century of abandonment of agro-silvo-pastoral practices and the effects of recent rewilding policies. Some evidence documenting the positive effects of such historical pastoral production will be discussed through the analysis of sedimentary, iconographic/cartographic, documentary, and oral sources as well as ethnographic/naturalistic museum collections. Examples (mainly situated in the NW Ligurian Apennines) will be in relation to hare (*Lepus europaeus*), wolf (*Canis lupus Linnaeus, 1758*), and fowling habitats. The interest in research on game resource planning will be also discussed. To understand this "unvoiced" management and wild animal relationships in such a particular societal context we need to redefine both the current land use categories (e.g. cultivated/uncultivated places, wild/domestic animals) as well as hunting/game practices by placing them in the historically changing local foodways.

6 UNTOUCHED WILDERNESS OR CULTURAL LANDSCAPE? HISTORICAL REINDEER CORRALS AS A TOOL FOR STUDYING PAST HUMAN INFLUENCE ON SUB-ARCTIC ECOSYSTEMS

Myrsky, Eero (University of Helsinki; Arctic Centre, University of Lapland) - Manninen, Outi (Arctic Centre, University of Lapland) - Lähteenmäki, Maria (University of Eastern Finland) - Ilmolahti, Oona (Arctic Centre, University of Lapland) - Kumpula, Timo (University of Eastern Finland) - Korpelainen, Pasi (University of Eastern Finland) - Stark, Sari (Arctic Centre, University of Lapland)

Reindeer have been a part of northern ecosystems since the beginning of the Holocene and the history of reindeer herding in Fennoscandia dates back over 1000 years. Reindeer is considered a keystone species in northern ecosystems, and can alter the structure of vegetation communities and soil properties with intense grazing. In early phases of the history of reindeer herding, animals were kept in small numbers and for different purposes, but from 1600's onwards a transition towards more large-scale herding started to occur, resulting in higher pressure on local ecosystems due to a significant growth in herd sizes. As vegetation succession in the cold environments is slow, many of the past disturbances caused by herding related activities are still visible today. Intense herding practices can even lead to a shift in vegetation to completely alternative states, where it can remain more or less stable for centuries. In this case, a dominant dwarf-shrub vegetation usually gets replaced by graminoids. Due to the long-lasting effects of land use on the environment, a sufficiently long time-scale is required to understand how past land use has shaped the landscape of the present day.

We gathered data from historical reindeer corrals from a wide geographical range in northern Fennoscandia. These corrals were used from 1800's to 1950's by local Saami people for different herding related practices such as reindeer separation, milking, and calf marking. After the cessation of their active use, the vegetation has had a long time to recover. We collected vegetation and soil data from the corrals, and also photographed many of them for the Sámi Museum Siida. We show that the present-day landscape in northern Fennoscandia is in many ways shaped by historical human influence, and that the historical herding activities still shape the landscape, resulting in distinct, often more diverse, vegetation communities.

7 CREATING LANDSCAPES. MEDITERRANEAN MARKET AND ANIMAL HUSBANDRY IN IRON AGE AND ROMAN CATALONIA: ZOOARCHAEOLOGICAL DATA IN PERSPECTIVE

Valenzuela-Lamas, Silvia (Archaeology of Social Dynamics (ASD), Institució Milà i Fontanals, Consejo Superior de Investigaciones Científicas (IMF-CSIC); Centro de Arqueologia da Universidade de Lisboa (UNIARQ))

From the Neolithic onwards, human agency over land use has progressively increased, and animal husbandry has played a significant role in the creation of landscapes. Recent regional syntheses reveal that significant changes occurred in many areas of Western Europe between the Iron Age and Roman transition, and some economic productions have persisted until today. This presentation will provide an integrated perspective of the zooarchaeological record in Catalonia (NE Spain) between the first millennium BCE and Late Antiquity (c. 800 CE) by combining archaeological, environmental, zooarchaeological and isotopic data. The archaeological record suggests that wine, cereal and wool production (and related industries) had a major impact on land use from the Iron Age onwards. This productive model has persisted –with some modifications – until recent times. The presentation will discuss the potential of archaeology to characterise long-term economic processes, and will relate present-day animal husbandry in Catalonia with the changes in forest cover, land use, and the current scenarios in the context of climate change.

484 ARCHAEOLOGIES AND HERITAGIZATIONS OF HISTORIC AND CONTEMPORARY VIOLENCE

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Baillie, Britt (Roskilde Viking Ship Museum; University of Amsterdam) - Kim, Geonyoung (University of Cambridge) - Saqqa-Carazo, Miriam (Universidad Complutense de Madrid) - Renshaw, Layla (Kingston University) - Walker, Yoon (SOAS)

Session format: Regular session

In the aftermath of violence, the identification, excavation, and analysis of sites at which such acts were carried out can be key to ensuring justice and a sense of closure for the families of those who perished. Once located, the process of excavation can evoke strong reactions and at times polemical debate. These places, be they concentration camps, sites of massacre, or incarceration, can become iconic sites of commemoration and often accrue memorials or become 'sacralized' sites of memory. However, many recent conflicts are not waged by opposing militaries, but rather by paramilitary or guerilla combatants, or by state actors against their own populations. During conflicts, alliances between various groups may shift. A consensus on who to commemorate is not always forthcoming. Competitive commemoration, desecration, or willful neglect may immediately follow a conflict. In turn, the sites of 'pain' of the

'Other' may be 'orphaned' on the 'wrong' side of a border or the 'fault line of memory'. What new discursive spaces do these sites open? Can one ensure that their heritagization acknowledges their respective historical and political specificities without reify divides? What can be learned from non-state sanctioned 'grassroots' activities at these sites (without romanticizing them)? Can such sites contribute to sustainable peace?

The discovery of older historic sites of violence often result in headline grabbing articles. Does the heritagization of historic sites of violence necessarily entail voyeurism and 'dark tourism', or does it contribute to a valid exploration of violence? Can historic sites of violence be understood through the same lenses as their more contemporary counterparts? How and why does their excavation and heritagization differ from those encountered for more recent examples?

Themes may include, but are not limited to:

- archaeology of sites of violence;
- management of the material remains of violence;
- museology, memorialization, and heritage interpretation of violence.

ABSTRACTS

1 LANDSCAPES OF THE OTTOMAN CONQUEST: BATTLEFIELDS, HERITAGE, AND MEMORY IN SOUTHEASTERN EUROPE

Parvanov, Petar (National Archaeological Institute and Museum - BAS)

Nothing quite captures the historical imagination like warfare. And very few stories of conquest can match the Ottoman military expansion from Gallipoli to Vienna and its consolidation of power over the Balkan peninsula. This presentation will report on a project re-evaluating the accounts on four prominent battles through an integrated conflict archaeology perspective. The principal case studies include, the battle of Maritsa (AD1371), the first battle of Kosovo pole (AD1389), the battle of Nikopol (AD1396), and the battle of Varna (AD1444). In the centre of the approach was the understanding that battle sites are not merely the setting for interpersonal violence rather than culturally and socially constructed landscapes of conflict. The military experience in the late medieval Balkans is provisionally reconstructed by complementary textual and archaeological observations on the modes of terrain use, markings on the sites etc. Arguably, the material signature of organized warfare holds a particular value for the long-term commemoration and cultural heritage. The comparative and interdisciplinary analysis on these foci of the Ottoman conquest shows a rather disproportionate scholarly and public interest on the different sites. It also reveals the varying entanglement of contemporary interpretation and heritagization of space with the narratives about violent events in the distant past.

2 THE TANGIBLE AND INTANGIBLE LEGACY OF THE FIRST WORLD WAR: THE SASSARI BRIGADE FROM REMEMBRANCE TO MYTH

Azzalin, Giovanni (University of Sassari) - Milanese, Marco (University of Sassari) - Magnini, Luigi (University of Venice)

This paper aims to investigate how the remembrance of the Sassari Brigade – one of most famous military unit of the Royal Italian Army during the First World War – was transmitted in time, focusing on the landscape transformations from the battlefield to the existing memoryscapes. Indeed, in the aftermath of the conflict, and still today, monuments have been built on the former battlefields to remember the fallen thus becoming landmarks of celebration and glorification in the Fascist Era, then memory and, lastly, commemoration.

In order to do that, different kind of information are taken into account: firstly, archaeological data has been collected through the study of historical aerial photographs, cartography and ground truthing to reconstruct and understand the Sassari Brigade warscape; then, monuments, epigraphs, restored cemeteries and other evidence of military remembrance have been mapped to evaluate the activities carried out in memorialisation (e.g. methodology and goals of restoration). The gained information has led to investigate how memory from different generation, social extraction and geographic origin shapes the feeling concerning the brigade, thus making the places as real "pilgrimage" sites (in institutional, commemorative, associative and individual terms). These different approaches in the transmission of memory are also manifested physically through the creation of dedicated venues or events that can, sometimes, directly affect First World War sites. Emblematic are the historical re-enactments that re-excavate the original trenches in absence of archaeological expertise to use them for their purposes or, also, the countless illegal digging activities conducted by people armed mostly with metal detector that, in a kind of distorted voyeurism, disrupt the archaeological contexts. In this perspective, violence is not only simulated in events, mostly promoted to attract macabre tourism, but is also applied ex novo on sites that deserve greater protection and preservation.

3 **TRANSLATING IMPERIAL VIOLENCE: INTERNATIONAL AND DOMESTIC INTERPRETATION OF ASIA-PACIFIC WAR MUSEUMS IN KYOTO AND TOKYO, JAPAN**

Moxham, Oliver (University of Cambridge)

The Asia-Pacific War (1931-45) remains a divisive conflict in East Asia, not only between nations but also within Japan where narratives are split between progressive, peace-oriented, or nationalist perspectives. War museums present material heritage from the same conflict in contradictory ways: a medal for the annexation of Manchuria into the Japanese empire is shown with pride in the Yūshūkan Museum of War in Tokyo, while the Ritsumeikan Museum for World Peace in Kyoto presents bloodied clothing of civilians killed by Imperial Japanese soldiers to demonstrate the violence of imperial expansion.

Discourse analysis of Google Maps reviews at these museums reveals that these contradictory narratives of the Asia-Pacific War elicit opposing interpretations from domestic visitors on how the conflict and empire ought to be remembered. However, linguistically adjacent to this are the interpretations of overseas visitors, some of whom personally identify with the history of the Asia-Pacific War, seeking to understand the Japanese perspective on the conflict through translated materials at these sites.

This paper presents a year's worth of data-gathering at these two war museums, analysing their English and Japanese texts and comparing them with domestic and international visitor interpretations to understand the role of translation in facilitating or impeding intercultural narratives of past violence. My findings suggest translation is essential in allowing stakeholders of past conflicts to develop an international historical perspective. However, without consultation with international stakeholders, translated narratives of international violence can fail to address or even outright dismiss information important to international visitors. Despite this, stakeholder visitors demonstrate a capacity to learn from war narratives even when they disagree with how they represent past violence, instead providing additional information in neutral online spaces like Google Maps for future visitors.

4 **BEYOND THE FENCE: A COMPARATIVE ARCHAEOLOGY OF THE FRANCOIST CONCENTRATION CAMPS (DES-ALAMBRAR)**

Muñoz-Encinar, Laura (University of Barcelona (UB). Barcelona, Spain.; Spanish National Research Council. Institute of Heritage Sciences (INCIPIIT CSIC). Santiago de Compostela, Spain.) - Alegre Lorenz, David (Autonomous University of Barcelona (AUB). Barcelona, Spain.) - Aragüete Toribio, Zahira (Independent researcher) - Douglas, Lee (Goldsmiths University of London. London, United Kingdom.) - González-Trejo, Alejandro (Spanish National Research Council. Institute of Heritage Sciences (INCIPIIT CSIC). Santiago de Compostela, Spain.) - Incio del Río, Cristina (Spanish National Research Council. Institute of Heritage Sciences (INCIPIIT CSIC). Santiago de Compostela, Spain.) - Rodríguez-Hidalgo, Antonio (Spanish National Research Council. Institute of Archaeology of Mérida. (CSIC-Junta de Extremadura). Mérida, Spain.; Catalan Institute of Human Paleoeology and Social Human Evolution (IPHES-CERCA). Tarragona, Spain.) - González-Ruibal, Alfredo (Spanish National Research Council. Institute of Heritage Sciences (INCIPIIT CSIC). Santiago de Compostela, Spain.)

In Spain, there were nearly two hundred concentration camps. Between 367,000 and 500,000 prisoners went through those camps, from the coup d'état in July 1936 until January 1947, when the last camp ceased to operate. The 'rhetorical' end of the civil war in April 1939 resulted in tens of thousands of prisoners being (re)integrated into the social fabric of the "New Spain". From then on, thousands of inmates embarked on a journey which, in the best case, would take them to concentration camps, prisons, or forced labour camps. The diversity of spaces that the camps represent is substantially unknown, and its comparative study presents a potential source of historical knowledge. This paper outlines the first results of the project DES-ALAMBRAR, which addresses the analysis of Francoist concentration camps from the study of the material culture left behind by the violence exerted on them.

The results have provided new data about the complexity of Franco's repressive apparatus and its organisation. The outcomes of the project reveal new aspects of the role played by violence as a form of social control as well as the extreme living conditions to which the inmates were subjected. Many of them were executed or died as a result of diseases derived from the hard living conditions inside the camps. Furthermore, it allows us to shed light on the specific violence applied to women, descendants of prisoners and other minority groups in society. Our results have also allowed us to get closer to the traces of the past that remain in the present of Spanish society— where together with the multiple materialities of war and the Dictatorship, there are also concentration camps or forced labour camps, as well as the bodies of those who disappeared and the mass graves where they are buried.

5 **HERITAGE-MAKING IN SPANISH CIVIL WAR LANDSCAPES: A CASE STUDY FROM THE MERINDADES AREA, BURGOS**

Perez-Juez, Amalia (Boston University)

In 2022, we started working in an area where domestic and foreign troops gathered in 1937 to prepare a crucial episode of the Spanish Civil War: the beginning of the battle of Santander. We have catalogued remains from the Italian and Spanish troops, inventorying war-related vestiges (trenches, memorials, shelters, engravings, etc.) and recorded memories from the shrinking local population. This work serves the larger goals of the project, which include a proposal for the preservation of Civil War remains and the resignification of heritage spaces and monuments, some of which are clearly anti-democratic.

The state-led strategies implemented in the aftermath of the war to create an official history have extensively shaped the understanding of the conflict. Part of these official strategies were processes of heritage-making that left a clear imprint on the landscape, such as the oblivion of vestiges of Italian participation in the Merindades or the construction of the Memorial to the Sagardia Column. By presenting this case study, we aim to scrutinize how heritage spaces can be dealt with during the current democratic moment.

This research prompts a critical question: can the revision of places of memory contribute to contemporary peace? While this may seem idealistic, the study argues that landscapes play a crucial role in fostering a profound comprehension of war, fascism, and repression. The pursuit of knowledge can provide a pathway to better understanding, extending closure beyond the immediate local community to encompass society more broadly.

In conclusion, this presentation seeks to shed light on the transformative journey of landscapes entangled in the Spanish Civil War, offering insights into the multifaceted layers of memory, monumentalization, and heritage interpretation. The exploration of Merindades region, where the Italian troops gathered before the battle of Santander, serves as a microcosm, revealing broader implications for understanding of historical facts.

6 **COUNTER-MEMORIES OF THE SPANISH CIVIL WAR: THE VANDALISM OF THE IRON BELT (BASQUE COUNTRY)**

González Cantera, Tania (University of Girona)

War heritage helps us to understand the different narratives surrounding a traumatic historical event. For example, the Republican fortified line known as the Iron Belt reflects the memory/forgetting dynamics of the Spanish Civil War memorialization in the Basque Country. Due to its wartime importance, the Iron Belt was the first war site to receive heritage status in the region. This status has not spared it from suffering different types of vandalism (from partial destruction to the proliferation of graffiti) over the years, which has, in fact, recently intensified. This paper explores the vandalism around the Iron Belt and its surrounding heritage through a selection of three sectors. We have used an interdisciplinary method based on the creation of a geospatial database of the Iron Belt's heritage elements. This information has later been analysed by means of geographic information systems (GIS) and data visualisation (R Studio).

Results show that this phenomenon is transversal and that in some cases it has become a chronic problem. Moreover, in those sites where vandalism actions have a clear intention for vindication, as in the case of political graffiti, they are directly related to their socio-cultural context. Beyond the intention of these (re)actions that claim an alternative political model, we wonder if they also seek to promote a *damnatio memoriae* process or if any of these interventions may even be protected in the future.

7 **FROM TABOO TO COMMEMORATION: CHANGES IN AUTHORISED NARRATIVES OF THE GEOCHANG SANCHEONG-HAMYANG 1951 MASSACRES**

Kim, Geonyoung (University of Cambridge)

In February 1951, the 11th Division of the Republic of Korea Army carried out civilian massacres of civilians in the Geochang Sancheong-Hamyang of the Southern Gyeongsang Province region in South Korea. For decades, the massacres were concealed by authoritarian regimes, until a special law (Geochang Incident Special Act) was legislated in 1996. This legislation enabled the ground of the official support of the commemorations of the massacres including the construction of memorial parks and exhibition halls in the Geochang and Sancheong region.

This study aims to discuss the changes in the authorised narratives of the Korean War (1950-1953) civilian massacre sites through a comparative analysis of two local exhibitions in Geochang and Sancheong. In particular, it investigates the changes in the stakeholder power dynamics in site management that enabled the disclosure of the once-restricted past. The talk will first present an overview of the stakeholders related to the massacres both in the Korean War era and the post-legislation period. Second, it will compare the conflicting visual and textual narratives of the two exhibitions that are managed respectively by the municipality and an association of bereaved family members. Lastly,

the talk will briefly discuss the role of the exhibition display in weaving the memoryscape of the Korean War heritage as a conflicting past.

8 ISLAND OF THE BOYS - HERITAGIZATION OF VIOLENCE AND DEATH

Walker, Yoon (SOAS University of London)

This presentation introduces and examines the process of heritagization of state violence within a contemporary framework, with a specific focus on the case study of the 'Seongam Academy' in South Korea. Established as a reformatory in 1943, towards the conclusion of the Japanese colonial era, the academy served as a site where the colonial government detained boys deemed to have 'potential problems' on an island known as 'Seongam.' Isolated from the mainland, the island underwent a transformation into a concentration camp during World War II, where the boys were forcibly mobilized for the war effort under conditions of severe deprivation and violence. Following liberation, South Korea witnessed a continuation of harsh living conditions and unjust treatment within the confines of the academy. Despite the transfer of ownership to the local government, the institution persisted in maintaining a violent and scarcely survivable environment. Those held in custody endured forced labor, acute hunger, rampant abuse, and even fatalities.

The second part of this presentation will explore the transformation of the academy into a commemorative site over time. Since its closure in 1982, concerted efforts by victims, local historians, and social activists have led to its recognition as a heritage site by the local government. This presentation will illuminate how a location once marked by sorrow and violence has been transformed into a place of remembrance, allowing for the recollection of its tragic past.

9 POPULAR CULTURE AND BRITAIN'S 'SMALL WARS'

Lawes, Tonia (University College London)

Popular culture as an area of heritage is something that can also be considered when exploring historic and contemporary violence. As well as playing a role in shaping the narrative both during and after a conflict, cultural artefacts can also become sites that demonstrate changing commemoration practices, or spaces for non-state sanctioned narratives to be put forward and debated.

My focus for exploring this has been 1950's Britain, particularly cultural artefacts that depict non-World War Two conflict narratives involving the British military. Though involving a range of actors and types of warfare, i.e. guerilla and irregular, some have referred to these conflicts using the term 'Small Wars'. This term has been rightly criticised and debated for its potential to undermine the pain and perspectives of those involved in the conflict, and indeed could have a long-term influence in the way it is remembered. The focus of this paper, however, is the role of popular culture as a discursive space for negotiating and renegotiating this remembrance. Exploring how narratives in cultural artefacts (both the intended and the interpreted) question or align with each other over time can contribute new understandings to the way in which violence is interpreted and memorialized; and indicate what their role might be in encouraging or undermining sustainable peace. Furthermore, exploring popular culture can provide insights into the impact of the violence on those removed from the location itself, i.e. civilians of countries who sent soldiers to assist.

Through exploring British novels and film that depicted the Korean War (1950-1953) either during or immediately after the conflict, I will demonstrate how popular culture can contribute to our understanding of how historic violence was being understood, negotiated, and ultimately commemorated in landscapes far removed from the site of the violence itself.

10 MEMORIALIZING GENOCIDE IN SOMALILAND: WHEN POLITICAL VIOLENCE, CLANNISM, AND STATE-BUILDING INTERSECT

Elgerud, Lucia (Bohusläns Museum; University of Tennessee Knoxville)

Memorialization of mass violence can constitute an important post-conflict process for families of the dead alongside the recovery and reburial of human remains. Although in Somaliland--an autonomous but internationally unrecognized region in the Horn of Africa--such memorials would be inextricably linked to ongoing state-building processes and underlying clan power structures. A government institution in Somaliland has been surveying and exhuming mass graves from the dictatorial 1960-90s Mohamed Siad Barre regime since the region self-declared autonomy in the 1990s. The author participated in the mass grave exhumations in 2014 and later conducted ethnographic research amongst families of the dead to investigate the impacts of the work. During interviews, Isaaq clan members--the clan predominantly targeted by Siad Barre troops and the majority clan in Somaliland--called for memorialization to commemorate the dead. Alongside the need for memorials, Isaaq clan family members widely expressed the need for international recognition for Somaliland, pointing to what community members consider to be genocide--although not universally considered as such--committed during the dictatorship. Conversely, during interviews with minority clan members in Somaliland--including from the Samaroon and Gabooye clans--they expressed less favorable views toward both mass grave exhumations and memorialization, despite having lost loved ones during the dictatorship.

Somaliland minority clans too were subjected to violence with large number of killings committed, although by Isaaq rebel forces as opposed to state actors. In addition, several interviewed minority clan members were not in favor of Somaliland international recognition, opting for reunion with Somalia. This presentation explores the ways in which political violence, clannism, and state-building intersect on the topic of genocide memorials in Somaliland as uncovered during evaluations of human remains recovery operations. Moreover, this work conveys the ways in which minority clan losses become "othered" as reflected in the appeal for memorials while threatening the tenuous intra-regional peace.

11 TERRORISM AS CULTURAL HERITAGE: MAPPING MNEMONIC TRACES FROM THE 2011 TERRORIST ATTACK IN OSLO'S GOVERNMENT QUARTER

Guttormsen, Torgrim (Norwegian Institute for Cultural Heritage Research)

The focus on terrorism as contentious heritage crosses related topics within memory studies and studies of contemporary archaeology. In this presentation, terrorism is examined based on what is defined as mnemonic traces of terrorism and what these traces as 'wounds and scars' express as heritage. The approach opens up several reflexives, hence ethical as well as political, and not least conservation ideological questions. The presentation introduces the Norwegian Institute for Cultural Heritage Research's (NIKU) work in mapping mnemonic traces from the terrorist attack on 22 July 2011 in the Government Quarter in central Oslo. What traces have been documented after the terrorist attack and what significance should they have, dynamically over time in the 22 July memorial landscape and in the design and use of the new Government Quarter in Oslo? The presentation provides methodical insight into how NIKU has worked with these issues from perspectives intersecting terrorism, heritage and urban planning.

492 ASSESSING DAMAGE CAUSED TO ARCHAEOLOGICAL HERITAGE: EXPECTATIONS AND REALITY

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Olevska-Kairisa, Irina (Maastricht University) - Mödlinger, Marianne (University of Genoa; University of Innsbruck; University of Salzburg) - Kairiss, Andris (Riga Technical University) - Godfrey, Evelyne (Uffington Heritage Watch, Faringdon, Oxfordshire, England)

Session format: Regular session

Recent times have been marked by the escalation of conflicts in different parts of the world: the war in Ukraine and armed conflicts in the Middle East, to name but a few. In addition to human and material sacrifices, each such conflict deliberately or inadvertently targets heritage sites, causing irreparable loss to individuals and groups, including local and professional communities, researchers, society as a whole, and even future generations to whom our shared memory and knowledge should be passed on.

The damage caused by such heritage crime is complex and multifaceted. We aim to discuss theoretical and practical issues related to the assessment of damage caused by looting, theft and illicit trafficking in artefacts in conflict zones. Discussions will also cover the rights of those affected to access justice and obtain appropriate redress, the development and use of criteria and methodologies for identifying the socio-economic and legal impact of the illicit treatment of sites and artefacts, and preventive and post-conflict measures to reduce the damage caused.

Papers for this session may include but are not limited to:

- Crimes affecting archaeological sites and artefacts;
- Archaeological damage assessment and respective criteria;
- Legal regulation of heritage crime, including the protection of suffered parties;
- Violation of (fundamental) "cultural rights";
- Socio-economic consequences of heritage crime.

ABSTRACTS

1 CULTURAL HERITAGE UNDER THREAT - TWO YEARS OF UKRAINIAN EXPERIENCE

Androshchuk, Fedir (National Museum of History of Ukraine)

In my presentation, I will summarize two years of experience in protecting cultural heritage in Ukraine. The presentation will highlight three main directions of work undertaken by the National Museum of the History of Ukraine.

Firstly, I will discuss the preventive measures taken to protect the museum collection during the initial days and months of the Russian invasion. I will address the problems faced and provided solutions for organizing space to protect unevacuated exhibits.

Secondly, I will discuss the work done in relation to “the ICOM Red Lists” and other measures taken to prevent illicit trafficking of cultural goods during time of war.

Lastly, I will provide examples of the protection and digital documentation of museum collections and immovable cultural monuments of international significance.

In conclusion, I will draw attention to some outstanding issues that still need to be addressed, such as the development of a national strategy for protecting cultural heritage and collaboration with international supportive actors. Additionally, I will discuss legal matters concerning the documentation of crimes related to the illicit trafficking of cultural goods and their return to the country during times of war.

2 LATE SCYTHIAN SITE CHERVONY MAYAK IN KHERSON REGION: THE VICTIM OF WAR

Symonenko, Oleksandr (Institute of Archaeology National Academy of Sciences of Ukraine) - Dzeladze, Olena (Institute of Archaeology National Academy of Science of Ukraine) - Sikoza, Denys (Kherson Inspectorate of Historic and Cultural Monuments Protection)

Late Scythian archaeological complex Chervony Mayak is located on the outskirts of the same name village in Kherson region. It consists of the hill-fort and burial ground and has official rank of the site of national importance. The first graves were discovered randomly in 19th century and the necropolis was partly explored in 1976-1977 and during 1986-1988 by Moscow archaeologists. Since 2011 the burial ground is excavated by the Late Scythian expedition of the Institute of Archaeology of National Academy of Sciences of Ukraine. In total 177 burials were excavated until 2022. Earliest burials of the necropolis can be dated by the Mid-La Tène fibulae to the late 2nd – 1st centuries BC, the bulk of graves are dated to the 1st – first half of the 2nd century AD, and part of them ought to be dated to the late 2nd – first half of the 3rd century AD.

But the research was interrupted In March 2022 when all Kherson region including Chervony Mayak was very fast captured by Russian invaders. Archaeological sites shared the sad fate of all cultural heritage. During the occupation the base of Late Scythian expedition was looted and completely destroyed by Russian soldiers. Until now, archaeologists have not managed to get into the liberated areas up the Dnieper, where the Late Scythian sites are located. Now the right bank of the Dnieper in the Kherson region is suffering of continuous Russian shelling from the left bank. Taking into account that Late Scythian sites are located on the very shore of the former Kakhovka reservoir, they certainly suffer from missiles and artillery fire.

It is unknown when Chervony Mayak will be available for further exploration. The only thing we can and must do now is to publish a full study of the current material.

3 EXPERIENCE IN WORKING WITH ARCHAEOLOGICAL MONUMENTS AFFECTED BY THE RUSSIAN-UKRAINIAN WAR, USING THE EXAMPLE OF “BILHOROD KYIVSKYI.

Zotsenko, Ivan (Institute of Archaeology, National Academy of Science of Ukraine) - Lavrov, Vitalii (Architectural-archaeological expedition, Institute of Archeology, National Academy of Sciences of Ukraine) - Ivanova, Oleksandra (National University of Kyiv-Mohyla Academy)

Since 2014, Russia has waged an ongoing war in Ukraine, causing widespread destruction not only to cities and villages but also to cultural and archaeological heritage, which bears the brunt of the conflict’s impact. The Monitoring Archaeological Expedition, conducted by the Institute of Archaeology, National Academy of Sciences of Ukraine, in collaboration with the Deutsches Archäologisches Institut, surveyed 345 archaeological monuments in the Kyiv region during 2022-23. Of these, 97 landmarks exhibited war-related damage, with a total affected area of 2,381.59 m².

From February 24th to April 2nd, 2022, Kyiv and its environs experienced active hostilities. This report delves into the consequences of the Russian-Ukrainian war on a nationally significant archaeological site, the medieval city “Bilhorod Kyivskiy.” Spanning 100 hectares, the site contains 1,400 meters of fortifications, temple foundations, and preserved archaeological objects.

During monitoring, the following types of damage were recorded at the monument:

1. Consequences of missile and artillery attacks;
2. Construction of military engineering infrastructure;
3. Arrangement of artillery positions;
4. Mining the territory;

Throughout 2023, archaeological investigations focused on non-operational fortifications, involving excavation and the conservation of damaged areas. The subsequent step involves a legal and financial evaluation of the cultural heritage damage, with the aim of holding responsible parties accountable. Ukraine’s regulatory framework for this process includes the Law “On the Protection of Cultural Heritage” and international obligations outlined in the UNESCO Convention, particularly the “Protection of Cultural Property in the Event of Armed Conflict,” and related protocols.

Of notable importance are the Articles of the Hague Convention on the Protection of Cultural Property in the Event of Armed Conflict of 1954, ratified by both Ukraine and Russia. Both nations are bound to uphold the principles outlined in the Convention to preserve cultural property during armed conflicts.

4 OCCUPIED HERITAGE IN CRIMEA: 10 YEARS OF ILLICIT EXCAVATIONS

Lifantii, Oksana (National Museum of History of Ukraine)

2024 is the 10th year since the Autonomous Republic of Crimea (ARC), Ukraine, was occupied by the Russian Federation. Illicit archaeological excavations thrive here during all this time of occupation, despite the Second Protocol to the Hague Convention (1999) of 1954 for the Protection of Cultural Property in the Event of Armed Conflict.

As of 2014, more than 930,000 items from the Museum Register of Ukraine were stored in the museums of the ARC, and more than 2,000 monuments of archaeology were in the State Register. The ancient city of Tauric Chersonesus, with its chora within the boundaries of modern Sevastopol, was included in the UNESCO World Heritage List.

The total losses of the cultural and archaeological heritage of Ukraine in Crimea due to the actions of occupiers are catastrophic and unprecedented. There are no available data on the total amount of excavation done by occupiers in Crimea. The leading Russian archaeological institutions work here. The Hermitage created the most extensive expeditions operating illegally in the Crimea: they are excavating the ancient cities of Nymphaeum, Kalos Limen, Chersonesus, Theodosia, Myrmekion, Pantikapaion and many others. Many objects newly discovered during the illegal construction were investigated “for demolition”, for example, the necropolis of the Roman era Frontove-3 (2018) and the settlement Kosh-Kuyu I (2015, 2017-2018). The illegal construction of the 310-kilometre Tavrida highway alone led to the destruction of at least a hundred archaeological sites, many of which are newly discovered.

The results of such works are published mainly in Russian scientific journals, some of which are in the Scopus list (e.g. Rossijskaja Arheologija, Stratum Plus). However, some non-Russian-based journals publish the results of these illicit excavations. It creates the problem of scientific acceptance of the occupation, which can not be tolerated in civilised society.

5 ARCHAEOLOGICAL HERITAGE MANAGEMENT METHODOLOGY AS A PREVENTIVE TOOL FOR HERITAGE PROTECTION

Kairiss, Andris (Riga Technical University)

The preservation and development of cultural (incl. archaeological) heritage is beneficial to the interests of various stakeholders. Thus, offenses against cultural heritage that result in damage, destruction, decontextualisation or illegal relocation have a strong negative socioeconomic impact and long-term consequences. These impacts and consequences are particularly pronounced in military conflict areas, bringing to the fore both preventive measures to protect it from potential threats and subsequent measures to comprehensively assess and minimize the damage. At international level, there are still no common criteria for assessing the damage caused by heritage crime, which is largely due to the lack of a common understanding of the socioeconomic impact of tangible cultural heritage.

The development and implementation of a methodology for the management of archaeological heritage would not only have a positive impact on its’ socioeconomic development, but would also support (incl., as a preventive measure) heritage protection against the threat of crime, as well as in times of crisis, allowing, inter alia, to:

- identify the socioeconomic benefits of the use of cultural heritage and to identify the types of harm caused to different suffered groups by heritage crime (damage, destruction etc.),
- identify the necessary forms of cooperation between state and local authorities, NGOs, scientific community, local residents and other stakeholders for heritage protection and development,
- facilitate the assessment of the socioeconomic damage caused (incl. for the purposes of investigations and legal proceedings),
- promote the protection of the rights and socioeconomic interests of suffered parties.

The presentation, based mainly on analysis of Latvian situation, will provide an insight into the nature of the methodology for the management and socioeconomic development of national immovable cultural heritage (incl. archaeological), focusing on its usefulness also in times of crises. Methodology development process is based on the author’s research carried out in 2019-2023.

6 ASSESSING THE IMPACT OF HERITAGE CRIME ON ARCHAEOLOGISTS

Olevska-Kairisa, Irina (Maastricht University)

In addition to being immovable property objects, heritage sites bear significant socioeconomic value. When the heritage site is damaged, it inevitably affects the interests of different kinds of stakeholders (to different extents based on the relationship of the respective stakeholders vis-a-vis heritage objects). Thus, the harm caused goes far beyond mere damage to property.

One of the important groups of stakeholders, suffered as a result of heritage crime, is researchers. The latter often serve as conduits of information and knowledge, thus contributing substantially to the increase and justification of the socioeconomic value attributed to heritage sites in the first place. Nevertheless, evidence suggests that, as a general rule, neither the impaired rights of the researchers, nor the harm they suffer by such actions are recognized or redressed within the legal proceedings. Thus, the voice of archaeologists is heard neither at the adjudicative, nor at the political level.

The presentation will be based on the research of the author and the survey performed among the members of the EAA, which is expected to establish:

- the nature and scope of heritage crimes' impact on the scientific/professional community of archaeologists and heritage professionals, thus helping in more accurate identification of the affected individuals and groups;
- the severity of the infringement of cultural rights of such community (including the right to access, enjoy and research heritage objects, participate in decision-making, etc.) caused by illegal intervention into the integrity of archaeological sites, thus contributing to the interpretation of the apparent scope the infringed fundamental rights.

The findings of the presented research will contribute to understanding and performing of the comprehensive archaeological damage assessment caused by illegal excavation, looting, vandalism, destruction or any other illegal activity damaging archaeological sites.

7 THE IMPACT OF WAR ON HERITAGE: LESSONS FROM THE NORTHERN ETHIOPIAN CONFLICT

Bekele, Tadele (Ethiopian Heritage Authority) - Abreha, Haftamu (Ethiopian Heritage Authority) - Negash, Arkebe (Ethiopian Heritage Authority) - Asmare, Belsti (Ethiopian Heritage Authority)

War imposes life-altering costs on human lives, economies, and societal well-being, making recovery tough. The recent conflict between the Ethiopian government and the Tigray Defense Force (TDF) exemplifies this reality. Beyond devastating human losses on both sides, heritage sites of historical, religious, and archaeological significance were directly and indirectly targeted. A team of experts from the Ethiopian Heritage Authority deployed to Tigray region to assess the war's impact on these sites, using the ICCROM Damage and Risk Assessment form as a benchmark. However, the war's complex nature and multitude of actors involved hinder fully understanding the damage and associated risks. Therefore, this paper draws lessons from the assessment to benefit future heritage protection during wartime.

The post-war assessment highlights the crucial role of pre-war heritage management and documentation, particularly in tracing looted movable objects. Moreover, existing domestic legal frameworks and adopted international laws influence the nature of interventions during war. Recognizing the fact that war developments take due process before the breakout, all stakeholders have a vital role in raising awareness to minimize damage and, especially, looting beforehand. Engaging local institutions like universities and heritage associations can significantly contribute to spreading the message of wartime heritage protection.

8 THE STATE OF PALESTINE'S UNESCO WORLD HERITAGE SITES

Godfrey, Evelyne (Uffington Heritage Watch, England)

The State of Palestine currently has four cultural sites inscribed on the UNESCO World Heritage list. They are: Ancient Jericho/Tell es-Sultan (2023); Birthplace of Jesus: Church of the Nativity and the Pilgrimage Route, Bethlehem (2012); Hebron/AI-Khalil Old Town (2017); and Palestine: Land of Olives and Vines – Cultural Landscape of Southern Jerusalem, Battir (2014). Of these four sites, the two latter (Hebron and Battir) are currently on the UNESCO List of World Heritage in Danger. In addition, a site proposed by Jordan, 'Old City of Jerusalem and its Walls' (1982) is also currently on the List of World Heritage in Danger. The State of Palestine's 2012-2020 Tentative List consists of 13 sites, including three in the Gaza 'strip'. This paper will review the World Heritage lists of Israel and Palestine and discuss archaeological damage assessment and the potential impact of the ongoing conflict on the "Outstanding Universal Value" of these listed sites.

9 TEMPORAL ANALYSIS OF LOOTING PITS IN TŪWĀNEH, SOUTHERN JORDAN 2002-2022

Wiesner, Piotr (Jagiellonian University, Kraków) - Kopij, Kamil (Jagiellonian University, Kraków) - Ćwińska, Paweł (AGH University of Kraków) - Puniach, Edyta (AGH University of Kraków) - Sochacki, Grzegorz (AGH University of Kraków) - Misk, Łukasz (Jagiellonian University, Kraków) - Bodzek, Jarosław (Jagiellonian University, Kraków)

This presentation focuses on the quantitative analysis of looting processes at the archaeological site of Tūwāneh in Southern Jordan spanning the years 2002 to 2022. The study relies on publicly available archival satellite imagery (Google Pro 2013-2021), low-altitude photogrammetric orthomosaics (2018-2019), archival aerial photographs (2002, 2007), and a surface survey conducted in 2022.

The research explores both temporal and spatial patterns of looting at the site level, aiming to understand the extent and impact of these activities over two decades. The analysis of satellite imagery reveals certain limitations, particularly in areas with dense constructions and debris, emphasizing the need for complementary methods.

The integration of surface survey data collected in 2022 adds a valuable layer to the analysis, providing a ground-level perspective on the observed patterns. The findings emphasize the importance of a multifaceted approach to looting quantification, combining remote sensing methods with field surveys for a more accurate and nuanced assessment of archaeological sites.

This study contributes to the broader discourse on archaeological preservation strategies, showcasing the complementary role of satellite imagery and surface surveys in monitoring and mitigating the impact of looting on cultural heritage.

10 MAPPING DAMAGE: ASSESSING POST-CONFLICT AND POST-EARTHQUAKE DAMAGE IN SYRIA

Montesanto, Mariacarmela (University of Florence) - Abate, Nicodemo (CNR-ISPC) - Alvaro, Corrado (Università di Roma-La Sapienza) - Masini, Nicola (CNR-ISPC) - Norini, Gianluca (CNR-IGAG) - Pedrazzi, Tatiana (CNR-ISPC) - Pucci, Marina (University of Florence) - Sansonetti, Antonio (CNR-ISPC)

Damages and changes represent for archaeologists, historians, geographers and geomorphologists visible milestones in the reconstruction of the past and in the safeguard of the present. They are silent testimonies of actions and actors in the past and provide crucial information to safeguarding policies and musealization. MAPDAM Project focuses on the concept of damage and destruction both as a modern phenomenon caused by conflict and economic crisis and as a past event that determined major changes in the history of a region. The project focuses on the region of Tartus in Syria, a coastal area that has experienced in the past twelve years conflict and economic crisis.

The main goals of the project are both to provide reliable data to safeguard the archaeological heritage of the region of Tartus and to increase the historical, geographical, and archaeological knowledge of the area in pre-classical and classical periods.

Based on an interdisciplinary approach, using an open access webgis, the Project explores damages and patterns of changes at three different scales.

The long-term major outcome of MAPDAM is a renewed shared awareness of the causes of damage and decay, of the economic and social, as well as strictly cultural, dimension of the damage in the archaeological field impacting not only the scientific community but also local social groups.

This paper focuses on the post-conflict and post-earthquake damage assessments accomplished so far by MAPDAM at the archaeological site of Amrit (Tartus region), well known for its monumental Phoenician and Hellenistic structures. Moreover, it will present the post-conflict measures employed not only to reduce the damage caused by the war and the recent earthquake, but also to make cultural heritage preservation sustainable and raise awareness among local and international communities.

11 IMMEDIATE RESPONSE. THE PROTECTION OF THE PAST DURING TIMES OF CONFLICT AND THE RECENT WORK OF HERITAGE FOR PEACE

Sabrine, Isber (Heritage for Peace)

The preservation of cultural heritage during times of war has emerged as a critical global concern, necessitating a concerted effort to protect irreplaceable artifacts, monuments, and cultural sites. This paper explores the pivotal role played by non-governmental organizations such as "Heritage for Peace" in the safeguarding of cultural property amidst armed conflicts. Focused on the protection of tangible and intangible heritage, these initiatives aim to mitigate the devastating impact of war on humanity's shared cultural legacy. With a focus on collaborative efforts involving local communities, national and international organizations, and governments to prevent, mitigate, and recover from cultural heritage losses, Heritage for Peace is dedicated to examining the challenges posed by armed conflicts to cultural heritage, including intentional destruction, looting, and illegal trafficking of artifacts. Drawing from work in Gaza, Syria, Ukraine, Sudan, Libya and Yemen, this research aims to contribute to the discourse on preserving our shared cultural identity in times of turmoil, underscoring the significance of Heritage for Peace and its counterparts

in fostering a global commitment to the protection of cultural property, promoting resilience, and contributing to the reconstruction of societies affected by conflict.

12

ADVANCED TECHNOLOGIES IN THE ASSESSMENT AND MITIGATION OF ARCHAEOLOGICAL HERITAGE DAMAGE IN CONFLICT ZONES

Giovanelli, Riccardo (Istituto Italiano di Tecnologia; Università degli Studi di Milano) - Bernardin, Michela (Istituto Italiano di Tecnologia) - Sech, Gregory (Istituto Italiano di Tecnologia) - Traviglia, Arianna (Istituto Italiano di Tecnologia)

In times when conflicts pose an increasing threat to archaeological heritage, the need for efficient protective, evaluative, and mitigative strategies is fundamental. The ALCEO (Automatic Looting Classification from Earth Observation) project addresses this challenge by employing artificial intelligence (AI) and remote sensing technologies to automatically detect looting activities especially in conflict-ridden and remote areas. This methodology accelerates the processes of site protection, and it facilitates timely interventions by instantly alerting relevant Law Enforcement Agencies (LEAs) or cultural heritage institutions to new incidents of looting.

In addition, ALCEO developed a framework to address the study of looting on a temporal scale by identifying changes (i.e. appearance/disappearance or modifications) in the looting pattern across different moments of observation. This enables the monitoring of looting activities on a quantitative basis and measures variations across time, potentially evaluating how much main socio/political events contributed to the development of the phenomenon and the damage to cultural heritage.

At the heart of ALCEO is a dataset of annotated features of looting activities, composed of 6,790 elements across significant archaeological sites, which include the sites of Dura Europos and Ebla (Syria), Aswan (Egypt), Arpinova, and Cerveteri (Italy). Specifically, in Dura Europos, the project detected that from April 2013 to September 2014, corresponding to 2 years of the Civil War, looting features rose from 1,019 to 3,843. Ebla saw a progression from 30 features in September 2004 to escalating numbers in subsequent years: 172 in April 2014, 250 in July 2018, and 154 in July 2022.

The project promoted ground truth campaigns for selected case studies, which were essential to support the correctness of remote interpretation and to derive information on the type and intensity of the phenomenon and its potential implications at the socio/political/economic level.

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ANIMALS MEDIATING THE REAL AND IMAGINARY: IN SEARCH FOR NEW UNDERSTANDINGS OF HUMAN-ANIMAL RELATIONSHIPS

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Mansrud, Anja (University of Stavanger) - Care, Barbara (Department of Art History and Archaeology/FNS, University of Fribourg, Switzerland) - Filioglou, Dimitris (The Malcolm H. Wiener Laboratory for Archaeological Science, ASCSA Athens) - Oehrl, Sigmund (Museum of Archaeology, University of Stavanger) - Armstrong-Oma, Kristin (Museum of Archaeology, University of Stavanger)

Session format: Regular session

The study of animal remains from archaeological sites occupies a prominent position in the study of ancient societies, helping us to explore subsistence strategies, use of landscape and environment, mobility and seasonality, craft techniques, among others in a variety of cultural contexts across space and time. However, archaeological enquiry into the human-animal relationship tends to remain focused on human agency and exploitation of animals, rather than on human-animal relationships, interactions and engagements, and proceed along distinct trajectories in scholarly literature, focusing either on zooarchaeological, bioarchaeological, literary, iconographic or artefact research. By exploring the intersection between real and imaginary animals in the past, this session aims to evaluate and contextualise various ways in which humans and animals interact, as reflected by:

- Animal representations on various media, such as in literary and iconographic materials, that enables insight into the diverse roles of animals in life-worlds, religions, cosmologies, and ontologies.
- Traces of animals and animal materials in the archaeological record, including transformed animal body parts (e.g., exploited animals, source of food, companion animals, sacrificial victims, votive offerings, ingredients for magical spells) and ritual practices.
- Evidence of everyday practices acknowledging how communities were co-created in inter-species dialogues, exploring how relationships between humans, domesticated and wild animals have unfolded and differed over time, such hunters and fishermen seeking out or attracting prey, transhumance routes co-created by humans and animals, and animals moving into human settlements as commensal species or fully domesticated co-inhabitants, eventually forming deep-rooted social bonds.

We invite papers that open up new channels of dialogue and cross-disciplinary collaboration, explore the space unfolding between humans and animals as living beings with agency, and how encounters with animals have sparked the human imagination irrespective of chronological periods. We are seeking examples of best practice, to further develop the field.

ABSTRACTS

1

PICTORIAL MOTIFS ON 6TH/7TH CENTURY SCANDINAVIAN CEREMONIAL HELMETS AND THE TRADITION OF PERFORMING BEARS IN LATE IRON AGE SCANDINAVIA

Oehrl, Sigmund (Arkeologisk museum, universitetet i Stavanger)

The well-known models for the production of figuratively decorated bronze helmet sheets from Torslunda, Öland (Sweden, 6th/7th century AD) show various motifs depicting human fighters interacting with bears and bear-like beasts. On the basis of archaeological finds and contexts, late antique traditions of staged bear fights and hunts, the tradition of bear hunting in the Middle Ages, the information provided by Old Norse literary sources on the subject of man and bear, as well as considerations of modern practices with tamed bears and the associated behavioural biology, this paper aims to provide an answer to the question of what these bear images on the Merovingian-era plates from Torslunda actually represent: Mythical battles and relationships between bear and gods or heroes or very real actions. My hypothesis, which arises from this overall view, is that these pictorial motifs reflect real-life martial performances with trained, captured bears that took place at the courts of the warrior elites of the Vendel culture. In my opinion, the most likely explanation is that captured and trained bears actually were kept as performing bears at the courts of Scandinavian warlords and used for animal fighting demonstrations as part of the warrior cult and martial self-dramatization.

2

ROLES OF IMAGINARY AND NATURALISTIC ANIMAL REPRESENTATIONS IN LATE IRON AGE SCANDINAVIA

Wicker, Nancy (University of Mississippi)

While many academic disciplines are experiencing an “animal turn” characterized by a growing interest in animals and their relationships with humans, what does this ontological shift mean for Scandinavian art of the Late Iron Age (5th–11th centuries CE), which is dominated by so-called “animal-style” art? In this presentation, I contrast two uses of animal representations— on practical artifacts and on objects that may have ritual or protective purposes. I propose that abstracted and imaginary animals and animal parts commonly appear on ostensibly functional items with “binding” potential— brooches that hold clothing together and horse trappings that link horses and human riders. This applied art may appear to be of secondary significance to the function of objects that are decorated with the abstracted animals. In contrast, I observe that more naturalistic animals (and occasional humans) frequently inhabit narrative compositions (where species identification can be crucial) and items with presumed ceremonial or protective purposes. The naturalistic tendency is seen, for example, on monumental picture stones on the Baltic island of Gotland in Sweden and on a wooden panel carved on the end of a wagon from the Oseberg ship burial in Norway. Relatively realistic representations of animals that convey presumed ceremonial or protective purposes are also depicted on certain classes of objects, including early versions of gold pendants known as bracteates, small gold foils, and helmet panels. All animals are not encompassed by what has been described as Scandinavian “animal-style” art. Instead, different roles performed by specific types of animal representation can be delineated.

3

THE GRIFFIN-PEOPLE FROM THE EAST

Jonuks, Tõnno (Estonian Literary Museum)

Over the years, animal representations in the Eastern Baltic have been interpreted based on very rational zooarchaeology. It was assumed that animals were depicted by people whose understanding about nature was similar to our Linnaean taxonomy. During the past decade, it has been demonstrated that, in fact, many Iron Age animal representation can be interpreted as depicting not some ordinary animal species but the mythological beasts – dragons, leucrottas, griffins.

In this presentation I will focus on a group of animal-headed handles found across the Eastern Baltic. Due to the massive beak the animals are often interpreted as raptors, however, some distinctive details suggest they rather were griffins. The fact that many of them are found from central places, raises a hypothesis that griffins could have served as symbols of some Eastern Baltic elite families. The objects are very similar but found sometimes even hundreds of kilometres apart, demonstrating long-distance communication of some selected kins. Such an interpretation helps to open a more nuanced discussion about the Late Iron Age societies.

4 ANIMALS IN CLAY MAKER'S BACKYARD

Blaževicius, Povilas (National Museum of Lithuania)

The analysis of animal traces on building ceramics is a valuable avenue for uncovering historical insights into everyday life, especially during the Middle Ages and the Early Modern period. While building ceramics have traditionally been studied in architecture, their growing significance lies in revealing not only the identity of the artisans behind these artifacts but also the intricacies of their daily surroundings and domestic practices. This research offers valuable insight into the variety of household animals and the distinctive attributes of fauna within specific chronological and geographical contexts. Animal imprints on ceramics provide information about the taxonomic classification of individual creatures, including class, order, family, or genus. These traces also offer information on other aspects such as the creature's stature, physique, age, health indicators, instances of trauma, and degrees of hairiness, thus adding supplementary layers of understanding.

To illustrate the application of this methodological approach, an analysis encompassing nearly 400 artifacts with animal prints from the 13th to the 18th century was conducted in Vilnius castles and Vilnius city, Lithuania, using the method of trasology. This method facilitated the reconstruction of the conceivable structure of households inhabited by craftsmen in Vilnius during the specified chronological period. Preliminary observations underscore that the animals that came close to the finished, albeit unfired, ceramic products were predominantly of domestic origin, with 8% comprising poultry and cats, 10% pigs, and 13% sheep and goats. A noteworthy revelation emerged, identifying dogs as the predominant instigators of "defective products," constituting 61% of instances. This research not only provides a nuanced understanding of cohabitation dynamics between humans and domesticated animals during the 13th-18th centuries but also furnishes a comprehensive assessment of the structure of ceramic workshops in the Vilnius region and the distinctive attributes of their domestic fauna.

5 MINERAL MENAGERIES: INTERSPECIES RELATIONSHIPS IN BRONZE AGE ANIMAL ICONOGRAPHY

Nic Aoidh, Nóra (UCD Dublin)

Chiefs, warriors, conquerors: the European Bronze Age is characterised by concepts of masculine social, political, and religious power. This power is thought to have been legitimised through public displays of divine associations or origins, as well as wealth and influence. Supposed proof of these divine origins frequently consist of certain animal associations: the horse with speed and control, the bull with power, the hybrid beast with the divine, etc. As such, animal iconography is thought to have been a key component in the construction and reinforcement of social and cultural norms. The horns and wings so characteristic of chiefly European iconography are still examined overwhelmingly through the lens of a human-centred, patriarchal social hierarchy. Indeed, much of the previous literature on Bronze Age animal iconography has been written from a functionalist anthropocentric viewpoint, which results in the objectification of animals in a human society. However, these animals were likely not subject to the modern, capitalist perspectives which view them primarily as resources or property. By drawing on Human-Animal studies to assess their depiction, this paper will reassess the potential manifestations of interspecies relationships in Bronze Age Europe. It will also apply posthumanist theory to examples of Bronze Age animal iconography to offer perspectives beyond functionalism and social regulation. The primary focus of this paper will be animal iconography in Nordic Bronze Age rock art, with additional consideration given to effigial animal iconography.

6 A REPRESENTATION OF A MONKEY ON A OIL LAMP: SPARKS OF NURAGIC IMAGINATION AND MARITIME CONNECTIVITY IN THE ANCIENT MEDITERRANEAN

Pisanu, Laura (University of Melbourne)

Representations of primates have been recorded in different Mediterranean sites dated to the Bronze Age and Iron Age. They consisted of wall paintings, figurines, and amulets, which have been mainly found in Egypt, the Aegean and Mesopotamia. Iconographic studies have led previous scholarship to identify the species represented as green monkeys (the Aegean), baboons, and macaque (Mesopotamia), and to discuss them as representation of animals traded or exchanged as gifts from the Egyptian Kingdom to other Bronze Age societies.

Among the various representation of monkeys in the eastern Mediterranean Sea, little evidence is known for the central-western Mediterranean. A bronze figurine manufactured in Sardinia between the Bronze and Iron Age (ca. 11th – 9th century BC) depicts a seated monkey at the centre of an oil lump. This representation is still unique in Sardinia, and a rarely found discovery in central-western Mediterranean. Early scholarship has postulated it was the result of maritime relationships because the Nuragic bronze figurines usually depicted local animals. However, no comparisons and further studies have been carried out to investigate this representation, its possible comparisons with depictions from other Mediterranean areas, and what a monkey could have symbolised for Nuragic people.

By analysing the Nuragic artefact using an archaeological approach based on iconography and study of material culture through comparisons, this paper aims at exploring the representations of monkeys in terms of human mobility, imagination, and interactions between Bronze Age societies and these species. In this way, it would be possible to contextualise the Nuragic artefact in a wider Mediterranean framework in which people (and monkeys) interacted in a complex network of maritime and social connectivity.

7 IDENTIFYING THE HUMAN DOG RELATIONSHIP IN THE AUSTRALIAN ARCHAEOLOGICAL RECORD

Balme, Jane M. (School of Social Sciences, University of Western Australia) - O'Connor, Sue (Australian National University)

Indigenous Australians first arrived by sea in the continent that is now Australia at least 65 thousand years ago. At that time, apart from murids and bats, the native mammals were all marsupials or monotremes. Around 4,000 years ago a placental dog, the dingo, appeared on the continent, which they rapidly colonised. People's responses to this new kind of animal were unlike those they had to any native Australian animal.

By the time of first European colonisation - a little over 200 years ago, dingoes were thoroughly incorporated into Indigenous Australians lives. Early written records note that people used dingoes for a variety of purposes including as hunting companions, guards, living blankets, pets, and occasionally as food. Dingoes were also deeply embedded into Indigenous cosmology holding important positions in stories about landscape creation. They are the only animal with which Indigenous people formed a close bond - in some places they were even incorporated into the kinship system. Archaeological evidence for the development of this human-animal relationship includes, for example, dingoes buried in manners paralleling those used for humans in the same area, rock art documenting ancestral dingo travel, and changes in the faunal records. Despite the clear evidence for human-dog bonding from early times, only a few of the dingo pups taken as pets remained with people. In this talk we will discuss advantages of co-dependence of Indigenous Australians and dingoes from both points of view, how it might be traced in the archaeological record, and the implications for dog domestication elsewhere.

8 THE ROLE OF THE DOG IN THE FUNERAL RITES OF THE SINTASHTA CULTURE (III - II MILLENNIUM BC)

Frikke, Polina (Free researcher) - Usmanova, Emma (Saryarka Archaeological Institute, Buketov Karaganda University, Kazakhstan; Margulan Archaeological Institute, Almaty, Kazakhstan) - Fricke, Fabian (German Archaeological Institute) - Kosintsev, Pavel (Free researcher)

The fact that the dog was of great social importance already in the Neolithic suggests such features as healed fractures and sacralization of the dog in the "funerary landscape". The last feature is observed as special methods of ritual dissection and burial of dogs together with or separately from humans. In the Bronze Age, the socio-cultural importance of the dog increased even more. This phenomenon is associated with human mobility. This process was accompanied by economic changes, the main feature of which was the active development of cattle breeding with the predominance of a meat and dairy diet.

On the territory of the Southern Urals the distribution of domesticated dogs is reflected by the "language" of ritual actions in burials of the Andronovo cultures. One of these cultures is known as the Sintashta culture. The time of its existence dates from the end of the 3rd millennium BC to the first half of the 2nd millennium BC. The main characteristics of the Sintashta culture are probably connected with the emergence of the fortified settlements like Arkaim and Sintashta, with a high degree of sedentarisation based on stall-and-drive cattle economy, and with the existence of burial complexes with multi-component inventory and valuable sacrifices.

Most often, as sacrificial animals, were used: cattle, sheep/goats and horses. The occurrence of dogs in the burials of the Sintashta culture is also a well-known phenomenon. However, the number of dogs is much lower compared to the number of other sacrificed animals. This fact allows us to assume a special status of people buried with dogs. The correlation analysis of traits and the identification of individual status features between burials with and without dogs contribute to verification of this assumption. A comparison of these features will be presented in this report.

9 WHAT DID DOGS DO FOR RITUAL IN ROMAN BRITAIN?

Fleming, Robin (Boston College)

I have found evidence for whole or partial dogs in just over 1,700 structured deposits in Britain dating to the Roman period, mostly from pits, shafts, abandoned wells, and boundary ditches in quotidian places rather than at temple or shrine sites. The dogs in my data were habitually placed in the ground with a constellation of other objects -- whole pots, shoes, coins, tools, keys, whetstones, curated human remains, human and animal heads, and the remains of wild animals and baby animals. I argue that deposits like these are the remains of ritual events held by ordinary people and

were a significant component of ritual praxis in Britain, something participants engaged in to counteract the gnawing uncertainties of everyday life and to bolster bodily and mortuary safety. The questions animating my paper are: what did dogs, as ritual participants, do for ritual? How did dogs' nature and historically constructed role as our flexible, socially engaged, put-upon fellow travelers impact ritual? In what ways did the killing of individual dogs—some probably strays, others certainly personal animals—do to the atmosphere of these uncanny events? The emotions of participants and witnesses? Were the doomed dogs treated in particular ways to heighten ritual-goers' experience? To change the atmosphere of an event? How did the dogs' deaths make each event memorable, different, or the same?

10 **BLURRED ENTITIES: ANTHROPO-ZOOMORPHIC DEPICTIONS ON NORTH CENTRAL CHILE BODYPOTS**

Mansilla, Luis (Universidad de Chile; FONDECYT 11221116; FONDECYT 120276) - Armstrong, Felipe (Museo Chileno de Arte Precolombino; FONDECYT 11221116; FONDECYT 120276)

Pottery depicting various beings is a hallmark of the communities that lived in today's North Central Chile before the Spanish conquest (1100-1540 CE), ancestors of the Diaguita people. Despite interpretations of vessels with "anthropomorphic" and/or "zoomorphic" features, a standardized understanding of the elements constituting these entities' faces and bodies remains elusive. A comprehensive iconographic study of these 'bodypots' has now delineated the prevalent features in depictions traditionally understood as human or animal, considering potential species referenced. This research discusses how these distinctive configurations might depict a mixed entity, blurring traditional distinctions between what animal and human mean. The recurrent depiction of a specific face found in vessels across different archaeological sites suggests its significance, potentially linked to the local socio-political landscape, cosmology, notable figures, or shamanistic practices, thereby influencing the visual and cultural landscapes of the region. These depictions, in addition to a particularly configured face, may lead to a more nuanced understanding of the human-animal relationships, characterising it beyond exploitation dynamics.

This paper is funded by Research Grants FONDECYT 11221116 and 120276.

11 **SEARCHING FOR LATE MESOLITHIC ANIMAL ONTOLOGIES**

Lødøen, Trond (University Museum of Bergen)

This presentation aims to discuss alternative world views associated with animals in the Late Mesolithic of Scandinavia to balance classic, and often chosen, consumption and utilitarian focused perspectives. Despite new archaeological approaches over the later decades, together with ontologies and ethnographic examples that have opened for an alternative and a pre-cartesian understanding of all species, most approaches within Late Mesolithic studies, or other prehistoric studies tend to return to present day conditions, with exploitation and consumption as the predominant values for all animals of the past – in short meat and hide on the run. Even though the great divide between humans and animals is a very recent classification, this is rarely compensated for in archaeological approaches which regularly projects uncritical mirror images of our modern western societies onto the past. This is also frequently supported by cherry picking amongst suitable rock art motives to legitimize modern cartesian world views for the distant past. On the basis of animal osteological material records, burials, votive deposits and rock art studies alternative pathways to uncover Mesolithic animal ontologies will be discussed, bringing in Mesolithic evidence from elsewhere in Europe and also addressing a diversity in terms of ideological, cosmological and societal importance between certain animals for the Late Mesolithic of Scandinavia.

12 **PREDATORS IN PUPILS: INTERSITE VARIABILITY AND HUMAN/ANIMAL LINKAGES OF PPNB PLASTERED SKULLS OF THE LEVANT**

Todd DaSilva, Raven (Dig it With Raven)

Perhaps the most well-known artefacts of PPNB (Pre-Pottery Neolithic B) Southwest Asia are the plastered skulls that were first found at the site of Jericho in the 1950s. These decorated skulls have been found at multiple sites across Palestine, Israel, Syria, and Jordan, with later examples found in Turkey. Since their discovery, they have been subject to multiple, blanketed interpretations, attempting to create one coherent meaning and purpose. While much has been written regarding the description of the skulls and their possible interpretations, their human-animal relationship has not yet been explored.

A new look into these plastered skulls through the examination of the contexts in which they were uncovered, alongside the variations in eye fabrication and pupil design, has revealed that those modelled with open eyes were found solely in domestic contexts. These eyes possess pupils reminiscent of small predators such as snakes, foxes and cats. These non-human attributes may indicate a human-animal linkage reminiscent of larger ritual sites such as Göbekli Tepe and Nevalı Çori that were no longer in use when the skulls were created.

13 **ANIMALS OF THE POLIS: REGIONAL DIFFERENCES IN HUMAN-ANIMAL INTERACTIONS ACROSS THE GREEK MEDITERRANEAN**

Lewis, Sian (University of St Andrews)

My research project, *Zoa Politika: animals that live in the polis*, aims to identify the distinctive animal experience of individual Greek communities. The Greek world was both geographically extensive and ecologically diverse, with poleis founded around the coasts of the Mediterranean and Black Sea, and regional faunas were thus very varied, from the desert species of Cyrenaica and the grazing mammals and birds of the Scythian steppe to the lions of Asia Minor and the fish shoals of the Bosphorus.

Previous studies based primarily on the evidence of literature and art, however, have tended to treat 'the animals of the Greek world' as an unvaried collective, as though the ancient experience of animals, domestic and wild, was the same everywhere. This project begins the overdue process of integrating zooarchaeological surveys of specific sites and regional ecological studies to identify the animals which were present in the landscape and those which were of economic, religious or social significance to each polis. The project draws on the concept (first identified by Nicolas Richer in the 1990s) of the 'communal bestiary'; that is, those animals which an individual polis chose to foreground in both practical and abstract terms, some drawn from the immediate surroundings of the state and its hinterland, and others non-resident species which were chosen to embody the city's collective identity and values.

In this talk I will present two of the case studies for the project, Cyrene in north Africa and Panticapaeum on the north shore of the Black Sea, to demonstrate how each Greek community created and developed its own conceptual bestiary, recognising animals and humans as co-inhabitants and co-citizens of the polis.

14 **ANIMALS IN RELIGIOUS CONTEXTS AND BEYOND: CASE STUDIES AND COMPARISONS FROM 1ST MILLENNIUM BCE CYPRUS**

Hadjikoumis, Angelos (STARC, The Cyprus Institute; Department of Archaeology, The University of Sheffield)

Animal remains recovered in sanctuaries usually represent food waste, resulting from feasts associated with religious rituals. Most of these rituals prescribed some animals as sacrificial victims and even more animals to feed the participants during those feasts. This paper presents zooarchaeological data from Archaic/Classical sanctuaries in Cyprus that provide insights into the lives of sacrificial victims and their interactions with people as living animals, the possible ways their lives ended and how their butchered bodies continued to interact with the organisers and participants of periodic religious events. The zooarchaeological data from sanctuaries are compared against literary references to sacrificial animals and procedures from the broader eastern Mediterranean. Moreover, comparative analyses between sanctuaries and non-sanctuaries further highlight how animal-human interactions were shaped by the context in which they take place (location, season, social and religious conventions, etc). The results of these comparisons highlight interesting differences between religious and secular animal-human interactions, as well as variability within these spheres. Moreover, they highlight the complementarity and discrepancies between literary and physical evidence. In sum, this study seeks to contribute new insights and inform zooarchaeological approaches employed to look into animal-human interactions in 1st millennium BCE Cyprus and the eastern Mediterranean, primarily in sanctuaries but also secular contexts.

15 **FAUNAL USES AT MONTE ALBÁN, OAXACA, MEXICO: SUBSISTENCE, RAW MATERIAL, RITUALITY AND SYMBOLISM**

Martinez Lira, Patricia (Independent scholar; University of York, UK) - Arroyo-Cabrales, Joaquín (Laboratorio de Arqueozoología del INAH, Mexico)

The ancient Zapotec city of Monte Albán, occupied from approximately 500 BC to 850 AD, was the prehispanic Oaxaca's largest and most important urban center. The zooarchaeological material dates from both the Late Preclassic (500 BC-AD 200) and Early Classic (200- AD 500) periods, and was found in association with households and public contexts near the city center. The faunal remains include bones of fish (snook, sea basses, buffalo fish, and bobo mulet); reptiles (mud turtle, pond slider, and green turtle); birds (yellow-winged cacique, common raven, great horned owl, ducks, red-tailed hawk, franklin's gull, harlequin quail, common turkey and curassow); and mammals such

as carnivores (dog, coyote, wolf, grey fox, northern raccoon, white-nosed coati and cougar), artiodactyls (collared peccary, white-lipped peccary, white-tailed deer and brocket deer) and lagomorphs (hare and rabbit). A great number of mammals were found in local habitats near Monte Albán or in cultivation areas, especially those allocated for subsistence activities. However, other species were brought from further away for ornamental, raw material, symbolic and ritual purposes. The animal use is discussed, taking into account archaeological contexts, taphonomic evidence, iconographic representations, evidence at other sites in Mesoamerica, animal representations in codices, stelae, and XIV-century ethnohistoric sources.

16 **PICK OUT THE EASY MEAT. HUMAN - DOG RELATIONSHIP AT 4TH MILLENNIUM PILE-DWELLINGS OF LJUBLJANSKO BARJE (SLOVENIA)**

Toskan, Borut (Research Centre SAZU, Institute of Archaeology) - Škvor Jernejčič, Brina (Research Centre SAZU, Institute of Archaeology) - Peto, Jessica (Department of Archaeology and History, University of Exeter)

Beginning with its domestication in the Upper Palaeolithic, the dog developed into man's best friend par excellence. From the development of lapdogs to the symbolic deposition of these animals in graves and other places of worship, archaeozoology has provided evidence of a special relationship that has developed between us and them since late prehistory at the latest. Before that, the role of dogs in human life is less well understood. In this talk, we will deal with this very topic at the 4th millennium pile-dwelling sites at Ljubljansko barje in the south-eastern Alpine region (present-day Slovenia).

At these sites, the dog is a normal, albeit rare, element of archaeozoological assemblages. Metrically, they correspond to small/medium sized turbarry type, typically observed at prehistoric lacustrine settlements in and around the Alps. A preliminary geometric morphometrics study of the skulls and mandibles indicated marked shape variability, possibly suggesting some kind of human control of reproduction in these animals. Such control may have been motivated by the need for a particular type of dog, either hounds or herding dogs. Finds of cracked dog skulls and bones with butchery marks, on the other hand, suggest that these animals may have served as 'easy meat' in times of hardship. A high proportion of well-preserved dog skulls in one of the pile dwellings also suggests that these animals may have been used for ritual purposes. Last but not least, by studying the diet of these animals using coprolites and stable isotopes, valuable insights could be gained into whether the pile dwellers regarded the dog as a valuable, possibly even beloved companion or rather as a tolerated scavenger.

17 **THE ANIMAL COMMUNITY OF ROMAN RED SEA PORT BERENIKE. PET CEMETERY - DATA ON HUMAN-ANIMAL RELATIONS, VALUES AND IDENTITY**

Osypinska, Marta (Institute of Archaeology, University of Wrocław) - Osypinski, Piotr (Institute of Archaeology and Ethnology, Polish Academy of Sciences)

The burial ground of companion animals, discovered in the Roman Red Sea port of Berenike (Egypt, 1st-2nd century CE), is a scientific phenomenon with apparent analogies among ancient animal necropolises. As in the case of modern cemeteries of this type, we can look for correlates of human reactions to death. Coexistence and the form of human-animal relations have already been a reflection of human cultural, religious and social identities in antiquity. Funeral practices towards animals reflected important values in the social and religious dimensions of ancient communities. We currently have data from nearly 650 animal burials discovered on approximately 110 m². The use of the area as an animal necropolis in the suburbs of the intercontinental port of Berenike dates back to the first half of 1st century to mid- 2nd century. Among the burials identified in Berenike, 92.9% are morphologically diverse cats (*Felis silvestris catus*), including wild steppe cats (*Felis lybica ornata*). Only 4.1% of animals are domestic dogs (*Canis lupus f. domestica*). We recorded 4 morphological types, including toy-dogs. However, 3% of the burials at Berenike were monkeys - in Berenike, these are representatives of two species, both found on the Indian subcontinent: *Macaca mulatta* and *Macaca radiata*.

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18 **BREACHING THE GAP BETWEEN THEORY AND PRACTICE: THEORETICAL APPROACHES TO HUMAN-ANIMAL RELATIONSHIPS IN BURIALS FROM A VIKING AGE PERSPECTIVE**

Mazza, Selene (University of Cambridge)

The nature of human-animal relationships in the past, like in the present, is intrinsically unbalanced, with humans ultimately holding power over the life and death of many other animal species. This is also true for Viking Age burial customs, where different types of animals were commonly killed to be placed in human graves. Acknowledging this asymmetry, however, does not imply that animals were – and should be considered – passive and inanimate props unilaterally used by humans based on modern anthropocentric ideas of hierarchical and dualistic interspecies relations projected onto past societies. Animals were not simply deposited in Viking Age graves like inanimate objects; they

were mixed with human remains, placed in close contact with human bodies, and sometimes buried without humans at all. Some people, on the other hand, were buried without animals, or not 'buried' at all. Animals were thus not simply 'animals', and humans, as well, were not simply 'humans'.

Moving away from universalistic and one-size-fits-all interpretations, the main aim of this paper is to discuss how contextual theoretical approaches rooted in post-humanism and relationality can be used to balance out archaeological interpretations of human-animal relationships in burials by focussing on the animals themselves as living agents rather than mere dead bones. To start breaching the gap between imaginary humans and animals and their real counterparts we need first and foremost to situate both in the lived-in world as physical entities coming together in specific points in time and space.

Integrating notions from other disciplines like animal studies and ethology, the development of a contextual theoretical framework for the interpretation of human-animal relationships in burials will be illustrated with examples from a case study of graves with animal remains from Viking Age central Norway and evidence from the broader Viking Age world.

19 **PRESERVING LIFE, REVEALING NARRATIVES: TRACING ANIMAL AGENCY IN THE ROYAL DANISH KUNSTKAMMER**

Tissot, Victoria (Aarhus University)

My presentation is based on the ongoing work conducted in my PhD project, which explores the intricacy and diversity of animal lives and afterlives within The Royal Danish Kunstkammer (c.1650-1825), a Cabinet of Curiosities. As an artificial microcosm, the Kunstkammer housed a rich collection of preserved animal matter, spanning the wild and domesticated, local and global, real and imaginary. These animals reveal a complex tapestry of human-animal entanglements, encompassing colonial ventures, scientific explorations, sport hunting, commercial hunting, the keeping of companion animals as well as the development of Early Modern zoos.

By drawing on ideas from 'new materialisms' in the study of Early Modern collections, this research facilitates a shift in focus from the more traditional approach centered around the evolution of museum practices and the individuals who established them to an emphasis on those who were collected and displayed. An interdisciplinary approach to extant material culture, written and pictorial sources allows for a closer look at the individual animal's prior life, death, and journey to the Kunstkammer, as well as the relations they formed with other actors along the way. By further exploring reasons for acquiring, preserving, altering, and organizing animal bodies for exhibition purposes, I seek to contribute to the ongoing animal-agency debate. In this case, questions about agency become particularly relevant when examining the processes in which animals were "immortalized" and transformed through preservation methods, thus engaging in new relations with their surroundings as animal-objects.

By recognizing the agency, thingness, and biographies of seemingly inert preserved animals and emphasizing their vital role within cabinets of curiosities, it is possible to move beyond the conventional understanding of museums as static repositories, offering a nuanced understanding of Early Modern museums as dynamic spaces of vibrant and active matter.

20 **'QUOTH THE RAVEN' - ON THOUGHT, MEMORY, COGNITION AND MULTISPECIES ENGAGEMENTS IN SCANDINAVIAN IRON AGE BELIEFS AND SOCIETY**

Armstrong Oma, Kristin (University of Stavanger)

Two non-humans from Old Norse mythology have achieved a popularity that eclipses the gods of the Norse pantheon: corvids Huginn and Muninn. In pre-Christian Iron Age beliefs, Huginn and Muninn were the shrewd ravens of Odin, the supreme god of Old Norse tradition. These two ravens perched on Odin's shoulders, and their names indicate that they represented thought (Huginn) and memory (Muninn). They were seemingly perceived as guardians of esoteric knowledge and magic in the Iron Age, and from their elevated position on Odin's shoulders, they could see the whole world. They would fly over the land and the sea to spy out everything that went on and brought tidings back to Odin. Initially harbingers of death sent to the battlefield to devour those fallen in war, their role developed into that of messengers. This denotes a belief that they could communicate – talk and make themselves understood – to Odin.

This paper presents and discusses some archaeological objects from the later Iron Age in Scandinavia depicting birds of prey resembling corvids that are interpreted as ravens. Literary sources and descriptions of ravens and crows in Beowulf, the poetic Edda, Snorra Edda and other written sources are considered, with findings compared with recent research on Theory of Mind and the cognitive abilities of corvids.

Finally, the paper explores how ravens were beings that mediated between the real and the imaginary in Norse Iron Age society and mythology, and how close observations of, and interactions with, non-humans became fledgling forces for multi-species engagements in this and in other realms.

21 MEANING OF BIRDS IN THE 6TH-4TH MILLENNIUM BC FROM A SUPRAREGIONAL EASTERN EUROPEAN PERSPECTIVE

Yanish, Yevheniia (Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine) - Schmölcke, Ulrich (Leibniz-Zentrum für Archäologie, Center for Baltic and Scandinavian Archaeology (LEIZA-ZBSA), Schleswig, Germany)

Bird bones are common in archaeozoological materials from the Neolithic in Eastern Europe; at some sites, they constitute a significant percentage of the total finds. We will consider the significance of birds in the life of the local population during this period based on the results of our research, from Latvia in the north to Ukraine in the south. Finds of bird bones are not primarily known from settlement contexts, but from graves. Sometimes funeral decorations - beads made of bird bones, or individual parts of birds such as wings or paws - are found near the buried person or carefully draped on them. It is therefore obvious that birds had a special meaning in people's conception of the world and the afterlife. In our paper, we want to show how widespread this belief was (temporally and spatially) and which bird species were of particular relevance. Additionally, we want to show whether this belief resulted in a kind of taboo on hunting (certain) birds.

22 BIRDS OF CLAY - MYSTERIES, TRANSFORMATIONS, AND REGENERATIONS OF MEANINGS

Pasaric, Maja (Institute of Ethnology and Folklore Research)

Though the representations of animal or human bodies decrease in frequency during the Eneolithic period in Croatia, in comparison to the earlier Neolithic, a number of zoomorphic objects manufactured from clay have still been unearthed. Amongst them is the vessel in the shape of a bird from the site of Vučedol, which gained the status of probably the most famous archaeological artefact from Croatia. This bird inspired renowned interpretations that elaborated the potential symbolic, religious and mythological values of the artefact, as well as narratives outside the academic discourse that shaped it into a distinguished contemporary ideological and identity symbol. Drawing from recent contributions that not only encourage the focus on the ways in which people relate to material culture but also question the theoretical distinction between active subjects and inert passive objects, the paper aims to move away from strictly representational interpretations of bird figurines. This contribution will consider their materiality, the ethology of particular bird species, and the potential meeting places of humans and birds in their shared landscapes that could have influenced and created specific ways of knowing and being in the world.

23 FEATHERED BEINGS IN ICE AGE ART

Taylor, Bernie (Community Member)

Global anthropologic surveys of hunter-gatherers and mythology from the classical literature widely record feathered beings representing spiritual leaders, deities and shamanic practitioners as well as feathers being worn by ordinary individuals on ceremonial rites of passage. These feathered beings are typically associated with a named individual or positions of religious authority who use the abilities of birds to enter alternative dimensions either above or below. Other anthropomorphic deities, humans and animals frequently interact with the feathered beings in sacred narratives memorializing such mythological events. Ceremonial practices and the sacred narratives of feathered beings appear worldwide in places rock art is not present, suggesting the concept of birds aiding humans emerged before rock art and were integral to the animistic experience in prehistory.

This study examined feathered beings, including birds, therianthropes and humans, depicted in Franco-Iberian Upper Paleolithic cave art. DStretch was utilized to surface otherwise hidden features. The characters in the images were compared over time using established archaeological dating of the panels to examine changes in their feathered representations and contextual themes. The study also looked for close motifs with documented Eurasian mythology.

The findings of this study indicate that Franco-Iberian Upper Paleolithic artists most often utilized feathered beings in larger contextual settings on the cave wall panels. The choice of which bird to represent varied by location. Real and supernatural characters, some which may still be recognized in Eurasian mythology, were surfaced. This study suggests that structural characteristics of feathered beings within their contextual themes may be studied with rock art to gain a unique perspective on animistic traditions in prehistory.

496 FROM MICRO TO MACRO: INTEGRATING MICROMORPHOLOGY AND MICROCONTEXTUAL ANALYSES FOR ARCHAEOLOGICAL INSIGHTS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Adewumi, Opeyemi (Geosciences Center (CGEO), Department of Earth Sciences, University of Coimbra, P-3030, 790 Coimbra, Portugal; Instituto Terra e Memória, Mação, Portugal; Instituto Politécnico de Tomar, Portugal) - Sifogeorgaki, Irini (Human Origins Group, Leiden University, Faculty of Archaeology, Einsteinweg 2, 2332EC, Leiden, Netherlands) - Soares, Miguel (The interdisciplinary Center for Archaeology and Evolution of Human Behaviour, Universidade do Algarve, Campus de Gambelas, 8005-139 Faro, Portugal) - Tomé, Laura (Archaeological Micromorphology and Biomarkers Laboratory (AMBI Lab), Instituto Universitario de Bio-Orgánica "Antonio González", Universidad de La Laguna, 38206, Tenerife, Spain; Área de Prehistoria, Departamento de Geografía e Historia, Facultad de Humanidades, Universidad de La Laguna, 38206, Tenerife, Spain) - Zambaldi, Maurizio (University of Coimbra, Centre of Studies in Geography and Spatial Planning (CEGOT), FLUC, Department of Geography and Tourism, Coimbra, Portugal)

Session format: Regular session

What is today's role of archaeological soil/sediment micromorphology in unearthing human narratives from different contexts? Soil micromorphology has proven to be a powerful tool for investigating the minute details of natural and archaeological deposits. This method offers a unique perspective, revealing "microscopic whispers" that echo across time and provide essential insights into formation processes, human activities, and environmental conditions.

Rooted in Soil Sciences, micromorphology's scope has expanded to encompass diverse fields of study, from Natural to Social Sciences, broadening its potential and helping us to understand past human cultures and their interactions with the surrounding environment. Micromorphological observations have thus become a recognised and shared basis of the geoarchaeological approach, paving the way for its integration with emerging state-of-the-art methodologies and analytical techniques concerned with the microscopic or sub-microscopic scale. To date, we might be talking about microarchaeology, considering it a 'pocket knife' to decipher context-based archaeology.

In this session, we will explore the integration of micromorphological analyses with other micro-contextual techniques within geoarchaeological investigations, as this integration provides valuable insights that enhance our interpretations of complex archaeological contexts. Therefore, we invite global case studies spanning all chronologies to foster discussions on (A) how micromorphology can be implemented with other micro-contextual analytical tools and (B) how these micro-scale analyses can help us shed light on macro-scale archaeological questions.

This session calls for contributions that not only highlight the current state of the field but also explore its future potential. By examining how micromorphology adapts to emerging methodologies, we aim to chart a course for the ongoing integration of micro-contextual techniques in the ever-expanding realm of archaeology. Together, we envision the continued growth of micromorphology as a cornerstone of archaeological inquiry, enriching our understanding of human history and environmental dynamics across diverse contexts and epochs.

ABSTRACTS

1 MICRO-SCALE PROCEDURE FOR THE INVESTIGATION OF BINDER TYPES IN HISTORIC MORTARS THROUGH COMBINED ANALYSES

Almeida, Luís (HERCULES Laboratory, University of Évora, Largo Marquês de Marialva, 8, 7000-809 Évora, Portugal; UNIARQ - Centre for Archaeology, School of Arts and Humanities, University of Lisbon, Alameda da Universidade, 1600-214 Lisboa, Portugal) - Santos Silva, António (Materials Department, National Laboratory for Civil Engineering, Av. Do Brasil, 101, 1700-066 Lisbon, Portugal) - Veiga, Rosário (Buildings Department, National Laboratory for Civil Engineering, Av. Do Brasil, 101, 1700-066 Lisbon, Portugal) - Mirão, José (Geosciences Department, University of Évora, Colégio Luís António Verney, Rua Romão Ramalho, nº 59, 7000-671 Évora, Portugal; HERCULES Laboratory, University of Évora, Largo Marquês de Marialva, 8, 7000-809 Évora, Portugal)

Microscopic techniques have assumed significant relevance in historical and archaeological domains, specifically, in investigating the evolution of construction activity over time. Applying these robust analysis techniques makes it possible to characterise building materials, relating them to possible origins, the availability of raw materials in the vicinity of the construction and the stratigraphy of applications in different typological contexts. It makes it possible to clarify doubts in a particular context, such as the use of different types of mortar binders in different historical periods. Microscopy and its complementary techniques emerge as pivotal tools for identifying binders in mortars, specifically hydraulic ones. Considering the potential co-application of multiple binders, the use of conventional methods (e.g. X-ray diffraction) proves to be inconclusive. Thus, microscopy techniques assume paramount significance, offering a

definitive analytical approach indispensable for discerning the complexities associated with hydraulic binders in mortars.

The present study aims to contribute to the establishment of an analysis procedure enabling the unequivocal identification of binders in various types of mortars, with a particular focus on hydraulic ones. This work involves the combined use of fundamental micromorphology principles derived from petrography and scanning electron microscopy coupled with energy-dispersive X-ray spectroscopy (SEM-EDS). Mortar samples from buildings with heritage value built throughout the 20th century in Lisbon, Portugal, were analyzed, as well as mortars formulated in the laboratory with different binders and with known compositions that served as a reference. The results from the application of SEM-EDS demonstrated that the proposed methodology allows the identification of binder types and the determination of clusters based on the analysis of the chemical composition of the binder. This procedure has contributed to a microcontextual methodological systematisation.

2 MULTISCALAR, MULTIPROXY APPROACHES TO UNDERSTANDING HUMAN IMPACTS IN THE HADRIAN'S WALL LANDSCAPE

Shillito, Lisa-Marie (Newcastle University)

Micromorphology is a powerful tool for understanding formation processes of archaeological deposits and human activity but is limited to two dimensional observation. Likewise, the very high resolution of analysis provides detailed insights into formation processes of specific contexts, but it can be challenging to link such observations to longer term processes at the landscape scale. This paper presents new multiproxy research in the Hadrian's Wall region, combining a multiscalar approach from landscape to specific contexts at Birdoswald Roman Fort. Micromorphology in combination with archaeobotanical, phytolith and microCT analysis has provided new insights into the nature of fuel use in Roman Britain. In this case, sampling for micromorphology was targeted at specific contexts of interest, to support hypotheses suggested during excavation. Thick charred deposits were observed, with a well preserved 'ashy' layer. On site flotation indicated a high concentration of charred material. Micromorphology samples were collected to better understand the formation processes, and to examine the composition of the ashy layer. The analysis provides specific information on how the site was using fuel, in this case for heating water in the bath house. In turn, this case study links to wider landscape studies, investigating the nature of human landscape impacts in the late Iron Age and Roman period through quantitative palynological analysis of peat cores. More quantitative data on landscape change can be gained from pollen analysis and macrobotanical analysis, whilst microarchaeology provides important contextual information showing the types of activities that may have caused these landscape impacts. Unlike other methods where samples are collected as standard from each unit of excavation, these methods should be more selective and targeted at selected contexts where they can be used to maximise information.

3 FIRE USE AND WASTE MANAGEMENT IN AN EARLY IRON AGE VILLAGE: CONNECTING ACTIVITY AREAS AT CERRO DE SAN VICENTE

Tomé, Laura (Archaeological Micromorphology and Biomarkers Laboratory (AMBI Lab), Instituto Universitario de Bio-Orgánica "Antonio González", Universidad de La Laguna, 38206, Tenerife, Spain; Área de Prehistoria, Departamento de Geografía e Historia, Facultad de Humanidades, Universidad de La Laguna, 38206, Tenerife, Spain) - Iriarte, Eneko (Área de Paleontología, Departamento de Historia, Geografía y Comunicación, Facultad de Humanidades y Comunicación, Universidad de Burgos, 09001, Burgos, Spain) - Blanco-González, Antonio (Research Group PREHUSAL, Departamento de Prehistoria, Historia Antigua y Arqueología, Facultad de Geografía e Historia, Universidad de Salamanca, 37002, Salamanca, Spain) - Fernández-Palacios, Enrique (Archaeological Micromorphology and Biomarkers Laboratory (AMBI Lab), Instituto Universitario de Bio-Orgánica "Antonio González", Universidad de La Laguna, 38206, Tenerife, Spain; Área de Prehistoria, Departamento de Geografía e Historia, Facultad de Humanidades, Universidad de La Laguna, 38206, Tenerife, Spain) - Mallol, Carolina (Archaeological Micromorphology and Biomarkers Laboratory (AMBI Lab), Instituto Universitario de Bio-Orgánica "Antonio González", Universidad de La Laguna, 38206, Tenerife, Spain; Área de Prehistoria, Departamento de Geografía e Historia, Facultad de Humanidades, Universidad de La Laguna, 38206, Tenerife, Spain; Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB), Universidade do Algarve, Campus de Gambelas, Edifício 1, 8005-139, Faro, Portugal)

Cerro de San Vicente, situated in the Northern Plateau of Iberia (Salamanca, Spain), is an Early Iron Age village dating from 900 to 400 BCE. Excavations so far have uncovered a prolonged occupation spanning the first half of the first millennium BCE, and open-area excavations have unveiled a complex village layout dating to a late phase (c. 650-550 BCE). This layout features earthen roundhouses with central clay hearths, benches, ancillary mud constructions, and open-air spaces displaying midden deposits. While the dwellings yielded limited archaeological materials, transit areas presented ashy and charcoal-rich dumps mixed with abundant culinary refuse and domestic equipment, including open-air fireplaces and other storage features. These material-rich deposits, associated with diverse households, were initially interpreted at a macroscopic scale. Our research aims to unlock the potential of these middens as valuable

sedimentary archives of information to uncover past daily life practices in the village. In order to address this archaeological issue, we applied a microcontextual, geoarchaeological approach to study two midden sequences from the village. Combining archaeological soil micromorphology, thin section phytolith analysis, sedimentary lipid biomarker analysis, and XRF and XRD analyses, our preliminary results showcase complex microstratified sequences formed through recurrent dumping, trampling, and transit events. Notably, lipid biomarkers and phytoliths exhibit excellent preservation. Micromorphological findings reveal the repetitive presence of trampled earth-based construction materials mixed with organic and charred debris, as well as ash layers likely linked to hearth rake-out events. Remarkably, micromorphological data have also allowed us to establish relative chronologies within the site, and therefore to link different spaces that were likely used concurrently in the village. Future analyses promise deeper insights into domestic space utilization and waste management practices, contributing valuable high-resolution, microcontextual data to the understanding of Iron Age contexts in Iberia.

4 MICRO-CONTEXTUAL APPROACH TO ANCIENT AGRICULTURE: THE CASE OF FERNOVETA (IBI, ALICANTE, SPAIN)

Agulló Mániz, Xavier (University of Alicante, Spain) - Gutiérrez Rodríguez, Mario (UIAI, Universidad de Jaén, Spain) - Grau Mira, Ignasi (INAPH, University of Alicante, Spain)

This comprehensive study aims to critically reassess and enhance our understanding of ancient agricultural practices prevalent during the eras associated with both the Iberian Iron Age groups and subsequent Romans in the Iberian Peninsula. The research employs a microstratigraphic perspective, integrating physicochemical and geochemical analyses with soil micromorphology investigations conducted at the Ibero-Roman site of Fernoveta in Ibi, Alicante. Through the amalgamation of various geoarchaeological analysis techniques, our investigation contributes empirical data, shedding light on historical soil cultivation practices.

We posit as the initial hypothesis that the inland territory of Iberian Iron Age Contestania (eastern Iberia) adhered to the model of Intensive Smallholders, and our study explores the multifaceted implications associated with this agricultural approach. This research significantly enriches the broader discourse on ancient agriculture by offering a nuanced understanding of the specific historical and geographical context of Fernoveta. The implementation of advanced analytical methods not only unveils intricate details of soil composition but also provides valuable insights into the socio-economic dynamics governing the ancient inhabitants of the region.

This presentation stands as a contribution to the ongoing dialogue surrounding protohistoric agriculture, serving as an impetus for further exploration into the intricate complexities of land management strategies during the Iberian Iron Age and Roman periods. Moreover, we will address the challenges and potential applications of the micro-contextual approach in agricultural contexts, always acknowledging any limitations that may arise. As we delve deeper into the intricacies of agricultural history, this study seeks to explore the heterogeneous realities of ancient societies, looking for a more profound comprehension of their agrarian practices and landscape and their socio-economic structures.

5 MICRO-ARCHAEOLOGICAL INVESTIGATIONS OF FOOD STORAGE FEATURES IN TURKEY AND THE KURDISTAN REGION OF IRAQ

Tumolo, Valentina (Università degli Studi della Tuscia - Italy) - Maher, Lisa (University of California, Berkeley - USA)

Storing food has always been a basic need for semi-nomadic and sedentary people, representing both a risk-management strategy and a source of social power that generates and supports social inequality. In archaeological contexts, the ways in which food is stored are associated with a combination of ecological, technological, and social factors. This paper will present the work of an ongoing project focused on the investigation of food storage features from key archaeological sites in Turkey and the Kurdistan region of Iraq dated to the late fifth, fourth, and third millennia BC. The research includes the direct examination of stockpiling facilities through a combination of macro-archaeological methods and micro-archaeological techniques. We focus here on the micromorphology analysis and the associated methodological issues, to examine the implications for interpretation of storage features. In particular, we discuss the debates on micromorphology sampling and representativeness of feature types with respect to the concept of case specific site-formation processes.

6 UNVEILING STABLES: FROM FIELD TO MICROSCOPE. STABLING CRUSTS FROM THE MIDDLE BRONZE AGE SITE OF LA MURAIOLA DI POVEGLIANO (ITALY)

Polisca, Federico (Department of Cultural Heritage, University of Padova) - Baldan, Maela (Department of Geosciences, University of Padova) - Battistel, Dario (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice, Italy) - Breglia, Francesco (Department of Geosciences, University of Padova) - Canti, Matthew (Historic England, Fort Cumberland, Eastney) - D'Aquino, Silvia (Department of Cultural Heritage, University of Padova) - Dal Corso, Marta (Department of Geosciences, University of Padova) - Gherardi, Francesca (Historic England, Fort Cumberland, Eastney) - Piazzalunga, Giorgio (Department of Cultural Heritage, University of Padova) - Nicosia, Cristiano (Department of Geosciences, University of Padova)

The identification of stabling activities is of paramount importance in the reconstruction of the social, economic, and ecological aspects of ancient communities. However, especially in open-air sites under dry preservation, stabling deposits usually leave faint macroscopic evidence in archaeological times, mainly related to post-holes. To recognise ancient stabling areas, therefore, a microcontextual approach is required, involving micromorphology and microbotanical techniques (e.g., palynology, phytolith analysis). In micromorphology, phosphate crusts containing articulated phytoliths are considered reliable evidence and therefore have been named 'stabling crusts'. Yet, if 'stabling crusts' exist in micromorphology, to our knowledge, no field evidence of them has been published so far.

Within the framework of the ERC CoG project GEODAP (Geoarchaeology of Daily Practices), a stable characterised by a sequence of compact, orange-brown 'floors' intercalated to ashy layers was discovered in recent excavations in the Middle Bronze Age settlement of La Muraiola di Povegliano (Verona, NE Italy).

Micromorphological analysis revealed that these 'floors' were, in fact, stabling crusts developed by cementing herbivore dung, fodder/bedding material, and domestic waste. The link between field and micro- data has been ensured by meso-observations using a Keyence microscope that allowed for a 3D description of the stabling crusts. Micromorphology, coupled with microchemical (SEM-EDS, μ XRF) and mineralogical analysis (XRD), revealed the formation processes and the burial conditions that lead to the phosphatisation of the deposits. Furthermore, microbotanical and faecal biomarker analyses on sediments extracted from the stabling crusts allowed us to understand which animals were stalled and provided details on the animals' diet and stalling.

This multidisciplinary study bridges the gap between 'micro' and 'macro' perspectives on indoor stabling activities. It offers crucial insights into the formation processes behind stable crusts, provides criteria for their identification in the field, and highlights their significance in deciphering past herding practices and living conditions.

7 MICROMORPHOLOGICAL INVESTIGATION OF HOLOCENE SLOPE DEPOSITS IN THE MIDDLE TAGUS, PORTUGAL

Adewumi, Opeyemi (Geosciences Center (CGEO), Department of Earth Sciences, University of Coimbra, Portugal; Instituto Terra e Memória, Mação, Portugal; Instituto Politécnico de Tomar, Portugal; IPHES, Institut Català de Paleoeologia Humana i Evolució Social, C/Escorxador s/n, 43003 Tarragona, Spain.) - Oosterbeek, Luiz (Geosciences Center (CGEO), Department of Earth Sciences, University of Coimbra, Portugal; Instituto Terra e Memória, Mação, Portugal; Instituto Politécnico de Tomar, Portugal) - Vallverdú i Poch, Josep (IPHES, Institut Català de Paleoeologia Humana i Evolució Social, C/Escorxador s/n, 43003 Tarragona, Spain.; Àrea de Prehistoria, Universitat Rovira i Virgili (URV), Avenida de Catalunya 35, 43002 Tarragona, Spain.) - Quinta-Ferreira, Mário (Geosciences Center (CGEO), Department of Earth Sciences, University of Coimbra, Portugal)

The Middle Tagus region in Portugal is a distinctive ecotonal area with diverse geomorphological features, a complex geological history, and hydrological factors. This region offers an intriguing setting for studying the formation and composition of slope deposits. Despite the considerable advancement of micromorphology as a scientific discipline and its associated methodologies, it remains largely underutilized in archaeological pursuits, particularly in the exploration of slope deposits within this specific Portuguese region.

This paper presents a comprehensive micromorphological approach to the study of slope soils of key archaeological sites in the Middle Tagus region, notably Cadaval Cave and the Amoreira terrace colluvial deposits. Amoreira is situated on the right bank of the Tagus River, in the municipality of Abrantes, while Cadaval is positioned in a karstic canyon along the Nabão River, part of the Tagus basin as well. Micromorphology has been applied, on one hand, to assess the variation of soils along the slope and, on the other hand, for refining the characterization of late Pleistocene and Holocene microstratigraphic units from already established stratigraphic profiles of these sites. Micromorphological samples were also collected for a better understanding of potential anthropic impact in the diagenetic process.

8 SEDIMENTARY MICRO-FACIES AND SOIL STRATIGRAPHY OF GRAN DOLINA TD-10 (ATAPUERCA, BURGOS, SPAIN)

Warnitz, Lila (IPHES, Institut Català de Paleoeologia Humana i Evolució Social, C/Escorxador s/n, 43003 Tarragona, Spain.; Àrea de Prehistoria, Universitat Rovira i Virgili (URV), Avenida de Catalunya 35, 43002 Tarragona, Spain.) - Adewumi, Opeyemi (Geosciences Center (CGEO), Department of Earth Sciences, University of Coimbra, Portugal; Instituto Terra e Memória, Mação, Portugal; Instituto Politécnico de Tomar, Portugal; IPHES, Institut Català de Paleoeologia Humana i Evolució Social, C/Escorxador s/n, 43003 Tarragona, Spain.) - Martín i Perea, David (IPHES, Institut Català de Paleoeologia Humana i Evolució Social, C/Escorxador s/n, 43003 Tarragona, Spain.; Department of Geodynamics, Stratigraphy, and Palaeontology, Faculty of Geological Sciences, Complutense University of Madrid, C/ José Antonio Novais, 12, 28040 Madrid, Spain) - Vallverdú, Josep (IPHES, Institut Català de Paleoeologia Humana i Evolució Social, C/Escorxador s/n, 43003 Tarragona, Spain.; Àrea de Prehistoria, Universitat Rovira i Virgili (URV), Avenida de Catalunya 35, 43002 Tarragona, Spain.)

Since the discovery of Gran Dolina, many studies have been carried out to understand the life conditions of the early humans of Europe. However, as the research on the site stratigraphy is still being discussed, the present focus of this study is on the TD-10 to determine the flow types and taphonomical evolution that can be associated with the site. This study proposes an extensive investigation of the TD-10 unit of Gran Dolina through the use of sedimentary geology and soil micromorphology disciplines as frames of reference to explore microfacies analysis. For this purpose, samples from three columns, N12, N17/N16, and K22, coming from the two different sections of Gran Dolina, North-West and South-East, have been transformed into 41 thin sections. They have then been studied through thin sections and under petrographic microscope at different magnifications in order to determine the different sedimentary structure, pedofeatures and microstructures.

A total of 7 microfacies have been described. The analyses of the microfacies pedofeatures and microstructures have allowed to identify several types of soil. Consequently, within these microfacies, four soil types have been identified: inceptisoi (microfacies 1), aridisoi in varying stages of development (microfacies 2), cryosoi (facies 3 and 4), and finally, alfisoi (facies 5). Those soils reflected different paleopedological variations during the deposit of TD-10, such as calcification, mechanical frost disturbance and illuviation paleopedological process. On the other hand, microfacies 6 and 7 are composed of reworked soil resulting from erosional processes and alluvial deposits. In addition, the stratigraphic distribution of the soil forming process shows distinct diagnostic horizon records between the northern-western and southern-eastern sampled profiles. Therefore, TD-10 seem to present different environmental records according to the Gran Dolina sediment cave entrance aperture.

9 MULTI-METHOD GEOARCHAEOLOGICAL APPROACHES UNTANGLE COMPLEX SITE FORMATION PROCESSES AND SOIL BIOGRAPHIES AT EARLY NEOLITHIC PEILIGANG, MIDDLE YELLOW RIVER VALLEY, CHINA

Ma, Zhe (Department of Archaeology, Durham University) - Milek, Karen (Department of Archaeology, Durham University) - Li, Yongqiang (Institute of Archaeology, Chinese Academy of Social Sciences)

This geoarchaeological study examines the impact of environmental and cultural processes on Peiligang, an early Neolithic site in the loess plains of the middle Yellow River Valley, China. Continuous occupation since the Neolithic and complex post-depositional processes caused irregular interlacing of darker and yellower soils, which posed major challenges for the excavation, sampling, and interpretation of the site. The geoarchaeological programme carefully sampled the darker and yellower soils separately in order to identify their formation processes. Quantitative analyses of geochemical properties, including pH, electrical conductivity, magnetic susceptibility, and organic matter content, were compared to micromorphological analyses of both soil types. This multi-method approach revealed that the darker soils, with higher magnetic susceptibility, organic matter content, and artefact densities, were the original Neolithic A horizons amended with cultural material from the Peiligang settlement, which had been subjected to long-term post-depositional pedogenic processes. The yellow soils, on the other hand, were vertebrate and invertebrate burrows infilled with 'clean' loess dragged in from overlying and underlying aeolian layers. The resulting long-term biography of the Peiligang soils, spanning 7000 years, has made it possible to strip back the later phases of soil development and extract the soil characteristics relevant to the early Neolithic phase of occupation. This has major implications for our understanding of Peiligang and will have significant impacts on how other early prehistoric sites on China's loess plateau are investigated.

10 **LAYERS OF TIME: MICROMORPHOLOGICAL RECONSTRUCTIONS AT UMHLATUZANA ROCKSHELTER**

Sifogeorgaki, Irini (Human Origins, Faculty of Archaeology, Leiden University, Leiden, Netherlands) - Huisman, Hans (Section Archaeology, Cultural Heritage Agency of the Netherlands, Amersfoort, Netherlands; Groningen Institute for Archaeology, University of Groningen, Groningen, Netherlands) - Karkanias, Panagiotis (M.H. Wiener Laboratory for Archaeological Science, American School of Classical Studies at Athens, Athens, Greece) - Schmid, Viola (Austrian Archaeological Institute, Academy of Sciences, Vienna, Austria; Human Origins, Faculty of Archaeology, Leiden University, Leiden, Netherlands; Work group of Early Prehistory and Quaternary Ecology, Eberhard Karls Universität Tübingen, Tübingen, Germany; UMR 7041, Equipe AnTET, Université Paris Ouest Nanterre La Défense, Nanterre Cedex, France) - Dusseldorp, Gerrit (Human Origins, Faculty of Archaeology, Leiden University, Leiden, Netherlands; Palaeo-Research Institute, University of Johannesburg, Johannesburg, South Africa)

In this study, we present a comprehensive analysis of the Umhlatuzana rockshelter in KwaZulu-Natal, South Africa, spanning the Middle and Later Stone Age as well as Iron Age (~70,000 years BP to present). Utilizing multi-proxy geoarchaeological data, including micromorphology, XRD, and SEM-EDS, we reconstruct the site's depositional and post-depositional history. Despite macroscopic homogeneity, micromorphological analysis reveals intricate depositional micro-layering, offering insights into past formation processes. Sediments associated with combustion activities are prevalent throughout the deposits, with preservation conditions notably better in the Holocene. Post-depositional geochemical alterations have led to the formation of phosphatic minerals, notably vashegyite, indicative of acidic and moist sedimentary environments. Despite evident bioturbation features, sediment mixing minimally affects the vertical distribution of lithic artifacts, allowing for the analysis of coherent assemblages. This study contributes to understanding human interactions with their environment, highlighting the critical role of micromorphological analysis in unraveling complex archaeological narratives across diverse temporal and spatial contexts. By integrating micromorphology with other micro-contextual techniques, we aim to enhance our interpretations of archaeological contexts and shed light on broader archaeological questions.

11 **AN INVESTIGATION OF GEOCHEMICAL PROCESSES AND STONE TOOL DIAGENESIS AT THE KATHU PAN SITE, SOUTH AFRICA**

Amaral, Selina (University of Toronto) - Chazan, Michael (University of Toronto) - Butler, Donald (University of Toronto)

Kathu Pan preserves evidence of early hominin behaviours from the Middle Pleistocene to the Holocene. The site is an ephemeral wetland situated in an irregular karstic bedrock topography that is fed by local aquifers and lies along the southern margins of the Kalahari Basin. Post-depositional geochemical factors affecting the site are the formation of calcretes and the dissolution and precipitation of silica (SiO₂). This can partially be explained by the inverse relationship between calcium carbonate (CaCO₃) and silica concerning pH. pH values of 9 or above strongly promote calcium carbonate precipitation and silica dissolution, while pH values below 9 exhibit the reverse effect. The investigation of this phenomenon occurring at the Kathu Pan site was prompted by the fact that some of the siliceous, banded iron formation lithics recovered from the site have acquired a silica "rind" and several may have undergone chemical dissolution. While this phenomenon has predominantly affected the lithic artifacts, some of the enamel recovered from the lower Acheulean layers have also had silica precipitate on their surfaces. The ongoing investigation of this phenomenon includes the analysis of lithic and enamel samples with an SEM and SEM-EDS, in concert with the analysis of micromorphological thin sections using optical microscopy along with SEM-EDS. The analysis of micromorphological thin sections allows us to fully investigate and characterize the extent to which silica and calcium carbonate precipitation and dissolution have affected the Kathu Pan site, thus giving us a better understanding of site formation processes. Results of this analysis will be presented and will be used to identify environmental conditions, beyond pH, that are contributing to this phenomenon's occurrence. This work ties into a larger study of site formation processes and palaeoenvironmental reconstruction during a critical period of hominin evolution at Kathu Pan.

12 **REFLECTING ON THE MULTI-SCALAR (MICRO-) GEOARCHAEOLOGICAL RESEARCH: THE CASE OF ARARAT-1 CAVE (ARMENIA)**

Oikonomou, Ioannis (Human-Environment Dynamics Laboratory, Institute of Archaeology, The Hebrew University of Jerusalem) - Karambaglidis, Theodoros (Department of Geological Engineering and Mining, University of Castilla-La Mancha) - Malinsky-Buller, Ariel (Human-Environment Dynamics Laboratory, Institute of Archaeology, The Hebrew University of Jerusalem)

The central objective of any geoarchaeological study is the reconstruction of the formation process of archaeological sites and the extraction of information regarding past human behaviour. While various types and scales of analyses are available, context-specific microstratigraphic techniques are growingly incorporated in the geoarchaeological research, currently constituting an integral and standardised component of the toolkit. This paper explores the effec-

tiveness of a multi-scalar approach, centered on micromorphological and associated context-specific analyses in tandem with macro-stratigraphic investigations and wider landscape considerations. The analytical component includes the use of archaeological sediment micromorphology, coupled with micro-contextual elemental and mineralogical mapping, utilising SEM-EDS and micro-FTIR respectively. An additional series of bulk analyses is also incorporated within the methodological framework. This includes the study of particle size and shape (laser diffraction granulometry & dynamic image analysis), mineralogy (FTIR), elemental analysis (ICP-AES), magnetic susceptibility, pH, colourimetry, estimation of the organic and carbonate content (Loss-On-Ignition), as well as phytolith and ash pseudomorph analyses.

The combination of macroscopic field documentation, microstratigraphic and bulk analyses is used to decipher and reconstruct the formation processes and depositional histories of the Palaeolithic Cave of Ararat-1 (Ararat Depression, Armenia). The preliminary results of this study enable an intricate reconstruction of the interplaying processes, highlighting differential input of geogenic, biogenic, pedogenic and anthropogenic sediment sources. However, have all these methods been shown equally valuable for the research enquiry? Through reverse engineering of the results, we can evaluate the contribution of the different methods in the construction of the cave accumulation narrative.

13 **THE MIDDLE TO UPPER PALEOLITHIC TRANSITION IN IBERIA: NEW SEDIMENTARY AND PALEOENVIRONMENTAL DATA FROM COVA FORADADA AND LA GRIERA**

Soares-Remiseiro, Miguel (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArE-HB), University of Algarve, Faro, Portugal) - Aldeias, Vera (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB), University of Algarve, Faro, Portugal) - Morales, Juan (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educativa 4, Campus Sescelades URV (Edifici W3), 43007, Tarragona, Spain.; Àrea de Prehistòria, Universitat Rovira i Virgili (URV), Campus Catalunya, Av. Catalunya, 35, 43002, Tarragona, Spain.)

One of the most significant events in prehistoric Europe is the population replacement of Neanderthals by Homo sapiens during the Middle to Upper Paleolithic transition. In this regard, the Iberian Peninsula has been the subject of debate concerning the chronology of sites and theorized that it could have acted as a cul-de-sac for both species: refugia for Neanderthals and latest arrival of Homo sapiens dispersals.

However, many of the studied sites in Iberia lack high-resolution data or are controversial regarding site formation, dating, or paleoenvironment. We present the preliminary micromorphological results of the sedimentary and paleoenvironmental sequences from the archaeological sites of La Griera and Cova Foradada (Catalonia, Spain). Cova Foradada is known for being the southernmost Châtelperronian site, while La Griera - which is less than 2 km away - can complement its sedimentary sequence since it contains levels from the Middle and Upper Paleolithic.

The initial results show that part of the sedimentary record of Cova Foradada has been affected by slope dynamics, which has displaced them from their primary position. In La Griera, we have established the depositional dynamics that explain the position of the Upper Paleolithic adjacent to the Middle Paleolithic, as well as noticing the formation of tufa in the Middle Paleolithic levels.

This study will lead to further analysis, including the examination of stable isotopes and lipid biomarkers, to enhance a stronger comprehension of the paleoenvironmental dynamics during this chronological framework.

14 **NEANDERTHAL AND CARNIVORE INTERACTION AT ESCOURAL CAVE (SOUTHERN PORTUGAL): A MICRO-GEOARCHAEOLOGICAL APPROACH**

Alzate, Guillermo (University of Algarve; Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB)) - Barbieri, Alvise (University of Algarve; Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB)) - Cascalheira, João (University of Algarve; Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB))

In this paper, we present the results of a micro-geoarchaeological study which examine the site formation processes of the Middle to Upper Paleolithic stratigraphic layers at the Escoural cave in southern Portugal. Based on archaeological soil and sediment micromorphology, μ -XRF, μ -FTIR and fluorescence microscopy, we explore the different formation processes in and outside the cave, identifying human activities by the variable presence of faunal bones (fresh and heated), micro-lithic artifacts, charcoal and seashells as well as carnivore input evidenced by coprolites, phosphatic grains and chewed/digested bones, along the whole sequences studied. Besides, we observed common formation processes in Paleolithic caves like bioturbation due to roots and soil fauna activities, phosphatized clayey and silty to sandy sediments related with the presence of carnivore coprolites, and precipitation, dissolution and cementation of calcium carbonates. Our conclusions establish a close interaction between Neanderthals and carnivores who shared this paleolithic cave, as well as different episodes of short-term occupations of the site by hominin groups.

REVISITING THE MADONNA DELL'ARMA CAVE (SANREMO, ITALY): NEW DATA ON NEANDERTHAL DWELLERS FROM 1960'S HERITAGE COLLECTIONS

Costanzo, Stefano (Dipartimento di Scienze della Terra "A. Desio", Università degli Studi di Milano, Milan, Italy) - Zerboni, Andrea (Dipartimento di Scienze della Terra "A. Desio", Università degli Studi di Milano, Milan, Italy) - Aldeias, Vera (The interdisciplinary Center for Archaeology and Evolution of Human Behaviour, Universidade do Algarve, Faro, Portugal) - Starnini, Elisabetta (Dipartimento di Civiltà e Forme del Sapere, University of Pisa, Pisa, Italy) - Pappalardo, Marta (Dipartimento di Scienze della Terra, Università di Pisa, Pisa, Italy)

The rugged Mediterranean coastlines conceal hundreds of caves that have been hubs of human occupation since deep prehistory. Some are hosted along the Ligurian coast of Northern Italy, the most famous being the Balzi Rossi caves - well-preserved and archaeologically rich localities occupied since the arrival of *Homo neanderthalensis* and even earlier hominin species, with excavations ongoing since the mid-19th century and finds exhibited worldwide. Evidence for Neanderthal occupation in the region is found at Madonna dell'Arma as well. This site is a narrow coastal cave nested at the base of a Pliocene conglomerate slope and hidden by a sanctuary sealing its entrance. Therein, 1950's-1960's excavations revealed, on top of a MIS 5e marine deposit, episodes of occupation dated to the MIS 5c and 5a, with a rich Mousterian lithic assemblage associated with faunal remains. Despite in-depth early publications, archaeological excavations at the site ceased and the cave remained mostly unexplored since the 1960's; nonetheless, due to the far-sighting of the former excavation director Giuseppe Isetti, remains of sub-lithified hearths and sediment samples were entrusted to the local museum. The pilot study we present here stems from the SPHeritage Project (MUR grant FISR2019_00040, PI: M. Pappalardo) at Balzi Rossi, and aims to valorise the Madonna dell'Arma cave by executing new analyses on Isetti's heritage samples and re-examining the preserved trench sections. New OSL dating and pedosedimentary analyses improve interpretations of site formation processes, whilst micromorphology, associated to palaeobotanical analyses, is employed on hearths to assess the nature of the fire remains and the anthropogenic processes associated with the groups dwelling in this cave. Results give new life to the site, adding value to the local archaeological heritage and integrating our knowledge about the role of Ligurian coastal environs for the spread and behaviour of *Homo* communities in the European continent.

497 FOOD STORAGE AND SECURITY IN PREHISTORIC EUROPE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: McClatchie, Meriel (University College Dublin) - Cleary, Kerri (Archaeological Consultancy Services Unit) - Johnston, Penny (University College Dublin) - Crowley-Champoux, Erin (University College Dublin) - Prats, Georgina (Universitat de Lleida)

Session format: Regular session

Food storage is likely to have played an important role in managing risk, dealing with surplus and providing security for prehistoric communities in Europe. Potential food storage facilities have been recorded at many sites, including large underground pits, overground granaries and structures, smaller vessels such as ceramic and wooden containers, and discrete deposits in peat bogs. Characterising the practices associated with these structures and objects can be challenging, however. Do food storage facilities always reflect a materialisation of surplus? Who was allowed to access stored resources (and who was not), and what types of dishes were created with stored foods? Can food storage enable resilience through adaptive behaviour in the face of environmental and social transformations, and what can storage tell us about ancient concepts of food security? Much archaeological discussion of food storage practices has focused on later prehistory, but is there also evidence for storage facilities in earlier periods? Are there parallels in more recent ethnographic and folklife records that can help us detect 'forgotten' storage practices? It is becoming increasingly clear that consideration of wider social, economic and environmental contexts can help us better characterise storage practices, and it is hoped that this session will highlight the many different ways in which scholars can approach the study of food storage and security. We welcome papers investigating food storage in prehistoric Europe, particularly those that draw upon evidence from archaeobotany, zooarchaeology, landscape and settlement studies, ethnography and related fields.

ABSTRACTS

1 "WHO EVER MISLAID A KEG OF BUTTER?" BOG BUTTER DEPOSITION AS A STRATEGY FOR FOOD STORAGE IN IRELAND

O'Toole, Karen (University College Dublin)

Bog butter is among the most common finds recovered from Irish peatlands. Often recovered in wooden vessels, wrapped in animal skins and bark, or even bare, this unusual find has an extremely long-lived chronology extending

from the Early Bronze Age through to the early modern period. Organic residue analyses have confirmed the dairy origin of bog butters from Ireland, highlighting the potential of these finds to enhance our understanding of early farming and dairying practice. However, interpreting bog butter deposition is challenging, particularly as it is always a stray find; although food storage has been one of the most popular explanations of the practice since the nineteenth century. Based on my PhD research, this presentation will review the evidence for Irish bog butter deposition as a strategy for food storage through the lens of food surplus and food security. It will explore why it may have been important to store butter for future use in prehistory, assess any aspects of these finds that may suggest they were intended to be retrieved, and consider why so many lay undiscovered into the present day.

2 LEAVE NO TRACE? STORAGE IN THE IRISH ETHNOGRAPHIC RECORD AND THE IMPLICATIONS FOR ARCHAEOLOGY

Johnston, Penny (School of Archaeology, University College Dublin, Ireland) - Cleary, Kerri (ACSU Ltd., Ireland) - Crowley-Champoux, Erin (School of Archaeology, University College Dublin, Ireland) - McClatchie, Meriel (School of Archaeology, University College Dublin, Ireland)

Storage has an important role to play in the way that archaeologists understand the development of past societies. Amongst other things, the role of storage has been debated when examining sedentism, the evolution of complex social orders and the conceptualisation of private property.

Drawing on the Irish ethnographic record for the storage of grain and grain products, we examine likely preservation mechanisms for storage features, make inferences about archaeological visibility and discuss the implications for wider archaeological interpretations of storage in past societies.

Our analysis is based on a dataset gathered as part of a two-year research project "FOODSEC: Food Security in Bronze Age Ireland", funded under the 2022-2024 Irish Research Council COALESCE Scheme (Strand 1L IN-STAR+; Project ID: COALESCE/2022/1623). Results suggest that storage methods used in the subsistence-based economies of the recent past probably had very limited chance of surviving in the archaeological record. Because of this, we suggest that the value of the ethnographic record lies not simply in its use as a resource for drawing parallels about practices in the more distant past, but more in the qualitative insights it provides. We highlight the recurring issues and concerns evident in the Irish ethnographic record for storage and suggest that the problems and the worries manifest there can be projected back into the prehistoric past. In this way the ethnographic record enhances our understanding of the everyday lived experiences of those dependent on efficient storage for their survival.

3 ARCHAEOBOTANICAL AND ARCHAEOLOGICAL EVIDENCE OF PLANT FOOD STORAGE IN PREHISTORY IN NORTHERN GERMANY

Filipovic, Dragana (Kiel University, Germany) - Effenberger, Henrike (Effenberger Archäobotanik, Germany) - Kneisel, Jutta (Kiel University, Germany) - Schaefer-Di Maida, Stefanie (Kiel University, Germany) - Wiethold, Julian (Institut national de recherches archéologiques préventives (Inrap), France) - Kirleis, Wiebke (Kiel University, Germany)

This paper presents the current knowledge on plant storage in the prehistory of northern Germany, based on the direct (archaeobotanical) and indirect (archaeological) evidence. First we consider the combined evidence with respect to (a) the question of what kind of deposits we consider as (remnants of) plant stores or storage facilities, and (b) plant taxa and amounts found in such deposits, along with the issues of taphonomy and formation processes. We then show examples of mainly small-scale storage of wild and domesticated plants from pre- and earliest agricultural sites (Mesolithic-Neolithic) and then contrast these with the finds of large stores of plant food discovered at sites from later prehistory (Bronze and Iron Ages). Our discussion focuses on the apparent temporal shift in the social organisation of plant food storage, from predominantly small ('household') to visibly larger ('community') scale, and on the economic context of this practice. We explore parallels in the ethnographic and historical record, where we also find information on the ways in which different plant products could be stored and the purpose of their storage.

4 WAS IT REALLY USED FOR STORAGE? ARCHAEOBOTANICAL ANALYSES OF THE TRB FEATURES IN NORTHERN POLAND

Kofel, Dominika (Nicolaus Copernicus University in Torun) - Adamczak, Kamil (Nicolaus Copernicus University in Torun) - Bienias, Dorota (Nicolaus Copernicus University in Torun)

Archaeobotanical samples were collected throughout two seasons of excavations at two sites: Browina and Kałdus. Both sites are located to the north of Toruń, at the territory of so called Chełmno Land, Kuyavian-Pomeranian Voivodeship, and were intensively settled in the Prehistoric and as well as in historic times. This presentation includes results of carpological and anthracological analyses of plant macroremains preserved as charred in soil samples as well as imprints in pottery sherds and daub fragments. Materials derived from four Funnelbeaker culture (TRB) features.

Assemblages collected from two features in Browina comprised occasional barley (*Hordeum vulgare*) and einkorn wheat (*Triticum monococcum*) grains along with abundant hulled wheats (*T. monococcum/dicoccon/spelta*) chaff. Additionally, samples from Browina consisted of occasional seeds and fruit of ruderal and segetal plants. Meanwhile a sample collected from one of the features in Kafdus contained highly fragmented grains of indeterminate cereals (*Cerealia indet.*) whereas in the second feature nothing but remains of segetal and ruderal plants were identified. Based on the undertaken research, the following questions arose: 1) Were all the researched features used for storage? 2) If not, what other purposes could the features hold? 3) If yes, were the stored goods intended for humans or livestock? 4) Is it possible to establish function of a feature relying just on archaeobotanical data? Some of the questions will find answers during the presentation as studies of plant macroremains, even sparse, might bring to light interesting insights into activities undertaken by Neolithic farmers.

5 STORAGE PRACTICES IN THE BRONZE AND IRON AGE LEVANT: AN ARCHAEOBOTANICAL PERSPECTIVE

Demeulenaere, Eline (Institute for Archaeological Sciences, University of Tübingen, 72074 Tübingen, Germany) - Riehl, Simone (Institute for Archaeological Sciences, University of Tübingen, 72074 Tübingen, Germany; Senckenberg Centre for Human Evolution and Palaeoenvironment (SHEP), 72074 Tübingen, Germany) - Kamlah, Jens (Institute for Biblical Archaeology, University of Tübingen, 72074 Tübingen, Germany)

The history of the Levant is closely interwoven with agricultural endeavours. Storage techniques and methods played a key role in ensuring the sustenance of the population and stimulating urban development.

This paper discusses Bronze and Iron Age storage practices across the Levant (Northern, Central and Southern Levant) through a synthesised analysis of archaeobotanical evidence. The created dataset compiles information from archaeobotanical studies in the Levant that refer to storage contexts in their publications. In addition, an analysis of archaeobotanical material from Kamid el-Loz is included. The comparison of plant material from storage and non-storage contexts is investigated, in order to identify notable patterns between the two assemblages. Subsequently, the stored plant remains are examined to investigate possible regional variations and temporal changes.

Through this research, this paper aims to improve our understanding of storage practices and their significance, shedding light on storage habits, and possible associated socio-economic structures and trade in the Levant during the Bronze and Iron Ages.

6 THE DYNAMICS OF STORAGE VESSELS AND STORAGE: THE CASE OF NEOLITHIC DISPILIO, NORTH GREECE

Voulgari, Evangelia (Laboratory Teaching Staff, School of History and Archaeology Aristotle University of Thessaloniki) - Sofronidou, Marina (Ephorate of Antiquities of Drama) - Kotsakis, Kostas (Professor Emeritus of Prehistoric Archaeology, School of History and Archaeology, Aristotle University of Thessaloniki)

Although the social significance of storage practices among Neolithic farmers is widely acknowledged, our understanding of this critical dimension of life remains inadequate in Northern Greece Neolithic. This paper focuses on storage practices and patterns from Neolithic Dispilio, based on the ceramic storage containers and pithoi. Dispilio is the first wetland site in Greece that has been systematically investigated since the 1990s by the Aristotle University of Thessaloniki. In the multi-layer diachronic development of the settlement from the mid-6th to the early 5th mil BCE, we have restored and recorded over 100 pithoi from a corpus of 1750 whole pots and profiles. This amount is unique in the Neolithic ceramic assemblage of Greece and opens new possibilities in understanding pottery's role in the storage practices of the Neolithic communities. The abundance of pithoi found in Dispilio may be related to the wet conditions of the settlement because of its proximity to the lake. Still, we believe the environmental setting may not offer the only explanation. After carefully analysing their technological and morphological characteristics, we concluded that the pithoi represented far more than a simple practical solution. Instead, they were tools for manipulating the product in social contexts and expressing ideas of social value.

This conclusion is based on two findings from our study. The first is the time-consuming treatment and decoration of their surfaces; the second is the uneven spatial distribution and their correlation with specific domestic units. We propose that these findings provide clues to reconsider ideas about the autonomy of Neolithic households in Dispilio and the relation of the domestic sphere to a public role of storage. Both indicate that the Neolithic dwellings' simplicity contradicts the complexity of the daily lives performed inside and outside the domestic sphere.

Our study has been supported by the ERC-funded EXPLO Project.

7 PRODUCTION, CONSUMPTION AND STORAGE: THE USE OF DOLIA BY THE FBA ENOTRIAN SOCIETY

van Leusen, Martijn (Groningen Institute of Archaeology) - Ippolito, Francesca (Groningen Institute of Archaeology)

For decades the go-to model for the presence of fragments of large clay storage vessels in the archaeology of protohistoric southern Italy has been that of 'elite distribution': a tribal elite, typically ensconced on hilltop settlements, controls the surrounding territory and monopolizes the sources of wealth (agricultural production and external trade contacts). In this model, the presence of the storage vessels known as pithoi or dolia is supposed to indicate storage, possibly in semi-interred cellars, for the purpose of redistribution at communal feasts. Intensive systematic field surveys in northern Calabria, followed more recently by targeted excavations, have begun to undermine this model, or at least its simplistic application.

From the surveys, it was already clear that many single-family rural settlements have multiple dolia, contradicting the idea of elite control over bulk storage. Starting in 2018, the authors ran a program of excavations targeting sites with evidence of storage vessels dated to the Bronze Age-Iron Age transition, including one from a geomorphological setting previously ignored by scholars. A specialist study of the dolium fabrics from the survey was conducted to underpin the impression that multiple fabrics had a broad regional distribution. In this paper, the authors will report on the relevant results from these studies but, more importantly, will pose a new series of research questions with which to probe the 'elite model' and engage with the multidisciplinary approaches that are the topic of this session. Our emphasis will be on the testable hypotheses emerging from these approaches.

8 CHANGES IN STORAGE ON THE GREAT HUNGARIAN PLAIN BETWEEN 6000 AND 4000 BC

Füzesi, András (Hungarian National Museum (Magyar Nemzeti Múzeum))

The history of Neolithic and Early Copper Age in the Carpathian Basin was eventful, so archaeologists have been able to sub-divide it into several parts. Due to this, the analysed millennia between 6000 and 4000 BC had a lot of connections which demonstrate consistent trends. Storage is one of these long-durée changes researchable in many aspects by archaeology.

Storage vessels represented the first solution for preserving. The large globular pottery of the Körös Culture also served as a communication platform, displayed landscape scenes with wild animals and natural, possibly agricultural vegetation. In the following phases of the Neolithic, storage jars were transformed into anthropomorphic ceramics, and the Late Neolithic rectangular bins were decorated with textile style. The technology and size of the vessels are equally significant, even if research on the social and ritual function of the containers has been at the forefront. The functional properties of organic and non-organic tempering were the main factors influencing the vessel use. The quantification of vessel size highlights the wide spectrum of storing. The variability of these data is related to different storage strategies and variants in supply activities.

Outdoor storage in pits was a secondary stage of preservation. The earliest storage pits were dug around 5200 BC. However we have a lot of excavated sites from Neolithic and Copper Age where there are no analyses of these features. This could be because each site only has a small number of storage pits discovered. The combined available information about the outdoor storage is sufficient to make a detailed analyses.

The presentation will focus on the technical aspects of two types of storage. The analyses will also try to find links between the economic, environmental and social dimensions of the choice and adaptation of the different storage techniques.

9 PITS AS PROCESS: EXPLORING THE UTILITY OF PIT FEATURES FOR DIFFERENT FOOD PRESERVATION PRACTICES IN THE PREHISTORIC PAST

Crowley-Champoux, Erin (University College Dublin) - McClatchie, Meriel (University College Dublin) - Cleary, Kerri (Archaeological Consultancy Services Unit, Ireland) - Johnston, Penny (University College Dublin)

Archaeological studies of storage practices have largely focused on the role of the storage environment as pit storage, ceramic vessels, bins, and silos provide visible archaeological signatures. These studies take an important look at the ways that communities were able to store food (mostly grains) for consumption, seed grain, accumulation, and exchange. The capacity for communities to meet their dietary needs as well as to plan for the future are key components in our understanding of food security. There are other substances and more ephemeral practices, however, that played a critical role in diets and culinary practices in the past. Communities in the past would also have depended on dried, smoked, salted, pickled, and fermented plant and animal products to meet their dietary needs through the winter and early spring, to supplement a diet focused on grain-based products and when fresh cultivated foods would not have been available. While these products remain largely archaeologically invisible, this paper expands our view on the preservation of foodstuffs by interrogating archaeological evidence for pits used to process bone grease and

hearths used for smoking/drying that offer a window into preservation practices in the prehistoric past. This research derives data from the FOODSEC project, which examines food storage and security in Bronze Age Ireland, and compares these data with practices known from the broader ethnographic and archaeological record. FOODSEC: Food Security in Bronze Age Ireland was a two-year project funded under the 2022–2024 Irish Research Council COALESCE Scheme (Strand 1L INSTAR+; Project ID: COALESCE/2022/1623).

10 FOOD STORAGE AND PROCESSING STRATEGIES: IDENTIFICATION OF DOMESTIC PRODUCTION IN NORTHEASTERN IBERIA BETWEEN THE 4TH AND 1ST MILLENNIUM BCE

Prats, Georgina (Grup d'Investigació Prehistòrica (GIP-UdL), Dept. de Geografia, Història i Història de l'Art, 2021-SGR-01607- ARQHISTEC, Universitat de Lleida) - Alonso, Natàlia (Grup d'Investigació Prehistòrica (GIP-UdL), Dept. de Geografia, Història i Història de l'Art, 2021-SGR-01607- ARQHISTEC, Universitat de Lleida)

Agricultural practices, such as storage and grinding, have played a key role in the evolution of human society and human–environment relationships. Storing allows the preservation and accumulation of foodstuffs over longer periods of time, thus reducing dependency on seasonal conditions and food seasonality and providing increased socio-ecological resilience under environmental and climatic stress. Additionally, the milling of cereals, other plants and materials, primarily conducted by women, is essential to the subsistence of human societies.

Various types of food storage and processing facilities have been identified at numerous sites, including underground pits, aboveground granaries, ceramic vessels, and grinding tools such as querns, milestones, and mortars. However, characterizing the practices associated with these structures and objects can be challenging. This study focuses on the relationship between macrolithic grinding tools and storage features and how their distribution indicates domestic spaces and production areas at different sites of north-eastern Iberia between the 4th and 1st millennium BCE. Specifically, we aim to determine whether grinding and food processing occurred within storage areas, households, or external spaces interpreted as residential or artisanal. We will achieve this by examining the type of archaeological site (isolated settlements, clusters of silos, etc.), storage structures, and sedimentation patterns within these structures, as well as the presence, contextual information, and location of processing tools. Understanding storage and grinding technologies and innovations is essential for identifying production spaces and domestic areas at the intra-site level from a diachronic perspective.

11 USING EXPERIMENTAL ARCHAEOLOGY TO EXAMINE FOOD SECURITY IN BRONZE AGE IRELAND

Cleary, Kerri (Archaeological Consultancy Services Unit, Ireland; School of Archaeology, University College Dublin, Ireland) - Crowley-Champoux, Erin (School of Archaeology, University College Dublin, Ireland) - Gryson, Dominic (Cornstown House Farm, Meath, Ireland) - Johnston, Penny (School of Archaeology, University College Dublin, Ireland) - McClatchie, Meriel (School of Archaeology, University College Dublin, Ireland) - Miklis, Michael (Heritage crop farmer, Kilkenny, Ireland) - Ryan, Liam (Consultant Food Scientist, Ireland)

'FOODSEC: Food Security in Bronze Age Ireland' was a two-year research project that took a multi-strand approach to examining the evidence for Bronze Age (c. 2200–800 BC) food remains and food storage facilities, with the aim of exploring how society managed the challenges of achieving food security. One element of this research was the use of experimental archaeological approaches to test the capabilities of underground storage for cereal crops (naked barley, hulled barley and emmer wheat). Previous experiments carried out in other countries have demonstrated that pits could successfully store grain for growing the following season, but these were in very different subsoils, climates and water table levels when compared to Ireland. This presentation will outline how we have used our experimental pits to examine temperature, humidity, oxygen and carbon dioxide levels to determine why some pits may fail but others appear to reach and maintain levels optimal for a fermentation process. The final results of the experimental work will be presented, alongside a reappraisal of how people in Bronze Age Ireland attempted to store their cereal grain to optimise their annual yield and aid their food quality and security. (The FOODSEC project was funded under the 2022–2024 Irish Research Council COALESCE Scheme Strand 1L INSTAR+; Project ID: COALESCE/2022/1623).

498 REFUSE IN CONTEXT: ARCHAEOLOGY OF WASTE MANAGEMENT PRACTICES IN ANCIENT MEDITERRANEAN URBAN SETTINGS

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Gutiérrez-Rodríguez, Mario (Instituto Universitario de Investigación en Arqueología Ibérica. Universidad de Jaén, Spain) - Acero Pérez, Jesús (Departamento de Prehistoria y Arqueología. Universidad de Sevilla, Spain; Uniarq - Centro de Arqueología da Universidade de Lisboa, Portugal) - Detry, Cleia (Uniarq - Centro de Arqueologia da Universidade de Lisboa, Faculdade de Letras da Universidade de Lisboa, Portugal)

Session format: Regular session

During Antiquity, urban Mediterranean societies spread and developed diverse town models to address the challenges associated with communal living, adopting a variety of solutions. One significant challenge was the daily, massive generation of solid, liquid, and physiological urban waste. While there has been some attention in recent decades towards urban sanitation infrastructure, such as aqueducts, sewerage networks, middens, and latrines, our understanding of the nature and composition of organic and inorganic waste, the temporal evolution of waste disposal areas, and the impact of refuse management practices on urban evolution remains limited.

This session takes a bottom-up approach to explore rubbish in Mediterranean urban settings, fostering the multi-disciplinary characterization of waste in specific archaeological contexts to uncover town biographies. We seek to address various research questions: What is the nature and composition of waste in urban settings? How are refuse areas distributed topographically? What is the temporality and specialization of refuse areas? What types of discarded materials are typically found in sewers, middens, streets, and buildings? What were the waste management practices in ancient towns, and what was the impact of these practices on urban development and population health?

To answer these questions, the session promotes multidisciplinary, integrated studies of urban organic and inorganic waste, combining various methods, such as microstratigraphy, zooarchaeology, archaeobotany, spectroscopy, isotopes, biomarkers, geochemistry, paleoparasitology, and more. The core themes of the session include: 1) the potential of archaeological sciences and microarchaeology in defining urban transformation processes; 2) the challenges of integrating data from different analytical methods, architecture, and material culture at diverse analytical scales, from waste management areas to town; 3) the importance of studying waste within their stratigraphic contexts by characterizing site formation processes. This session aims to cover a broad timespan in Mediterranean history, spanning from the Late Bronze Age to Late Antiquity.

ABSTRACTS

1 URBAN LATRINES IN THE ROMAN PROVINCE OF LUSITANIA: LOCATION, DESIGN AND OPERATION

Acero Pérez, Jesús (Universidad de Sevilla; UNIARQ - Centro de Arqueologia da Universidade de Lisboa)

Latrines, both in public and private spaces, were an essential element of Roman cities. However, their study has been largely neglected in the territories of ancient Hispania. This work aims to provide an overview of urban latrines in Lusitania, one of the three provinces into which Hispania was divided during the High Empire. The analysis focuses on the remains identified in the provincial capital, Augusta Emerita, and in other towns with different levels of urban development, such as Capera, Conimbriga and Mirobriga.

This global approach shows that most public toilets were located in or near the most frequented buildings, especially public baths, whose surplus water was used to flush the latrines. Their design varied from the most monumental, even with internal colonnades, to very small, with a capacity for only a few people.

Concerning residential spaces, the number of known cases is more limited due to the difficulty of identifying toilets, especially if they were modest facilities. They were all located in peripheral areas of the dwellings, in order to have an easy connection to the public sewerage system. Depending on their design two basic types can be distinguished: single-person latrines with very simple operation, where running water was not necessary, and multi-seater facilities, with a similar operation to public toilets.

An overall analysis of the latrines allows us to better understand the functioning of these facilities, their role in the urban and domestic context, and the sanitary conditions of Lusitanian cities.

2 WHERE'S THE LOO? AN ANALYSIS OF THE SPATIAL DISTRIBUTION OF LATRINES IN POMPEII

Trusler, Kate (Wright Paleohydrological Institute; University of Missouri)

The location of sanitation facilities has important social and cultural ramifications about the use and management of waste in the ancient Mediterranean. Several seasons of field work in Pompeii have led to a more precise understand-

ing of residential and business latrines and downpipes (indicators of upper story sanitation features) by challenging commonly held notions about the distribution of latrines around the site and within different property types. The location of residential latrines has been mostly attributed to kitchens, but this study found that latrines are also commonly found near entrances and in dedicated latrines rooms. Businesses sanitation facilities are closely associated with downpipes and frequently located in the front room of shops. While the distribution of upper story latrines, is partly an artifact of volcanic destruction, the distribution of downpipes more accurately represents the importance of private sanitation on upper floors. The patterns have implications for understanding latrine use and socioeconomic variation in waste management in urban environments.

3 **A SUBURBAN DUMP IN POMPEII: CONTEXT, FORMATION PROCESSES AND VALUE OF FAUNAL REMAINS**

Fecchio, Mirko (University of Padova) - Furlan, Guido (University of Padova)

A suburban dump excavated in Pompeii, right outside the Sarno Baths, provides a unique picture of consumption and discard strategies in the ancient city before the eruption of 79 CE.

Located on the southern city boundary, between the plateau hosting the settlement and a marshy area, the context was excavated in 2016 and the study of the whole assemblage is being completed. The study of ceramics provided an overall economic picture, including daily consumption and trade. Glass and metal finds shed light on the effectiveness of local recycling practices, a picture recently confirmed by archaeometric analyses on glasses, which also highlighted the importance of perfume production in the city. The recent study of faunal remains, including mollusks, adds further details to this dynamic frame, providing a first picture of the exploitation of the animals in the area. The taphonomic study on the bones, the mortality profiles of the main domestic species, and the subsequent quantification of the data contributed to reconstructing local breeding practices.

This new information has high relevance not yet because of the quantity of data processed, but because of the quality of the stratigraphic context investigated: this is not the result of redepositions and mixing through time but represents a well-dated mirror of what was discarded in the city (or at least in part of its neighborhoods) on a routine basis.

4 **HOW ANIMAL REMAINS CAN TELL A STORY ABOUT WASTE MANAGEMENT**

Detry, Cleia (UNIARQ, Centro de Arqueologia da Universidade de Lisboa, Faculdade de Letras da Universidade de Lisboa, Portugal) - Bustamante-Álvarez, Macarena (Universidad de Granada, Spain) - Heras Mora, Francisco Javier (Extremadura Government, Spain)

A large Roman dumpster was excavated during extensive works directed by J. Heras Mora. This area was situated just outside the Roman wall in Mérida, Spain m2. The dumpster was active between the first century and the beginning of the 5th century, with a profile up to 12 m.

The contents of a person's garbage can reveal much about their way of life, while the management of a city's garbage can provide insight into its overall lifestyle. Mérida, known as Emerita Augusta, served as the capital of Lusitania, one of the provinces of the Roman Empire.

In this study, we utilized animal remains to observe how the dumpster was managed over time and how refuse containing animal remains was handled by the inhabitants of Mérida. Our findings indicate that some waste originated from bone craft workshops in the vicinity, likely more than one, with heightened activity observed in the 4th century. This activity influenced the selection of cattle sizes used for bone utilization. Additionally, we observed the utilization of sheep and goat horns, likely to produce utensils. Furthermore, the presence of animal bones that were food refuse offers insight into the dietary evolution during the Roman period in Mérida.

Moreover, the layers of refuse also surrounded other ritual constructions, such as a small tower with human remains and around 36 dogs and one Egyptian mongoose. This illustrates how the city continued to thrive, engulfing some of the previous monuments, including the initial monument mentioned.

5 **A NEW EXTRACTION METHOD OF INTESTINAL PARASITE EGGS FROM ARCHAEOLOGICAL SEDIMENTS. THE CASE-STUDY OF A BYZANTINE MIDDEN IN SEPTEM (CEUTA)**

García Ruiz, Miriam (University of Jaén) - Gutiérrez-Rodríguez, Mario (University Institute for Research in Iberian Archaeology, University of Jaén) - Bernal-Casasola, Darío (University of Cádiz) - Peña-Santiago, Reyes (University of Jaén) - Sánchez Vizcaíno, Alberto (University Institute for Research in Iberian Archaeology, University of Jaén)

Living in towns of the Byzantine Empire entailed diverse challenges, one of which was the management of the massive volume of physiological residues. This daily necessity was addressed through waste disposal and evacuation facilities, such as middens and sewers. Its deposits can be understood as biological archives of the past, containing relevant information at the microscale about the nature and composition of physiological waste. This, in turn, serves as a potential source of data about living conditions, health, and sanitation practices of the past. Intestinal parasites are among

the most informative microscopic features present in these waste management structures. In this paper, we present a specific archaeological context: a 7th-century AD Byzantine midden located in the ancient town of Septem (Ceuta), the westernmost and final Byzantine possession in North Africa.

A new extraction method of intestinal parasite eggs from archaeological sediments is described. The method is based on successive cycles of sugar gradient centrifugation and has been successfully used for materials of two genera. It has been validated and is able to extract 95% of the eggs present in only three extraction cycles. Results obtained from the analysis of 20 archaeological sediment samples reveal a total of 553 eggs per gram of sediment from two species, one belonging to *Ascaris* and another to *Taenia*. *Ascaris* sp. was more abundant than *Taenia* sp. in all samples. Distributional data of abundance and occurrence are analyzed to detect differences among stratigraphic units.

In sum, this paper aims to present a new intestinal parasite eggs extraction method, discuss its relevance for the understanding of waste management practices in the past, and consider how to integrate this new method into multiproxy question-driven research about the genesis and temporality of middens in byzantine towns.

6 **MULTIPROXY MICROSTRATIGRAPHIC APPROACHES TO WASTE DEPOSITS FOR UNRAVELING ROMAN URBAN REFUSE MANAGEMENT PRACTICES: INSIGHTS FROM HISPANIA AND NORTH AFRICA**

Gutiérrez-Rodríguez, Mario (University Institute for Research in Iberian Archaeology, University of Jaén)

The transformation of urban areas from the Early Empire to Late Antiquity in the Western Mediterranean is a historiographic topic with a long history of development. From the 2nd century onwards, the archaeological record within urban environments became more diverse due to a new conceptualization of urban spaces. These spaces underwent secondary uses and episodes of abandonment, leading to the proliferation of intramural middens, pits, and reflooring sequences. Many of these transformations and changes in urban life were driven by shifts in habits and dynamics related to the management of solid and liquid waste. While written sources do not definitively establish whether there was a regulated system for urban waste disposal in every city during the Early Empire, solid archaeological evidence points to the existence of evacuation systems such as sewer networks and urban and suburban middens. In Late Antiquity, however, middens became prevalent within inhabited areas, obscuring streets, public spaces, and private buildings, thereby affecting urban mobility and the utilization of urban space.

This contribution examines how the evolving dynamics of urban waste management significantly influenced the conceptualization of cities in southern Hispania and North Africa, highlighting that crucial insights into human practices, habits, and attitudes towards urban waste are only discernible at the microscale. We have employed a multiproxy microstratigraphic approach to analyze several urban middens in Hispania and North Africa, incorporating micromorphology, physical-chemical analyses, geochemistry, paleoparasitology and lipid biomarkers. This integrated approach enables us to investigate questions such as the frequency and nature of discarded materials in urban middens, which are essential for understanding the evolution of these features. In sum, understanding urban waste practices turns essential to unravel town biographies from the Early Empire to Late Antiquity in the Western Mediterranean.

499 **NEUTRONS AND SYNCHROTRONS IN HERITAGE SCIENCE: NEW METHODS, TECHNIQUES, AND THEIR IMPACT ON ARCHAEOLOGY**

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Nimura, Courtney (Ashmolean Museum, University of Oxford) - Fauvelle, Mikael (Department of Archaeology and Ancient History, Lund University) - Nilsson, Björn (University Museum, Bergen) - Nehzati, Susan (Max IV Laboratory, Lund University) - Fedrigo, Anna (Institut Laue-Langevin)

Session format: Regular session

Heritage resources are the culturally and scientifically significant objects, artefacts, and places that modern society has inherited from past generations. This includes both 'natural' resources, such as fossils, sediments, and landscapes, as well as 'cultural' resources including art, archaeological artefacts, and ancient buildings. As archaeologists, we engage with all these different types of finite resources. In recent years, advancements and investments in neutron and X-ray science have opened the door to new applications that bridge the divide between the sciences and the humanities. They have proved their potential in the study of heritage resources by providing scientists with the tools needed to powerfully, yet non-invasively, characterise, image, and communicate these critically important and often invaluable materials.

This interdisciplinary session draws specifically on the organisers' new research theme at the LINXS Institute of Advanced Neutron and X-Ray Science at the University of Lund, which is funded from 2023–2026. It aims to bring together archaeologists and scientists, from within and outside of archaeology, to explore the cutting-edge potential of using synchrotron and neutron science to study and understand our shared cultural heritage. To maintain broad

inclusivity, this session has no chronological or geographical parameters, but we are keen to discuss the application of neutron, synchrotron, and cutting-edge X-Ray imaging techniques to archaeology specifically.

ABSTRACTS

1 NEUTRON IMAGING IN HERITAGE SCIENCE, SOME EXAMPLES FROM TOMOGRAPHY TO ELEMENTAL MAPPING

Fedrico, Anna (Institut Laue-Langevin (ILL)) - Cantini, Francesco (University of Florence) - Léonard, Fabien (University of Manchester at Harwell) - O'Flynn, Daniel (The British Museum) - Scherillo, Antonella (ISIS Neutron and Muon Source) - Grazi, Francesco (Consiglio Nazionale delle Ricerche Istituto di Fisica Applicata "N. Carrara" (CNR-IFAC))

Scientific investigations and archaeometric studies have played a major role in the field of archaeology, especially with regard to materials that have been transformed through human activity, like metals. In this talk, I will give an overview of how neutron imaging can be useful to improve our knowledge of ancient manufacturing processes of metals, their technological evolution, and how they degrade over time.

Neutron imaging is a non-destructive method that allows the investigation of bulky and dense materials non-invasively. Neutron tomography and radiography can be used to shed light on the inner structure of composite materials and their manufacturing techniques, but also can be used for elemental investigations. In addition, the combined use of X-ray and neutron imaging provides additional element-dependent information which is fundamental in case of multi-phase objects.

The talk will give an overview of some imaging case studies carried out at different neutron facilities in the field of Heritage Science, spanning from Renaissance statues to Egyptian artefacts.

2 APPLICATION OF NEUTRON SCIENCE IN THE STUDY OF ANCIENT IRANIAN WEAPONRY

Rodzinka, Alex (Cranfield University; ISIS Neutron and Muon Source) - Scherillo, Antonella (ISIS Neutron and Muon Source) - Fedrico, Anna (Institut Max von Laue - Paul Langevin (ILL)) - Erb-Satullo, Nathaniel (Cranfield University) - Shortland, Andrew (Cranfield University) - Simpson, St John (British Museum)

Neutron techniques such as neutron diffraction and neutron tomography allow for non-invasive analysis of complex metal artefacts, providing information about their internal structure, conservation status and, via Neutron Resonance Capture Analysis, elemental composition. In this talk we discuss the application of neutron science at ISIS Neutron and Muon Source to the study of Iranian swords from the Iron Age (1250-550 BC). The objects were recovered by the Border Force after being seized on entry to the UK and will be repatriated to Iran, providing an opportunity to investigate both ancient manufacture and modern modifications. Neutron tomography allowed us to discover remnants of iron tangs preserved inside bronze hilts, while neutron diffraction provided information on the crystalline phases present in these metals without sampling. Similarly, iron swords were analysed with neutron diffraction to examine the crystalline phases of iron and estimate carbon content. The non-invasive nature of this technique allows for analysis of many spots throughout the object, which would not be possible if sampling was required. The results provide information about Iron Age metallurgy in northwestern Iran and together form a comprehensive picture of both assembly methods and phase/elemental composition, allowing us to understand better the technological choices of ancient metalworkers.

3 NEUTRONS: A FANTASTIC TOOL FOR CONSERVATION AND RESTORATION SCIENCE AND FOR THE STUDY OF ANCIENT TECHNOLOGIES

Mondelli, Claudia (CNR-IOM-OGG, Institut Laue Langevin, Grenoble-Francia) - Zorzi, Sandro (Department of Molecular Sciences and Nanosystems, Università Ca' Foscari di Venezia, Italy) - Cattaruzza, Elti (Department of Molecular Sciences and Nanosystems, Università Ca' Foscari di Venezia, Italy) - Schweins, Ralf (Institut Laue Langevin, Grenoble, France) - Chaumat, Gilles (ARC-Nucléart CEA, Grenoble, France) - Taglieri, Giuliana (Department of Industrial and Information Engineering and Economics, University of L'Aquila, Italy)

Artefacts of interest in cultural heritage (CH) are often rare, precious, manifolds and complexes and their secrets are difficult to disclose.

Neutrons are a very unique probe to investigate CH samples and their history.

The neutron techniques are a non-destructive probe, often complementary to the x-ray ones, being sensitive to the light elements, as we can find in organic samples as wood or paper, as well in nano-materials for conservation science (for example nanolimes). For our investigations we used mainly small angle neutron scattering (SANS), in particular the instrument D11 at the Institut Laue Langevin, that covers four decades in Q, i.e. it is able to investigate dimensions between the Å to some hundreds of microns: a very interesting range of investigation for complexes systems as those

of interest in CH. Furthermore the fact that with neutrons we can use contrast methods to make in evidence some specific part of the systems, they represent a powerful and very versatile tool for the study of such complex systems. We will present two applications of neutrons in the study of CH systems: a study of the porosity of ancient ceramic and how it is related to a specific technique of production and the historical context; a study of the characteristics of nanoparticles of alkaline earth hydroxide to drive their production on large scale, for curative and preventive eco-friendly treatments of waterlogged wood.

4 SECTIONING WITHOUT A SCRATCH? USING MUONS TO NON-DESTRUCTIVELY DEPTH PROFILE THE COMPOSITION OF ROMAN COINS

Hillier, Adrian (ISIS Neutron and Muon facility, STFC Rutherford Appleton Laboratory, Harwell Science and Innovation Campus, Oxfordshire, OX11 0QX, UK) - Butcher, Kevin (Department of Classics, University of Warwick, Coventry, CV7 7AL, UK) - Green, George (Lincoln College, University of Oxford, Oxford OX1 3DR, UK) - Pongting, Matthew (Archaeology, Classics and Egyptology, University of Liverpool Liverpool L69 7WZ) - Ishida, Katsu (RIKEN Nishina Center, RIKEN, Wako, Saitama, Japan)

Archaeologists have become increasingly familiar with surface-level compositional analyses of artefacts. A common approach is X-ray fluorescence, which returns results from ~0.01-0.03mm deep. Determining the composition deep beneath the surface often requires destructive drilling or sectioning; something routinely not permitted for samples of high historical, monetary, aesthetic, or scientific value.

Negative muons present a solution to this. By controlling the momentum of the muon its implantation depth can be controlled. When muons are captured by atoms within the sample, they release relatively high-energy muonic X-rays. These are characteristic of the element from which they came, allowing us to perform elemental and isotope analysis of artefacts at discrete depths non-destructively.

This technique is particularly useful for investigating if an object has been deliberately surface enriched or gilded. Furthermore, it can bolster new archaeological narratives that are proposed using surface analyses. Presented here are two case studies in Roman coinage:

1) Ancient silver-copper coin alloys have usually been substantially altered by enrichment, so that the balance of silver to copper at the surface is no longer representative of the original blank. In this study, a group of small silver coins of the late Hellenistic and early Roman imperial periods have been analysed using negative muons. We detail the existence of this surface enrichment and replicate the results obtained with destructive techniques.

2) During the AD68/9 Civil Wars, four emperors fought for control of the Roman Empire, a period of serious and sustained disruption. Gold coins from this period are fully pure, slightly debased, and occasionally heavily-debased with copper. We show that the interior and surface compositions are congruent, eliminating surface enrichment, XRF error, or modern contamination as the source of the variation. This allows us to propose new historical narratives e.g., continued debasement after the Civil Wars reflecting their fiscal toll on the state.

5 LOOKING INSIDE ANCIENT (BIO)ARCHAEOLOGICAL FINDS TO DECIPHER THEIR HIDDEN FEATURES

Mancini, Lucia (ZAG - Slovenian National Building and Civil Engineering Institute, Ljubljana, Slovenia) - Bondioli, Luca (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy; Department of Cultural Heritage, University of Padua, Padua, Italy) - Drossi, Diego (Elettra - Sincrotrone Trieste S.C.p.A., Basovizza, Trieste, Italy) - Bernardini, Federico (Dipartimento di Studi Umanistici, Università Ca' Foscari, Venezia, Italy; Multidisciplinary Laboratory, The Abdus Salam' International Centre for Theoretical Physics, Trieste, Italy) - Bernardi, Massimo (MUSE, Museo delle Scienze di Trento, Trento, Italy) - Tuniz, Claudio (Multidisciplinary Laboratory, The Abdus Salam' International Centre for Theoretical Physics, Trieste, Italy) - Nava, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy)

In the last two decades, the ability to perform ex situ or in situ observation using X-ray microradiography and computed microtomography has increased dramatically. Hard X-ray imaging techniques can be applied in many fields from biomedicine to materials science, from geology to heritage science studies, both using synchrotron- and advanced laboratory-based X-ray sources.

Earth scientists and (bio)archaeologists have recently developed analysis protocols suitable to investigate and quantify microstructural features of several materials (i.e. ceramics, glass, stone, textiles, ancient bones and teeth) to extract precious historical and evolutionary information but also for restoration purposes, economic evaluation, and fabrication of replicas.

Research as well as manufacturing applications can benefit from the non-destructive character of these techniques allowing to investigate the external and internal features of an object in the three-dimensional (3D) domain working in static and dynamic (4D = 3D + time) conditions. The basic principles as well as advantages and limitations of these

technique when applied to heritage sciences will be illustrated together with state-of-the-art methods of image visualization and quantitative analysis.

Several case studies will be used to better understand the potential of modern 3D/4D methodologies applied to natural and cultural heritage studies.

502 ADVANCES IN JAPANESE ARCHAEOLOGY

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Stein, Britta (Martin-Luther-University Halle-Wittenberg) - Zancan, Claudia (Università Ca' Foscari Venezia)

Session format: Regular session

Japanese archaeology has received very little attention outside Japan. Even today only a handful of archaeologists in Europe are focussing their research on the pre- and proto-history of the Japanese archipelago, which is often perceived as being peripheral to both the archaeologies of Europe and Asia. Moreover, European researchers in the field of Japanese archaeology face tangible challenges, such as language barriers, limited data access, theoretical disparities, and the difficulties associated with direct fieldwork. Nevertheless, the number of scholars specializing in Japanese archaeology outside Japan has steadily increased in recent years.

This session will showcase the wide variety of research on Japanese archaeology done by scholars based in European institutions. It aims to introduce current research and research trends in Japanese archaeology by sharing information and results of ongoing and recently finished projects. Through the introduction of aspects of Japanese archaeology that have been largely overlooked this session aims to promote a cross-cultural and comparative approach in archaeological research on Japan and beyond. It also aims to establish a network of scholars to initiate a discussion on the possibilities and limitations of researching the pre- and proto-history of the Japanese archipelago while based in Europe.

We invite contributions that encompass a wide range of topics in pre- and protohistoric Japanese archaeology, including but not limited to:

- Trade, exchange, and social interactions
- Rituals
- Burial systems
- Identity and symbolism
- Comparative studies
- Cultural heritage
- Iconography and pre- and protohistoric art
- Museum Studies
- Heritage Management.

ABSTRACTS

1 LIVING CLOSE TO AN ACTIVE VOLCANO: JOMON ENGAGEMENT WITH MOUNT FUJI IN PREHISTORIC JAPAN

Uchiyama, Junzo (Sainsbury Institute for the Study of Japanese Arts and Cultures) - Jordan, Peter (Lund University)

Mount Fuji, the iconic mountain of Japan, remains a young and frequently active volcano. However, despite these dangers, people have continuously lived in the landscapes surrounding Mount Fuji since the peopling of the Japanese Archipelago, approximately 38ka. In this paper we explore the geological history of Mount Fuji and use a landscape archaeology approach to reconstruct how Jomon communities would have engaged with the “growing” mountain, both as a major geohazard that threatened daily existence, but also as an important topographic feature that would have dominated the horizon from all directions. Our contextual analysis of both general settlement patterns and the two large Jomon sites situated close to Mount Fuji generates surprising insights. First, Jomon communities appear to have settled closer to Mount Fuji during times of heightened volcanic activity. Second, they established unique ritual sites - Ōshikakubo and Sengo - which formed nodal points in much larger interaction, exchange and aggregation networks. Third, these sites were the focus of rituals that made explicit reference to Mount Fuji in relation to major celestial events such as summer solstice. Overall, our preliminary research suggests that Jomon communities incorporated understandings of volcanic geohazards into their worldviews, and found way to “live dangerously” via negotiating appropriate relationships with powerful and landscape forces.

2 THE IMPACT OF BIOCULTURAL STRATEGIES ON PREHISTORIC JOMON BIOLOGICAL DIVERSITY

Green, Madelyn (The Ohio State University; Columbus State Community College) - Hubbe, Mark (The Ohio State University)

Jōmon culture is associated with the prehistoric foraging groups who inhabited the Japanese Archipelago from 13,000 to 2,100 years BP. Jōmon groups successfully occupied a wide range of environments and developed cultural strategies, ranging from groups who predominantly gathered plants in the western regions to groups who hunted mammals and collected marine resources on the eastern coasts. These practices resulted in long-lasting occupations, showing adaptation to environmental challenges. As such, the Jōmon are credited as the precursors to practices that resulted in the later cultural and social development of Japanese societies. Despite their success in establishing long-held cultural traditions, it is not clear how their niche construction, or biocultural adaptations to different environments and landscapes, influenced the patterns of biological isolation and contact among the Jōmon. The overarching goal of this ongoing dissertation research is to assess the population affinities of prehistoric Jōmon groups through a contextual lens that accounts not just for biological variables, but also cultural and environmental variables. Three primary data types were collected: 1) cranial morphology, 2) archaeological information on cultural practices, and 3) ecogeographic information. Craniometric data (2D and 3D) was collected on N=474 Early to Final Period Jōmon individuals from 89 archaeological sites across Hokkaido, Honshu, and Kyūshū. Niche construction cultural practices were quantified through five broad aspects of lifestyle and adaptation: 1) subsistence type, 2) mobility level, 3) settlement size, 4) degree of cultural exchange, and 5) climate and ecology. It is expected that societies who share similar lifestyles will be significantly biologically closer than those that do not, independent of the geographical distance (i.e., genetic isolation) between them. Data analysis is ongoing, with dissimilarity matrices being calculated from the biological and archaeological data to assess the relationship between population affinities and niche construction in Jōmon samples.

3 JOMON SEA: THE IRIAE ARCHAEOLOGICAL EXCAVATION ON TSUSHIMA ISLAND

Petrella, Daniele (International Research Institute for Archaeology and Ethnology)

The Japanese Neolithic, the so-called Jōmon Period, represents a vast area in which to develop new and exciting research in archaeology. This is because there are still many questions that need to be answered to better elucidate the evolutionary dynamics of the cultures that characterized it.

IRIAE's project, “Jōmon Sea: Navigation in the Origins of Japan”, aims to study and understand the use of coastal sites, the sea, and waterways during Neolithic Japan, both in terms of movement within the archipelago and contact with surrounding territories.

In its first phase, the project focuses on analyzing the nature and dynamics behind early relations with the Korean peninsula.

The first site identified by IRIAE researchers as a crucial point at which to look for answers that can help clarify these dynamics is Tsushima Island (Nagasaki Prefecture) and, specifically, the coastal site of Ongasaki and Ongaura Bay below it, which perfectly overlook the Korean coast and meet the geomorphological characteristics of possible landings and/or coastal settlements.

That on the origins of Jōmon culture, is a topic that cannot be separated from human and cultural contacts and the relationship with the surrounding environment, which results in an inseparable pair: the relationship with the Korean people and the relationship with the sea.

Among the questions the project aims to answer are understanding how they adapted to changes in the environment with the advent of the Holocene; what the role of the sea was in the lives of the Jōmon people; what their nautical knowledge was; and whether there can be an identifiable pattern in the selection and use six sites in the bay.

4 UNDERSTANDING THE SIGNIFICANCE OF AOTORA STONE: EXPLORING EXCHANGE NETWORKS AND CHRONOLOGICAL VARIATIONS DURING THE JOMON PERIOD

Astier, Clara (Hokkaido University)

The Aotora stone, a distinctive blue tuff found along the Nukapira River in Hokkaido, Northern Japan, serves as a compelling case study for understanding trade dynamics and chronological variations during the Jomon Period the archipelago. Despite being a known resource, the origin of polished Aotora stone axes found around Northern Japan Jomon sites remained elusive until recent research efforts. This paper examines the historiography of petrographical and geological studies in Japan, revealing gaps in archaeological research methodologies and nomenclature standardization.

Furthermore, this study investigates potential trade routes for Aotora stone polished axes across Hokkaido and the Tohoku region during the Jomon Period. Although numerous artifacts exist, many remain unattributed, hindering a comprehensive understanding of material dispersion. Focusing on the variations in exchange modalities throughout

the extensive Jomon chronology, this research aims to elucidate the impact of cultural shifts on trade networks between Hokkaido and Honshu Islands.

This work endeavors to incorporate the prehistoric significance of Hokkaido into both Japanese and international research paradigms. Ultimately, this project seeks to disseminate knowledge of Japanese prehistory to a global audience, fostering interest and understanding in this captivating area of study.

5 VEGETAL TEMPER PHENOMENA

Nishida, Yastami (Niigata prefectural museum of history) - Abe, Akinori (Chiba University) - Mizunoe, Kazutomo (Doshisha University) - Udatsu, Tetsuro (Miyazaki University)

In the long history of pottery making, potters have been using and trying many kinds of tempering materials. While the inorganic temper is predominant, vegetal temper usage is reported from many parts of the world past and present.

Though not widely known, vegetal temper was also used in the Jomon period. It can be observed in the oldest period, the Incipient Jomon pottery. Somehow, the use of vegetal temper ceased and became popular again at the end of the initial Jomon period. In the early phase of the Early Jomon period, the amount of vegetal inclusion was at its zenith. The tradition disappeared by the middle phase of the Early Jomon period in the central part of the archipelago. Still, it persisted till the early phase of the Middle Jomon period in the north. In general, it seems that vegetal tempering was practised despite the shape or size of the pots.

Our project is the first attempt to substantiate the geographical and chronological domains wherein vegetal temper was employed and to identify the plants utilized for tempering with CT scanning, phytolith analysis, thin section analysis and other methods.

It became apparent that the vegetal temper was also used in southwestern Japan, where it has been unrecognized. The term “fiber-tempered pottery”, used for over a century, should be reevaluated since CT scanning and microscopic observations revealed that wood fragments, roots and even fishing nets were also used.

The past examinations of the physical properties of plant-tempered pottery have proven that despite their porous matrix, they are not inferior to pots with inorganic temper. We also have to consider the explanation why the vegetal tempering ceased.

6 CHILD MORTALITY, GRIEF AND SHIFTING CONCEPTS OF PERSONHOOD IN PREHISTORIC JAPAN

Bausch, Ilona (Heidelberg University)

The lives of infants and small children are as precious as they are fragile; straddling the liminal state between this world and the next. Many cultures throughout history have delayed assigning personhood and agency to small children, fearing their loss to the spirit world if claiming them too soon as a member of human society. This paper explores the possibility of shifting ideas of personhood in infants and children in prehistoric Japan, following research by Yasuhiro Yamada on Jōmon burials, and Koji Mizoguchi on Yayoi cemeteries. During the Jōmon period, various categories of data potentially inform on the social relationship between adult community members and small children, and the impact of child mortality on their grieving families: funerary evidence such as burial type and location within the site; treatment of the bodies (when preserved); their location vis-à-vis family or being interred solo; the presence or absence of grave goods such as sacred pigments, adornment and/or amulets. Commemorative material culture may also include imprints of infant handprints, footprints, even teeth prints preserved in ceramic objects.

During the Late Jōmon period (c. 1500BCE), particularly in Northern Japan, a shift in social relations occurred, also reflected in changing funerary customs regarding infants and small children: some were interred separately, with grave goods such as precious jade beads, which before had been restricted to ‘adults’ of reproductive ages. A comparison will also be made with child burials from Mesolithic Europe.

7 EXPLORING THE DEIFICATION OF THE DEAD AS A MECHANISM IN THE EMERGENCE OF LARGE-SCALE COMPLEX POLITIES AND ANCIENT STATES

Mizoguchi, Koji (Kyushu University)

The research of Shin et al.* challenges conventional understanding regarding the emergence of ancient states and complex polities. The author proposes a novel theoretical model highlighting the crucial role of an expansive interactive-communicative horizon driving their development. This paper draws upon their argument to propose that the deification of deceased chiefs is crucial for sustaining and reproducing this extensive horizon and leading to the formation of early states. Drawing on insights from prominent social theorists such as Mauss, Luhmann, and Deleuze & Guattari, the model provides a social archaeological perspective on the mechanisms that led to the emergence of early states. As the interactive-communicative horizon expands beyond shared experiences and mutual expectations, maintaining trust in the exchange machine becomes difficult, impacting the supply of vital resources for connect-

ed communities. A ‘phase transition’ occurs to address this challenge, replacing the traditional gift exchange-based mechanism with unlimited gift-giving to a non-human-yet-human-like entity, i.e., a deity. This practice becomes integral to inter-communal exchange on an extraordinary spatial scale. The author argues that coupling the deification of the deceased elite and the expansive interactive-communicative horizon is required for early state formation.

* Shin, Jaeweon, Michael Holton Price, David H. Wolpert, Hajime Shimao, Brendan Tracey, and Timothy A. Kohler. 2020. “Scale and Information-Processing Thresholds in Holocene Social Evolution. *Nature Communications* 11 (1): 1–8.

8 REVISITING THE MODE, TEMPO, AND THE CONSEQUENCES OF THE DISPERSAL OF FARMING IN PREHISTORIC JAPAN

Crema, Enrico (University of Cambridge) - Brainerd, Leah (University of Cambridge) - Carrignon, Simon (University of Cambridge) - Craig, Oliver (University of York) - Lundy, Jasmine (University of York) - Shoda, Shinya (University of York; Nara National Research Institute for Cultural Properties) - Stevens, Christopher (University of Cambridge)

The dispersal of rice and millet agriculture during the 1st millennium BC was a pivotal moment defining the foundation of the cultural, linguistic, and biological variation observed in present-day Japan. The archaeological record from the Japanese islands has long suggested the existence of a regional variation in how farming is dispersed, as indicated by the presence of significant delays in certain areas and divergent demographic and cultural responses to the cultural package brought in by the continental farmers. Here, we will summarise some of the main findings of the ERC-funded ENCOUNTER project, which is investigating the patterns and the processes of this major transition by re-examining one of the largest archaeological legacy data available in the world. The paper will focus in particular on whether and to what extent slowdowns and accelerations characterised the dispersal of rice agriculture and whether different regions experienced the same demographic response after the introduction of the new subsistence economy. Our analysis combines a wide range of techniques, including Bayesian modelling of radiocarbon dates, multivariate statistics on tool assemblage, and ecological niche modelling of rice agriculture. Results highlight the extent of regional variations in the transition to agriculture in prehistoric Japan and the putative environmental, cultural, and social causes that might explain the observed patterns.

9 HARNESSING DIGITAL & COMPUTATIONAL FRONTIERS IN JAPANESE ARCHAEOLOGY

Loftus, James (Institute for Liberal Arts, Tokyo Institute of Technology)

The field of Japanese archaeology is currently undergoing a significant transformation, propelled by the gradual acceptance of digital and computational technologies. Historically less prominent in global discussions, this shift presents an opportunity to enhance Japanese archaeology’s international visibility and collaboration. This paper seeks to showcase ongoing domestic and international work being conducted in the digital and computational realms of Japanese archaeology, and how these methods are the key to the future of a “global Japanese archaeology”.

Key scholars within and outside Japan are at the forefront of internationalization, integrating digital tools like GIS, computational demographic modelling, 3D analysis, etc. into large scale, international research groups. Their work demonstrates how digital methodologies can revolutionize our understanding of Japan’s past, and further bridge the gap between Japanese archaeology and international discourse.

Despite these advancements, international collaboration in Japanese archaeology still lags. Factors like language barriers, divergent research methodologies, and limited global awareness of Japanese archaeological studies hinder wider engagement. To address these challenges, proactive and mutually beneficial measures are crucial. These include hosting international symposiums, engaging in collaborative projects, and disseminating research in multiple languages. As international scholars, we must ask ourselves, what can my voice add to the discipline? How is my work useful not only for myself, but for domestic scholars as well? Especially with regarding to digital and computational revolution of the field, in order to maximize international impact, inward reflection on “why does Japanese archaeology need to internationalize in the first place?” is critical. If fruitful answers can be gleaned, digital and computational methods are critical tools to the future of Japanese archaeology on a global stage.

10 MEANING OF THE STANDARDIZED KEYHOLE-SHAPED MOUNDED TOMBS IN THE PROCESS OF STATE FORMATION IN ANCIENT JAPAN

Sasaki, Kenichi (Meiji University)

In the middle third century CE, giant keyhole-shaped mounded tombs appeared in the Nara basin of western Japan, and the practice of constructing keyhole-shaped mounded tombs all over Japan except for the northern and southwestern islands continued until the early seventh century. This time period is called the “Kofun period. Apparently, there were a few fixed “standards” of the mound construction, and it is likely that the paramount chief and high-

er-ranking elites in the central polity distributed a standard of mound construction to local elites as a sign of alliance or friendship. In regions surrounding the central polity region, the construction of keyhole-shaped mounded tombs had a strong political connotation, symbolizing the central control over these regions. At the same time, it seems that local elites adopted the keyhole shape for their burial mounds in ways different from the central polity. In regions far away from the central polity, the construction was often economical, as a local symbol of trade routes. Yet in other cases, the construction was religious in nature, such that local people would have believed that the participation in construction would result in better agricultural yield in the next year. The local and regional differences in attitude toward the mound construction would suggest that the central polity was not super powerful, and that local elites were relatively autonomous during the Kofun period when ancient Japanese societies began to evolve toward a state.

11 INVESTIGATING HOMOGENEITY ISSUES IN THE KOFUN PERIOD

Thierfelder, Doreen (Martin-Luther-University Halle-Wittenberg)

The Kofun period (mid-3rd century—end of the 6th century) is characterized by the construction of monumental burial mounds and highly standardized burial practices with fixed sets of burial goods. These assemblages display temporal variations during the Kofun period and show a religious change closely linked to heightened interactions with the east Asian mainland. Yet, Japanese archaeology has often overlooked regional variations in religious practices, favoring a theory of a homogeneous, emerging state.

Due to the extensive and consistent use of bronze mirrors as ritual objects in Yayoi/Kofun period Japan those objects are particularly well suited for a comparative analysis of ritual objects, their utilization and the diversity of religious practices across different regions. Additional ritual objects such as terracotta clay figures (haniwa) and talc imitations were impacted by bronze mirrors and reflect the concurrent religious transformations. The murals within burial mounds contribute to a comprehensive understanding of religious beliefs in the Kofun period.

This paper will present a spatio-temporal analysis of these ritual objects as well as depictions in decorated tombs. Employing a comparative regional approach, it challenges the prevailing notion of homogeneity in Kofun period society and religion, demonstrating distinct regional variations. Furthermore, this paper will show the importance of prioritizing the archaeological material over the written sources from the 8th century to avoid bias and gain a more nuanced understanding of Kofun period religion.

This contribution will emphasize the complexity of rituals in Japanese protohistory. It will caution against framing them solely within the context of later written sources. By analyzing potential regional differences in Japan's protohistory based on ritual objects and decorated tombs, this contribution aims to deepen our understanding of the complex religious belief systems in Kofun period society.

12 REGIONAL IDENTITY AND KOFUN PERIOD HORSE CULTURE

Stein, Britta (Martin-Luther-University Halle-Wittenberg) - Zancan, Claudia (Università Ca' Foscari Venezia)

The introduction of the horse led to profound socio-cultural developments in Kofun period society during the middle and late Kofun period (5th – 6th century CE). In recent years, various aspects of Kofun period horse culture, such as horse burials, horse gear and military equipment for mounted combat have been discussed in great detail in Japanese archaeology. Yet, depictions of horses and riders in decorated tombs and on pottery as well as rider-shaped clay statues and decorated sue pottery have received very little attention and few advances have been made to incorporate these depictions into the wider research on Kofun period horse culture. It is these depictions however, that show significant regional variation and indicate that the role and importance of the horse in both society and religion differed within Kofun period society.

This paper adopts a comparative approach to identify patterns of regional variation in Kofun period horse culture, highlighting differences in iconography, symbolism and funerary assemblages between Northern Kyushu and Kanto. Interregional interactions and center-periphery relationships during the Kofun period will be analyzed to demonstrate that throughout the Kofun period peripheral centers maintained a very high degree of political and economic independence from the central Kinki region. By examining the interplay between material culture, ritual practices, and regional identities, this paper contributes to a deeper understanding of the complex socio-cultural dynamics of ancient Japan.

Finally, this paper highlights the importance of considering regional variation and local contexts in the interpretation of archaeological data by integrating depictions of horses and riders into the wider discourse on Kofun period horse culture and thus shedding light on the diverse cultural landscape of the Kofun period and its implications for broader narratives of Japanese history and archaeology.

13 SEAFOOD BEYOND SUBSISTENCE: 'LUXURY' CONSUMPTION AND MARINE RESOURCES IN JAPAN

Hudson, Mark (Max Planck Institute of Geoanthropology) - Muñoz Fernández, Irene (Complutense University of Madrid)

Historiographically-speaking, Japanese archaeology is very 'fishy': the role of fish and other marine resources in the history of the Japanese Islands has been over-written by a series of influential though often competing paradigms, notably Confucian and Marxist 'agrarian fundamentalism', American neo-evolutionary functionalism, and broadly Romantic ideas about food and environment. Yet human use of marine resources covers a wide range of procurement, storage and consumption behaviours which are rarely given full attention in the Japanese literature. In this paper we focus on delayed-return marine resources. We first attempt to position these resources in broader histories of luxury and consumer revolutions. Historians have discussed a 'consumer revolution' in the eighteenth century, although the extension of global trade networks after the sixteenth century was a key factor in the expanded consumption of new 'global goods'. By contrast, David Wengrow argues that 'commodity branding' can be dated back to the Bronze Age, a proposal that critiques previous research on luxuries in opposition to 'essential goods'. Our talk will examine archaeological and historical evidence for the procurement, consumption and trade of 'luxury' seafoods in Japan from the Bronze Age to the early modern period. Resources considered include abalone, herring, kelp, shagreen (shark and ray skin) and trepang. Some comparison of similarities and differences between Japan and western Europe (especially Iberia) will be made.

505 ETHNOGRAPHIES OF MAKERS AND MAKING: TRADITIONAL CRAFT AND TECHNOLOGY IN CONTEMPORARY SOCIETIES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Pearson, Kristen (Anthropology and Inner Asian Studies, Harvard University) - Hobbis, Geoffrey (Knowledge, Technology, and Innovation, Wageningen University and Research)

Session format: Regular session

This session brings together archaeologists interested in contemporary contexts and sociocultural anthropologists concerned with material culture to discuss projects that cross disciplinary lines. Our focus is on highlighting research that investigates material culture practices in present-day societies around the globe as they relate to issues of broader anthropological significance. In particular, we invite contributions from scholars working on makers and making, broadly construed. Ethnoarchaeology as originally practiced had a keen interest in craft as an analogical tool for understanding non-industrial technologies; post-processual developments in 'the archaeology of the present' opened the field to investigations of the technologically diverse present, but, with exceptions such as French technologic culturelle, tended to address questions of consumption and infrastructure rather than craft. We aim to revive ethnoarchaeology's interest in traditional and non-industrial makers and making from a position of engagement with contemporary concerns. How do traditional crafts contribute to resilience in an age of climate catastrophe? How do communities use and understand the making of things as they construct and reconstruct themselves in a rapidly changing world? How do crafts interact with industrial commodities in a globalized economy? How does craft shape ontology, epistemology, sociality, and politics, and what consequences stem from the loss of traditional craft knowledge and practice around the world?

ABSTRACTS

1 MILK WITHOUT HONEY: AN ARCHAEOLOGICAL ETHNOGRAPHY OF LIME ACROSS THE ALBANIAN-GREEK BORDER AND THE EARLY MODERN CULTURAL LANDSCAPE

Moudopoulos-Athanasiou, Faidon (Institut Catala d'Arqueologia Classica)

This presentation wishes to reflect on some aspects of a project conducted in the context of the Endangered Material Knowledge Programme of the Arcadia Fund, entitled: "Burning the Bones of the Earth - Documenting the Traditional Lime Manufacturing in the Region of Epirus". The objective of the project was to unveil the knowledge and craftsmanship nuances of the traditional lime making in both sides of the Albanian-Greek border. Our host institute was the Athens-based Itinerant Workshop on Traditional Building Techniques "Boulouki", and our team consisted of young researchers: architects, a civil engineer, a chemical engineer and an archaeologist.

In this presentation I will outline the basis for our interdisciplinary collaboration and address issues of particular interest in relation to craftsmanship and cultural landscape. Lime was historically of great importance for the culture of the transborder region – being used to create mortars for the iconic regional stone structures and to pave the domestic space. In that sense, it played an important role in social life.

I wish to explore how the language and practice of contemporary lime produces relates to the regional cultural heritage. To do so, I will employ evidence from interviews, excerpts from 20th century literature (Ismail Kadare - AL / Dimitris Chatzis - GR) as well as archaeological observations.

2 DIVING INTO CONTEMPORARY GREYWARE POTTING PRACTICES AND COMMUNITIES IN CATALONIA (SPAIN, 18TH-21ST CENTURIES): SOME THOUGHTS ON POTTERS' RESILIENCE AND PERSISTENCE

Travé Allepuz, Esther (Universitat de Barcelona)

Ceramic production has shaped the industrial and human landscapes of Catalonia, especially in the northeastern area. This activity remains significant in certain places, where it transitions between traditional practices and industrial modes of production. Our contribution aims to explore the construction process of a genuinely artisanal identity and to study the re-signification of the material and immaterial heritage related to greyware pottery production in Catalonia. Indeed, a strong productive tradition that developed during the late medieval and modern periods ultimately turned into an element with inherent heritage value, still persisting today. Within an ongoing research project, we archaeologically explored the material culture originating in these communities throughout Catalonia. The enduring presence of productive activity over time, its recognition in a wide territorial area, different geographic or social conditions, and possibly some random elements were factors that converged in specific locations, allowing for collective awareness and the singularization of traditional pottery as a heritage element.

In recent years, we examined the transformation of production processes through a multidisciplinary approach, including archaeological material analysis, historical study of documentary sources, ethnoarchaeology, and information sciences, to provide an overview of the greyware pottery production and to integrate the material culture and industrial development of this area into archaeological studies. This comprehensive approach seeks to understand the evolution of pottery, encompassing both the material element itself and the social and economic interactions associated with pottery activity, its symbolic nature, or the sense of belonging originating in pottery-producing communities. This contribution offers some preliminary thoughts about the present-day state-of-the-art and suggests further research strategies to dive into the communities' resilience and persistence in maintaining an economic activity that deserves investigation from the archaeological perspective.

3 GENDER, CRAFT AND TINIAN MARBLES: A CASE STUDY OF THE (RE)INVENTION OF TRADITION

Voulgareli, Isavella (Cambridge Heritage Research Centre (CHRC), Department of Archaeology, University of Cambridge)

During the late Venetian rule (17th c.), the (modern)-Greek practice of marble craftsmanship was a dominant feature of the traditional crafts at the Cycladic Island of Tinos in Greece. In Tinos, marble techniques have been traditionally transmitted from fathers to sons (or kinsmen) over the centuries. Drawing upon the idea of 'tradition' (Hobsbawm 1983), we can understand how Tinian marble craftsmanship becomes largely male-dominated and male-oriented through the passage of time. While gender-role attitudes and normative practices still exist within traditional marble craftsmanship, progress is made toward easing their grip. For instance, nowadays, more and more women are becoming marble craftworkers. Female marble craftsmen (across the island and beyond) highlight the women's role in the (re)construction of (modern)-Greek marble craft heritage. This development helps us examine broader disruptions of what is known as traditional marble craftsmanship in the wider geographical area of Greece.

Drawing upon Judith Butler's notion of 'gender performativity' (1999), feminist approaches to the production of knowledge, and reflexive ethnographic methods, this paper aims to explore how the relational (re)construction of Tinian marble craftsmanship produces subversive 'know-how' techniques in response to digital technologies and niche market demands and redefines marble craft tradition amid new societal stimuli. In the first part of my paper, I investigate how current marble craft practitioners navigate changing social settings, and how their navigation relates to the subversion of their professional and public gendered identities. In the second part of my paper, I explore how change in gender expectations influences the performance of traditional marble craftsmanship and the making of (modern)-Greek marble craft heritage.

4 MAKING YARNS: THE RESILIENCE OF MARKA-DAFING DYEING TECHNIQUES (BURKINA FASO, WEST AFRICA)

Douny, Laurence (Humboldt University)

In the context of climate change and the human impact on ecosystems, the textile production of West African rural communities, which relies heavily on natural resources, is endangered. Over the last thirty years or so, responding to a growing lack of indigenous (Anaphe and Epanaphe) 'wild' silks, Marka-Dafing women of Burkina Faso have had increasing recourse to alternative vegetable fibres that require a specific coating treatment to mimic the properties

of the hard-to-find animal material. The dyeing technique, which uses an alkaline fermentative process to confer sheen, elasticity and shades of brown to the fibre, thus reminiscent of indigenous silk, is a long-standing technique used to copy the original tuntun (wild silk textile), the preserve of the elites. Grounded in an anthropology of materials and techniques, this paper looks into the fermentation dyeing of cotton yarns (using plants, cow manure and, when available, waste water derived from the cooking of wild silk nests) by retracing the operational sequence. A descriptive analysis of this dyeing process against the historical backdrop of material depletion since colonial times is provided by a focus on the technical relationships between the container, the dye, the yarns, the surrounding environment and the dyer's skills and knowledge. A particular focus is placed on the adaptative capacity of Marka-Dafing craft in the face of depletion and as a form of resilience regarding adverse biodiversity loss.

5 WAITING FOR THE WATERS: DOCUMENTING TRADITIONAL FISHING PRACTICES ON TANZANIA'S RUFJI RIVER FLOODPLAIN AT A TIME OF RAPID ENVIRONMENTAL CHANGE

Moreau, Marie-Annick (UCL - University College London)

The use of fishing traps was once widespread in pre-industrial societies, from the river weirs of medieval Europe to the salmon fences of the Pacific Northwest. On Tanzania's Rufiji River floodplain, people continue to construct a variety of traditional fish traps from plant materials, adapting their form, placement and management to target fish moving across a seasonally shifting waterscape. The social values associated with trap making and fishing—in the sharing of catches, labour, and access to fishing sites—remain central to local conceptions of fairness and belonging. But what will happen to the knowledge, skills and values involved in trap fishing, and to the material contribution traditional traps make to local livelihoods, if the floods end? The Julius Nyerere hydropower megadam, built without adequate impact assessments or public consultation, is nearing completion on the Rufiji River. The consequent disruption to flooding patterns, coupled with the stresses of a drier and more unpredictable climate, are already testing the productivity of traditional fishing methods, and reconfiguring makers' relationships to their craft. In this paper I reflect on a collaborative project with fishers in one Rufiji village to document through photographs, videos and interviews traditional fishing traps and practices at this moment of transformation, and ask whether a focus on cultural heritage offers a way for affected communities to challenge narratives of hydropower megaprojects as a "green" and just solution to climate change.

6 MEMORY WORK IN MUD, STONE AND WOOD: A CONTEMPORARY ARCHAEOLOGY OF MATERIAL KNOWLEDGE IN TURBULENT TIMES IN SOUTHERN AFRICA

Fredriksen, Per Ditlef (University of Oslo; University of Cape Town) - Bandama, Foreman (The Field Museum of Natural History, Chicago; University of Illinois)

What happens to material knowledges and practices in the aftermath of involuntary uproot and relocation? How do displaced newcomers weave their lifeworlds, knowledges and practices into a novel context in the early stages after arrival? Guided by these queries, this archaeological study of contemporary communities in southern Africa, anchored in a primary case in southern Zimbabwe, employs a temporally layered approach to minority communities experiencing intense mobility in a dense political landscape and facing a state that turns to violent evictions. Our primary aim is to understand craftspeople's practical problem-solving when coping with loss and absence while seeking to re-weave their social webs. Our examples share a common focus on earth materials (mud, soil, clay), stone and wood – easily available, low-cost or cost-free materials frequently used by displaced and refugee communities. Key analytical concepts are material attention, local agency and an expanded version of Achille Mbembe's 'necropolitics'. The approach seeks to merge two research domains only rarely combined: craftspeople's engagements with the socioecological landscape and the sociopolitical relevance of ancestral commemoration and related forms of memory work.

7 TYPOLOGIES, TECHNOLOGIES AND KNOWLEDGE. SW ETHIOPIAN SHABO HUNTER-GATHERERS AND THE CONSTRUCTION OF OTHERNESS.

Salazar-Bonet, Juan (Florida State University - Valencia International Program) - González-Ruibal, Alfredo (Institute of Heritage Studies - Spanish National Research Council (Incipit-CSIC)) - Falquina Aparicio, Alvaro (Institute of Heritage Studies - Spanish National Research Council (Incipit-CSIC)) - Derara Megeenassa, Worku (Department of Archaeology & Heritage Management, Addis Ababa University) - Rodríguez Simón, Pedro (Independent archaeologists)

Typologies of objects, tools and techniques were employed by Western academia to first hierarchize world societies. XIX century European archaeologists and anthropologists established that hunter-gatherer societies were the lowest stage of human development. Their material culture was considered a clear evidence of their primitiveness. In the case of SW Ethiopia, early explorers and travellers reinforced this Eurocentric dominant world-view. Moreover, diverse farming and herding groups in this region, in close contact with hunter-gatherers shared this negative perspective on

these small-scale societies. In the latter case, their consideration of hunter-gatherers backwardness was substantiated in their eating of wild animals and the absence of domestic species rather than in their typology of objects.

The Shabo are a present-day small hunting-gathering group of around 1500 people in southwest Ethiopia. Shabo people still hunt wild animals in the highland forest in the border region of three Ethiopian regional states (Gambela, Oromia and SNNPRS). To obtain several mammal species, they employ spears (bakee) and traps (kambo), two types of objects that have been a common subject of archaeological and anthropological research. Shabo original land is now threatened by large-scale coffee plantations, and they are also under pressure from Christian churches and state development projects. Furthermore, as far as 2023, the Federal State of Ethiopia has not acknowledged their existence as an independent ethnic group due to their nomadic life in the forest. An EMKP-British Museum project has allowed us to record Shabo material culture and, as a consequence, approach a particular technological coherence adapted to the forest. Shabo hunting typologies and technologies challenge the still prevailing pejorative narratives on this group and help to break long-term academic consideration of innovation as a superlative value and the only path to knowledge.

8 PLAYING WITH WOODFIRE: AESTHETIC SENSIBILITIES AND LIFESTYLE ASPIRATIONS OF CERAMIC PRACTITIONERS IN JAPAN AND BRAZIL

Morais, Liliana (College of Sociology, Rikkyo University)

Drawing on semi-structured interviews and participant and non-participant observation with non-Japanese ceramic practitioners in Japan and Brazil, this paper explores the intersection between aesthetic sensibilities and lifestyle aspirations in the allure of Japan-style ceramic wood-firing. Understanding aesthetics as the evaluative judgments of stimuli on the senses (Ingold, 1997), we will see how the technical choice of firing with wood at high temperature in Japanese kilns not only shapes the multisensory qualities of ceramic objects but also gives form and is formed by the lifestyle choices and aspirations of ceramic practitioners. Departing from the proposition that not only people make objects, but objects also make people (Miller, 2005), we delve into the embodied relationships contemporary ceramic practitioners in Japan and Brazil establish with materials, techniques, and aesthetic sensibilities nurtured via direct and indirect transmission of Japanese ways of knowing, seeing, and making ceramics. We explore how these culturally located values, cultivated in the interaction between technology, aesthetics, ethics, and morality (Saito, 2017), are negotiated with broader lifestyle aspirations marked by ideas of sustainability, authenticity, and collaboration with human and non-human others in an age of political and environmental crisis.

9 TO CUSTOMERS WITH CARE: AN ETHNOGRAPHIC EXAMPLE OF BUTSUDAN DISTRIBUTION IN RURAL JAPAN

Hui, Lok Hang (University College London)

Care is an important aspect in Japanese craftsmanship. This paper discusses the ethnographic example of a traditional craft known as Nanao butsudā, a local-style Buddhist altar found in many homes in Nanao, northwestern Japan. A traditional Nanao butsudā is built collectively by five specialist craftsmen with skills learnt and perfected over many years. For many rural households, looking after their butsudā on a daily basis is the most accepted way to show care to the family ancestors, and passing down the altar to the future generations is considered a serious family affair. Customer demand for craft butsudā, however, fell in the late 1990s, when some national manufacturers started mass-producing low-cost alternatives with parts imported overseas in their in-house assembly line. Based on ethnographic research conducted with local butsudā makers and shop owners, this paper demonstrates how the work of creating and conveying care is delegated downstream to the distribution process as production shifts from handcrafting to mechanised manufacturing. Craft making, by definition, refers to the value-added process through which the raw materials become the finished products. This paper suggests that post-production activities, including packaging, transporting installation and coordination with the clients, also play a significant role in converting industrial products into valued family items. One of Marx's main criticisms of capitalist economy is that it causes alienation, in which workers become disconnected from the result of their own labour. In contrast to Marxist theory, this paper presents a case in which the commodity's affective transformation occurs during the distribution process rather than during production.

10 "WE ALWAYS REMEMBER FOR WHOM WE MAKE A TANDYR". ETHNOARCHAEOLOGICAL RESEARCH OF TANDYRS IN SOUTHERN KYRGYZSTAN

Koštial, Jozef (University of West Bohemia in Pilsen)

The presentation has two informative levels: a) describes the construction, distribution and use of tandyr cores as a traditional product of the bread-baking culture in southern Kyrgyzstan; compares these processes with the well-documented phenomenon of tandyr in the Middle East and b) tries to define the implications for potential archaeological

research of tandyr in this area, where (despite their proclaimed general distribution and use) these products have not been archaeologically identified to date. The basic method of the work is the direct collection of ethnographic data at four production locations and dozens of consumption locations through direct observation and formalized questionnaires.

Preliminary results:

- without any formal standardization (given from above), a significant production, material and shape standardization of production can be traced through whole Fergana region
- technological procedures are ritualized by reference to tradition ("we've always done it this way")
- production is limited by ethnicity and gender ("work is for men; Kyrgyz are nomads, Uzbeks artisans").

11 PRACTICAL PARADOXES: EXPLORING THE SOCIAL AFFORDANCES OF THINGS IN CONTEMPORARY MONGOLIA

Pearson, Kristen (Harvard University)

For both Mongol and Kazakh pastoralists in Mongolia, spatial divisions within the yurt are used to mark relational status. Where a person moves and sits within the yurt is not prescribed in absolute terms, however, but varies depending on whomever else is present. In this paper, I will explore how household objects and daily material practices are similarly involved in the construction of relational distinctions and how this impacts the meaning and value of gifts. Focusing on felt carpets (syрмаq), I will show how a focus on relational status pervades every aspect of the syрмаq chaîne opératoire, whether making, keeping, giving, or sitting. Given as a dowry gift, the syрмаq materializes unequal but mutualistic relationships among kin and helps newly established households identify themselves within a network of obligations. For Kazakh pastoralists in Western Mongolia, objects are socially useful insofar as they can be used to mark relational identity and status, a fact that underlies the resilience of some traditional technologies, explains the transformation or disappearance of others, and contextualizes the adoption of mass-produced commodities.

12 TRADITIONAL CRAFTS AS CULTURAL RESILIENCE: ON THE MAKING AND USE OF KHEKHE OBJECTS/SUBJECTS AMONG THE NENETS OF NORTHWESTERN SIBERIA

Solfeldt, Erik (Stockholm University)

The making process of Khekhe objects/subjects rests upon the animistic ontological premises of the past. Khekhe is the Nenets notion of a certain thing in a particular situation, an animation of a thing or a place, such as idols, sledges, drums, poles, and place in chum (Nenets type of tent) and places in the tundra and taiga landscapes. Yet, these animated things are being viewed and explained based on Western notions. First, by missionaries, as the work of the devil, and secondly, by ethnographers and anthropologists, as representations of gods within a failed epistemology and/or ontology. By studying the making and use of these Khekhe objects/subjects from a new animistic theoretical perspective and drawing on the Ingoldian critique of hylomorphism in favour of ontogenesis, I argue that these Khekhe objects/subjects are not static objects of art but a fundamental part of the old ways – a part of the animism that, in the form of an animistic syncretism, has persisted despite Christian missionaries, Soviet politics, and the explanations of both Eastern and Western ethnographers and anthropologists.

13 KEEPING THE HAMMERS' VOICE ALIVE

Ferraro, Emilia (University of Dundee)

The ancient craft of Ecuadorian silversmithing has pre-Hispanic roots, and can be compared to an ecosystem, i.e. a community of interacting organisms and their physical environment. Like any other ecosystem, the silversmithing one also is a complex network of interconnected components – natural and manmade materials (still mostly handmade); relationships (with materials; with different artisans; and between masters and materials), and skills – that work together in synergy.

Like all ecosystems, this one also has a dangerous "predator": the encroaching global economy that in the last three decades especially, has caused Ecuadorian artisans to migrate in search of better economic opportunities; skills to be lost; materials not to be as accessible as before; workshops to be closed; and intergenerational knowledge transmission to be broken.

My research focuses on the Ecuadorian way of creating vessels by hammering on the inside from a single sheet of silver/metal that, to the best of my knowledge, is unique and unknown, at least in the UK, and quite distinct from the better-known method of hammering "on/from the outside" (e.g. angle raising).

Of pre-Hispanic origins, this unique technique conveys a worldview and belief system related to the "feminine" (despite being practiced nowadays almost exclusively by men) and to creation as a process that a) comes from the complementarity of the masculine and the feminine, and b) where the source of all life is believed to come from the inside.

The creation of vessels is not different from any other process of creation of (any form of) life in the Andes. This is conveyed in the language used to refer to techniques, tools and even the makers' relationship with materials, which is permeated by gendered and sexual metaphors.

Note: The research project, still ongoing, is funded by the British Museum under their programme Endangered Material Knowledge Programme (EMKP). Fieldwork was carried out in three traditional workshops in Quito over the summer of 2022.

14 **APPROACHING THE PAST THROUGH PRACTICE: RECONSTRUCTION OF A HISTORICAL GREENLANDIC DOG SLED**

Vitale, Emma (University of Greenland; University of Copenhagen)

Since the emergence of the Thule culture (1000 CE), dog sledding has been perceived as a central means of transportation in traditional Inuit life in the Arctic. However, there is an absence of research concerning traditional Inuit dog sled construction and the operational sequences of this technology. This study investigates Inuit dog sled construction using enskilment methodologies and employs experimental and ethno-archaeological observations to explore the relationship between knowledge and technical practice. It involves the reconstruction and testing of a West Greenlandic dog sled from the 1920s, shedding light on carpentry techniques and construction processes. This method emphasises the interaction between humans, technology, and time, providing essential practical data for future archaeological and historical research, particularly for comprehending fragmented archaeological remains. Inspired by the chaîne opératoire concept, which challenges conventional perspectives and places emphasis on process over the end-product, this research provides insight into understanding Inuit dog sled technology and the complexity of the practice. The connection between artefacts and materially situated practice is demonstrated through the reconstruction of a dog sled, which illustrates the value of physicality in enskilment. It highlights how experimental archaeology can improve our insights into the historical and prehistoric Arctic societies technologies and practices.

15 **THE WANIGELA POTTERS: PATTERNS OF PRODUCTION AND CHANGE. SOCIAL CHANGE AND POTTERY MAKING IN WANIGELA, ORO PROVINCE, PAPUA NEW GUINEA**

Bonshek, Elizabeth (Independent)

The women of Wanigela make distinctive pots using a technique unique in Papua New Guinea. A number of different pot forms are made: if decorated with clan designs they are generally kept for domestic use while cooking pots without clan designs can enter into a long standing regional exchange network in which pots, netbags, barkcloth and mats, all made by women, move between the villages of Collingwood Bay, each object regarded as being of equal value.

This pottery tradition was first reported by the Administration of British New Guinea and Anglican missionaries between the 1890s and 1910; archaeologist Brian Egloff and anthropologist Margaret Stephens documented pot making during the 1960s, the latter noting trans-generational aspects of pottery making. Around the same time, Margaret Tuckson contributed a ceramist's view of pottery making in this region.

Drawing upon this background this paper reflects upon insights into the changing patterns of pottery production gained during my doctoral fieldwork in Wanigela between 2001-2003. In considering the theme of this panel, I trace the social and cultural changes manifest within the armature of this material knowledge practice. The social mapping of material knowledge practices reveals changes in the transmission of pottery making skills and gives pause to reflect upon the concomitant effects on the kinds of designs potters apply to their vessels. In different ways the survival of both design making and the technique of pottery making appear to be threatened.

16 **CONCRETE PASTS, CONCRETE FUTURES: BUILDING ISLANDS IN THE ANTHROPOSCENE (LAU, SOLOMON ISLANDS)**

Hobbis, Stephanie (Wageningen University) - Hobbis, Geoffrey (Wageningen University)

In the Lau Lagoon, Solomon Islands, there is no material process, operational sequence and associated knowledge broader than the creation and maintenance of land itself. The Lau make land in the form of small islands, called fera-i-asi (rock in the sea), inside the eponymous lagoon on the northwest coast of Malaita Province: fashioned out of coral rocks, sand and coconut trees, and using practices dating back to at least seven hundred years. These "artificial islands," scattered across the lagoon, have played the backdrop to everyday and ritual life as it has met a long history of challenges, protecting the Lau from dangers from the mainland, such as malarial mosquitos and raiding parties, and from the ocean in the form of traders, whalers and slavers. Now the ocean itself is a threat. The sea is rising, so too the water's temperature which is bleaching the coral reef. In this paper, we draw on longitudinal ethnography to explore a central component of the assemblage that is the Lau artificial islands: kastom concrete. A binding agent and a substantive material in and of itself, kastom concrete holds the world of the fera-i-asi together. Surprisingly resilient, based off a centuries old recipe, the future of concrete making is uncertain. Industrial concrete is vying to take

its place, threatening a sustainable material practice that may be particularly suited to fend of the negative effects of climate change in the region.

17 **TECHNICITIES AGAINST "TECHNOLOGY": SOME METHODOLOGICAL SUGGESTIONS**

Coupaye, Ludovic (University College Ldon)

This presentation takes as a premise the implied suggestion made by the call for paper that an approach that relies on a strong contrast between crafts and "modern technologies" often risk obscuring the fundamental relational dimensions which underly ways of making and doings, whatever the place or the period. Instead, I suggest exploring how technical activities always actualise culturally and historically specific modalities of relations between humans and their milieus, not only avoids the reproduction of ethnocentric and presentists preconceptions about "technology" but provide also an avenue for revealing the various technicities these relations actualise. Starting with the classical works of Mauss and the French Technologie Culturelle, implemented with more recent works in Material Culture Studies and other disciplines which have discussed "technology", the paper presents some methodological suggestions which could allow the allows to ethnographically, that is empirically, investigate questions of materiality, personhood, agency, political economy, cosmology or "ontology".

510 **ROME'S PLACE IN AN EPONYMOUS EMPIRE**

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Hanson, John (University of Oxford) - Ortman, Scott (University of Colorado) - Bellviure Perez, Joel (University of Oxford) - Dominici, Corso (University of Oxford)

Session format: Regular session

Over the last few decades, there has been significant debate about the place of Rome within the Roman Empire, with scholars suggesting, adopting, critiquing, and rejecting various models of imperialism, colonization, acculturation, resistance, and hybridization, often in response to contemporary social and economic events. At the same time, the combination of recent and on-going excavations and multiple revolutions in archaeological theory and practice, the storage, manipulation, and dissemination of information, and the digital and computational interpretation of ancient remains means that we have never been better informed about the material life of the capital and its relationship to the provinces. The aim of this session is therefore to take the opportunity to reflect on the place of Rome in the empire that bears its name, and its role within the imperial system. In particular, it will consider, first, the extent to which recent discoveries allow us to reassess the demography, topography, and socio-economic conditions of the capital, and, secondly, what newer theoretical models, more powerful computational approaches, and more thoughtful modes of synthesis reveal about the relationship between the capital and other communities. We would therefore welcome contributions that either allow us to reassess the relationship between Rome and the wider empire using new theoretical, computational, synthetical approaches, or that allow us to trace the interactions between them through the lens of social and cultural transmission or the exchange of material remains. Contributions to the session may therefore come in a variety of forms, from direct reports from fieldwork projects to the results of longer-term research initiatives, and could cover a range of types of evidence, from art and architecture to epigraphy, numismatics, ceramics, and bioarcheological and archaeobotanical evidence.

ABSTRACTS

1 **ON THE POPULATION OF ROME**

Hanson, John (University of Oxford)

As part of a renewed interest in the demography of the ancient world in recent times, many scholars have largely come to accept the estimate of around one million inhabitants for Rome at its peak in the second century AD, despite the fragmentary and somewhat problematic nature of the evidence available. In this talk, I will begin by offering a short review of the available evidence for the numbers of inhabitants that lived in the capital, focusing on the information provided by the inhabited area, the grain dole, the so-called Regionary Catalogues, the Forma Urbis Romae, and wider comparisons, before suggesting a new method for estimating its total population, drawing on previous research. This reveals an interesting surprise. The remainder of my talk will be dedicated to understanding this, which I will do by considering the wider catchment of the capital, the level of inequality reflected in Gini coefficients, and the extent to which the capital is representative of other settlements in the empire.

2 HOW CENTRAL WAS ROME FOR ITS HINTERLAND?

Haas, Tymon (University of Groningen)

Rome and its surrounding region, often referred to as the Suburbium, are generally considered as highly integrated, but with a strong focus on the city of Rome itself: economically, with economic specialisation around Rome presumably taking place according to Von Thünen's Isolated State model (Morley 1996); demographically, with high degrees of mobility between Rome and surrounding regions (Witcher 2005); and socio-politically, as surrounding territories were directly controlled by Rome while Roman elites retained spatially dispersed power bases (Terrenato 2019).

While this image of Urbs and Suburbium as one integrated urban system with a globalised countryside (Smith 2020) may by and large hold true, it is certainly also one-sided: based mainly on written and epigraphic sources, it very much focuses on Rome and its political and economic elites as agents of integration. Much less attention has been dedicated to the evidence from the Suburbium itself, which may offer a rather different perspective on the nature of this integration and its effects on the daily lives of rural non-elite. While both excavation and especially survey data are amply available for the rural landscapes around Rome, these data are still rather dispersed and have therefore so far not been approached synthetically from such a perspective.

Drawing on three major survey datasets that have recently been integrated within the Roman Hinterland Project, this paper aims to explore, from a rural perspective, how central Rome was for the surrounding Suburbium. By presenting several analyses of the integrated site and ceramic data, aspects of demographic developments, economic networks and consumption patterns in different parts of the Suburbium are explored in order to assess how and to what extent rural communities were (more or less directly) affected by or dependent on the city of Rome.

3 THE STATIONES ALONG THE SACRA VIA. WITNESSES OF MOBILITY AND REPRESENTATIVENESS OF FOREIGN COMMUNITIES IN IMPERIAL ROME

Grazian, Andrea (Sapienza)

A series of inscriptions found on several occasions in the area of the Roman Forum testify to the presence, starting from the imperial age, of stationes (στατιώνες) from some of the cities of the empire (Caesarea-Anzarbos, Tarsos, Tiberias, Tralles, Sardis, perhaps Bethaisda and a Heraclea), on whose function the scientific debate is still open. Perhaps some of the stationes could be recognized in a series of small brickwork rooms aligned along the southern side of the Sacra via that came to light in the 1990s.

In this contribution we aim to re-examine the issue and all the related problems (chronological, onomastic, topographical), starting from the fundamental testimony of an epigraph, pertaining to a statio of the Tirii in the city of Pozzuoli very rich in data on the functioning of the stationes of foreign cities. At the same time, the in-depth study of the related archaeological issues (decoration, architecture, floor plans) aims at a thorough understanding of the characteristics of these structures, inevitably derived from the function they were meant to perform.

Not adequately emphasized, in fact, appear the elements on the nature of these places as monumenta and on the very close relationship that existed between them and imperial power: the stationes, understood as an architectural structure, constituted, symbolically, the "personification" of the cities on which they depended, which allowed them to be present and "participate" in the public life of Rome, not by chance placed in one of the most politically charged places, the Roman Forum.

In this sense, we intend to investigate in depth the meaning of these spaces linked to the communities of peregrini from the various cities of the Empire, exceptional witnesses of mobility and sociality in the ancient Mediterranean, as well as of the activities and interests at the origin of this mobility.

4 WHAT IS ROME'S ROLE IN THE TRANSFER OF ARCHITECTURAL DESIGN TO THE NORTHWESTERN PROVINCES?

Skolik, Annika (DAI Rom)

This paper attempts to understand the transfer of architectural design to the northwestern provinces during the early imperial period. Based on a classical typological, iconographic-stylistic analysis of entablature/cornices of both rural and urban areas from the Germania Superior and backed by a cluster analysis for the detailed recording of ornamental design possibilities, an infrastructural and topographical analysis of the area of this province is also carried out. In addition to infrastructural connectivity through roads and river paths, resources such as local stone material and the human factor (donors and recipients of the buildings), are also taken into consideration. The questions and issues I would like to address are among other things: How and in what way are Roman ornamental designs adapted in the province? How does the transfer generally take place? Which actors are generally responsible for the transfer? What role do the territories play that had been conquered and established since Republican times, such as northern Italy or the province of Gallia Narbonensis? Does Rome actively engage in this development, or does it rather remain passive by simply establishing the basic infrastructure?

5 DEVELOPMENT AND INEQUALITY IN ROMAN HOUSING IN BRITAIN AND ITALY

Ortman, Scott (University of Colorado Boulder) - Harbison, Victoria (University of Colorado Boulder) - Bulik, Olivia (University of Colorado Boulder)

The long-term consequences of Roman expansion in peripheral provinces is an important research topic around which there is significant debate. Here, we synthesize the archaeological record of housing from the Late Iron Age through the Roman era in Britain to examine spatial and temporal patterns of development and inequality, and we compare these patterns to those from cities in the Imperial heartland. We find evidence that the primary mechanism of development shifted from provincial administration to self-organization over time. We also find evidence that Britain experienced significant "catch-up" growth in the centuries following its incorporation into the Empire. Finally, we find evidence that cities in Britain and Italy exhibit both similarities and differences in their spatial properties. The resulting picture is complicated, and interpretation depends on one's point of view. While Roman Imperial administration was extractive relative to the Late Pre-Roman Iron Age, the material conditions of life for the average Briton also clearly improved during the Roman period.

6 LATE ROMAN COIN FINDS FROM THE MINT OF ROMA ON THE LIMES OF PANNONIA SECUNDA

Lukic, Katarina (PhD student at the Faculty of Humanities and Social Sciences, University of Zagreb)

This paper examines the mint composition patterns of Late Roman coinage found at the military sites along the limes of the Pannonia Secunda, focusing on the presence and share of coins minted in Roma. Pannonia Secunda was a western province and a touch-point between two parts of the Roman Empire. Its portion of the Pannonian limes was a rural and military frontier zone where the army was an impetus of the fresh coins, which then circulated on local markets. Therefore, changes in mint composition patterns and the amount the coin finds could indicate alteration of the military units residing in the area due to political reasons, i.e. who had the actual and who had the nominal authority.

This paper aims to detect such changes through numismatic evidence in the set time frame from the Valentinian dynasty until the last found Late Roman coin on the sites. That is, to examine from the numismatic perspective the turbulent period of external and internal menaces to the Empire at the time of its division. The focal point in the analysis is how the share of coins minted in Roma reflects the idea.

7 PRESTIGE AND LOCAL TRADITIONS BETWEEN ROME AND THE PROVINCES

Christensen, Kristian (recently finished post.doc. at School of Classics, St Andrews University)

Following the dismantling of the Romanization paradigm in recent decades research into the cultural relationship between Rome and her provinces has produced both studies emphasizing wide-ranging interaction (Pitts and Versluys (eds.) 2015. *Globalisation and the Roman World*. Cambridge; Belvedere and Bergemann (eds.) 2021. *Imperium Romanum*. Palermo) and studies emphasizing the limited capability of pre-modern imperial centres for influencing their peripheries (Johnston 2017. *The Sons of Remus*. Cambridge; Dench 2018. *Empire and Political Cultures in the Roman World*. Cambridge) and the hierarchy within which provincial cultures were structured (Fernández-Götz, Maschek and Roymans (2020). "The dark side of the Empire" in *Antiquity*, 94, 1630-1639).

In order to capture these aspects of Roman imperialism in a single framework, the present paper sets out a middle position by employing an interdisciplinary approach that draws on the anthropological model of universalization and localization first designed by Robert Redfield and McKim Marriott. This model envisages agrarian civilization as always consisting of two layers of tradition. The prestige tradition was the culture of the elite and was standardised and codified by literature. The local tradition was the culture of provincial communities.

Unlike in other binary cultural models, however, these two layers existed in a state of perpetual, low-intensity interaction. The paper will demonstrate this through a re-assessment of the implications of a diverse array of archaeological and historical research – including on pottery assemblages in Essex, grave portraiture in the Rhineland, burial mounds in Austria and epigraphy from Asia Minor. Filtered through the anthropological model these sources present the picture a provincial world that drew upon the culture of metropolitan Rome for inspiration. Yet instead of assimilating to the Roman model, they transformed Roman elements to suit local contexts, using them as building blocks for renewing their own traditions under the changed circumstances of imperial rule.

8 HADRIANA PALMYRA

Bobou, Olympia (Aarhus University) - Raja, Rubina (Aarhus University; UrbNet)

One of the most important events in Palmyra's history happened in AD 129, when the emperor Hadrian visited the city as part of his tour of Syria, an event that was documented through various inscriptions. These inscriptions, as well as the material culture from the oasis city have been the topic of intense study by Rubina Raja and her projects Palmyra Portrait Project and the Circular economy and urban sustainability in Antiquity Project. Through such data and

the research conducted in the last 12 years, it is possible to reconsider the relationship between the capital and Palmyra and to re-evaluate the impact that Rome and the Roman Empire in general had on the material culture of the city. In this paper, the visit of Hadrian will be taken as the starting point for re-assessing the relationship between Rome and Palmyra through the material culture of the city. The imperial visit has been rightly seen as a point where the civic centre of Palmyra was transformed, and its elites sponsored public and civic architecture that could be connected to imperial architecture and that of cities of the eastern part of the Roman Empire. The newly re-evaluated evidence, however, allows us to see that the relationship of Rome and Palmyra was more complex than that of a city adopting Roman models of architecture and civic life.

9 RECONSTRUCTING HYBRIDITY IN ROMAN EGYPT: 'THIRD SPACE' IDENTITIES EXPLORED THROUGH THE HAWARA MUMMY PORTRAITS

O'Brien, Louise (University of Liverpool)

The socio-political environment of Roman Egypt represents an area of the Roman empire which experienced hybridity and cultural entanglement that relied upon the cooperation of elite individuals and local administration. This hybridity, displayed most clearly in the Roman Fayum, not only disproves previous culture-historical theories applied to material culture, but indicates that a new approach is required to better understand the hybrid identities cultivated and manipulated by these individuals. The Hawara mummy portraits, as artistic and cultural hybrids, evidence that Fayum elites used culture as a currency, assimilating themselves using new Roman values while maintaining elements of traditional Egyptian belief and practice that can be traced throughout the pharaonic period. This coming together of cultures creates a Third Space – evidenced by material culture that cannot be described solely as Greek, Roman, or Egyptian but instead is all three at once, and is not as clearly defined by social, legal, or political structures as we may assume. Reconstruction, a new methodology aimed at rethinking how we approach hybrid material culture, considers three elements of this phenomenon: Reception, Content, and Perception. It considers how modern receptions of hybridity match up to the lived experience of the creator or owner, how the material was used or perceived, and how the intended audience may have interpreted it. This will allow for a more accurate understanding of how hybrid identities and experiences were displayed through material culture, and how the cultural environment of Roman Egypt allowed for such manipulation of one's image, even in death.

10 UNDERSTANDING ROME BEYOND THE BOUNDARIES OF ITS EMPIRE ROME IN THE CONTEXT OF THE GLOBALIZING WORLD OF ANCIENT AFRO-EURASIA

Tevdovski, Ljuben (Institute of History and Archaeology, Goce Delcev University)

The application of the theory of globalization to the ancient world created dramatic changes in our approach to the research of cultures, nations, cities, and empires of Ancient Afro-Eurasia and beyond. Its contributions in archaeological theory promote strongly the ideas of constant interaction and interconnectedness, and multidirectional flow of ideas and materials throughout wider areas of the ancient world. Rejecting the traditional and pervasive concept of "cultural containers", this emerging methodological model provides unique critique and promising alternatives to various previously proposed or dominant models of approach, such as: imperialism, colonization, acculturation, resistance, or hybridization.

This contribution utilizes the globalization theory and recent advances in archaeological theory and practice that reveal the multidirectional wide-scale flow of materials, ideas, knowledge, and technological know-how in the last millennia BC. It also reconstructs an ancient oikumene of interconnectedness that extended through and related communities, urban centers, and wider areas from the Indian to the Atlantic Ocean.

In such context, I suggest a new understanding of the urban growth and living and the cultural, demographic, and social transformations of the city of Rome through a wider comparative matrix of the urban developments of the globalizing world of Ancient Afro-Eurasia. I hypothesize three phases of the development and transformation of the city of Rome during the Roman imperial times. The first phase of the development of the city from the reign of Augustus to the reign of the Flavians is analyzed through the lenses of "building of a new post-Hellenistic dynastic center". The analyses of the second phase, track the process of "becoming critical center of the post-Hellenistic globalizing world", and extend throughout the second century AD. Finally, the third phase of the hypotheses, exposes a marginalized urban core on the fringes of the globalized post-Hellenistic world as early as the third century AD.

11 THE SUNK COST OF ROMAN SHIPWRECKS: A NEW VOLUMETRIC APPROACH TO QUANTITATIVE ANALYSIS OF AMPHORA CARGOES

Bellviure, Joel (University of Oxford)

The cargoes of amphora-carrying ships have long been assessed by using minimum vessel count (MVC) methods. This paper argues that all quantifications derived from a MVC analysis are heavily biased as a result of the variations

in volume among the different types of Roman amphorae. Instead, this work argues for a more realistic approach to quantifying seaborne products by digitally extracting volumetric information from 2D representations of these individual containers. This results in the creation of "sunk cost" tables, which, in turn, can be analysed from a financial point of view by using literary evidence and price lists from the period. This approach corrects distortions caused by MVC analyses, revealing that, despite fewer olive oil amphorae being stowed in Roman vessels, olive oil was often more significant than other cargoes. The analysis uses evidence from Ostia and Rome, as well as Mediterranean shipwrecks, to reshape the debate over the long-term evolution of trade in the main products stored in amphorae: wine, olive oil, and fish sauces. It is suggested that changes in containerisation in the third century AD did not necessarily correlate with a decrease in the commercialisation of the respective products and that a decrease in the size of wine amphorae may be better explained by the popularisation of barrels.

514 APPLYING ARCHAEOLOGICAL RESEARCH SOFTWARE ENGINEERING AS LITTLE MINIONS: STATISTICAL & COMPUTATIONAL APPROACHES TO DAILY ARCHAEOLOGICAL TASKS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Thiery, Florian (Leibniz-Zentrum für Archäologie (LEIZA); NFDI4Objects) - Schneider, Agnes (Leiden University, Faculty of Archaeology, Digital Archaeology Research Group; PhD Candidate) - Fricke, Fabian (Deutsches Archäologisches Institut (DAI); NFDI4Objects) - Allison, Jim (Brigham Young University) - Stefan, Daria (Technische Universität Wien; Master Student)

Session format: Regular session

Nowadays computer applications as well as statistical and computational approaches constitute a big part of the toolbox of every archaeologist, as they open tremendous possibilities for all research. These can be ready-to-use (proprietary) software applications but also "Little Minions" (self-scripted tools) or research software (e.g. implementation of statistic algorithms in R, Python), which are written by researchers. Both, research software and research data are part of Computational Archaeology and play an important role in up-to-date archaeological research. Optimally research data (and software) is FAIR(4RS) – Findable, Accessible, Interoperable, Re-usable (for Research Software) – and reproducible of which other users can benefit from or even develop further. The increasing number of topics and papers at the international and national chapters of the CAA show manifold applications but also implications. Working Groups like the SIG SSLA (<https://sslarch.github.io>) or the "Little Minions" (<https://littleminions.link>) also deal with Computational Archaeology and are building a community.

Several initiatives, such as the German National Research Data Infrastructure (NFDI) – especially NFDI4Objects – or the European Open Science Cloud (EOSC), engage with this topic to strengthen the position of Computational Archaeologists and Research Software Engineers, highlight the scientific merit of their work, and ensure researchers receive credit for computational approaches, software development, as well as for writing papers.

To support this, this session invites contributions dealing with various aspects of Computational Archaeology, but not limited to:

- treating source code/software as research data
- presenting a "Little Minion"
- discussing challenges in Computational Archaeology
- advancing new algorithms and statistical/computational analysis methods
- (critical) use of AI, discussing pitfalls and complications
- addressing the divide between FAIR(4RS) principles and practices
- incorporating FAIR(4RS) principles into the teaching curriculum
- discussing approaches concerning problems and solutions to legacy data and software
- making complex statistical and computational methods accessible to main-stream archaeology.

ABSTRACTS

1 STATISTICS AREN'T A "BLACK BOX" - USING FAIR-RS TO MODEL ARCHAEOLOGICAL DATA

Fricke, Fabian (Deutsches Archäologisches Institut)

The definition of proxies, in the form of artifact types, has been one of the core methods of archaeology from the very beginning of our discipline. The emergence of the use of scientific, i.e. mostly metric, data has made it necessary to

classify them into groups and subgroups. Various approaches, some more and some less statistical, have been and are being pursued for this purpose. The emergence of genetic data in particular has given new impetus to more complex statistical data processing in archaeology.

However, this boost has also created the need to adapt new working methods that take into account the special requirements of good scientific practice in dealing with such methods. In the practice of archaeological work, more complex statistical methods, such as cluster, correspondence or principal component analysis, are all too often regarded as “black boxes” into which data is fed and results extracted. The specifics and functionality of these tools are rarely questioned.

In the following presentation, I would like to use Late Bronze Age data to illustrate three points.

1. How the free-and-open-source statistical environment R can be used to model archaeometallurgical proxy groups.
2. How different statistical processes can interact with each other.
3. How the FAIR principles should be used to comply with good scientific practice.

2 IMAGE MATCHING FOR SEMI-AUTOMATED DIE STUDIES AND THEIR VISUALISATION TO EVALUATE AND TO IMPROVE THE DATA QUALITY

Gampe, Sebastian (University of Frankfurt) - Deligio, Chrisowalandis (University of Frankfurt) - Tolle, Karsten (University of Frankfurt) - Steiner, Alina (University of Frankfurt) - Möller, Markus (RGK - Romano-Germanic Commission DAI) - von Nicolai, Caroline (University of Leipzig)

Ancient coins were produced in large quantities using several unique handmade dies. Coins produced with the same dies are very likely to be produced within a small time and geographic distance. To understand the order of production and their geographical distribution it is necessary to find coins produced with the same die. A die can be replaced for one side for several reasons, usually during the minting process, as the upper die wears out more quickly and needs to be replaced sooner. In this case, a new die is used, which makes it possible to create links between groups of dies. A die study that analyses such links is a common but also very time consuming manual task in numismatics. The challenge to find the die links is getting more complicated the more coins you have. With the approach of linking existing resources by linked open data (e.g. based on Nomisma.org), the amount of coins to be analysed in a die study is increasing. Therefore, tools are needed to support the domain experts. In our previous project, “ClareNet” (Classifications and Representations for Networks)*1, we developed a tool based on an image matching algorithm ORB*2 and used Orange*3 in order to visualise the results. For the Celtic hoard find of Le Câtillon II, which contains 70.000 coins, our results were very promising. It is important to note that our approach keeps the human in the loop. We are currently trying to further improve the process of creating such a die study. The aim of this paper is to show how such a computer-based die study can be done and visualised, and further, how it can be used to improve the data quality, finding mistakes, and lastly to prepare the data for deeper analysis.

*1-<https://clarenet.hypotheses.org/>

*2-https://docs.opencv.org/3.4/d1/d89/tutorial_py_orb.html

*3-<https://orangedatamining.com/>.

3 A STATISTICAL ANALYSIS OF REPEATED NAMES AMONG JUDAHITE “PRIVATE” JAR-HANDLE IMPRESSIONS

Levy, Eythan (University of Zurich; University of Bern)

This paper deals with repeated names among the so-called Judahite “private” jar-handle impressions, a widely distributed type of stamps attested on jar handles found all over Judah (southern Levant) in the Iron IIB period (8th century BCE). These stamps usually bear a personal name followed by a patronym. Over 80 years ago, David Diringer noted that this corpus contains many repeated names and concluded that the stamp bearers were part of one extended family, for which he gave a genealogical tree. His ideas did not catch, however, and this pattern of repeated names has since then never been studied in depth. We propose a statistical approach to this problem based on three steps: (1) we define three metrics to quantify the phenomenon of repeated names, (2) we compare the value of these metrics in our corpus and another contemporary corpus of seals and seal impressions, (3) we show that, with a high probability, the pattern of repeated names among the stamped handles cannot be due to mere chance. We then examine the stamped handles more in depth, to characterize the precise pattern of repeated names. We show that most of the repetitions are due to pairs of names occurring as a personal name on one stamp, and as a patronym on another stamp. We show that the statistical significance of this pattern is extremely high and conclude that it most probably points to genealogical relations between the stamp bearers, thus quantitatively vindicating Diringer’s old intuitions. We also propose an updated genealogical tree of the stamp bearers. Our analysis is based on a simple random sampling procedure implemented in the Python programming language. This study opens the way for further future

analyses of names occurring in epigraphic corpora, in order to better assess the relations between the individuals mentioned therein.

4 FROM FAIR PRINCIPLES TO FAIR PRACTICES: ARE WE THERE YET? THE CASE OF ARCHAEO-GEOPHYSICS

Schneider, Agnes (Leiden University; Technische Universität Berlin)

Although since 2004 a huge number of papers have dealt with the semi-automated analysis of archaeological remote sensing datasets, data, code, or even complete workflows are rarely published (exceptions: Niculita 2020, Orengo et al. 2020, Berganzo-Besga et al. 2021, Kazimi and Sester 2023). This is even more so in the case of archaeo-geophysics.

This shows that there is still a long way to go in the implementation of the FAIR (Findable, Accessible, Interoperable and Reusable, Wilkinson et al. 2016) principles and the sustainability of research output. This is a clear deceleration and declaration for research: lacking code, data, open workflows and best practices, researchers spend much time understanding and reconstructing existing models and workflows, sometimes even giving up (Barton et al. 2022; ‘reproducibility crisis’) and often starting from scratch, which has led to a multitude of custom solutions and a lack of transferability and generalisation.

These are the symptoms of the lack of broadly used research standards (Barton et al. 2022). These might exist on local, regional and even international scales, but their implementation often depends on financing and politics, but also on coordination and infrastructure. E.g. for long, the significance of spatial data standards was not recognised in archaeology, which constituted a barrier to sustainable solutions for the future of research data and also for research itself (McKeague et al. 2019).

Regarding archaeo-geophysics, the existing EAC guidelines (Schmidt et al. 2015) do not state how to execute the interpretation specifically, due to the specific character and complexity of the different data types. Exactly because of this, standardised and semantically consistent protocols are needed to develop workflows that can be generalised and transferred to data sets with similar factor influence.

The following presentation proposes a set of desiderata which would facilitate FAIR and sustainable work with archaeo-geophysical data.

5 TAMING TIME: USING CORRESPONDENCE ANALYSIS TO HANDLE RELATIVE CHRONOLOGIES AS GRAPHS

Thiery, Florian (Leibniz-Zentrum für Archäologie (LEIZA)) - Mees, Allard (Leibniz-Zentrum für Archäologie (LEIZA))

“Dated sites” in archaeology are usually not “dated sites”. Most of the temporality of “dated sites” is usually derived from historical assumptions. However, the chronology of these materials is often based on material coming from the manifold of other assumed “dated sites”, thus potentially resulting in a circulus vitiosus. A methodological way out of this dilemma is possible when we enhance the assumed external dating evidence and go back to the factual occurrences and overlaps in the data from the suspected “dated sites” since only these data are free of any temporal interpretations.

As a method, the chronological assumptions used in defining “dated sites” based on archaeological find materials must be deconstructed and restricted to the occurrences and overlaps within and between “find materials” from suspected “dated sites” only to arrive at a relative chronology. This can be achieved by using correspondence analysis and visualising the resulting dimension values on maps recalculated in Hue values. By applying Allen’s interval algebra, including the Alligator and AMT tools, we can fix missing or enhance existing start- or endpoints by adding information about the vagueness/uncertainties.

To cover as many assumed “dated sites” as possible, the Samian Research database with its 250,000 potter’s stamps from all over Europe is used.

It turns out that it is possible to visualise historical development on maps, timelines and graph structures without using historical-chronological assumptions about individual “dated sites”. Simultaneously, this paper demonstrates the application of a different concept of temporality. The development of the Samian consumption patterns in the progressing Southern German Limes and the enrollment of the occupation of Britain appears to be gradual only. Applying the methods above, based on Linked Open Data techniques, enables the FAIRification of these data related to temporality, especially by creating interoperability and reproducibility.

6 LITTLE MINIONS GROWN OLD: REJUVENATING LEGACY SOFTWARE

Allison, James (Brigham Young University)

In recent years, archaeology has slowly moved toward open-science ideals. Researchers and funding agencies are increasingly concerned with sharing data and research software, including the self-scripted tools that archaeologists often create in scripting software languages such as R or Python. Despite significant progress in sharing code, the problem of legacy software has been largely neglected. This paper takes a personal look at the issues around legacy software. During my career I have written a number of software tools for research or teaching that have never been openly available, and which are written in now-outdated formats that make them difficult to reuse. Some of these tools are too specialized or too small to be useful outside of their original context, but others have more potential to be useful to other researchers. As a case study, I focus on one program, originally written in PASCAL in the 1990s, that calculates probability intervals in several different ways for calibrated radiocarbon dates. The program was originally written to show that standard ways of reporting calibrated radiocarbon dates (as often discontinuous probability intervals) often make interpreting dates needlessly complicated, and other ways of reporting calibrated dates using continuous intervals) are equally valid and often preferable. The process of resurrecting this outdated software tool by recoding it into R leads to questions (and some tentative answers) relating to the problems of legacy software tools in archaeology: what are the best ways to make outdated tools useful again? How often should we even care about reviving old software tools? And, how do we decide what to prioritize?

7 GENERATING RDF-GRAPHS WITH SIMPLE CSV FILES - RDFIER

Tolle, Karsten (Goethe University Frankfurt am Main) - Pöpperl, Jan (None)

Your data is stored in a relational database or in a spreadsheet, and you want to generate Resource Description Framework (RDF) data out of it? With the open-source tool RDFier [1], one can easily transform a CSV file into RDF. The main task is to set the column names correctly. This way, the tool can handle different datatypes, languages, and blank nodes, and it also allows the usage of prefixes for abbreviation.

Another reason for the creation of the tool was to provide different ways to model uncertain data in RDF. By adding “^^certainty“ at the end of a column name, one can specify a column as such and can select out of eight different modeling ways that are 100% in RDF. In addition it provides two ways to model it in RDF-Star.

We will present the tool that was generated by Jan Luca Pöpperl in the context of his master’s thesis [2], with some use cases to show its potential.

[1] Jan Luca Pöpperl: RDFier (2023) License: CC-BY-NC-4.0 <https://github.com/poepperl/rdfier>

[2] Jan Luca Pöpperl: Modellierung von Unsicherheiten in Daten: Benchmarktests verschiedener Ansätze (2023) https://github.com/UncertaintyC/unco/blob/42a561ca68543ffbde32e953cd71f18093628824/master_thesis.pdf.

8 SURVEYER: AN R PACKAGE TO ASSESS CHRONOLOGIES BASED ON ARTEFACT TYPOLOGY

Cortell-Nicolau, Alfredo (University of Cambridge) - Pardo-Gordó, Salvador (Universidad de La Laguna)

Since its inception, and when available, archaeological science has always and increasingly relied on radiocarbon dating to properly identify the chronology of the different assemblages found. However, and besides from its chronological limitations in terms of time range, radiocarbon dating is not always a viable option, nor the most reliable one. Indeed, dates might be affected by the conditions and the reliability in which one specific archaeological deposit has been found. For example, and considering archaeological sites, stratigraphic disturbances might affect the association between the dated proxy and the archaeological assemblage, or the earth acidity (e.g. pH levels) might affect the preservation of datable material. On survey projects, additionally, there is no possibility of dating the assemblage due to the lack of reliable associations.

In this work we present an R package able to help in this problem. We develop a Bayesian Dirichlet-multinomial inferential process in order to produce posterior predictive distributions based on the training set from well-dated and stratified assemblages. Thus, we explore the conditions where radiocarbon dating performs at its best, and use that to produce reliable chronologies for insecure assemblages. Additionally, by combining the potential ¹⁴C information of the insecure assemblages with the artefacts found within them, we provide the opportunity to narrow the confidence intervals involving any specific date, thus increasing their chronological accuracy and resolution.

Finally, we will illustrate with different case studies where the package can be used, and we will provide examples so that users can use it adapt it to their own needs.

9 ARBODAT+ / THE NEW EDITION OF A CLASSIC IN ARCHAEOBOTANICAL DATA RECORDING

Mennenga, Moritz (Lower Saxony Institute for Historical Coastal Research) - Knappe, Carina (Kiel University)

Systematic digital data collection in archaeobotanical research has been carried out in many working groups throughout Europe since 1997 by using ArboDat. This MS Access application, which was developed by Hessen Archäologie,

enables scientists to record important metadata on sites, features and samples. It is also possible to enter the counts of botanical macroremains with various details and to create reports as well as to conduct data analyses. ArboDat has been completely redeveloped since summer 2023. While the basic structure has been retained, fundamental technical changes regarding the backbone of the software have been realized. Furthermore, in order to address weaknesses in the content, a survey was conducted in the community with the aim of highlighting desiderate, but also to localise unnecessary functions.

The development of the new ArboDat+ is being realized as part of the DFG-funded National Research Data Infrastructure (NFDI) and is being carried out in cooperation between the Lower Saxony Institute for Historical Coastal Research in Wilhelmshaven, which has been responsible for ArboDat since 2016, and the Institute of Computer Science at Kiel University. In this talk, ArboDat+ will be presented by giving an overview of its current functions, the survey results and, above all, the status quo of the development of ArboDat+ including all main technical and content-related objectives.

517 BC_BEFORE CHURCH. CULT BUILDINGS IN ANCIENT MEDITERRANEAN EUROPE. SESSION 2: HUT - TEMPLE - CHURCH (XTH BC - IIIRD-IVTH AD)

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Fusco, Ugo (Tor Vergata University of Rome) - Davies, Penelope (University of Texas) - Truffi, Michele (Roma Tre University) - Woodhull, Margaret (University of Colorado, Denver)

Session format: Regular session

In a seminal paper, Christopher Hawkes outlined a “ranking” of possible interpretations derived from archaeological data that judged it virtually impossible to reconstruct the ideology and spiritual life of primitive communities (Hawkes C. 1954, Archeological Theory and Method: Some Suggestions from the Old World, American Anthropologist 56: 156, 158). Fortunately, the study of the relationship between religion and archaeology - particularly our ability to identify evidence for religious activity and associated places of worship at the archaeological level - has advanced considerably in recent decades. Analysis of cult buildings aims to identify various elements with increasing precision, including architectural features, the nature of rites practiced within cult buildings and archaeological indicators that allow their identification, methodologies for the analysis and interpretation of material culture, bioarchaeological evidence for cult offerings, the “ritual” landscape in which a cult building is inserted, and relationships with local geomorphological features.

This session will analyse the evolution of cult buildings from the huts dedicated to this function in settlements of the early first millennium BC, to the emergence and development of the temples that replaced them, and the earliest evidence of Christian cult structures (III-IV century AD).

The session will welcome papers addressing the following themes: theoretical and methodological reflections on the topic of the session, revisionist analysis of previous contexts using new methodologies, and finally, the latest discoveries from ongoing archaeological research.

ABSTRACTS

1 ONCE UPON A... HUT. “SACRED (?) HUTS” BELOW TEMPLES: COMPARISONS BETWEEN ITALY AND GREECE IN THE IRON AGE

Truffi, Michele (Dipartimento di Studi Umanistici - Università degli Studi Roma Tre; Associazione ORTA) - Nomi, Federico (Scuola Superiore Meridionale; Associazione ORTA) - Saltini Semerari, Giulia (Department of Anthropology - University of Michigan; Museum of Anthropological Archaeology - University of Michigan) - Guidi, Alessandro (Dipartimento di Studi Umanistici - Università degli Studi Roma Tre)

A research line related to the history of architecture, notably advanced in the sphere of Greek archaeology, has centred on the origin of temple structures from the Late Geometric period (ca. second half of the 8th century BCE) onwards. This exploration has highlighted potential links to Early Iron Age or, in certain instances, Bronze Age structures. This phenomenon seems akin to what has been identified in various Early Iron Age settlements within the Middle Tyrrhenian region of Italy. More broadly, a noteworthy correlation is observed in both Greece and Italy, where the rise of spaces distinctly designated for cultic purposes aligns with the initial phase of development of the first urban entities.

In 1980, for example, one of us observed the presence of miniature materials datable to the recent phase of the Early Iron Age (8th century BC) in some diachronic votive deposits placed in association with sanctuaries of the Archaic period in Latium, beneath which were Iron Age huts. Consequently, it was hypothesized that these huts served a cultic function preceding the construction of the cult buildings in the historical period.

A comparative analysis is undertaken between the two regions, aiming to scrutinize similarities and differences. The study relies on a thorough assessment of topographical positioning, finds, and potential pre-existing structures.

2 IDENTIFYING EARLY GREEK TEMPLES. PROBLEMS OF METHOD AND DEFINITION

Pierattini, Alessandro (University of Notre Dame)

Greek temples of dressed stone with elaborate columnar orders and a distinctive peripteral layout appear in the archaeological record at the turn of the 6th century BCE. Before then, most temples were built of perishable materials and did not differ substantially from other local architecture. Without distinctive physical features, identification relies on material evidence that may demonstrate a building's function. But what functions did early temples serve? Our success in tracking the early development of sacred architecture depends on our definition of these functions, which should be precise enough to offer clear criteria but comprehensive enough to allow for variation in temple function over time and space.

Twentieth-century scholarship often defined Greek temples retrospectively, focusing on Classical features like the presence of a dominant cult statue, thus capturing only specific aspects or stages of temple development. One prominent scholarly tradition, grounded in the archaeology of cult, traces temples to rulers' dwellings of the Early Iron Age but faces problems related to the scarcity of material evidence and attendant problems of generalization. Considerable new archaeological findings have been made in the last four decades, but our understanding of early Greek temple architecture is limited by problems of method and definition.

This paper reviews narratives of pre-Archaic Greek temple architecture in light of recent discoveries, exposing the methodological flaws inherent in both old and recent discussions. After articulating a comprehensive definition of the temple, it outlines the major changes in the temple's long trajectory of development from the end of the Bronze Age through the early 7th century BCE, showing that temples underwent transformations in function, social significance, meaning, and design. As important, it demonstrates that temples could manifest different meanings and architectural expressions in different places.

3 COMMEMORATIVE DEMOLITION, THE CASE OF FRANCAVILLA MARITTIMA

Kleibrink, Marianne (Groningen Archaeological Institute)

The southern part of the top of the hill 'Timpone della Motta' (280 a.s.l.), named acropolis by one of her excavators, the famous archaeologist Paola Zancani Montuoro, later (1991-2004) investigated by the Groningen Archaeological Institute, gave evidence of the remains of six superimposed sacred buildings (Va, horseshoe-shaped MBA building; Vb, early- 8th c. - BC, sacred apsidal longhouse; Vc, 725 BC, rectangular timber temple; Vd, 650 BC, rectangular temple on stone foundation; Ve, stone temple with terracotta roof; Vf. Late Medieval Chapel).

If this had been Rome or some other place through time constantly contested by those in power, the constant reconstruction of Francavilla Marittima's Athenaion would be less surprising than on a Calabrian hilltop, repeatedly interpreted as marginal to the nearby Greek polis of Sybaris. Now that GIA research has well articulated each phase, these appear moreover to be very different from each other from a material point of view and thus presumably ritually.

Each new phase obliterated the previous one by covering the area before rebuilding. Archaeologically, from phase 2 onwards each period consists of a). burial of the previous phase and b). the assemblages of the phase proper: a very short overview of the main periods will be presented. Related phenomena are the scrapping and melting of dedicated objects, which are more difficult to date. The site of Francavilla Marittima is not unique in this special handling of older phases, because – although in a different way – Incoronata is also such a site, while complete resettlement is postulated for nearby Amendolara.

The extreme care taken before rebuilding and reusing encourages our search for historical and religious reasons. To what extent do we succeed in interpretations without violating the archaeological framework? To answer this question agency theory seems of value.

4 RETHINKING SACRED ON THE TIMPONE DELLA MOTTA SETTLEMENT (FRANCAVILLA MARITTIMA - CS, ITALY)

Altomare, Luciano (Università della Calabria) - Brocato, Paolo (Università della Calabria) - Capparelli, Chiara (Università della Calabria)

The settlement of the Timpone della Motta constitutes in the context of the Oenotrian peopling a strategic site of great importance, also for the contacts with the Greek world and the progressive 'Hellenization' of Sybarite matrix. Therefore, it represents a long-lasting focal point for the emergence and structuring of the sacred in its material and ideological forms. Considerable attention has been given in the history of studies to the findings of the acropolis, which have provided many data, albeit heavily conditioned by illegal excavations. The research conducted by M. W.

Stoop and M. Kleibrink has introduced a wealth of information, determining significant interpretative consequences regarding cult and ritual aspects.

Recent studies have rethinking previous work, focusing for contextual analysis, using up-to-date methodologies, benefiting from new field research that has involved various areas of the settlement. The objective of this intervention is, therefore, to re-examine the interpretative framework outlined so far, also in light of new discoveries, with a contextual stratigraphic approach.

5 FAMILY-HEROES IN INDIGENOUS SOUTH ITALY: LIFE AND DEATH IN "LANDSCAPES OF MEMORY"

Piccioni, Aura (Universität Trier; Università degli Studi di Roma Tor Vergata)

The present paper aims to analyze a phenomenon emerging in the domestic religion of the indigenous south Italy, that is the burial of adult individuals inside of (aristocratic) residences, departing from the Archaic age. At Monte Sannace (BA) probably the 'founder' of the gens inhabiting the house was buried at the end of the 6th c. BC in a very visible way inside the building and received a hero cult.

What is worth considering here is the coexistence of the dead in the same realm of the living, which is very unusual in ancient Italy and gives the house the characteristics of a sanctuary, overwhelming the dichotomy of "places of living/ places of dead" (cf. Remotti 1993; Favole, Ligi 2004, 6), and becoming at the same time "landscape of memory" (cf. Favole, Ligi 2004, 6). In the case of Monte Sannace, for instance, the sema – and the memory of the ancestor – was constantly visible to family and relatives, but at the same time to the visitors entering the house. The separation between 'private' and 'public' inside the house was overwhelmed, also for what concerns religion (cf. Piccioni 2020, with previous literature).

6 CONTEXTUALISING RITUALS. THE ARCHAIC TEMPLE OF S. OMOBONO AS A CASE STUDY FOR INVESTIGATING ARCHAIC ROMAN RELIGION

Timpano, Francesco (Humboldt Universität zu Berlin) - Brocato, Paolo (Università della Calabria)

The study of Roman religion has long been based on a philological approach, essentially determined by the considerable amount of data transmitted by written sources; less attention, on the other hand, has been paid to archaeological evidence, often considered as mere support for these sources. This tendency was also adopted in the case of the Archaic period, a time span rather distant from the earliest written sources on religious topics, from the late Republican period. More recently, however, the qualitative improvement of archaeological data has led to a shift of attention towards the material remains linked to the religious sphere in the ancient world, such as architectural remains of buildings and cultic of sacred sites, as well as stratigraphic sequences and material culture artefacts. As a result, these realia have been culturally contextualised, shedding light on their intrinsic features of first-hand evidences and on their relevance to the sites to which they belong.

With specific regard to the Archaic temple of S. Omobono in Rome, this paper continues this tradition, re-examining newly collected evidence together with crucial archival and publication data from previous excavations, carried out in the 1930s and in the second half of the 20th century, therefore with different methods and intentions. This context-specific analysis will not only better define the features of one of the most significant sites for our knowledge of the city in its early stages, but will also provide a term of comparison for the architecture of cult buildings and aspects of the ritual sphere within the religion of Archaic Rome, a cultural and socio-political context that is still rather obscure.

7 GREEK SANCTUARIES AT OLBIA DE PROVENCE (HYÈRES, VAR): NEW PERSPECTIVES ON ANCIENT EXCAVATIONS

Roure, Réjane (UMR5140-ASM-CNRS-University Paul Valéry Montpellier 3) - Sarrazanas, Clément (University of Picardie (AMiens)) - Serieys, Maeva (Département de Vaucluse-UMR5140-ASM)

Archaeological excavations carried out under the direction of Jacques Coupry at Olbia de Provence in the 1960s uncovered two cult complexes, interpreted as urban sanctuaries, used between the end of the 4th century BC and the middle of the 1st century BC. One was dedicated to Aphrodite, as attested by the discovery of an inscribed stone; the other is located at the end of the main street and appears to be the main sanctuary of the settlement, but the identity of the deity or deities worshipped there is unknown. A research programme carried out in recent years has made it possible to carry out new surveys of the remains, carry out chemical analyses on sets of vases and study the remains of certain ritual practices. All these innovative approaches are shedding new light on the gestures performed in these places, by comparing them with the data contained in the literary sources. The large sanctuary to the west of the site yielded numerous fragments of terracotta figurines, lamps and weights. Its position within the urban layout of the site demonstrates the special place it occupied. The sanctuary dedicated to Aphrodite is located to the north of the site,

next to the ramparts. The block bearing the name of the goddess, written in Greek, was found buried beneath a large fill, on top of which nearly 200 bowls were discovered, turned over against the ground and stacked one on top of the other. Chemical analyses carried out on a sample of these bowls detected substances that had been deposited there more than 2,000 years ago. As Greek religion is also well documented in written sources, cross-analysis of the various existing data will provide a better understanding of these spaces and the practices that took place there.

8 THE CULTUAL BUILDINGS IN VEII FROM THE FOUNDATION OF THE SITE TO THE ROMAN IMPERIAL AGE: A FIRST CRITICAL ASSESSMENT

Fusco, Ugo (Tor Vergata University of Rome)

In recent years, the state of knowledge of the site has made significant leaps forward thanks to the publications of the British School at Rome and the multiyear 'Progetto Veio', started in 1996 from a convention between La Sapienza, University of Rome and the current Soprintendenza Archeologica, Belle Arti e Paesaggio per l'area metropolitana di Roma, la provincia di Viterbo e l'Etruria meridionale. From a topographical point of view, the town of Veii stands on a plateau (h 185) and is skirted by two watercourses, both still active today: the Fosso Valchetta, the ancient Cremera, and the Fosso Piordo. In the context of studies on Veii, a specific and updated analysis of the proposed topic (the cultual buildings) between the early Iron Age and the Roman Period is still lacking. This paper aims to fill this gap, proposing an updated catalog of structures for each historical phase and using an approach that identifies religious spaces considering not only individual structures but a convergence of information: archaeological, epigraphic, topographic, ecological (e.g. springs), literary and historical continuity. These parameters make it possible to propose probabilities of religious attribution (certain, probable, hypothetical).

9 THE SACRED LANDSCAPE OF THE GRAECO-ROMAN PHILADELPHIA (AMMAN) AND ITS CHORA

Burdajewicz, Mariusz (Faculty of Archaeology, University of Warsaw)

In 2023, a new research project of the Faculty of Archaeology, University of Warsaw, was launched at Khirbat Sarah (Khirbat es-Sar) on the western outskirts of Amman in Jordan. The research aims to understand the nature and chronology of that site, which, occupying an excellent strategic position, is topped with a monumental architectural complex with the Iron Age Ammonite tower in its centre. This compound is surrounded by unspecified walls of later periods. Research indicates that the ancient occupation of Khirbat Sarah covers the period from the Ammonite Iron Age to the Middle Islamic period (c. 8th cent. BC - 14th cent. AD).

During the Greco-Roman period, the Ammonite tower was adapted for a temple with the Classical order. An arcaded courtyard was added to it in the 3rd century. At that time, the site was an important religious centre whose monumental character indicates prominence beyond just local.

The present paper examines the sacred complex at Khirbat Sarah from the broader perspective of the process of Hellenization and Romanization of indigenous cults in the Greco-Roman East, especially in Decapolis. Numismatic, epigraphic, and archaeological sources provide information about the religious life in Philadelphia itself and its chora, with two extra-muros temples/sanctuaries in er-Ragib and Khirbat es-Suq, both ca. 12-14 km southeast from the centre of the Roman Philadelphia. The third one, in Khirbat Sarah, is a hybrid structure showing a unique combination of the native architecture rooted in the Iron Age with elements of Classical Greco-Roman temples. It offers a chance to gain new and essential information regarding the sacred landscape of ancient Philadelphia.

10 FOLLOWING HERAKLES. THE ROLE OF THE GOD AS TOPOGRAPHICAL MARKER IN THE ORGANIZATION OF THE LANDSCAPE

Busonera, Roberto (University of Sassari) - Trivelloni, Ilaria (University of Sassari)

There is a common opinion developed around the figure of Hercules that assign to the god a set of roles and functions that qualify him as a cultural hero (Burkert 1992). His peculiarities derive from his semi-divine origin and from a mythological system that requires a figure prepared to come to man's rescue in order to justify his actions in the territory. In this sense, Hercules assumes the role of a mediator and, especially in the Mediterranean basin, reflects the progression of civilisation (Azzena 2008). Through this contribution, focused on case studies distributed in Roman Sardinia and central Italic areas, an emphasis will be placed on his quality as a 'territorial marker' and landscape organiser (Burkert 1992). The investigation on the topography of cult sites, their distribution and diffusion, will emphasise the role of divinity where there is a limit and a boundary. The analysis will also highlight where it becomes necessary to locate and define spaces in which opposing cultures must meet: on the edge of civilised territories, as well as in places of exchange and market. Or, where traditionally opposing economies confront each other (Azzena-Busonera 2019).

Moreover, the topographical functionality of Hercules is also revealed through the frequent connection with a Goddess, which is necessary in a mythological system that in Sardinia, for example, exists in the relationship with the parallel cult of the Sarda Ceres. This duality emerges in the consequent religious, traditional and functional separation

between the mountainous territories, characterised by pastoral activities, and the coastal territories, characterised by agricultural activities. Altogether, the invisible (but extremely concrete) relationships suggest a sacred symbolism of space that may support further interpretations of economic and territorial management and settlement patterns in antiquity.

520 PERSISTING AND CHANGING WORK IDENTITIES FROM THE PREHISTORIC TO THE HELLENISTIC MEDITERRANEAN

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Hochscheid, Helle (University College Roosevelt; Utrecht University) - Brysbaert, Ann (Leiden University; Netherland Institute at Athens) - Gorgues, Alexis (Universite Bordeaux Montaigne)

Session format: Regular session

Markers of identity operate in a fluid continuum both in antiquity and nowadays: each identity is a label we ascribe to ourselves (emic) and others (etic). In the contexts of work and crafting, aspects of class, rank, race, age, gender, job status, religion, and occupation play important roles in how we ourselves, as well as others, shape a person's identity.

Each label or ascription is linked to specific behaviours (e.g. political posture). Moreover, specific feelings are connected to (self-)identity, determining how we behave towards others. Outward behaviours, appearances and accessories are what indicates, out of choice or necessity, whether someone belongs, is weird, or worthy of esteem. A level of judgement is also involved, and while labels have always been part of our judgements and categorization of people's identities, there is far more fluidity and ambiguity in label ascription than we tend to think, both now and in the past.

In archaeology, traditional identities along the lines of, for example, male/female, Greek/foreign, craftsman/landowner, free/enslaved, etc., are not easily determined. People have always had multiple identities, fluid and ambiguous, based on many factors in endlessly varied combinations. This session will address the ways in which ancient craftspeople and labourers shaped their multivalent identities through a range of markers, some chosen, some ascribed by others. Among the topics explored will be:

1. Women's work, from the traditional meaning of this term, to work assumed to be 'male', and everything in between
2. Emic vs. etic views of a person's (work) identity
3. Correlation between local/non-local status, or alternatively, socio-political status of labourers
4. Modern-day constructs of class, power, and wealth applied to ancient craftspeople and their impact on identity formation
5. Ancient identity constructs of (craft) labourers that reverberate in modern society.

ABSTRACTS

1 PERSISTING THROUGH CHANGE. SOCIAL IDENTITIES AND SPACE IN BRONZE AGE AEGEAN CRAFTING

Brysbaert, Ann (Leiden University; Netherlands Institute at Athens)

This paper is concerned with the socio-political and economic status of artisans and workers of a range of professions in the prehistoric Aegean, and specifically in the context of workshops in which both the making of objects and employing of other objects may create fluid levels of human identity in working life. In the relationship of people with their objects in crafting contexts, I will consider two elements: first, I will (re-)introduce an often forgotten agent, that of the space in which workers perform their activities, because these spaces and locations play an essential role in identity formation: via training, via ancestral presence, and via the senses. The contexts of crafting and workshops are very useful arenas to explore aspects of class, race, age, nationality, gender, job, status, religion, and how various occupations were viewed in the past and how that may translate to our perceptions of them now.

Furthermore, Prehistoric identity labels such as man/woman, artisan/landowner, free/enslaved have often been solved by employing the concept of 'social identity' since written evidence is scarce. I will therefore, also discuss whether this concept provides the actual blanket-cover it claims for the range of identities we recognise in the material world that people left behind. Each identity tends to be a label we apply to ourselves and others, but who determines what the label ascription is and who makes up the labels and why? Labels and ascriptions are linked to specific behaviours and specific feelings, often enhanced or barred via our senses. These senses and feelings may irrationally determine how we behave towards others: those who we consider having similar IDs, versus others who don't. Outward behaviour, appearance and accessories may indicate, out of choice or necessity, whether someone belongs or not, is weird, is worth our esteem or not.

2 TECHNICAL SKILL AND IDENTITIES IN THE (WESTERN) MEDITERRANEAN IRON AGE

Gorgues, Alexis (University of Bordeaux Montaigne)

In the archaeological analysis, identities related with the technical sphere are studied and described in a thoroughly etic way. When referring to ancient craftspersons as “goldsmiths” or “potters”, and not considering any other aspects of their “social skin”, we assume that the technical sphere had in the past a taxonomic relevance comparable to the one it has today: i.e. it allows for categorizing people, socially speaking, in relation with their main economic activity. In other words, we colonize the past with our class-society oriented vocabulary. It is particularly true when we deal with Late Prehistoric societies that did not leave written self-descriptions, and in some way, it is almost unavoidable, as we have to name things though ignoring how the people of the past named them.

Yet, this technical skill-related label appears often a bit exclusive of any other consideration, and being a craftsperson is considered as a social status, as is “elite member”, “peasant” or “slave”. This bias brings us to describe, willy-nilly, past societies as dominated by leisure-oriented elites ruling over –among others– persons involved in production, themselves divided between free artisans or peasants or dependant workers.

In this paper, I will try to demonstrate, through specific case-studies, that technical skills could have been displayed and mobilized as an identity marker all throughout the social fabric, from the peak elite to poorer dependant workers. We will first focus on the Western Mediterranean Iron Age (c. 1000-200 BCE), and assess the role of technical skills in relation with identity making and negotiation. We will then discuss the variability of situations around the Mediterranean, and discuss the factors that allowed for fluidity in the relationship between technical skill and social identity or on the contrary, generated rigidity.

3 WORKING EVIDENCE: CHANGE AND CONTINUITY OF WOMEN'S WORK IN ARCHAIC TO HELLENISTIC ATHENS

Hochscheid, Helle (University College Roosevelt; Utrecht University)

Recent scholarship has paid increasing attention to work and professions in the ancient Greek world. However, women have not been considered serious participants in economic activities. Their contributions to domestic work are acknowledged and now more frequently highlighted in museum contexts – yet in research, both the economic value of domestic work, and women’s non-domestic work and craft activities have remained less researched than that of their male counterparts.

This paper will collect and analyse material evidence from workshops to sanctuaries and tombs, as well as the sparse literary and epigraphic texts regarding women’s work, in particular in the context of manufacture in ancient Athens, with some excursions to other parts of the Greek world and comparisons with men’s working lives. This evidence allows for an exploration of the pathways of work in women’s lives from the Archaic to the Hellenistic periods, and the changes that occurred in these over time. More important, however, is the impact of their activities on the status of women who worked, and vice versa, how their status may have determined what work they could, or had to, take on. For instance, women’s civic status or (lack of) freedom would powerfully influence the professional roles that were accessible to them, or forced upon them. Work and status are thus construed as parts of a circle of identification, where both elements are key constituents to the woman’s self-identity.

Through comparisons with other time periods in which women’s work fulfilled major roles in their lives, both socio-economically and in their self-identification, this paper will re-examine the scope and impact of women’s work in Athenian society from the Archaic to the Hellenistic periods.

4 FOLLOWING THE THREADS: WOMEN'S LABOR, WEAVING, AND THE ARCHAEOLOGY OF THE ECONOMY IN CLASSICAL GREECE

Harrington, Katherine (AAAS Fellow)

Penelope, the archetype of the dutiful wife in Homer’s *Odyssey*, weaves by day and picks apart her work at night. Her steadfastness in attending to her work as a ruse to avoid remarriage is celebrated in the text, and the woman at her loom was often used as a symbol of virtuous womanhood in ancient literature. Beyond this symbol, however, the amount of work required to produce textiles by hand and their importance to the functioning of the ancient economy and ancient society has often been ignored. Indeed, many of the types of labor that women did in the ancient world, like care work and food preparation, are often marginalized in wider studies of the ancient economy. Such labor, often done without pay and at home, has been treated as mere background noise, economically unimportant and largely unworthy of analysis. Even women’s labor for the market economy in been has been undervalued.

This paper has two main arguments. The first is that the lack of serious consideration of women’s labor in Classical Greece is the result of the impact of modern attitudes towards domestic labor which persist into the 21st century. Studies of modern European and American society have often shown that women who are partnered with men are responsible for housework, childcare, care for elderly relatives, and various other forms of unpaid labor in domestic

settings at higher rates. Few modern models of the economy consider this unpaid labor, however, and this bleeds into the way we view the ancient economy. Second, I argue for the central role of archaeology in constructing a more gender-balanced history of labor. The places where women lived and worked, the objects they used, the ways they were represented, and the remains of their bodies themselves can illuminate the far-reaching impacts of women’s work.

5 WHO AM I? (SELF-)PRESENTATION OF CRAFTSPEOPLE ON ATTIC FUNERARY MONUMENTS OF THE 4TH CENTURY BC

Massar, Natacha (Royal Museums of Art and History, Brussels)

My presentation will study funerary monuments for craftspeople found in the Ancient Greek world, with a special focus on Athens and Attica in the 4th century BC. Although the mention of the profession was rare on Greek funerary monuments, it did appear on occasion from the mid-6th century BC onwards. In Athens in the 4th century though, for a few decades, it was much more common. This coherent group of documents depicts craftspeople of many different specialties, from the slipper maker to the seer. It includes women and men, most of whom were foreigners.

Funerary monuments are private documents on public display, a memorial to the qualities and, sometimes achievements, of the departed person. Their content was usually chosen by people close to the deceased, either family members or their professional entourage. We can therefore assume that, to some extent, they accurately reflected the way the deceased wanted to be remembered. These funerary monuments provide information about the individual’s status, their family, their origin, their professional activities, their reputation (real or imagined), how they learnt their *techne*. The individual elements also reveal which aspects of their identity were thought to be important to themselves, their family and perhaps their entourage, especially in relation to their work. Often, they combine word and image which provide complementary information. They may be complex, and sometimes subtle, documents, which can say much about *technitai*.

Since these monuments cover a wide range of professional activities, they will also be compared amongst themselves, revealing possible differences in perception or projected image depending on the activity of the deceased. They will also be compared to other sources on specific professions or to funerary monuments from other areas or periods. Finally, the reasons for the large concentration of these documents in late Classical Athens will be examined.

6 TEMPORALITY, WORKSPACES AND IDENTITY: PROPOSAL FOR A 3D-BASED NEW APPROACH

Lefebvre, Marie (Université Bordeaux Montaigne; Association EponArchéo)

Productive spaces –workshops or else–, are places where to work, but also where craftspeople can build and claim their identity. Display of skills, performative aspects of the technical actions, or, on the contrary, confidential or hidden work, in relation to space and time are some of the aspects. A detailed study of such spaces may allow us not only to delve in-depth into ancient techniques, but also to assess a relationship between gestures, time and space. However, the formation of the archaeological record –and the mindset of the archaeologists– often makes that the emphasis is on the space and its structure, rather than on the temporality of its use. This paper will present an attempt, applied to ancient Mediterranean production spaces, to reframe productive activities in space and time. The method I propose to use is 3D methods to formulate hypotheses regarding the organization of production space through time, and to refine them through an iterative process of comparison between the archaeological record and what I would name the “graphic hypothesis”.

In this context, 3D modeling is more than just an illustration: it is an archaeological research instrument that can be used to digitally recreate the dynamic use of a space for productive activities and, therefore, to better understand how they took place in the experienced time of past societies.

By focusing more on the iterative process of graphic experimentation than on the realization of a picture showing a reconstruction, this method offers new analytical perspectives and allow us to re-discuss the traditional etic vision of ancient craftsperson as actors whose identity is frozen in a specific time and place. On the contrary, it allows for a renewed discussion of the context of the technical activity.

522 SOCIETY IN THE MEDIEVAL MEDITERRANEAN (5TH TO THE 12TH CENTURIES) THROUGH ARCHAEOLOGY OF DEATH

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Brufal, Jesús (Universitat Autònoma de Barcelona) - González, Carmen (Universidad de Córdoba) - Palma, Maria de Fátima (Campo Arqueológico de Mértola/CEAACP) - Castellsagué, Guillem (Universitat Autònoma de Barcelona)

Session format: Regular session

Death is omnipresent because it is the end of life for all living creatures, but also because almost all History has been characterised by high mortality rates, which increase further during times of crisis and war. This has been experienced by collective identities and has forged a social memory that has been translated into ideologies and spiritual experiences to prepare us for the afterlife. It has also had a deep repercussion on urban and rural landscapes: the ways in which people died, grieved, were buried and remembered is a reflection, and a consequence, of society's main characteristics. The Medieval Mediterranean provides a very interesting area for addressing these topics, since the Jewish, Islamic and Christian cultures developed different rituals and material expressions related to death and dying that have generated extremely wealthy archaeological evidences -cemeteries, types of tombs, grave goods, monuments, skeletal remains, etcetera. Deathscapes were frequently used uninterruptedly over time, which favours the historic-archaeological analysis of the origins, evolutions and consolidations or disappearance not only of rituals or topographies, but also of beliefs, behaviors and social practices.

We aim to explore the Medieval societies in the Mediterranean (5th to the 12th centuries) through all the aforementioned aspects, creating an opportunity to see larger changes and connections across traditional cultural divides. We would like to examine the materiality of death for a better understanding of the world of the living. This session welcomes papers that offer reflections on the individuals and their larger belonging communities and how they dealt with death; on inhumation rituals, on the role of necropolises as landscape organisers, on the topography of deathscapes and other material manifestations related to death, from monumental architectures and spaces to smaller domestic artefacts, and a large etcetera.

ABSTRACTS

1 DEATH IS COMPLICATED: THE CHRISTIANISATION OF BURIAL PRACTICE IN LATE ANTIQUITY BEYOND DICHOTOMIES

Selsvold, Irene (University of Leicester; University of Gothenburg; University of Oslo)

Late Antiquity is a transition period effectively squeezed between the two historical blocks in the Mediterranean world: Roman society and culture, and the subsequent Medieval/Byzantine societies. In total, this period-in-between-periods covered approximately 500 years between the third and eighth centuries CE. During this time, burial practices changed significantly.

The Christianisation of the Roman Empire, at its most intense around 400 CE, is resilient as the dominant explanation model for these changes. Consequently, a dichotomy has been created where a diverse Roman burial practice was rapidly substituted by an equally monolithic, distinctly Christian, burial practice. However, researchers including Eric Rebillard and Barbara Borg have challenged the dominance of the Church and the Christianisation in this process. How do we proceed from that challenge?

This paper draws on new materialist thinking to embrace complexity in place of dichotomies and universal explanation models in the study of changing burial practices in Late Antiquity and the Early Medieval period. It will highlight some of the complexities of late antique burial practices, and situate them in a world of complex societal changes that reaches beyond the religious transformation. Ultimately, the paper argues that embracing more messy answers to how, where, and why burial practices changed may lead us towards a richer (though not simpler) understanding of late antique and Early Medieval burial practices.

2 LANDSCAPES, STRUCTURES, AND DEPOSITION FORMS - STRATEGIES FOR DEALING WITH THE DEAD AND FORGING IDENTITIES (5TH-8TH CENTURIES)

Arezes, Andreia (FLUP - Faculty of Arts and Humanities - University of Porto; CITCEM - Center for Transdisciplinary Research Culture, Space and Memory)

Ancient Lusitania, a vast territorial expanse in the core of the Iberian Peninsula, was a space of encounter and competition between different human groups in the complex period that spanned the 5th and 8th centuries. Coexisting or

overlapping in time, these groups marked the landscape of the living and the dead with their ways of making, building, and interacting.

Framed by changing political and administrative powers, guided by traditions and beliefs that combined or opposed each other like a mosaic, they resorted to the deposition of their dead and the careful composition of burial contexts as a need felt at various levels, namely also as a strategy of social affirmation, giving visibility to identities that were not necessarily univocal.

This presentation aims to question and discuss funerary practices in the necropolises that extend south of the Tagus in present-day Portuguese territory, paying particular attention to the burial areas that border the Guadiana River and the south coast, facing the Atlantic Ocean. Along this route, and in a detailed look at the architecture, spatial organization, construction, and reuse of funerary devices, as well as the nature of the materials associated with the deceased, I will try to demonstrate the variability of the solutions found and sedimented in the soil. The aim is, therefore, to try to explore and interrogate the web where continental and Mediterranean influences intersected, the potential ancestry exerted by ethnic or family ties and religious affiliation, among other factors and circumstances, and how these were combined or excluded to highlight the construction of the deceased's identity in dialogue with the human community to which he belonged.

3 GRAVE GOODS FOR THE AFTERLIFE BETWEEN THE VTH AND XIITH CENTURIES IN MÉRTOLA'S TERRITORY, PORTUGAL

Gómez-Martínez, Susana (Campo Arqueológico de Mértola / CEAACP; University of Évora) - Rodrigues, Andreia (Campo Arqueológico de Mértola / CEAACP; University of Évora) - Rodrigues, Clara (Campo Arqueológico de Mértola / CEAACP) - Rafael, Lígia (Câmara Municipal de Mértola) - Fernandes, Marco (Campo Arqueológico de Mértola / CEAACP; Universidade de Évora) - Palma, Maria de Fátima (Campo Arqueológico de Mértola / CEAACP; Universidade de Granada) - Lopes, Virgílio (Campo Arqueológico de Mértola / CEAACP)

This presentation aims to interpret and summarize the information gathered in the archaeological interventions of the last 45 years in Mértola concerning the funerary practices between the fifth and twelfth centuries. The village, located in southeast Portugal, has the final navigable stretch of the Guadiana River, which allowed for an intense and regular trade of goods and different cultures with the Mediterranean bay.

The chronological range studied has two different time frames: firstly, the Late Antiquity between the fifth and seventh century, in several necropolises, namely in Mosteiro, in Eixo Comercial, in Achada de São Sebastião and Rossio do Carmo; secondly, the Islamic Period, between the eighth and twelfth centuries, from which we have only discovered the necropolis/almocávar of Rossio do Carmo, which confirms the continued use of the space throughout times.

Regarding burial practices, frequently, the objects that accompany an individual throughout life can also accompany them in death. The most frequent examples of this are the accessories used in clothing and adornment pieces. However, in Late Antiquity, we occasionally find votive offerings associated with the burial practices. In the Islamic period, these offerings were scarce, following religious customs. Nevertheless, archaeological records have proved they exist.

In both periods, the objects are of different types; they have distinct execution techniques and use various materials, such as ceramic, glass or metal/metal alloy.

4 EARLY MEDIEVAL FUNERARY LANDSCAPES: THE CASE OF MATERA

Bruno, Brunella (University of Salento) - Dicanio, Giuseppe (University of Salento)

The city of Matera is in Basilicata, southern Italy, known for its ancient urban nucleus called Sassi, UNESCO world heritage site since 1993. The Sassi district is situated near the Gravina stream, which flows through the Murgia plateau. The major part of the city's architecture is made possible by the easily malleable sedimentary and porous rocks in the region, creating a unique rupestrian landscape. The oldest settlement is on the Civita hill, between the two Sassi districts, Barisano and Caveoso. The city's complete history remains unclear due to the scarcity of information and the continuity of life. In the Late Antique period, Matera was connected to the Via Appia through secondary roads, establishing contact with neighbouring Apulia throughout the Middle Ages, standing between the social and political influence of the Lombards and of the Byzantines. Furthermore, only Early Medieval funerary contexts provide enough evidence for this period.

This paper aims to offer a reconstruction of the Early Medieval funerary landscape of the old settlement of Matera adapting a methodology that may be summarized with the concept of "mortuary geography", to define the interactions between funerary areas and landscape. To study these interactions, it is necessary the aid of a GIS support to run visibility and least cost path analyses, in order to understand the impact of the landscape on the funerary features.

5 ARCHAEOLOGY OF DEATH IN THE ANCIENT ANDALUSIAN DISTRICT OF LLEIDA (8TH-12TH CENTURIES)

Brufal, Jesús (University Autònoma of Barcelona)

The archaeological study of Andalusian necropolises is a long-standing field for understanding Andalusian society during the Early Middle Ages. For this reason, the necropolises in this context, located in the old Andalusian district of Lleida, are the object of study in order to recognise two key features: food and health. Of all the necropolises located and identified, those with Christian rituals stand out, far above the Islamic muqadir. While the Christian necropolises of context V-XI or XII are visible throughout Lleida, the muqadir have only been identified in the cities of Lleida and Balaguer.

Furthermore, of the total number of Christian necropolises, a considerable number still preserve burials, which is relevant for studying the individuals, the burial rituals, the organisation of the necropolis and its location in the ancient Andalusian landscape. Thus, we highlight the necropolis of Santa Coloma in Àger, the Tossal de les Forques in Sentiu de Sió, Tossa de Baix in Rosselló, the Saladar in Cogul, among others. These Christian ritual necropolises have been partially excavated in the 80s of the 20th century with scarce results in the interpretative study. The recovery of the remains in the museums and the restarting of the excavation process are yielding very interesting results on the daily life of Andalusian society in Lleida, which maintained its ideological framework but was perfectly integrated into the social and political dynamics of al-Andalus.

6 EXPLORING CHRISTIAN RURAL COMMUNITIES IN THE SOUTH OF AL-ANDALUS: INSIGHTS ON TÓZAR'S RUPESTRIAN CEMETERY AND OTHER FUNERARY SPACES

Mattei, Luca (University of Granada)

In the historical and social context of al-Andalus, the material evidence left by funerary rituals represents an important archaeological indicator for exploring and understanding the diverse religious tapestry, aiding in comprehending the evolution of Islamization processes in the formation of its society.

This paper presents an investigation into the Mozarabic rupestrian cemetery of Tózar (Granada, Spain), dating from the 10th to 12th centuries. New insights are provided regarding Christian funerary spaces in al-Andalus, as well as the need for more in-depth studies on rock-cut necropolises.

Ancient funerary rituals have helped to identify the religious identity of populations, essential for a better understanding of Andalusian society, particularly the significance of Christian rural communities in the social and commercial dynamics of al-Andalus. The study of the peasant agency within these rural Christian communities, a focal point of the DICRAN project (PID2022-142554NA-I00), also aids in deciphering their productive strategies and active role in shaping agrarian landscapes. This understanding contributes to grasping the dynamics of continuity, adaptation, or change between different societies and environments in the Medieval Mediterranean, the focus of the MED-GREENREV project (ERC SyG Ref. 1011071726).

7 SPACES OF LIFE AND DEATH IN THE LANDSCAPE OF GARB AL-ANDALUS. PRELIMINARY ANALYSIS OF TOPOGRAPHY AND RURAL SETTLEMENTS

Gonzaga, Raquel (University of Coimbra) - Palma, Maria de Fatima (Campo Arqueológico de Mertola; CEAACP)

In the territory of Garb al-Andalus, archaeologists recorded rural settlements lacking burial areas for the use of Medieval Islamic communities. Indeed, the absence of these testimonies may be related to preventive archaeological work that focuses on areas directly affected by projects and ignores those areas that don't constitute an immediate threat. However, each settlement should have its own cemetery area. It is in this systematic absence in the archaeological records that we question the implantation and localization of the rural Islamic necropolis from the 8th to the 12th century.

By cross-referencing information from written sources and the few excavated rural settlements with recorded necropolises, we seek to analyze and understand the preferred spaces for burial areas.

The methodology focuses on reading the historical and Quranic sources and using mapping tools and comparative studies to analyze settlement patterns and spatial distribution. With this method we aim to identify possible cultural patterns in the arrangement between rural settlements and burial areas. This analysis aims to answer several questions related to implantation areas, rituals, social dynamics, and the organization of the rural territory of Garb al-Andalus.

We will present topographies of life and death spaces in the rural landscape, where settlements and necropolises are understood as fundamental organizers of the landscape. This approach has been insufficiently explored and few researchers have dedicated themselves to it.

Through this study, it will be possible to obtain a more comprehensive view of the organization and interactions between the spaces of life and death, contributing to a better understanding of the cultural and social organization of Islamic communities in the rural context of Garb al-Andalus.

8 FUNERARY ARCHAEOLOGY FOR MADINAT QURTUBA: STATE OF THE ARTS, POSSIBILITIES AND NEEDS

González Gutiérrez, Carmen (University of Córdoba)

This paper aims to present the current state of the arts in the study of Muslim cemeteries of Madinat Qurtuba (Córdoba, Spain, 7th to 13th centuries) in comparison to the funerary areas documented from Roman times. This comparative view will show how the multidisciplinary and rigorous study of former Medieval Islamic cemeteries can reveal important aspects of the societies that produced such evidence not only by focusing on funerary architecture, but also by considering bones as an historical source of information. These aspects often relate to the social stratification and conditions of the population and the origins and identities of the deceased, burial typologies, religious practices and beliefs, urban organisation and its spatial evolution, and etcetera. This viewpoint is crucial for analysing medieval Islamic cemeteries in the Iberian Peninsula, which were regulated by the Maliki doctrine, especially when under Umayyad rule (756-1031 CE). According to this doctrine, monumental graves were forbidden and certain types of gravestones were banned as well. Taking Córdoba as a study case and comparing it with other cases in al-Andalus, it will be shown how a better knowledge of Andalusian society should be reached through the study of bones. Finally, this paper also intends to raise consciousness about the relevance and even urgency of these techniques in our case study.

525 EXPLORING DENTAL PATHOLOGIES AND DIET ACROSS TIME AND SPACE: AN INTERDISCIPLINARY APPROACH

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Pedergrana, Antonella (Museo Archeologico dell'Alto Adige) - Seiler, Roger (Institute of Evolutionary Medicine - UZH)

Session format: Regular session

Dental pathologies are a valuable source of information about human dietary habits and overall health throughout history. Methods developed within the fields of paleo-dentistry and bioanthropology are used to identify and document the oral status of prehistoric and historic human populations. Dental parameters such as macro/micro wear are also used to infer the overall diet of individuals. These, applied in combination with methods used in paleodietary reconstructions, such as isotopic, genetic, and proteomic data, contribute to a more thorough understanding of dietary habits associated with oral disease in the past. In particular, dental calculus analysis (DCA) including microscopy, aDNA and ancient proteomics, is an incredibly informative tool to explore both ancient diet and shifts of the oral microbiome.

This session will welcome contributions where the aforementioned methods are applied alone or in combination. Case studies covering various chronologies and geographical locations are welcome and an evolutionary perspective is particularly appreciated.

This session will foster interdisciplinary discussions among scholars, researchers, and practitioners in the fields of anthropology, archaeology, dentistry, and paleopathology with the main aim of reaching a holistic understanding of the interplay of diet and oral paleo-pathologies across time and space.

ABSTRACTS

1 EVOLUTIONARY PERSPECTIVES ON ORAL DISEASE: A HOLISTIC APPROACH

Pedergrana, Antonella (Museo Archeologico dell'Alto Adige)

Oral diseases constitute a significant aspect of human health. Evolutionary perspectives on oral disease can offer valuable insights into their prevalence and distribution across time and space. Understanding the etiology and progression of diseases in past human populations requires consideration of both biological and cultural factors that could contribute variably to disease occurrence and development. Dental anthropology employs a number of different analytical techniques, including paleopathology, radiology, microscopy, isotopic analysis, proteomics, and ancient DNA studies, to unravel the evolution of oral diseases and dietary habits in past populations. While interdisciplinary approaches are being used to address evolutionary questions in paleo-odontological studies, the integration of diverse methodologies into analytical workflows remains a developing area.

Teeth, as widespread remains at archaeological sites and resilient components of the masticatory system, hold paramount importance in deciphering evolutionary patterns of oral disease. Not only do they preserve evidence of the

food consumed, para-masticatory activities, and stressful events that occurred during one's lifetime, but they also retain dental tartar deposits, which function as screenshots of past oral environments.

The addition of multiple lines of evidence to the examination of ancient and historical dental remains is key to reconstructing the use of the masticatory system by human populations in the past. Adopting a holistic perspective that includes several aspects influencing disease development—comprising host-pathogen relationships, behavioural, and environmental factors—promises to uncover the evolutionary determinants of oral diseases.

This contribution aims to touch on the evolutionary implications of oral diseases and advocates a holistic and multi-disciplinary approach to improve data recovery from ancient and historical dental human remains. Drawing from past and current research, it will explore potential future avenues of research, fostering discussions among experts from diverse disciplines and promoting innovation in the study of ancient human dentition.

2 DIGITAL AND CONFOCAL MICROSCOPY: APPLICATIONS TO DIACHRONIC ANALYSIS OF HUMAN DENTAL AND ORAL PATHOLOGIES

Lozano, Marina (IPHES-CERCA. Institut Catala de Paleoeologia Humana i Evolució Social; Facultat de Lletres. Universitat Rovira i Virgili) - Francès-Abellán, Anna (IPHES-CERCA. Institut Catala de Paleoeologia Humana i Evolució Social) - Jiménez-Serrano, Alejandro (Departamento de Antropología, Geografía e Historia. Facultad de Humanidades y Ciencias de la Educación. Universidad de Jaén.) - Sánchez-Barba, Lydia (Laboratorio de Antropología. Departamento de Medicina Legal, Toxicología y Antropología Física. Facultad de Medicina. Universidad de Granada) - Carrión-Méndez, Francisco (Departamento de Prehistoria y Arqueología. Universidad de Granada.) - Gutiérrez-Mesa, Laura (Laboratorio de Antropología. Departamento de Medicina Legal, Toxicología y Antropología Física. Facultad de Medicina. Universidad de Granada) - Borja-Miranda, Erik (Laboratorio de Antropología. Departamento de Medicina Legal, Toxicología y Antropología Física. Facultad de Medicina. Universidad de Granada) - Allué, Ethel (IPHES-CERCA. Institut Catala de Paleoeologia Humana i Evolució Social; Facultat de Lletres. Universitat Rovira i Virgili) - Vergès, Josep (IPHES-CERCA. Institut Catala de Paleoeologia Humana i Evolució Social; Facultat de Lletres. Universitat Rovira i Virgili) - Rubio-Salvador, Ángel (IPHES-CERCA. Institut Catala de Paleoeologia Humana i Evolució Social; Facultat de Lletres. Universitat Rovira i Virgili)

Dental and oral status is a valuable indicator of health, diet, and lifestyle of past populations. The assessment and diagnosis of bucco-dental pathologies has been improved through advances in microscopy applied to external surface observations. However, some of these microscopy analyses are not only expensive but also time-consuming and not always accessible, thus limiting their applicability for scoring dental pathologies specially those of large burial assemblages.

The aim of this contribution is to assess suitability of two types of microscopy (digital and confocal microscopy) to score, describe, and analyze oral and dental pathologies in different human archaeological samples. Also, we show the suitability and reproducibility of these methodology to obtain diachronic information about this topic as it can be applied independently of the chronology of the sample.

Our sample come from three sites with distant chronology. The earliest one is El Mirador Cave (Sierra de Atapuerca, Spain) with a sample of 23 individuals from a Chalcolithic collective burial dated to 3013-2889 cal BC and 2578-2463 cal BC. The second site is Qubbet el-Hawa (QH) (Aswan, Egypt) with 9 individuals coming from the reuse of the tomb in the Late Period (664-332 BC). Finally, 13 individuals from El Saucejo (Sevilla, Spain) and Barranco de Viznar (Granada, Spain) mass graves from the Spanish Civil War (1936-1939).

The identified oral pathologies, disorders, and additional comorbidities along with anomalous dental wear related to non-alimentary uses of teeth has been described. The analysis of some of these pathologies with both types of microscopy allows a more in-depth characterization and improved precision of differential diagnoses. Also, the high-resolution images and data resulting from digital and confocal analyses provide useful information not only for research but also for teaching and outreach dissemination purposes.

3 EVALUATING TISSUE CLEARING PROTOCOL VARIATIONS FOR THE MICROSCOPIC EXAMINATION OF HUMAN DENTAL SPECIMENS

Dönmez, Denis (University of Zurich) - Pedernana, Antonella (University of Zurich) - Seiler, Roger (University of Zurich) - Rühl, Frank (University of Zurich) - Eppenberger, Patrick (University of Zurich)

This study assesses the efficacy of variations in the PEGASOS tissue clearing protocol on the clarity, transparency and microscopic visualization of whole human teeth spanning ancient, historical and recent specimens.

The PEGASOS tissue clearing protocol was originally developed for whole-body imaging in animal studies. Its application to dental tissues, particularly human teeth, marks a novel exploration. Our investigation demonstrates the original protocol's applicability to enhancing the microscopic examination of whole human teeth without necessitating physical sectioning.

Additionally, we investigated modifications to the protocol to determine their effects on visualization depth, leading to varied transparency and dental visibility within different dental layers, including the tooth cementum, dentin and enamel. These findings indicate that a tailored protocol can provide a refined approach to the study of dental micro-morphology and pathology.

Our study underscores the versatility and potential of the PEGASOS tissue clearing technique for the comprehensive examination of human dental specimens, ranging from archaeological finds to contemporary samples. It offers a promising avenue for dental research, facilitating an in-depth understanding of dental morphology and pathology, while avoiding the destructive processes traditionally involved in such analyses.

4 DENTAL PATHOLOGIES IN THE EVIDENCE FOUND IN DJEDKARE'S ROYAL NECROPOLIS AT SAQQARA (EGYPT)

Vymazalová, Hana (Charles University, Faculty of Arts, Czech Institute of Egyptology) - Hashesh, Zeinab (Beni Suef University) - Gabr, Ahmed (Ministry of Tourism and Antiquities, Egypt)

Djedkare's royal cemetery at south Saqqara (Egypt) has been systematically explored since 2010 by the archaeological mission of Charles University (Faculty of Arts, Czech Institute of Egyptology) headed by Mohamed Megahed. This work focuses not only on the pyramid complex of King Djedkare but also on the surrounding cemetery, untouched by earlier excavators. The discovery of several monuments from the late Fifth Dynasty (the middle of the 3rd millennium BCE) has expanded our knowledge of King Djedkare and members of his family and court. At the same time, however, the site has yielded a large amount of evidence from later periods, which shows that the necropolis was continually used for more than two thousand years, at least until the Ptolemaic era (the end of the 1st millennium BCE). Whereas the Fifth-Dynasty evidence includes costly stone-built tombs of the elite, in later periods the site was used by lower classes, burying their dead in mats or wooden coffins placed in the sand around the earlier monuments. The wish to rest in the shadow of the king's pyramid reflects the desire of the later population to connect with the glorious past, the golden age of the pyramid builders. Several hundred such burials have been uncovered at Djedkare's cemetery in recent years. They form a valuable group of evidence attesting to the history of this site as well as to the development of the burial customs and material culture between the middle of the 3rd and the end of the 1st millennium BCE. In addition, they provide the opportunity to study the population of Egypt through human remains, reflecting the quality of life, access to medical care and other such aspects. The paper focuses on selected cases documented during the ongoing anthropological and osteological research of the burials from Djedkare's royal cemetery.

5 CHRONICLES OF DENTAL HEALTH: UNVEILING ANCIENT EGYPTIAN DIETARY PATTERNS THROUGH PALEO-ODONTOLOGY

Seiler, Roger (University of Zurich, Switzerland) - Eppenberger, Patrick (University of Zurich, Switzerland)

This study examined the dental and skeletal remains of 125 people from two adjacent but chronologically and socio-economically separated burial sites at Thutmose III's mortuary temple near Luxor, Egypt, covering the XIth dynasty (2160-1985 BC) and the XXV-XXVIth dynasty (948-525 BC). The earlier burial site mainly consisted of modest burials of persons from a social class engaged in physical labor. In contrast, the later burial site contained tombs with sophisticated architectural patterns, most likely the resting sites of people from the middle social strata, such as priests or mid-ranking Cushite or Saite officials.

We investigated paleo-odontological patterns of dental caries and tooth wear in dentitions and related skeletal structures. We classified both populations into a younger (19-35 years) and an older age group (36 years and above). Significant tooth wear was seen at both locations, particularly in the earlier XIth dynasty. While caries rates were similar in younger individuals at both sites, an increase in caries frequency among older adults in the later XXV-XXVI dynasties indicates distinctive dietary patterns across time and social strata.

Our findings highlight the impact of socioeconomic and environmental changes on dietary patterns, including food processing techniques and carbohydrate availability. Our findings illustrate the intricate relationship between diet, society, and oral health in ancient Egypt, highlighting the dynamic evolution of dietary practices and their health implications across millennia.

6 ORAL PATHOLOGY OF ZAGREB MUMMIES -- REVISITED

Cavka, Mislav (University of Zagreb, School of Medicine; University Hospital Center) - Prenc, Matea (University of Zagreb, School of Dental Medicine; University Hospital Centre Sisters of Mercy, Department of Diagnostic and Interventional Radiology)

Dental paleoradiology provides insights into oral pathologies and procedures in the past. We conducted a paleo-radiological study to re-evaluate the dental status of mummified remains from the Archaeological Museum in Zagreb, which was never done as a separate study. The dental analysis included a CT investigation of 5 whole mummies and 3

mummified heads using an MDCT unit and MRI unit. Several interesting dental features were noticed. Despite the scant evidence of developed oral surgery in ancient Egypt, the lack of third molars could indicate the surgical extraction of teeth. Some teeth were missing part of its anatomical crown which was probably chipped off postmortem. Signs of tooth wear, along with skeletal osteoarthritis changes presume the mummy should be at least 40 years old. Three third molars were not in occlusion and the fourth third molar missing indicating that the head belonged to a younger person, around 20 years old. The other head had all the teeth in occlusion and closed cranial sutures, meaning the person was between 30 and 40 years old. Prognathism of the upper jaw was seen in both head specimens. An accessory tooth behind the lower left canine was found in one specimen. CT scan with 3D reconstruction allows visualization of dental elements with great spatial and contrast resolution and is the paleo-radiological method of choice in the assessment of teeth and jaw. Interesting MR features will be presented as well.

7 STRONGER TEETH, LONGER LIFE? CORRELATION OF PRESENCE AND FREQUENCY OF LEH AND LONGEVITY AT EBA NECROPOLES MOKRIN AND OSTOJIČEVO

Kreckovic Gavrilovic, Marija (University of Belgrade, Faculty of Philosophy) - Petrović, Bojan (University of Novi Sad, Faculty of Medicine) - Stefanović, Sofija (University of Belgrade, Faculty of Philosophy)

Adverse early life conditions have been demonstrated to have a significant impact on later health and longevity outcomes, both in contemporary and archaeological populations. The Developmental Origin of Health and Disease (DOHaD) hypothesis posited a correlation between low birth weight and the onset of cardiovascular disease in later life. Subsequently, researchers have extended the application of the DOHaD hypothesis to archaeological populations, with different degrees of success. The ability of dental enamel to serve as a permanent record of early life physiological stress presents researchers with a potential of research into developmental plasticity and adaptive response when coupled with the data on health and longevity inferred from skeletal remains.

In this paper we use linear enamel hypoplasia (LEH) as a proxy for survived childhood stress on the individuals buried at Early Bronze Age necropolises of Mokrin and Ostojićevo in Northeastern Serbia. We hypothesized that the individuals, who survived childhood stress, as evidenced by the presence and frequency of LEH, will have shorter lifespans on average than the individuals who were not exposed to stress in their childhood. Poor preservation state of the skeletal remains resulted into markedly wide age ranges, which was successfully overcome by statistical modeling of the age variable before the correlation analysis. The results showed some significant relationship between LEH and reduced age at death, as well as different sex-specific patterns related to LEH. Therefore, even though the negative correlation was in most cases weak, the general trend that emerged from the results of this research indicates the existence of adverse effects of early childhood stress on mortality outcomes. Additionally, analysis using the Kvaal technique and Tooth Coronal Index (TCI) for precise age estimation for a number of individuals are underway, and will further our investigation of the correlation between longevity and LEH.

8 NEW INSIGHTS INTO PREHISTORIC AGRICULTURE OF NORTHERN IBERIA FROM THE ANALYSIS OF STARCH GRAINS EMBEDDED IN DENTAL CALCULUS

González-Rabanal, Borja (University of Valladolid; Grupo I+D+i EvoAdapta, Universidad de Cantabria) - Marín-Arroyo, Ana B. (Grupo I+D+i EvoAdapta, Universidad de Cantabria) - Carmona-Ballester, Eduardo (Servicio Territorial de Cultura, Turismo y Deporte de Valladolid, Junta de Castilla y León; Universidad de Burgos) - Gutiérrez-Zugasti, Igor (Instituto Internacional de Investigaciones Prehistóricas de Cantabria, Universidad de Cantabria) - Martín, Miguel Ángel (Sociedad Española de Espeleología y Ciencias del Karst) - Ortega, Ana Isabel (CENIEH – Centro Nacional sobre la Evolución Humana) - Straus, Lawrence G. (University of New Mexico; Grupo I+D+i EvoAdapta, Universidad de Cantabria) - Vega Maeso, Cristina () - González Morales, Manuel R. (Instituto Internacional de Investigaciones Prehistóricas de Cantabria, Universidad de Cantabria) - Cristiani, Emanuela (Diet and ANcient TEchnology laboratory, Sapienza Università di Roma)

Plant domestication constituted one of the most radical changes of the “Neolithic Revolution”, leading to biological, technological, socioeconomic, and cultural transformations that began in the Near East ca. 12,500 years ago and reached the Mediterranean coasts of Iberia three millennia later. Archaeobotanical studies have revealed that a wide variety of crops were cultivated since the Early Neolithic across Iberia, including cereals (wheat and barley), pulses (pea, lentil, fava bean) and other non-edible plants such as flax or poppy. However, the early stages and development of agriculture in northern Iberia are still little understood, mainly due to the scarcity of carpological data because of old excavations or preservation biases. With the aim of understanding the origin and development of agricultural practices during Late Prehistory, a dental calculus analysis was achieved to ascertain what types of plants were involved in the diet of these farming communities. In particular, starch grains can survive in the ancient dental calculus matrix, being considered a repository of dietary habits of past human groups. In this research, we analysed calculus from 18 individuals buried in 10 funerary caves of coastal and inland areas of the Cantabrian Region (northern Iberia) and dated to the 4th/2nd millennium cal. BC, spanning from the Late Neolithic to the Middle Bronze Age. For the identification of archaeological starch granules, a reference collection of more than 300 modern wild and domestic plants native to

the Mediterranean area and housed at the DANTE laboratory was used for morphological and statistical comparisons in order to provide a potential identification at the species level. Our results support extensive and stable agriculture based on the cultivation of wheat and barley from the Early Neolithic to the Bronze Age when millets were introduced and became major crops, integrated into a mixed farming economy.

9 PROTEOMIC ANALYSIS OF IRON AGE DENTAL CALCULUS PROVIDES INSIGHTS ON SCYTHIAN FOOD SYSTEMS

Pecnik, Jaruschka (Department of Environmental Sciences, University of Basel, Basel, Switzerland; Institute for Evolutionary Medicine, Faculty of Medicine, University of Zurich, Zurich, Switzerland) - Wilkin, Shevan (Department of Environmental Sciences, University of Basel, Basel, Switzerland; Institute for Evolutionary Medicine, Faculty of Medicine, University of Zurich, Zurich, Switzerland; Department of Archaeology, Max Planck Institute for the Science of Human History, Jena, Germany) - Ventresca Miller, Alicia (Department of Anthropology, University of Michigan, Ann Arbor 48109, Michigan, United States; University of Michigan Museum of Anthropological Archaeology, University of Michigan, Michigan, United States; Max Planck Institute for Geoanthropology, Department of Archaeology, Jena, Germany) - Schuenemann, Verena (Department of Environmental Sciences, University of Basel, Basel, Switzerland; Institute for Evolutionary Medicine, Faculty of Medicine, University of Zurich, Zurich, Switzerland; Department of Evolutionary Anthropology, University of Vienna, Vienna, Austria) - Johnson, James (Department of Anthropology, University of Wyoming, Wyoming, United States) - Makhortykh, Sergey (Institute of Archaeology of National Academy of Sciences of Ukraine (NASU), Kyiv, Ukraine) - Litvinova, Ludmilla (Institute of Archaeology of National Academy of Sciences of Ukraine (NASU), Kyiv, Ukraine) - Andruk, Svetlana (Zaporizhzhya National University, Zaporizhzhya, Ukraine) - Toshev, Gennady (Zaporizhzhya National University, Zaporizhzhya, Ukraine) - Krützen, Michael (Department of Evolutionary Anthropology, University of Zurich, Zurich, Switzerland)

Recent genetic and stable isotopic studies of Scythian remains across the Eurasian steppe have significantly reshaped our understanding of these steppe people, challenging the notion of a homogeneous political assembly of nomadic, horse-back warriors from the Iron Age. It is now evident that the Scythians were composed of diverse populations with heterogeneous origins, which possessed complex socio-political structures. Even variations in agro-pastoral subsistence strategies among these populations have been identified, yet the specifics of their dietary intake such as its taxonomic origin from wild or domestic species remain inconclusive. Consequently, a palaeo-proteomic analysis of dental calculus from two Scythian-era populations in the Northern Black Sea region (present-day Ukraine) was conducted. Various dietary proteins and their taxonomic origins were identified, revealing milk, plants, and fish from various species as a part of Scythian food systems. Based on these findings, we suggest that these two agro-pastoral Scythian populations relied especially on ruminant milk and supplemented their subsistence regimes for food resilience in forest-steppe/steppe environments by fishing.

10 EXPLORING ANCIENT DENTAL CALCULUS: UNCOVERING THE DIVERSITY OF ORAL ARCHAEOLOGICAL METHANOBREVIBACTER THROUGH METAGENOMIC ANALYSIS

Granehill, Lena (Institute for Mummy Studies, Eurac Research) - D. Huang, Kun (Helmholtz Centre for Infection Research; CIBIO Department, University of Trento) - Tett, Adrian (CIBIO Department, University of Trento; CUBE - Division of Computational Systems Biology, Centre for Microbiology and Environmental Systems Science, University of Vienna) - Manghi, Paolo (CIBIO Department, University of Trento) - Paladin, Alice (Institute for Mummy Studies, Eurac Research) - O'Sullivan, Niall (Institute for Mummy Studies, Eurac Research) - Rota-Stabelli, Omar (Department of Sustainable Agro-Ecosystems and Bioresources, Fondazione Edmund Mach; Center Agriculture Food Environment, University of Trento) - Segata, Nicola (CIBIO Department, University of Trento) - Zink, Albert (Institute for Mummy Studies, Eurac Research) - Maixner, Frank (Institute for Mummy Studies, Eurac Research)

Dental calculus (mineralised dental plaque) preserves many types of microfossils and biomolecules, including microbial and host DNA, and ancient calculus are thus an important source of information regarding our ancestral human oral microbiome. We used genetic data to taxonomically characterise the dental calculus microbiome from 20 ancient human skeletal remains originating from Trentino-South Tyrol, Italy, dating from the Neolithic (6000–3500 BCE) to the Early Middle Ages (400–1000 CE).

We found a high abundance of the archaeal genus *Methanobrevibacter* in the calculus. However, only a fraction of the sequences showed high similarity to *Methanobrevibacter oralis*, associated with periodontitis and the only described *Methanobrevibacter* species in the human oral microbiome so far. To further investigate the diversity of this genus, we used *de novo* metagenome assembly to reconstruct 11 *Methanobrevibacter* genomes from the ancient calculus samples. Besides the presence of *M. oralis* in one of the samples, our phylogenetic analysis revealed two hitherto uncharacterised oral *Methanobrevibacter* species. The study thus suggested a possible shift in the human oral microbiome member *Methanobrevibacter* over the last millennia.

We now aim to incorporate more recently published dental calculus samples to the analysis which will extend the analysis to an even broader range of geographical locations and time periods. This will allow us to further explore microbial diversity and evolution of this potential dental pathogen over the course of human history.

11 TOWARDS THE CO-EXTRACTION OF PROTEINS AND LIPIDS FROM DENTAL CALCULUS

Mackie, Meaghan (School of Archaeology, University College Dublin; Archaeobiomics, Department of Life Sciences and Systems Biology, University of Turin) - Spiteri, Cynthianne (Archaeobiomics, Department of Life Sciences and Systems Biology, University of Turin; Institut für Ur- und Frühgeschichte und Archäologie des Mittelalters, Eberhard Karls Universität Tübingen) - Dal Bello, Federica (Department of Molecular Biotechnology and Health Sciences, University of Turin) - Buckley, Stephen (Department of Archaeology, BioArCh, University of York) - Quagliarello, Andrea (Department of Comparative Biomedicine and Food Science, University of Padua) - Demarchi, Beatrice (Archaeobiomics, Department of Life Sciences and Systems Biology, University of Turin) - Power, Robert (School of Archaeology, University College Dublin)

In the last decade, the examination of ancient dental calculus using proteomics has increasingly become an almost routine analysis to gain direct dietary information of past people, especially for animal products. The extraction of lipid residues and metabolites is less common, but can still provide valuable information on past diet, especially from plant products. Consequently, the two approaches are complementary and necessary to get a more holistic idea of ancient diets. However, current protocols require separate dental calculus samples for each analysis. The co-extraction of proteins and lipids from the same sample of calculus would represent a more sustainable and comparable approach to examine this limited resource. This would allow for a more comprehensive understanding of individuals who consumed and inhaled substances in the past with fewer samples destroyed, leaving the door open for future analyses.

In order to achieve this goal, we have examined different protocols for the sequential extraction of lipids and proteins from the same sample of calculus. Modern and mediaeval calculus were used to determine the effectiveness of different lipid extraction methods and to observe any modifications to the protein yield and composition caused by preceding lipid extraction. Co-extraction of proteins and lipids is shown to be a potentially viable route for maximising information related to individual diet and inhaled materials from a single sample of dental calculus.

531 MAKING CONNECTIONS: TOWARDS ARCHAEOLOGICAL NARRATIVES IN CONTEMPORARY SOCIETY

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Fernie, Kate (CARARE) - Corns, Anthony (Discovery Programme; 5DCulture)

Session format: Regular session

In today's digital age, people have unprecedented access to online content at home and work, transforming the field of archaeology. Advanced digital technologies are now used for recording, analysing, and sharing archaeological and historical content. Sharing archaeological datasets with open licences enhances their value, benefiting society in various ways. This content has a wide range of applications including monitoring the effects of climate and other environmental and human impacts, supporting the creation of narratives which inform education and tourism initiatives, empowering creative industries and creating a sense of ownership and involvement among people in the management of their heritage.

CARARE's mission is to advance professional practice and foster appreciation of the digital archaeological and architectural heritage by creating opportunities for practitioners, researchers and the creative industries to connect with each other, exchange experiences and knowledge, and open access to their datasets via Europeana and research infrastructures. Together with other researchers across Europe, CARARE is participating in the 5DCulture Project which focuses on European 3D digital cultural heritage assets and fostering their re-use. The session aims to unite individuals passionate about creating archaeological narratives in contemporary society by exploring how archaeological datasets can be used for work, research, learning, creating narratives and enjoyment.

Talks can address but are not limited to the following topics:

- Real case examples of reuse of archaeological data in society
- Best practices, standards and strategies for making datasets available for re-use
- Barriers and opportunities for reuse of digital archaeological data
- Methods and approaches to reuse in 3D, XR and AR applications
- Connecting with the education, tourism, creative industry and other sectors
- Working with communities.

ABSTRACTS

1 ARCHAEOLOGY DATA AND NON-ARCHAEOLOGICAL PROFESSIONALS: WHY DO PEOPLE NEED ARCHAEOLOGY?

Lauzikas, Rimvydas (Vilnius University Faculty of Communication) - Jovaišaitė-Blaževičienė, Indrė (Vilnius University Faculty of Communication) - Kelpšienė, Ingrida (Vilnius University Faculty of Communication) - Šuminas, Andrius (Vilnius University Faculty of Communication)

This paper focuses on the intersection of archaeology and non-archaeological audiences, delving into why and how individuals outside the realm of professional archaeology seek access to archaeology data, heritage objects, and associated knowledge and materials.

The research group members decided to adopt the quality-in-use conceptual approach for this study. Quality in use is described as "the degree to which a product or system can be used by specific users to meet their needs to achieve specific goals with effectiveness, efficiency, satisfaction, and freedom from risk in specific contexts of use". The research methodology is based on the SQuaRE model, represented in the ISO/IEC 25000 standards series. The methodological model created consisted of (i) interviews with non-archaeological professionals; (ii) definition of three use cases (use of archaeology data for inspiration, for improvisation, and precise reconstruction of the past reality); (iii) eye tracking experiments; and (iv) after the experiment questionnaire. The research focuses on reusing data from the three types of digital archaeological archives: (i) ADS, as a traditional, CoreTrustSeal accredited archive that holds actual data in the long term; (ii) ARIADNE, as an aggregation portal that holds no data, only metadata, but facilitates resource discovery and points users to data held in repositories and archives; and (iii) AIR as an interactive virtual research environment and reporting platform for organising newly captured archaeological field data and organising it in ways that allow it to be used for collaborative analysis.

The paper presents the results of the research, including the differences (i) in the need for highly precise archaeological data for the different groups of users (ii) in the ways how they access the archaeology data in the different types of digital archaeological archives; and (iii) in the information behaviour of different users.

2 IT IS EXCAVATED AND NOW WHAT? HOW DO WE COMMUNICATE OUR DATA TO THE COMMUNITY?

Tapavicki-Ilic, Milica (Institute of Archaeology Belgrade)

Over the past few decades and with development of new technologies, it has become rather challenging to present the work of archaeologists to the public. Classical (old-fashioned) museums are still there, but open-air museums seem to become more and more attractive, because they allow interaction. A step further is achieved with AR and VR applications that tend to add to the experience of both those interested in our common past and those interested in gaming.

The Institute of Archaeology from Belgrade has been participating in several projects that aimed to explore the possibilities of disseminating archaeologists' research. Among them, there were projects that tended to promote cultural heritage among younger generations, basically millennials, but also those that aimed to connect formal and informal education. On the other side, such projects also involved experts in cultural heritage.

One of the projects provided a cooperation model for cultural heritage by using digital technologies to enhance cultural experiences of several archaeological sites. The target group of this project were all of those young and less young people who like gaming.

Another project promoted cultural heritage and fostered sustainable tourism, since it included sailing along the (Roman) Danube limes as basis for a cultural route. The target group of this project were experts in experimental and experiential archaeology, but also tourist organizations.

3 **ARCHAEOLOGICAL HERITAGE IN 3D AS AN EDUCATIONAL AND RESPONSIBLE DISSEMINATION TOOL: IBERIANS AND THE 5DCULTURE PROJECT**

Sánchez, Alberto (University Research Institute for Iberian Archaeology. University of Jaén. Spain) - Rueda, Carmen (University Research Institute for Iberian Archaeology. University of Jaén. Spain) - Rísquez, Carmen (University Research Institute for Iberian Archaeology. University of Jaén. Spain) - Fuertes, José-Manuel (University Research Institute for Iberian Archaeology. University of Jaén. Spain; Department of Computer Science. University of Jaén. Spain) - Segura, Rafael-Jesús (University Research Institute for Iberian Archaeology. University of Jaén. Spain; Department of Computer Science. University of Jaén. Spain) - Rueda, Antonio-Jesús (University Research Institute for Iberian Archaeology. University of Jaén. Spain; Department of Computer Science. University of Jaén. Spain) - Lucena, Manuel (University Research Institute for Iberian Archaeology. University of Jaén. Spain; Department of Computer Science. University of Jaén. Spain) - Herranz, Ana (University Research Institute for Iberian Archaeology. University of Jaén. Spain) - Moreno, Isabel (University Research Institute for Iberian Archaeology. University of Jaén. Spain) - Cubero, Inmaculada (University Research Institute for Iberian Archaeology. University of Jaén. Spain)

From the University Research Institute for Iberian Archaeology of the University of Jaén (Spain) we are working on a programme of activities that delves into the possibilities offered by digital archaeological heritage from different training and educational perspectives. Currently, within the framework of the European project Deploying and Demonstrating a 3D cultural heritage space (5DCulture) (Digital Europe Program) and the CARARE Network, we develop an extensive research and transfer programme that emphasizes 3D technology as a fundamental tool to get closer to the knowledge of the societies of the past, paying special attention to the Culture of the Iberians (6th-1st BC).

In this proposal we show the approach, actions and innovative resources designed for dissemination on which we have been working from a collaborative framework and with inclusive perspectives. We will present some of our strategies based on the search for technical innovation and new materials that help generate more enriching and direct practices with archaeological heritage and that contribute to universal accessibility through recognized platforms such as Europeana. We will conclude with the presentation of our experiences of educational and social transfer environments aimed at school groups at different levels (primary, secondary and university education) and also for people with special needs or impairments.

4 **VIRTUAL LANDSCAPES AND THEIR COMMUNITIES: DIGITAL HERITAGE FOR PRESERVATION, ENGAGEMENT AND AGENCY**

Cassidy, Catherine Anne (University of St Andrews) - Aitken, Jacquie (Timespan Heritage & Arts Society) - Miller, Alan (University of St Andrews)

Virtual reconstructions of the past serve as portals for connecting audiences with global issues of present and possible futures. Employing immersive technologies augments the opportunities for rich and complex narratives to be told within these virtual environments. As the main case study presented, the Strath of Kildonan in the northeast Highlands of Scotland has been populated from the Neolithic, to the Iron Age, through to Highland Clearances in the 1800s. The area has seen numerous climatic shifts throughout history, demonstrated in three temporal reconstructions of the same valley and coast. As the area is experiencing accelerated change due to the climate crisis, the reconstructions are a tool for connecting locals to their past cultural landscapes. With greater understanding of past environments, practices of people throughout history and issues faced in their own time, Timespan Heritage & Arts Society has begun foundational strategies for greater community agency in constituting heritage of 'national significance', monitoring climate change, and valuing local knowledge in future sustainable planning. As a result, the infrastructure for this process has been repeated by the University of St Andrews research group Open Virtual Worlds in other remote communities in collaboration with local heritage organisations to monitor, preserve, and communicate vulnerable heritage by building associations and empowering remote localities. Visualising scientific datasets from archaeological excavations including historical built heritage, ecology, landscapes, people and their practice from the archaeological record constitutes a nexus for present local communities to address their place in wider societal issues, demonstrating digital heritage as a potential divisive tool in preservation, engagement and agency.

5 **FRAMEWORKS FOR NARRATIVES: TOWARDS INTEROPERABILITY FOR 3D AND OTHER MEDIA**

Fernie, Kate (CARARE) - Alkemade, Henk (CARARE)

Creating narratives using digital technology involves combining digital media (text, images, video, audio and 3D) to create a resource centred around a historical event or an experience. The resource itself does not need to be a highly sophisticated media presentation; a slideshow can provide the framework for an effective digital story. But the process of creating narratives underlines the importance of digital media being FAIR (Findable, Accessible, Interoperable and Reusable).

Today we are in the midst of a drive towards digitisation. In terms of cultural heritage, the European Commission has recommended that all monuments at risk of deterioration or destruction, or which are highly visited should be digitised in 3D. The aim is that, as well as being used by institutions to record and manage archaeological monuments or for outreach, the data be made available in the common European data space for cultural heritage (the data space). This paper will discuss the standards, practices and strategies which support interoperability and which enable FAIR reuse of the data.

CARARE is an accredited aggregator for Europeana and has had a huge impact in contributing a rich diversity of content about the archaeological and architectural heritage including 3D content to the data space. We offer advice and support to organisations and projects who wish to deliver high-quality digital content to the data space, and a member of the expert working group on 3D content in the data space. This work includes looking at the metadata needed for digital media to be Findable; best practices in terms of copyright and access licences to enable Reuse; and the standards for file formats and viewers for 3D media to be Accessible. This focus on Interoperability between 3D and other media types enables their re-use in digital story-telling and narratives.

6 **5DCULTURE: IMPROVING THE QUALITY AND PROMOTING THE REUSE OF 3D CULTURAL HERITAGE DATA**

Corns, Anthony (The Discovery Programme) - Shaw, Robert (The Discovery Programme) - O'Reilly, Rebecca (The Discovery Programme) - Namberi, Siva (The Discovery Programme) - Boyd, Hannah (The Discovery Programme)

5DCulture, a 24-month collaborative project co-funded by the European Union, involves twelve partners across cultural heritage sectors such as archaeology, museums, and fashion. Its goal is to enhance European 3D digital cultural heritage assets in the data space, promoting reuse in education, tourism, and broader cultural and creative sectors for sustainable outcomes. The project focuses on delivering high-quality 3D content by engaging existing datasets from partner collections, emphasizing fashion, archaeology, and architecture. Reuse scenarios, spanning from high-quality to derivatives, are being developed.

The Discovery Programme, with a history of involvement in 3D digital documentation, particularly through projects like 3D-ICONS, recognizes opportunities and challenges in reusing 3D archaeological content. This includes enhancing visitor experiences at archaeological sites and leveraging 3D surrogates across various sectors like tourism, education, gaming, arts, conservation, and heritage management.

This paper discusses the research conducted in this context, introducing an improved processing pipeline to enhance the quality of 3D models of cultural heritage assets, facilitating their increased reuse. It details approaches to refining model geometry, generating and applying enhanced textures, creating rich metadata, and establishing strategies for persistence and archiving.

The paper addresses project deliverables, emphasizing use case pilots in tourism, conservation, and the creative arts sectors. The paper also explored the collaborations the Discovery Programme has with partners in these sectors to deliver enhanced yet practical outputs tailored to diverse user needs and reuse potential.

7 **ENGAGING WITH CLIMATE CHANGE THROUGH INTELLIGENT CHARACTERS IN HISTORIC SCENES**

Miller, Alan (University of St Andrews) - Chapman, Alice (University of St Andrews) - Zhang, Junyu (University of St Andrews) - Cassidy, Catherine Anne (University of St Andrews)

Climate change poses a direct threat to many archaeological sites through coastal erosion and extreme weather. Yet recognition of the value of sites and engagement with their heritage poses the possibility of archaeology becoming a mover in motivating the behaviour required to mitigate against climate change.

Digital reconstruction of archaeological sites poses the possibility of holistic representation of natural and cultural, tangible and intangible, moveable and immovable heritage within immersive environments developed within game engines. The capability of modern computers and graphics cards offer the possibility of large environments modelling artefacts, flora, fauna and people together with animations and interactions.

In this presentation we will report on and discuss the development of authentic characters, based upon archaeological evidence, and their situation within historic scenes.

Further we will discuss the ways that large language models can be used to develop natural language, within the context of informed interactions with historic scenes that will enable interrogation of their relevance to climate past, present and futures, enable personalised and factually correct engagement with the heritage.

Though adding characters and natural language interactions to engagement with archaeology, we aim to increase understanding of the past and influence behaviour for the future.

8 ARCHAEOLOGICAL TOOLS FOR DOCUMENTATION AND COMMUNICATION

Nilsson, Nicholas (Kalmar County Museum)

For 10 years, a digital workflow, IDA - Instant field Documentation and Availability, has been used by Kalmar County Museum's archaeologists. The workflow is completely digital: from surveying, documentation, analysis, and communication. Using a cloud service, data is collected via an app, but this also enables communication of data to colleagues, researchers, and the general public in real time. Not all archaeological data makes sense to communicate. Seeing all the documentation data that an archaeologist fills out can be tiring for a generally interested audience. By using filters, customized maps for the public or other stakeholders can be created. Communication takes place through shared maps or using so-called Story maps, a tool where maps, images, video, and text can interact to create a story about a place and to enable a digital participation from the public and others in the archaeologist's work. By using social media, Instagram, Facebook or websites, this information is shared and communicated in an easy way. By using Story maps for communication, 3D information can also be shared as well as 360 videos and images, which can further enhance a story. As such, Story maps does not only make a valuable tool for communication, it also makes archaeology accessible for people that for different reasons are unable to visit excavation sites physically. It is also possible to adapt the information to reach specific target groups, such as nursing homes, schools, etc. This increases the possibility of reaching out with archaeological information to different groups, which strengthens archaeology's role in society.

9 REIMAGINING PICTISH HERITAGE: INTERACTIVE DIGITAL NARRATIVES AND CONTEMPORARY CONNECTIONS

Pisani, Sharon (University of St Andrews) - Miller, Alan (University of St Andrews) - Hall, Mark (Perth Museum)

In the 'Painting the Picts' project, we remodelled and recoloured two significant Pictish stones, the St Madoes and Inchyra stones, situated within a landscape that has undergone transformative changes over the centuries. This aimed to showcase their interconnectedness integral role within Scotland's broader tapestry of Pictish heritage.

As part of this project, a virtual environment allowed users to virtual walk between the St Madoes and Inchyra stones, illustrating the historical context and the impact of modern development on their environment. The stones are presented within scenes depicting aspects of daily life, from ceremonial practices to communal interactions, bringing the Pictish era to life.

A museum exhibit featuring touchscreens displaying 360 photos of scenes from the virtual environment offers interactive engagement. Visitors can explore the stones in detail and, notably, actively participate in the narrative by recolouring the St Madoes stone from a curated palette before reintegrating it into the digital landscape. This communicates the uncertainties of how the stones were coloured and introduces a personalisation element, where visitors create a personal relationship with their encounter with Pictish archaeology.

While the project showcases the evolving landscape, the use of characters humanises the scene, enabling comparisons between Pictish rituals and contemporary settings, offering insights into the cultural practices of the time. By locating the reconstructed stones within their historical context, multiple modes of engagement are possible: the exhibit connects the stones as they are today with how they looked in the past, augmented reality applications connect today's landscape with the past, and web virtual reality provides access from home or school.

In conclusion, our project aimed to visually explore Pictish heritage and invite active personalised participation and engagement from the public. Through digital technologies, we bridge the gap between the past and the present, fostering renewed appreciation and interest for Pictish history.

10 FROM TRENCH TO TIME TRAVEL: IMMERSIVE 3D-RECONSTRUCTION AS A TOOL FOR PROCESSING AND MEDIATING ARCHAEOLOGICAL DATA

Erkell, Miriam (Arkeologerna SHM) - Lindahl, Mikael (Arkeologerna SHM) - Ekholm, Niklas (Arkeologerna SHM) - Ramirez, Teobaldo (Arkeologerna SHM) - Skredsvik, Andreas (Arkeologerna SHM) - Edqvist, Johanna (Arkeologerna SHM) - Nannmark, Ester (Arkeologerna SHM)

Bridging the gap between digital method development in contract archaeology and the mediation of its results, our project is focused on the reconstruction of the historic city of Gothenburg, Sweden, in the 3D-game engine Unreal Engine 5. The 3D-model presents new possibilities for involving local communities in their history through an immersive environment with easy access to archaeological data, and possibilities of tailoring it to different target groups.

The construction of a railway tunnel through Gothenburg has led to extensive excavations, unearthing the city's history back to its founding in 1621. The tunnel, part of a larger infrastructure project, has led to debate among the citizens of Gothenburg; many criticizing the impact of the massive construction sites on the cityscape. The archaeology undertaken as part of the construction works has, on the other hand, been met with a lot of interest amongst gothenburgians; "softening the blow" of the project itself. Archaeological results have mainly been mediated through public lectures, exhibitions, magazines and online blogposts, all of which have been well received.

As part of a new approach on analyzing and visualizing archaeological data, a VR-compatible 3D-model is now being constructed based on historical records, maps and excavation results. The model has already proven itself useful in public outreach; still images, 360° panorama views and short films can be extracted with ease.

The adaptability, accessibility and diversity of historically accurate 3D-environments facilitate a new kind of archaeological mediation. By sharing the model with local schools, museums and libraries, people can partake in the history of their city by walking through it. Due to the flexibility of the game engine, the model can be adapted to different needs and wants; from professional use, aiding the analysis of spatial relationships, to use in exhibitions or development of educational videogames.

533 FORENSIC ARCHAEOLOGY: THE IMPORTANT ROLE OF ARCHAEOLOGY IN LEGAL AND HUMANITARIAN INVESTIGATIONS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Mickleburgh, Hayley (University of Amsterdam; Forensic Anthropology Center, Texas State University) - Barone, Pier Matteo (Forensic Geoscience Italy; American University of Rome) - Drath, Joanna (Pomeranian Medical University) - Moghaddam, Neghanaz (University Center of Legal Medicine Lausanne-Geneva)

Session format: Regular session

Forensic Archaeology is the application of archaeological theory, methods and techniques to assist in criminal investigations and legal matters. Forensic Archaeology is strongly interdisciplinary, with multiple fields playing a role in recording and collecting evidence to help solve crimes and seek justice. The field has developed as a robust subdiscipline of archaeology, employing approaches and methods such as remote sensing and geophysics for site identification, archaeological excavation and recording of in situ evidence and taphonomic processes. Activities also include humanitarian responses to conflict and human rights abuses, and crimes against archaeological heritage, including looting sites and trafficking artifacts by organized crime or during wars. The rapid development of Forensic Archaeology, encompassing technological advancements, such as the innovative use of digital archaeology, a growing focus on defining detailed and globally accessible protocols, as well as incorporation of criminalistic frameworks to interpret the recovered finds and features, contributes to broadening the horizons of the overarching field of archaeology. This broad scope also highlights forensic archaeologists flexibility to switch between macro and microscale analysis of forensic archaeological evidence. Forensic archaeologists are instrumental in conducting both comprehensive evaluations of crime scenes, and in narrowing the scope of research and analysis to effectively delineate the investigative evidence.

This session aims to shed light on the critical role of Forensic Archaeology in the search, recovery, and of missing persons and decomposed or decomposing human remains, particularly in European casework. It will cover the broad spectrum of approaches and methods used in Forensic Archaeology, from research to sharing knowledge and expertise required for this field. We particularly invite contributions reflecting the interdisciplinary and innovative nature of forensic archaeology as well as those related to the important role of this field in current global conflicts and humanitarian action, and its role within the wider discipline of archaeology.

ABSTRACTS

1 THE PARETO PRINCIPLE IN SEARCH AND RESCUE DURING FORENSIC INVESTIGATIONS: BALANCING EFFICIENCY AND ACCURACY

Barone, Pier Matteo (American University of Rome; Forensic Geoscience Italy; ANCRIM (Associazione Nazionale Criminologi e Criminalisti))

The Pareto Principle, often referred to as the "80/20 Rule," has been a guiding concept in various domains, including business and decision-making processes. In the context of forensic investigations and search and rescue operations, this principle finds intriguing applications that demand a delicate equilibrium between efficiency and accuracy.

In the realm of forensic investigations, a dichotomy emerges. On one hand, providing a mere 20% of the available intelligence can inadvertently yield an overwhelming 80% of false positive outcomes, potentially leading investigations astray and misallocating valuable resources. Conversely, adopting an exhaustive approach by compromising 80% of the crime scene may yield only 20% of the forensic results deemed admissible and valuable during legal proceedings.

This abstract explores the intricate dynamics of the Pareto Principle within the context of search and rescue operations during two forensic cases. It delves into the challenges faced by investigators when deciding on the extent of information to provide, recognizing that excess information can obscure pertinent evidence amidst the noise of false positives. Conversely, insufficient information can hinder effective investigations, potentially overlooking critical clues.

Balancing these two facets requires a nuanced approach that leverages advanced techniques, technology, and expertise. Moreover, it calls for the development of innovative methodologies that optimize the allocation of resources, ensuring that the search for evidence aligns with the objective of delivering accurate, admissible results.

2 REFLECTIONS OF SERVICE: THE SEARCH, RECOVERY, AND IDENTIFICATION OF PRISONERS OF WAR/MISSING IN ACTION (POW/MIA) CASES

Christie, Shaheen (Chronicle Heritage; University of Wisconsin-Milwaukee)

Forensic Archaeology, as a sub-discipline to the overarching discipline of archaeology, contributes to the nuanced evaluation of the formation and transformation of sites, especially in cases when human remains may be present in historic and prehistoric contexts. Those investigations may occur through rigorous interdisciplinary efforts involving academic and industry professionals, early researchers and students, from institutions around the world. In addition to their educational value, research involving the search and recovery of missing individuals contribute social and personal value to those participating in such efforts, including Veterans, volunteers from the local community and the families of the missing, some located thousands of miles away from conflict zones. Although many countries work to recover their war dead, this presentation will reflect on the personal experiences of participating in two historic archaeological recovery projects in western Europe in 2022 and 2023 through strategic partnerships with the Defense POW/MIA Accounting Agency (DPAA). While each of these projects involve the search for and fullest accounting possible of missing service personnel and incident-related materials from airplane crash sites dated to World War II, differences in the project types, incident event, discretionary budgets, project length, procedural requirements and other factors necessitated flexibility and selectivity in the application of archaeological methods and techniques in the field. As a result, project participants discover how to strategize, teach and implement adaptive learning opportunities and best practices alongside innovative techniques to improve in the success of recovery projects in the future. One of the primary benefits of recovery partnership projects with the DPAA is the inclusion of international researchers and students, because such collaborations result in training opportunities and the establishment of similar organizations in foreign countries focused on the recovery of their own unaccounted MIA service members and others lost in recent humanitarian crises and global conflicts.

3 GLOBAL PRACTICE IN FORENSIC ARCHAEOLOGY: CURRENT WORLD TRENDS

Marquez-Grant, Nicholas (Cranfield University)

Forensic Archaeology applies the theory, methods and principles of archaeology to medico-legal and humanitarian contexts. Today, forensic archaeologists work for independent forensic providers, government agencies and NGOs. This paper presents a review of trends in research and practice worldwide in forensic archaeology. The discipline has been in an increase since the 1980s and often now many forensic investigations worldwide will see the involvement of archaeologists. Through an analysis of scholarly publications in the last ten years, as well as interviews with a number of organisations, this talks focuses in particular on recent roles of forensic anthropology including mass disaster investigations where they have assisted in the search, location and recovery of missing individuals. Publications in the discipline have increased in forensic journals as well as capacity building worldwide. In particular, the bulk of the paper will focus on forensic archaeology practice worldwide in particular in human rights investigations of 20th and 21st century contexts.

4 FORENSIC ARCHAEOLOGY AT INTERNATIONAL MECHANISMS SUPPORTED BY THE INTERNATIONAL COMMITTEE OF THE RED CROSS FOR THE SEARCH FOR MISSING PERSONS

Fischer, Patricia (ICRC) - de Abreu e Souza, Rafael (ICRC) - Morcillo Mendez, Maria Dolores (ICRC)

This presentation provides a thorough exploration of the roles, responsibilities, actions and challenges faced by forensic archaeology in the context of International Mechanisms dedicated to the search for individuals missing following armed conflicts supported by the International Committee of the Red Cross (ICRC). Specifically, it sheds light on the impactful contributions of the ICRC's Forensic Unit, which since 2003 has provided humanitarian forensic services to improve processes related to preliminary forensic investigations and fieldwork as part of forensic archaeological actions. The presentation also addresses the Unit's involvement in actively assisting States in fulfilling their obligations under international humanitarian law, with a central focus on delivering answers to the families of the missing, recognizing their right to crucial information about the fate and whereabouts of relatives unaccounted for. The importance of understanding forensic archaeology beyond mere recovery and mass graves is highlighted, stressing its key role in improving search actions, being at the forefront of the response and sometimes closer to families, at the same time that it facilitates link between the various phases of the identification process. Furthermore, it emphasizes the need for forensic archaeologists to have a broader understanding of the potential to improve forensic services within medico-legal systems to better align them with humanitarian needs. Such improvement could involve supporting short-term emergency curation actions on documents, remains, personal and local belongings, medium-term initiatives to

re-establish traceability and infrastructure, and longer-term efforts to promote forensic humanitarian dialogue aimed at to establish stronger relations between authorities and standard operating procedures.

5 ASSUMING THE NARRATIVE: HUMANITARIAN FORENSIC ACTION, MISINFORMATION, AND THE COLOMBIAN INTERNAL CONFLICT

Cawley, William (University of Tennessee)

Forensic archaeology is a critical component of humanitarian forensic action (HFA). Human rights abuse, terror, and crimes against humanity often define the context of HFA implementation and the environment forensic practitioners must navigate. These efforts commonly occur in the aftermath of political turmoil or in the wake of conflict during tenuous periods of transitional justice. Information derived from the context of clandestine graves and human remains can reduce the ambiguity of loss suffered by the loved ones of a missing individual. Families of victims and the disappeared in the context of HFA, however, are not the sole stakeholders of these practices. Political factions, grassroots movements, and media outlets, among others, are also interested in findings derived from forensic archaeology. Despite the humanitarian focus of HFA, these data may be co-opted in the public milieu to promote potentially destabilizing rhetoric in times of delicate peace. Misinformation, propelled by modern social media, is a recognized problem for peacebuilding efforts. As explored in this paper, forensic investigations of human remains re-create the context and crimes committed by perpetrators of violence in the public sphere. Families deserve their 'right to know.' However, the data generated from humanitarian efforts can find a home in non-humanitarian narratives. Those committed to HFA must accept the reality of misinformation, including portrayals of their forensic work, and how these narratives may be co-opted for non-humanitarian purposes. In this paper, the Colombian Internal Conflict provides a firm example of how the findings of forensic practitioners, even those committed to HFA and not involved in judicial processes, must engage with the public via accessible conduits such as social media. Data for this paper are derived from interviews with 45 interlocutors in Colombia between 2022-2023 representing the public, individuals working within transitional justice efforts, and forensic practitioners.

6 THE USE OF CHEMICALS IN THE BURIAL OF VICTIMS OF CONFLICTS IN THE 20TH CENTURY

Kadikinaite, Jovita (Faculty of Medicine, Vilnius University) - Karoblis, Dovydas (Faculty of Chemistry and Geosciences, Vilnius University)

Research on victims of 20th-century conflicts often encounters remains covered with sediments or powders of uncertain origin. Such sediments have been found in the remains of Lithuanian partisans, as well as some individuals of the Polish Armia Krajowa. There are preliminary assumptions (without further chemical investigations or a more detailed historical evaluation) that the above-mentioned materials are lime deposits, and such behavior is interpreted as disrespect towards soldiers from the opposing side. These assumptions were questioned because historical data indicated a different scenario in one case of the Home Army soldiers whose remains were affected by the sediments. Since the idea of the use of different materials leaving the same/similar effects on remains came up, an initial chemical elemental analysis was carried out. The analysis of the first three samples of the above-mentioned sediments from different contexts by scanning electron microscopy and X-ray energy dispersive spectroscopy (SEM-EDX) has already revealed a much more complex picture: the sediments not only contain calcium but also other elements such as magnesium, aluminum, and iodine, which are present in disinfectants (iodine), antiseptics, and fertilizers (aluminum and magnesium sulfates). This study aims to investigate the use of chemicals and the impact of the environment (seasonality, soil composition) on the burial and/or burial of corpses in the 20th century. This would allow a more detailed reconstruction of more complex environmental processes or traces of human activity, and thus the formation of specific chemicals (sediments) on the bones. The study takes into account the circumstances in which the remains were found (mass graves or common burials), as well as the historical context. This topic has not yet been investigated in collaboration between the fields of history, archaeology, and chemistry and is therefore innovative, relevant, and provides important insights for the field.

7 CIVILIANS IN A PRISONER OF WAR CAMP: FORENSIC ARCHAEOLOGY UNRAVELS THE STORY OF STALAG IID'S FORGOTTEN VICTIMS

Drath, Joanna (Pomeranian Medical University) - Jarzęcka-Stąporek, Joanna (Pomeranian Medical University) - Ościłowski, Jarosław (Polish Academy of Sciences) - Kalka, Monika (Pomeranian Medical University) - Popek, Filip (Pomeranian Medical University) - Wołyńska, Marta (Pomeranian Medical University) - Lisman, Dagmara (Pomeranian Medical University) - Zacharczuk, Julia (Pomeranian Medical University) - Parafiniuk, Mirosław (Pomeranian Medical University) - Ossowski, Andrzej (Pomeranian Medical University)

Forensic archaeology is the application of traditional research methods, theories, and excavation techniques to forensic sites and crime scenes. Through an analysis of archaeological data, especially in the form of artifacts, a forensic archaeologist contributes to the process of personal identification and time of death estimation.

Shortly after the outbreak of World War II, in Stargard (then part of Germany), a temporary prisoner of war camp was hastily established. The camp later changed its status to a permanent POW camp, Stalag IID, and it detained soldiers from Poland, France, French colonies in Africa, the Netherlands, Belgium, Serbia, USSR, Italy, and Canada. Following the Warsaw Uprising in 1944, many Polish civilians were deported to Stalag IID.

From 2021, and the subsequent years, archaeological research began on the grounds of the former camp. During the initial survey, a mass burial pit containing 64 bodies was found. Many of the bodies had soldier nametags on them, which facilitated the identification process. Over the following years, two additional burial rows were uncovered, ultimately increasing the total number of individuals to over 300. One grave contained densely arranged bodies of Soviet soldiers, many with their nametags on them. The other burial row contained bodies of the elderly, women, and young children.

To explain the presence of women and children within the confines of the POW camp, two hypotheses were formulated. One suggested that these civilians were indigenous inhabitants of the nearby area, while the alternative hypothesis proposed that the skeletons belonged to families relocated from Warsaw after the Uprising. Based on the personal artifacts recovered from children's graves, the researchers concluded that the latter hypothesis was more plausible.

8 FORENSIC EXCAVATION AT MOUNTJOY PRISON, IRELAND

Harte, Aidan (ARC Forensics Ltd.) - McCullagh, Niamh (ARC Forensics Ltd)

Forensic excavations are currently being undertaken at Mountjoy Prison, Dublin, with the principle aim to locate and recover the remains of a pardoned prisoner executed in 1941. As part of such a sentence, those executed were interred within the grounds of the prison, with no marker or record of where remains lay. This scenario applies to approximately 30 executed in the period 1924 – 1954, all of which are to be recovered and identified (where possible).

The existing legal framework uses the term 'exhumation' – 'The removal of a dead body from the ground after it has been buried'. However, the process necessitates a forensic archaeological approach for several reasons. Firstly, in this instance, the specific burial locations are unknown, with no associated documentation, and so a robust search strategy is needed. Secondly, once discovered, the identity of those within each burial needs to be established, through various methods (Osteoarchaeology, DNA, stratigraphy etc.). Finally, all human remains must be recovered, within an operational prison, and retained for reinterment subsequently.

Current terminology applied in Irish law (i.e. exhumation) seemingly falls short of recognising the forensic archaeological process essential to completing the most extensive forensic excavation undertaken so far on the island of Ireland.

9 DETECTING DIFFERENTIAL CHEMICAL SIGNATURES OF TATTOO INKS ON PORCINE SKIN AND BONE USING PXRF

McCrane, Samantha (University of New Hampshire, Anthropology Department; Forensic Anthropology Identification and Recovery Laboratory) - Fry, Megan (University of Florida, Anthropology Department; C.A. Pound Human Identification Laboratory) - Watanabe, Aldo (University of Florida, Anthropology Department; C.A. Pound Human Identification Laboratory) - Stubblefield, Phoebe (University of Florida, Anthropology Department; C.A. Pound Human Identification Laboratory)

Portable x-ray fluorescence (pXRF) spectrometry is a non-destructive methodology that measures the chemical composition of a sample by x-ray emission, causing different elements to emit characteristic signatures. pXRF is widely utilized in archaeological and forensic samples to help resolve commingling, identify unknown staining, and determine the composition of associated artifacts. In this research project, we test the ability of pXRF to detect minute differences in chemical signatures left by different tattoo inks on porcine skin and bone. Differences in the chemical compositions of tattoo inks is well documented, especially for different colored dyes. Some dyes also contain elements that have been demonstrated to stain bone. For instance, red and orange tattoo dyes often contain iron, while green and blue dyes often contain copper. To explore if these differences would be detectable on decomposing soft tissue, or the bone directly beneath a tattoo, we had licensed technicians apply 1' x 1' tattoos to the anterior surface of pigs feet for seven different colored dyes produced by Eternal Ink (lime green, orange, dark purple, true blue, light red, caramel, and lightning yellow), three commonly utilized brands of black dye (Kirosome, Dynamic, and India Ink), and four Softtap cosmetic dyes (Pecan, Copper, Mahogany, and Blonde). These samples, created in duplicate, were measured by pXRF prior to and after burial for one year in a wooded North Florida environment. After recovery, macroscopic ink staining was evident on some pigs feet samples; other pigs feet samples differed only in chemical signature, or showed no notable differences. These results suggest expanded application for pXRF utilization in forensic identification, to help determine the presence of particular tattoo inks, even after decomposition has removed macroscopic traces, as well as in bioarchaeology where tattoos may be differentially preserved due to taphonomic variables.

538 CONTACTS, MOVEMENTS, MIGRATIONS IN THE VIKING AGE: MARITIME ASPECTS OF THE NORSE EXPANSION INTO THE NORTH ATLANTIC

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Sanmark, Alexandra (University of the Highlands and Islands) - McLeod, Shane (University of the Highlands and Islands) - Lu, Erman (University of Kiel)

Session format: Round table (without formal abstracts)

This session is run by participants of the ongoing research project The Norse and the Sea, which explores the maritime cultural landscape in Scandinavian Scotland (c. AD 790-1350) and addresses the overarching questions of contacts, movements and migrations. This session draws its inspiration from the work of Christer Westerdahl to focus upon the Maritime Cultural Landscape, encompassing places on land that provide clues to sailing routes and navigation. As well as archaeology, both excavations and geophysics, evidence such as placenames, logistics, written sources and early maps will be investigated in an attempt to understand sailing and navigating. Discussion will be guided by short specialist papers on topics such as mental mapping, landing places, navigation, beacons, portages, evidence for Norse raids and migration, the logistics of raiding and migrating by Viking Age ships, the locations of culturally Scandinavian burials, settlements and assembly sites in relation to sailing routes and navigational hazards. The session aims to explore how these various aspects interacted with each other and the navigation strategies employed by the Norse during their successful expansion westwards often in dangerous and unfamiliar waters. Can different strategies designed for particular circumstances be found?

542 MEDIEVAL SENSORIUM: EXPLORING THE ARCHAEOLOGY OF THE SENSES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Dordevic, Zorana (Departament de Història i Arqueologia, Universitat de Barcelona (UB)) - Ćirić, Jasmina (University of Kragujevac, Faculty of Philology and Arts) - Costa-Badia, Xavier (Institut de Recerca en Cultures Medievales (IRCV), Universitat de Barcelona (UB))

Session format: Regular session

In recent decades, the exploration of sensory experiences in the Middle Ages has attracted increasing attention across diverse scientific disciplines. This session is envisioned as a dynamic platform that fosters interdisciplinary dialogues, delving into the multifaceted sensory landscape of the medieval world. The central question addresses how medieval communities perceived, understood, and harnessed their sensory reality. Therefore, this session aims to uncover the intricate interplay of senses within their spatial contexts, the portrayal of sensory experiences in visual arts, and the sensory encounters that enriched the lives of rural and urban medieval communities. It sets out to discuss a wide spectrum of sensory encounters, encompassing both interior and exterior spaces, including those of sacred and secular significance. Particular interest is placed on the methodologies employed for researching the sensory experiences of the medieval world, as well as the presentation of research outcomes. Consequently, contributions that employ cutting-edge technologies to explore and map sensory experiences within historical contexts are warmly welcome. Embracing an interdisciplinary approach, this session promises to illuminate and broaden our understanding of the medieval sensorium and the profound role that the senses played in shaping cultural practices and landscapes of the medieval world.

This session is organized by the CULT-AURAL project, CA19131, and the MAHPA research group, and it is open to everyone.

ABSTRACTS

1 NEUROMEDIEVALISM AND THE SENSORIUM

Wilner, Raquel (University of Bergen)

Neuromedievalism is a relatively new approach to art history and involves applying modern neuroscientific knowledge to expand our understanding of medieval cognition, particularly within the context of art and devotional practice. The central premise of the approach is that neurobiology is largely unchanged when comparing humans in the 21st century and the Middle Ages, despite significant cultural changes. Medieval sensology understood art as an interactive object to activate the senses in the perceiver, in particular the use of sight and how art was a visual aid in prayer. However, neuromedievalism goes beyond this: the activation of senses in medieval art also means cognitive activation. Understanding how art is treated neurologically will grant deeper insight into an artwork's effectiveness and significance in medieval devotion. This does not supplant existing methodology but provides a more expansive contextual understanding of medieval objects and the senses. Recent developments in mirror neuron research shows a range of

medieval applications, for instance how using visual artworks of the cross will facilitate a sense of touch in the devotee, bringing forth a personal connection - or activation of 'inner senses' - to the religious experience. Even art showing someone tasting will activate taste areas of the brain, granting the viewer an experience closely akin to tasting what is shown in the artwork. This paper provides an overview of neuromedievalism as an approach for medieval studies and discusses it within the context of the sensorium.

2 SENSORY ENCOUNTERS: DECODING THE SYMBOLISM OF ST. NICHOLAS CHURCH IN LJUBOTEN

Ciric, Jasmina (University of Kragujevac, Faculty of Philology and Arts)

This paper examines the intersection of embodied cognition and sensory encounters within St. Nicholas Church in Ljuboten, built in 1337 near Skopje, North Macedonia. Central to our analysis is the church's ornamental brickwork, particularly the apse's decorations, which we argue are not merely aesthetic but serve as mediums for immersive, embodied spirituality. Highlighting the role of Danica, a female ktetor, this study delves into the significance of the monogram of her son, Demetrius (Dmitar), concealed within the interior of the west portal. This monogram serves as a critical point for exploring the interplay between material culture and spiritual practice, underscoring the familial and devotional intentions behind the church's architectural embellishments. The inscription not only memorializes Demetrius but also engages the visitor in a sensory dialogue with the divine, transforming the act of entry into a multisensory journey of devotion.

Employing a multidisciplinary methodology that combines art historical analysis with insights from cognitive science, our research reveals how the church's physical and ornamental features engage the senses, facilitating a deeper understanding of religious concepts through visual, tactile, and spatial interactions. The apse's decorative motifs—chess fields, zigzags, and cryptograms—are analyzed as cognitive metaphors that bridge the sacred and the sensory, enriching the medieval sensorium.

This paper contributes to the discourse on medieval sacred spaces by illustrating how the architecture and ornamentation of St. Nicholas Church act as conduits for a sensory-engaged spirituality. In doing so, it underscores the importance of sensory encounters in mediating the divine, situating the church within the broader context of Byzantine and Serbian medieval culture. By focusing on the sensory dimensions of religious experience, this study offers new insights into the cognitive processes underpinning devotion in the medieval Balkans, highlighting the church as a site of multisensory engagement and spiritual communion.

3 SENSORY EXPERIENCES IN MEDIEVAL POETRY OF SAN FRANCESCO D'ASSISI AND JACOPONE DA TODI

Gjorgjievska, Eva (Goce Delcev University)

My presentation aims to analyze the poetic works written by two medieval Italian authors and monks of the 13th century: San Francesco d'Assisi and Jacopone da Todi. The focus will be on the fact that through the genre of the nonliturgical devotional songs, called "lauda", these poets expressed not only their faith in God, but also their overall sensory experience in the real world.

The presentation will approach the two laudas, "Laudes Creaturarum" and "The Lament of the Virgin", firstly from a formal aspect, through an analysis of rhetoric figures that emphasize the sensory experience, and then through a thematic analysis that puts the primacy of pathos and empathy, as a means for achieving an emotional and expressive quality of the poetic discourse.

In the end, we will dwell on the meaning that sensory expression in poetry had in the context of medieval dogmatics, as well as in the cultural space of medieval Italy. We will ask the question whether poetry represents a domain of sublimation of the prohibition in culture, or whether poetry testifies to the sensory perception and expressiveness of culture, which, despite rational religious dogmas, still finds space for the expression of the human sensory experience.

4 ANALYSIS OF THE SENSE PERCEPTION IN THE FRESCO PAINTING OF THE DEČANI MONASTERY

Beuk, Bojana (Aeronautical museum)

This study explores the visual paradigm of art in the Middle Ages as a carrier of narrative media through sensory perception, particularly in the context of religious and ontological representations. The analysis focuses on the frescoes of the Visoki Dečani monastery as an authentic manifestation of written narrative contextualization. In the art of medieval painting, there is a tendency to faithfully depict biblical word, inviting the viewer to participate through sensory perceptions, thus leading to the adoption of an exegetical message interpreted today through phenomenological archaeology. The frescoes of the Visoki Dečani monastery represent a monument of late Byzantine art in Serbia, characterized by a rich oeuvre of painters who merge liturgical word and image into a unique symbiosis aimed at the believer's "co-signing" and full acceptance and understanding of the liturgical word through often personified

representations and abstract painting, which was not an isolated case among Byzantine artists. In our opinion, the perception of specific artistic expression in the Orthodox monastery of Visoki Dečani abounds in sensory sensations and theological-mystical reflections. Through a detailed analysis of various aspects of fresco painting in the monastery, this study contributes to a deeper understanding of the artistic, religious, and cultural elements of the medieval Orthodox tradition and their influence on the perception of spirituality and faith during that period.

5 MEDICAL AND RELIGIOUS CONCEPTS OF THE SENSE OF SMELL IN THE MIDDLE AGES

Ramšak, Mojca (University of Ljubljana)

The author examines the connection between medicine, religion and philosophy using the example of the sense of smell. During the Middle Ages, scholars made significant advances in the understanding of smell by drawing on Greek and Arabic knowledge. This theoretical knowledge was then put into practise by medical writers to improve public health. The sense of smell played an important role in assessing general wellbeing, restoring balance in the body and even treating various diseases. It was widely believed that bad odours could lead to illness, which is why people used perfumes, herbs and incense to mask unpleasant smells and purify the air. Medieval doctors knew the link between odours and disease, which led to changes in cities to prevent the spread of disease. Certain odours reminded city dwellers of the potential dangers posed by smoke, exhaust fumes, stagnant water, and air pollution.

The significance of smells went beyond physical well-being and had a philosophical and spiritual dimension. Religious authors integrated the philosophical and medical knowledge of smell into their teachings, leading to a theology of smell that combined both theological and medical understanding. This theological perspective had a profound influence on popular beliefs and mystical writings. Smells were seen as indications of God's presence and intentions in the supernatural realm, while unpleasant smells were often associated with decay and disease, sometimes even with the presence of demons. Although smells themselves were intangible, they left visible and occasionally tangible signs, such as the smoke produced by incense, and symbolic representations in works of art.

The methodology is based on published sources from the Middle Ages that deal with medical, philosophical and religious concepts related to the sense of smell and the location of the smell organ.

6 PERCEPTIONS OF A "JOURNEY TO THE PAST" IN SOME VIATICAL STORIES ON MOUNT ATHOS

Sourd, Jean-Michel (Aix-Marseille University)

As travellers to Mount Athos have, over the centuries, embarked on a "journey into the past" by residing in the monasteries of the Holy Mountain, one may wonder whether their diverse perspectives on intellectual and social environments were not, to varying degrees, romantic visions of Byzantine civilisation. The travellers transcribed visual experiences into words and expressions, encompassing the art of monasteries such as architecture, frescoes, and icons, as well as the auditory allure of Byzantine chants and prayers, and the olfactory sensations of incense and beeswax, including the perceived sacredness of the landscape that has been preserved throughout the centuries. This symphony of the senses, therefore, generated viatical texts - stories, descriptions, and epistolary exchanges - wherein a shared imagination for the medieval period materialised through language. The travellers' expressions conveyed an ideology shaped by their cultural backgrounds, ranging from passion and self-sacrifice to criticism.

The aim of this paper is to unveil the archaeology of meanings emerging from the narrative evolution of French-speaking viaticum stories at the Holy Mountain of Athos over almost half a millennium. Through textual analyses of French-speaking literature since the 16th century, from botanist Pierre Belon du Mans (1555) and Byzantium enthusiasts like Eugène Mercier (1933) to the spiritual exploration of Jean-Claude Larchet (2022) and the initiatory perspective of Greek language and civilization lover Jacques Lacarrière (1954, 1975), this exploration extends to the sarcasm of journalist-future psychoanalyst Maryse Choisy (1929) and the criticism of Catholic Church Oblate Claude Chevreuil (2008).

7 A VISIBILITY STUDY OF MUR CASTLE'S TERM (10TH AND 11TH CENTURIES) AND ITS PROBLEMS

Melero Pérez, Paula (Universitat de Barcelona)

Mur (Pallars Jussà, Catalonia, Spain) is one of the best-known feudal castles in Catalonia, not only for the archaeological research done over the last decades but also because of the many written sources conserved. These documents allow us to recognize Mur Castle as one of the main strongholds in the border between the County of Pallars and Al-Andalus in the context of the 10th and 11th centuries. Moreover, they enable us to define its territorial jurisdiction and identify the main elements of their surroundings, such as villages or other minor defences. All these data are particularly suitable for a GIS visibility study. This communication will present the results of this GIS study (visibility net), but essentially discuss the different problems, limitations, and not contemplated alternatives that aggravate our distance from the reality of the moment, such as meteorology, vegetation, the difference between see and be seen,

the difference between visibility on the field and visibility results from GIS, and other forms of communication may be used on the defence of a castle term.

8 KNOWING THROUGH LISTENING: EXPLORING MONASTIC AURAL COMMUNITIES IN MEDIEVAL RURAL EUROPE

Costa-Badia, Xavier (University of Barcelona) - Álvarez Morales, Lidia (University of Barcelona) - Dordevic, Zorana (University of Barcelona)

This research introduces a multidisciplinary approach to uncover the rich tapestry of monastic soundscapes in medieval rural Europe. Grounded in the conceptual frameworks of R. Murray Schafer's soundscape theory and Steven Feld's acoustemology, we delve into the nuanced auditory experiences within monastic environments. Our exploration unfolds through three phases: (1) Conceptual Foundations, where we elucidate the terms "soundscape" and "acoustemology" in the medieval monastic context; (2) Identification of Medieval Monastic Soundscape, involving an analysis of monastic regulations and musical instruments to define the auditory elements; and (3) Exploration Methodology, employing historical sources, on-site acoustic measurements, and sound mapping through GIS, interpret the meaning of sounds, capture empirical data, and map dynamic acoustic communities, respectively. The research concludes with a critical discussion on the inherent limitations, such as scarce historical records and interpretative challenges in sound mapping in GIS, aiming to foster a nuanced understanding of medieval monastic auditory dimensions. This multidisciplinary approach contributes to the scholarly discourse on medieval monasticism and serves as a methodological blueprint for researchers exploring historical soundscapes.

544 NEW DIRECTIONS FOR METRIC AND NONMETRIC BIODISTANCE ANALYSIS IN EUROPE AND BEYOND

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Lee, Matthew (Durham University) - Faillace, Katie (Cardiff University) - van Hattum, IJk (Ghent University)

Session format: Regular session

Methods investigating biological relatedness, collectively referred to as Biological Distance (or Biodistance) Analysis, are powerful tools for investigating and reconstructing networks from the intra-cemetery to inter-continental scale. Biodistance analysis has been applied to questions of kinship, regional population affinities, and evolutionary speciation. Many of these methods are built on traditional osteological techniques, including non-metric and metric studies of the cranium and dentition with technological and statistical advances further refining these methods. Recent publications (e.g., Pilloud and Hefner 2016; Scott and Irish 2017; Rathman and Reyes-Centeno 2020, Rathmann, Lismann et al. 2023) demonstrate an active and growing specialist area. Despite this, biodistance analysis is, seemingly, under-utilised in European contexts and institutions. Furthermore, researchers often focus on one data type/analysis when performing biodistance analysis, with the integration of different data types and methods a relatively rare occurrence. Additionally, the constraints imposed by missing data in the osteological record often result in relatively small datasets, which can limit the application of robust statistical methods and occasionally lead to valuable datasets remaining unpublished.

This session aims to address the current state of biodistance analysis in Europe and to develop a network of Europe-based researchers using these methods.

The session welcomes papers from researchers at all levels who use biodistance analysis in their work on European material or in European institutions. The papers can present ongoing research or explore theoretical and methodological issues. Research may focus on one form of analysis (e.g., craniometrics) or multiple forms of analysis (e.g., dental non-metrics and metrics). Papers which also incorporate other forms of data (e.g., biomolecular or artefactual evidence) as supplementary data to the biodistance analysis are also encouraged.

ABSTRACTS

1 EVALUATING THE UTILITY OF CRANIODENTAL METRIC AND NON-METRIC DATA IN BIODISTANCE ANALYSIS

Rathmann, Hannes (Senckenberg Centre for Human Evolution and Palaeoenvironment, University of Tübingen; Paleoanthropology, Institute for Archaeological Sciences, Department of Geosciences, University of Tübingen) - Perretti, Silvia (Department of Life Sciences and Biotechnology, University of Ferrara) - Porcu, Valentina (Department of Life Sciences and Biotechnology, University of Ferrara) - Hanihara, Tsunehiko (Department of Anatomy, Kitasato University School of Medicine) - Scott, G. (Department of Anthropology, University of Nevada) - Irish, Joel (Research Centre in Evolutionary Anthropology and Palaeoecology, School of Biological and Environmental Sciences, Liverpool John Moores University; The Centre for the Exploration of the Deep Human Journey, University of the Witwatersrand) - Reyes-Centeno, Hugo (Department of Anthropology, University of Kentucky; William S. Webb Museum of Anthropology, University of Kentucky; DFG Center for Advanced Studies 'Words, Bones, Genes, Tools', University of Tübingen) - Ghiretto, Silvia (Department of Life Sciences and Biotechnology, University of Ferrara) - Harvati, Katerina (Senckenberg Centre for Human Evolution and Palaeoenvironment, University of Tübingen; Paleoanthropology, Institute for Archaeological Sciences, Department of Geosciences, University of Tübingen; DFG Center for Advanced Studies 'Words, Bones, Genes, Tools', University of Tübingen)

Biological distance, or biodistance, analysis utilizes skeletal phenotypic data from archaeological human remains to infer genetic relationships across individuals or groups, shedding light on questions about past population structure and history. The primary data types employed are metric and non-metric traits of the cranium and dentition, believed to be highly heritable and to evolve neutrally. However, there is disagreement regarding whether certain craniodental data types preserve neutral genomic signatures more reliably than others. This discrepancy poses a problem, as biodistance investigations based on different data types may yield markedly disparate conclusions. To address this research gap, we systematically tested the relative utility of the four craniodental data types in capturing neutral genomic signatures, employing an extensive genotype:phenotype comparison across modern populations worldwide. Our analysis utilized the largest existing datasets available and accounted for geographically structured environmental variation, population and variable sampling uncertainty, as well as stochastic variation inherent to a neutral model of evolution. Our findings reveal that the four data types capture varying degrees of neutral genomic variation, with the highest signals preserved in dental non-metric traits and cranial metrics, followed by cranial non-metric traits and dental metrics. Importantly, our results indicate that combining the four data types maximizes genotypic coverage compared to using them separately, even with a limited number of phenotypic variables. We hypothesize that this may reflect a lower level of genetic integration through pleiotropy between, as opposed to within, the four data types, effectively forming four distinct modules associated with relatively independent sets of loci. Consequently, we recommend that future biodistance investigations strive for more holistic combined data approaches to enable more robust inferences about past population structure and history. Reference: Rathmann et al. (2023). Inferring human neutral genetic variation from craniodental phenotypes, PNAS Nexus, Volume 2, Issue 7, pgad217, <https://doi.org/10.1093/pnasnexus/pgad217>.

2 WE HAVE NEVER BEEN SO DISTANT: NON-METRIC DENTAL TRAITS IN EURASIAN POPULATIONS FROM THE NEOLITHIC TO THE MIDDLE AGES

Vescovo, Giulia (Department of Environmental and Prevention Sciences, University of Ferrara) - Zedda, Nicoletta (Department of Environmental and Prevention Sciences, University of Ferrara) - Bramanti, Barbara (Department of Environmental and Prevention Sciences, University of Ferrara)

In recent decades, a considerable amount of scientific literature has been published concerning the study of non-metric dental traits to understand the biological relationships between populations and to define the geographical patterns of groups, their history, ancestry, or structure. Especially for Eurasian populations the literature is extensive, and a systematisation of the studies conducted is needed.

The purpose of this study is to provide a comprehensive overview of the scientific research on non-metric dental traits of Eurasian populations from the Neolithic to the Middle Ages.

To perform the analysis, the scientific literature was screened using the main search engines such as PubMed, Web of Sciences, Scopus and Google Scholar, with specific search criteria.

Full-text English, French and Russian original papers on Eurasian populations, studies on different prehistoric and historical periods (Neolithic to Medieval), studies presenting all non-metric dental data with absolute frequencies and percentages, studies with the aim of providing knowledge of the biological relationships between the populations and their ancestry were included.

After evaluation of the articles, 28 studies from 1998 to 2023 were selected, covering territories such as Armenia, Cyprus, Italy, Japan, Siberia, Spain, Thailand. From these articles, metadata were extracted for 33 non-metric dental traits, which were used to perform a meta-analysis applying a Mean Measure of Divergence (MMD). The results show how much the biological distance varies between Eurasian populations from the Neolithic to the Middle Ages.

This systematic review with metanalysis aims to offer a useful tool for future studies on biological relationships between Eurasian populations.

3 EXPLORING THE AVAR PERIOD POPULATION STRUCTURE – A GRAPH THEORETICAL STUDY OF BIOLOGICAL RELATIONSHIPS USING PHENOTYPIC TRAITS

Szeniczey, Tamás (Department of Biological Anthropology, Eötvös Loránd University) - Rácz, Zsófia (Institute of Archaeological Sciences, Eötvös Loránd University,) - Marcsik, Antónia (Department of Biological Anthropology, University of Szeged) - Hajdu, Tamás (Department of Biological Anthropology, Eötvös Loránd University)

Biological relatedness among past populations can be estimated by either neutral genetic markers or skeletal traits (such as metric or non-metric characteristics) which reflect them. In our study, we apply phenotypic affinities as a proxy for genetic relations since the neutral model of phenotypic evolution predicts the proportionality of phenotypic and genetic covariances. Although analysis of phenotype traits provides a lower level of detail than ancient DNA data, it is more cost-effective and enables researchers to study the population structure and its shaping factors in a larger sample size.

Based on graph theory, considering the population as nodes and the pairwise biological distances as links, the most relevant relationships can be selected from a saturated graph using the principle of conditional independence. The topology of the pruned graph can be used to calculate the conditional distance which is robust in exploring demographic processes and the impact of spatial factors in the development of population structure.

We test this methodological approach on the Avar Period population due to the abundance of skeletal material and its importance in East-Central European history. The Avars were an Asian-originated tribal federation that conquered and united the whole territory of the Carpathian Basin. We collected cranial measurements of 1899 individuals from 50 sites from Transdanubia and the Great Hungarian Plain.

The results of the community detection algorithms were found to correspond well with the geographical locations of the sites. The spatial analysis suggested the importance of distance in the development of population structure as well as the role of the Danube as a potential barrier that hinders gene flow. The graph-based approach also allows us to investigate inter- and intraregional biological relationships and assess the role of each region in the network.

The research was supported by the National Research, Development and Innovation Office (PD 146612).

4 ROMAN AND ANGLIAN SCORTON, NORTH YORKSHIRE. WHAT CAN DENTAL ANTHROPOLOGY TELL US?

Lee, Matthew (Durham University) - Gowland, Rebecca (Durham University) - Montgomery, Janet (Durham University) - Semple, Sarah (Durham University)

Much debate exists around how the transition between Roman and Early Medieval Britain occurred. Theories derived from historical, archaeological, and biomolecular evidence suggest a range of possibilities, from mass migration to the migration of only a social elite, and/or cultural ideas. However, analyses of Early Medieval England often exclude the complex frontier zone of the North, particularly the area which would become the kingdom of Northumbria, instead focusing on the South and East of England.

Dental morphological and metric data was collected from 44 individuals buried in the late Roman (c. 4th Century AD; n=11) and Anglian (c. 5th – 8th Century AD; n=33) cemeteries excavated at Hollow Bank Quarry, Scorton, North Yorkshire. This data was then examined using the recently published FLEXDIST statistical protocol to explore the possibility of population continuity between the two cemeteries. This talk will include a description of the FLEXDIST protocol followed by a discussion of the results of the analysis, including the possibility of population continuity at Scorton. The relationship between biological similarity and other archaeological evidence from the site, including cultural evidence (e.g. presence of grave goods, burial location) and biomolecular evidence for migration from the site is explored. Additionally, consideration will be given to how clustering algorithms may be fruitfully applied to results gained through the FLEXDIST method.

5 EXPLORING BIODISTANCE IN THE NEOLITHIC MEUSE BASIN: TOOTH CROWN AND ROOT MORPHOLOGY AND THE COMPLEXITY OF COMMINGLED DENTAL REMAINS

van Hattum, IJk (Ghent University) - De Groote, Isabelle (Ghent University) - Irish, Joel (Liverpool John Moores University)

More than 200 collective burials from the Neolithic period were discovered in natural caves and rock shelters within the karst systems of the Belgian Meuse basin. With a lack of known settlement sites and a scarcity of diagnostic archaeological finds, these funerary sites provide the primary source of information about the Neolithic people in the region. Some of the funerary caves date back to the Middle Neolithic (ca. 4300-3700 cal BC), while most belong to the Late and Final Neolithic period (3700 - 2000 cal BC) in Belgium. Most caves contained skeletal remains representing between five to 15 individuals, although rare sites like Burnot and Maurenne yielded remains of 55 to 60 people. The relationship between larger and smaller caves remains unclear, prompting questions as to whether they represent separate groups or a unified Neolithic population. Similarities in material and funerary culture suggest connections between groups in the Meuse basin and contemporary populations in Northern France.

This study explores biological distances between Neolithic groups in the Meuse basin using dental non-metric and metric traits, with preliminary data from sites including Ben Ahin, Grotte de la Faucille, Maurenne de la Cave, and Burnot. Our analysis explores population diversity and provides foundational research for future interregional comparisons, particularly with Northern France. Additionally, we discuss the potentials and pitfalls of studying comingled collections, highlighting the importance of including isolated teeth versus only teeth in gnathic remains for comprehensive analysis. Overall, this research contributes to a deeper understanding of Neolithic populations in the Meuse basin and underscores the potential of the analysis of comingled dental assemblages in biodistance studies.

548 “LAND AHEAD!” ISLANDS-MAINLAND MOBILITY ACROSS THE MEDITERRANEAN IN PREHISTORY

Session theme: 6. The Mediterranean from Within

Session organisers: Gori, Maja (Istituto di Scienze del Patrimonio Culturale | Consiglio Nazionale delle Ricerche) - Arena, Alberta (Österreichische Akademie der Wissenschaften)

Session format: Regular session

Mobility in Mediterranean Prehistory has consistently served as both a recurrent response to social and environmental constraints and a strategy of resilience and cultural integration. Concurrently, it has played a pivotal role in triggering phenomena such as crisis and transformations, the emergence of social complexity and the collapse of societies. However, the tendency to regard the Mediterranean as a unit, adopting thus a macro-scale approach to investigate mobility and emphasizing long distance seaborne connectivity, has often downplayed the significance of small-scale movements in understanding these phenomena. This session stems from the 3-year research project PRIN2020 “Mobility, social integration and culture change in the Mediterranean Bronze Age”, hosted at the Universities of Udine, Catania and CNR. Focused on mobility in the central and eastern Mediterranean during the 3rd and 2nd millennia BCE, the project places particular emphasis on networks linking islands and mainland regions, with a primary focus on movement in the Tyrrhenian, Adriatic-Ionian, and Aegean areas.

We welcome papers focusing on these and other Mediterranean areas and prehistoric epochs, fostering a comparative perspective in exploring mobilities connecting Mediterranean islands with their nearest or farthest mainlands and hinterlands. Indeed, any assessment of seaborne interaction, particularly at short and medium ranges, cannot avoid considering the terrestrial domain. We welcome contributions from both early career and established researchers employing different approaches and methodologies to investigate islands-mainland mobilities in Mediterranean Prehistory (6000-800 BCE).

ABSTRACTS

1 BRIDGING ACROSS THE STRAIT: EBA CERAMIC NETWORKS BETWEEN SOUTHERN ITALY, AEOLIAN ISLANDS AND SICILY

Todaro, Simona (Catania University) - Giacoppo, Flavia (Catania University) - Palio, Orazio (Catania University)

Sicily, due to its strategic position in the center of the Mediterranean, has always represented a crossroads of cultures and a bridge between the East and the West. The first exchanges date back to the Neolithic period, but it is from the end of the 3rd millennium BC that the island became integral part of long-range Aegean exchange networks. In an insular context, however, medium and short-range exchanges (micro-scale) are also of great importance to decipher dynamics of cultural interaction and can be appreciated in particular in aspects of ceramics production.

During the late 3rd millennium BC - mid 2nd millennium BC two classes of pottery appeared in Sicily, which were produced in different technological traditions especially with regard surface finishing. One -known as pottery in Castelluccio style and spread across most part of the island- is characterized by geometric decoration in black on a red/yellow background; the other one -known as Rodi-Tindari-Vallelunga and attested in the north-eastern cusp- is characterized by a particular finishing and pre-firing surface treatment that, together with the angular profile of most shapes, has been usually linked to classes of pottery typical of southern Italy.

This paper aims to investigate human mobility on a small and medium scale by comparing the chaînes opératoires of burnished pottery from Sicily, Aeolian islands and peninsular Italy, so as to clarify whether their evident similarity is apparent or the outcome of a shared know-how. Particular attention will be given to forming and finishing technique, assessed with the confocal laser scanning.

2 MINORITY REPORT: MOBILITY NETWORKS IN THE AEOLIAN ISLANDS DURING THE EARLY BRONZE AGE

Di Renzoni, Andrea (CNR - ISPC) - Bettelli, Marco (CNR - ISPC) - Martinelli, Maria Clara (Parco Archeologico delle Isole Eolie, Museo Luigi Bernabò Brea, Lipari (ME)) - Ferranti, Francesca (CNR - ISPC) - Levi, Sara Tiziana (Dip. di Scienze Chimiche e Geologiche, Un. di Modena e Reggio Emilia; Institute for the Study of the Ancient World, New York University, NY, USA)

By the end of the 3rd millennium BCE, a network of interactions emerged, encompassing the Aegean, central Mediterranean, and Balkans, characterized by intense cultural contacts and, perhaps, the movement of small groups of people.

Sicily and the adjacent islands, particularly the latter, are believed to have played pivotal roles in this context. It has been suggested that small islands served as early centers organizing exchange activities. Within these centers, interactions occurred at various scales, influenced by the historical and cultural specificities of each location. The Aeolian Islands, strategically situated along a major Mediterranean navigational route, emerged as key hubs in the central Mediterranean network. Available data depict the archipelago as involved in a complex network of communication systems, operating at different scales and according to various mobility patterns: (1) interactions among the islands, characterized by a core-periphery model; (2) connections within the lower Tyrrhenian region, likely driven by people moving to and from the islands; (3) participation in the wider Mediterranean network involving the Balkans and Greece; and (4) the involvement in the Mycenaean western expansion, serving as intermediaries between Aegean seafarers and local networks.

This period also corresponds to the Bronze Age phase marked by the highest density of known archaeological sites, spread across six of the seven islands. However, only a few of these sites have been extensively investigated and fully published. Consequently, data concerning the islands of Salina, Panarea, Alicudi, and Ginostra (Stromboli) are largely unavailable, hindering the formulation of comprehensive models.

We present the first results of an ongoing project focused on analyzing legacy data from the Capo Graziano archaeological contexts. The project aims to quantify allochthonous items as a proxy for the varying degrees of involvement of the islands in the aforementioned network, with the goal of refining models used to describe this phenomenon.

3 WIND OF CHANGE. THE SPREAD OF DECORATED POTTERY AMONG CENTRAL MEDITERRANEAN SMALL ISLANDS BETWEEN THE 3RD AND 2ND MILLENNIUM BC

Magri, Alessandra (Italian National Research Council (CNR-ISPC Roma))

During the transition between the 3rd and the 2nd millennium BC large territories and small islands of the Central Mediterranean were involved in supra-regional cultural phenomena, linking distant places through increased human mobility and maritime connections. Differently from previous phases, the interactions expanded beyond the mere circulation of resources and objects, now including widespread sociocultural practices.

This paper attempts to assess the degree of shared cultural elements among insular human groups, starting from the analysis of selected archaeological indicators, such as pottery assemblages, 'special' objects, and funerary traditions. Within the most significant material culture aspects, special emphasis is placed on the presence of incised and impressed pottery that can be examined through a cross-cultural comparative approach, identifying similarities and differences between the decorative systems adopted by different communities.

Although regional and local varieties, during the Early Bronze Age recurring pottery assemblages and a shared 'decorative taste' can be observed across wide-ranging territories, including coastal areas of Sicily, Southern Italy, and the surrounding islands. The origins of this phenomenon point to the 3rd mill. Cetina and Early Helladic III cultural spheres, involving the Balkans and the Peloponnese, with open questions on the modes of transmission of ceramic styles and other related cultural practices, such as specific funerary habits and long-distance exchange of 'prestige' objects.

The Aeolian Islands, Malta and Pantelleria, respectively represented by Capo Graziano, Tarxien Cemetery and Mursia facies, are relevant case studies for exploring these interconnections through the lens of material culture with a focus on insularity, a subject that could be defined as 'Islands Materiality'. Incorporating both first-hand data and published research, and considering the concept of 'community of practice', we find that small islands have actively participated in the development of Central Mediterranean networks, receiving outside influences while also maintaining their distinct and original cultural identities.

4 EXCAVATING THE "LONE CITY OF ŠKAR. ISLAND-MAINLAND MOBILITY IN THE EASTERN ADRIATIC IN THE BRONZE AGE

Gori, Maja (National Research Council of Italy) - Arena, Alberta (Österreichische Akademie der Wissenschaften) - Magri, Alessandra (National Research Council of Italy) - Recchia, Giulia (Sapienza University of Rome) - Vilmercati, Melissa (Sapienza University of Rome)

Škarin Samograd is a karstic cave located at the bottom of a sinkhole, north-east of Šibenik (Central Dalmatia, Croatia) famous for its deposits, ranging from the Neolithic to the Bronze Age. The first extensive excavations at the site were carried out in 1959-61 by Marović, and brought to light an extraordinary archaeological deposit, approximately 7 m thick. Unfortunately, the results of that work remained unpublished, and even if Škarin Samograd is regarded as one of the most significant archaeological sites in the entire Adriatic basin (Govedarica 1989, Forenbaher 2018), the nature and type of its occupation still need to be understood. Given the importance of the site, excavations were resumed under the direction of M. Gori within the project "PRIN 2020 - Mobility, social integration, and cultural change in the Bronze Age Mediterranean", and thanks to the co-financing of MAECI, the Italian Ministry of Foreign Affairs and International Cooperation. What seems to be evident from the published material culture from the cave, is its importance for understanding the relationship between Dalmatia and its islands in the 3rd millennium BC. This paper will present the first results from the new excavations and relate them with the data already available from other contexts, first of all the island of Palagruža, and put them in the wider framework of Bronze Age Adriatic mobility.

The original name of the cave Škarin samograd was erroneously recorded by geologists as Škarin samograd. During the first excavation campaign that took place in July-August 2023 we loosely translated the site name as "the lone city of Škar".

5 INCISED POTTERY OF THE EH III - MH I NORTH-WESTERN PELOPONNESE: REGIONAL INSIGHTS INTO THE CETINA PHENOMENON

Mercogliano, Assunta (Department of Humanities and Cultural Heritage, University of Udine, Italy) - Gazis, Mihalis (Ephorate of Antiquities of Achaia, Greece) - Spiroulas, Andreas (Department of History and Archaeology, University of Ioannina, Greece) - Filis, Konstantinos (Ephorate of Antiquities of Chalcidice and Mount Athos, Greece) - Hein, Anno (Ceramic and Composite Materials Group, Institute of Nanoscience and Nanotechnology, NCSR 'Demokritos', Greece) - Day, Peter (Ceramic and Composite Materials Group, Institute of Nanoscience and Nanotechnology, NCSR 'Demokritos', Greece)

The late 3rd millennium BCE in the Aegean is a time of radical cultural change and disruption, when novel stylistic traits of pottery have often been interpreted as representing the movement of people. While the appearance of both stylistic traits and technological practices from the Eastern Aegean have inspired a range of increasingly sophisticated approaches, the Cetina phenomenon, whose stylistic roots lie in the north-western Balkans, is less intensively studied. Though found at several sites in the Peloponnese during the EH III - MH I periods, the incised pottery in the Cetina tradition is often present as only a small part of the assemblages, prompting the question as to whether these vessels are imported, represent the adoption of specific shapes and decorative elements, or perhaps are the products of an intrusive population element.

We present results of an integrated macroscopic and analytical methodology investigating the provenance and production technology of a range of incised pottery of this period, including Cetina-style pottery, at four sites bordering the Patras-Corinthian Gulf: Trapeza, a settlement located 7 km southwest of Aigion in Eastern Achaia; the site of Keryneia which forms part of the major EBA centre of the Helike area; Lousika to the west of Patras and nearby Teichos Dymaion, the major anchorage on the north-western tip of the Peloponnese.

Petrographic, chemical and microstructural examination of the pottery allows an assessment of the relation of these and other incised ceramics to other components of the assemblage, notably location of production, and the degree to which they are products of the same technological practices as other pottery groups.

The paper considers the role of Achaia in the complex networks at the end of the 3rd millennium BCE, reappraising Adriatic cultural components in the diverse ceramic landscape of the time.

6 PREHISTORIC SEABORNE CONNECTIONS AND MOBILITY DYNAMICS IN THE EASTERN AEGEAN REGION: INSIGHTS FROM CERAMIC ANALYSIS

Menelaou, Sergios (British School at Athens)

As a sensitive marker of technological and socio-economic transformations, pottery can be used as a proxy for investigating developments in social structures, craft practices, human-environment interactions, as well as mobility dynamics and connectivity patterns. Methodological advances in ceramic studies of the last few decades allows for a more precise provenance determination and identification of production sources/locations through integrated, analytical approaches.

With a focus on the geo-cultural region of the eastern Aegean, this paper investigates the *longue durée* shifts in the connectivity of the offshore Greek islands with their peraiai (western Anatolian coastline) and beyond, and assesses how this reflects on pottery transformations. A particular focus is placed on the second half of the third millennium BC, traditionally viewed as a period of extensive innovations, such as the emergence of supra-regional urban centres, the expansion of communications via maritime and in-land routes, and the westward spread of technological novelties. This ceramic phenomenon is characterised by the appearance of new ceramic forms and morphostylistic features, novel traits related to knowledge transfer and the circulation of ideas, across a wide geographical area extending from inner western Anatolia to Mainland Greece. Following a micro-scale analysis of site-specific ceramic assemblages, this cultural phenomenon seems to be inconsistent in its technological attributes and geographical distribution, calling for reconsideration of previous, generalised interpretations of mobility dynamics in the region.

7 THE ROLE OF THE AEGINA BRONZE AGE HARBOR IN THE MINOAN AND MYCENAEAN NETWORKS IN THE EASTERN MEDITERRANEAN

Ferentinos, Georgios (Geology Department, Patras University, Greece; OCEANUS-Lab, Geology Department, Patras University, Greece) - Karali, Lilian (History and Archaeology Department, Kapodistrian University, Athens, Greece) - Gkioni, Maria (OCEANUS-Lab, Geology Department, Patras University, Greece) - Stefanopoulos, Panagiotis (OCEANUS-Lab, Geology Department, Patras University, Greece)

This study reconstructs the configuration and the size of the Bronze Age (BA) Aegina harbor from the Early Helladic (EH) II to the Late Helladic (LH) IIIB and reassess the Aegina's harbor role and the participation of the "Aeginetans" in the BA maritime trade in the Aegean and the eastern Mediterranean through its harbor perspective. The Aegina harbor functioned throughout the EH II - LH IIIB, initially as a naturally sheltered harbor and from Middle Helladic (MH) onwards as a man-made structure to mitigate the environmental impact of wind and waves and offer shipping, docking and anchoring facilities. At present the harbor is submerged and lies at an average depth of about 4.5 m below present sea-level. It is enclosed by two moles and a detached breakwater totaling in length 1,727 m. The enclosed basin covers an area of about 568,500 m² (ca. 57 ha). Therefore, the harbor could be considered to have been the largest harbor in the Aegean and the eastern Mediterranean of that time. Throughout this period the Aegina harbor functioned progressively as a maritime hub in local, regional, and interregional networks. The Aeginetans initiated and operated the Saronic Gulf network, then they interacted with the Minoans and were involved in the Aegean economic space, that interconnected the Greek Mainland, the Aegean islands, Crete, and western Anatolia, and finally they participated in an interregional long-distance system, acting as intermediaries to the Mycenaeans, which included connections between Cyprus, the Levant, Egypt, and Italy.

8 ISLAND ARCHITECTURE ON LAND: THE QUESTION OF EARLY BRONZE AGE INSULAE IN TAVŞANLI HÖYÜK (INLAND WESTERN ANATOLIA)

Naiboglu, Nihan (Istanbul Nisantasi University) - Fidan, Erkan (Bilecik Şeyh Edebali University)

With a size of over 40 ha, Tavşanlı Höyük is one of the largest Bronze Age towns in the western half of Anatolia. Geophysical investigations and archaeological excavations conducted over the past 5 years have revealed interesting results about the Bronze Age occupation of the mound together with its surrounding area. Among the most unexpected findings is the potential presence of an insula in the lower town of Tavşanlı Höyük dating back to the middle of the 3rd millennium BC.

Consisting of long houses adjacent to each other in blocks and divided by regular streets, insulae are the typical settlement plan of the Aegean from the second quarter of the 3rd millennium BC onwards. This plan has no other parallels in Inland Western Anatolia known so far. However, the GPR images from Tavşanlı Höyük revealed a different picture, suggesting that the site represents the easternmost example of a typical Aegean settlement.

To examine the GPR results, a test trench of 10x10 m has been dug right next to the area where GPR was conducted. At a depth of 5 meters, the team unearthed the well-preserved corner of a house, perfectly matching the layout observed in the GPR image. This indicates that the settlement, in fact, consisted of insulae.

The size of the excavated 3rd millennium BC settlements in Inland Western Anatolia varies between 1 to 5 hectares, making Tavşanlı Höyük, with its 40 hectares, the largest settlement in the region with the only known exception of Beycesultan. The paper aims to explore the nature of the architectural connection between Tavşanlı Höyük and the Aegean, as well as to discuss whether the remarkably large size of the settlement had an impact or any kind of advantage on the selection of the insula planning.

549 INTERDISCIPLINARY APPROACHES TO THE MIDDLE PALEOLITHIC RECORD OF THE BALKAN PENINSULA

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Monnier, Gilliane (University of Minnesota) - Pajovic, Goran (National Museum of Montenegro)

Session format: Regular session

Archaeology has always been an interdisciplinary endeavor, incorporating methods and techniques from the natural sciences to assess chronology and reconstruct paleoenvironments. In recent years, rapid advances in the archaeological sciences and in the realm of digital archaeology have yielded a growing number of methodologies allowing us to extract ever-more precise data from the archaeological record. Such data include, but are not limited to, a broad range of geological (geophysical, geochemical, geoarchaeological) and molecular (genetic, proteomic, lipid) data, which can be tightly integrated with the traditional archaeological record (distributions of artifacts, faunal remains, and features) through the spatial resolution afforded by digital imaging and proveniencing methods.

These archaeological science advances have been particularly important in research within the Middle Paleolithic, a period that is key for understanding Neanderthal biological and cultural evolution. The complexity of the archaeological record in such a remote time requires great care in excavation and interpretation, and new archaeological science methods enable us to better assess and control for site formation processes as well as extract data which, previously, was unattainable. This session gathers results from a range of recent applications of interdisciplinary approaches to the Middle Paleolithic of the Balkan peninsula with the goal of documenting Neanderthal occupations in this region. The outcome of this growing body of research helps us contextualize the key role of this region within Neanderthal evolution.

ABSTRACTS

1 RESEARCH ON NEANDERTHAL SETTLEMENT IN THE CENTRAL BALKANS

Mihailovic, Dušan (University of Belgrade - Faculty of Philosophy) - Mihailović, Bojana (National Museum of Serbia) - Majkić, Ana (University of Belgrade - Faculty of Philosophy) - Plavšić Gogić, Senka (University of Belgrade - Faculty of Philosophy) - Dragosavac, Sofija (University of Belgrade - Faculty of Philosophy) - Dimitrijević, Vesna (University of Belgrade - Faculty of Philosophy) - Milošević, Stefan (University of Belgrade - Faculty of Philosophy) - Pajović, Danilo (University of Belgrade - Faculty of Philosophy) - Roksandic, Mirjana (University of Winnipeg)

Recent research into Middle Palaeolithic settlement in the Central Balkans has been systematic. Field surveys of cave and open-air sites have covered the entire expanse of central and eastern Serbia, spanning various topographical and ecological zones. Special attention was given to areas neighbouring sources of raw materials, which were extensively surveyed due to their importance in tool production. During the reconnaissance, more than 100 Paleolithic sites were recorded, of which about 30 were tested. Various geoarchaeological and bioarchaeological methods—including sampling materials for aDNA analysis—were utilized in the investigation of specific sites, notably Velika and Mala Balanica, Pešturina, Šalitrena pećina and Kozja and Mala pećina. The acquired data has offered preliminary insights into the settlement patterns, on-site activities and the technical and economic behaviours of Neanderthal groups inhabiting the region during the Middle and Late Pleistocene.

Funding from the Science Fund of the Republic of Serbia - Programme grant agreement no. 7746827 (NEEMO).

2 LATE NEANDERTHAL OCCUPATION OF BACHO KIRO CAVE (BULGARIA)

Tsanova, Tsenka (Department of Chemistry G. Ciamician, Alma Mater Studiorum, University of Bologna, Italy; Department of Human Origins, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Rezek, Zeljko (Chaire de Paléanthropologie, CIRB, Collège de France, Université PSL, CNRS, INSERM, 75005 Paris, France) - Aldeias, Vera (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour, Universidade do Algarve, Campus de Gambelas, Portugal; Department of Human Origins, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Delvigne, Vincent (CNRS, UMR 8068 TEMPS, University of Paris X - Nanterre, Nanterre, France & Service de Préhistoire, University of Liège, Liège, Belgium) - Lauer, Tobias (University of Tübingen, Tübingen, Germany) - McPherron, Shannon (Department of Human Origins, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Slon, Viviane (Department of Evolutionary Genetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; The Dan David Center for Human Evolution and Biohistory Research, Tel Aviv University, Tel Aviv, Israel) - Talamo, Sahra (Department of Chemistry G. Ciamician, Alma Mater Studiorum, University of Bologna, Italy) - Sirakov, Nikolay (National Institute of Archaeology with Museum, Bulgarian Academy of Sciences, Sofia, Bulgaria) - Hublin, Jean-Jacques (Chaire de Paléanthropologie, CIRB, Collège de France, Université PSL, CNRS, INSERM, 75005 Paris, France; Department of Human Origins, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany)

Bacho Kiro Cave, located on the northern slopes of the Balkan Mountains in central Bulgaria, is one of the reference sites for the Middle-to-Upper Paleolithic transition in Europe. Excavated by D. Garrod and then by B. Ginter and J.K. Kozłowski, ninety and fifty years ago, respectively, it has been best known for the transitional “Bachokirian” lithic industry that we recently reported as an Initial Upper Paleolithic (IUP) associated with the earliest *Homo sapiens* in Europe. Between 2016 and 2021, our excavations also uncovered new lithic and faunal material from the underlying Middle Paleolithic (MP), Layer K (corresponding to layers 12 and 13 of the previous excavation). Here we will report results of this late MP context, compared to the overlying IUP record of Layers I and J but also to other late MP deposits from this geographical region (namely, Temnata, Kozarnika, and Samuiltsa Caves). The OSL date for Layer K is 61 ± 6 ka. However, due to the sediments present in this layer that were likely originating from inside the cave and being redeposited, this OSL age should be regarded as a maximum age. More probable age of Layer K should be constrained between this date and the ^{14}C age of the lower part of the overlying Layer J, which is > 51 ka. The lithic technology is predominantly Levallois, with raw material of local origin very different from the imported flint in the IUP. Bones and lithics were also found in dark colored sediments mixed with charcoal and indicating possible use of fire in the lower part of this layer. The dietary focus was mainly on large-to-medium herbivore species and it involved exploitation of *Bos/Bison*, *Cervidae*, *Equidae*, and *Caprinae*. In addition, mtDNA from the sediment encompasses signals from *Bovidae*, *Cervidae*, *Elephantidae*, *Equidae*, *Felidae*, *Hyaenidae*, *Rhinocerotidae*, *Ursidae* and *Neanderthals*.

3 MULTI-DISCIPLINARY APPROACHES TO THE STUDY OF LATE NEANDERTHALS AT CRVENA STIJENA, MONTENEGRO

Monnier, Gilliane (University of Minnesota) - Tostevin, Gilbert (University of Minnesota) - Pajovic, Goran (National Museum of Montenegro) - Bakovic, Mile (Center for Conservation and Archaeology of Montenegro) - Borovinic, Nikola (Center for Conservation and Archaeology of Montenegro) - Morin, Eugene (Trent University) - Mallol, Carolina (Universidad de la Laguna; Archaeological Micromorphology and Biomarkers Lab) - Boaretto, Elisabetta (Weizmann Institute of Science) - Vidal Matutano, Paloma (Universidad de La Laguna) - Porter, Samantha (University of Minnesota)

The rock shelter of Crvena Stijena in Montenegro preserves a 20-meter-deep sequence of deposits spanning the Middle Paleolithic through the Bronze Age. This continuous record of human occupation makes it one of the most important archaeological sites in the Balkan peninsula. Since 2017, our team has been excavating the late Middle Paleolithic levels, which are characterized by a large and well-preserved faunal assemblage; a comparatively small lithic assemblage composed of a wide variety of raw materials; and extensive evidence of fire use, in the form of stratified layers of charcoal, wood ash, and burnt bone. Site formation processes are complex, hampered by a tectonically active environment which periodically released car-sized boulders from the roof of the shelter into the deposits. We present our main research questions and methodology, as well as results from some of the numerous studies our team has deployed to reconstruct hominin behavior while controlling for site formation processes.

4 ELEMENTS OF NEANDERTHAL FIRE TECHNOLOGY AND CLIMATE FROM A MICROSTRATIGRAPHIC STUDY OF UNIT XXIV AT CRVENA STIJENA, MONTENEGRO

Mallol, Carolina (Universidad de La Laguna) - Jambrić, Enríquez, Margarita (Universidad de La Laguna) - Monnier, Gilliane (University of Minnesota) - Tostevin, Gilbert (University of Minnesota) - Pajović, Goran (National Museum of Montenegro)

Multiproxy microstratigraphic research can provide clues about behavioral and paleoenvironmental aspects of past societies. At Crvena Stijena (Montenegro), a Middle Palaeolithic site under current investigation, lipid biomarker data has informed us about the paleohydrological evolution of the entire sequence, and archaeomagnetism and Raman microspectroscopy have provided useful clues about the formation of Unit XXIV, a rich archaeological stratified deposit with visible combustion residues. Here, we present coupled soil micromorphology and lipid biomarker data from Layer XXIV that reveal elements of fire technology, climate, and some of the taphonomic processes associated with this unit. These data indicate a well-preserved, primary record of recurrent human activity involving fire, syn- and post-depositionally deformed by cryogenic processes. These processes did not obliterate the primary microstratigraphy, which shows a complex sequence including in situ bone and charcoal-rich hearths, ash dumps, and trampled combustion residues. The Layer XXIV microstratigraphic sedimentary record shows great potential to elucidate different aspects of Middle Paleolithic fire technology, human occupation intensity, and human-climate interactions.

5 NEANDERTHAL FAUNAL EXPLOITATION IN THE MIS 5-3 WESTERN BALKAN PENINSULA: ZOOARCHAEOLOGY RESULTS FROM THE EARLY SEQUENCE OF CRVENA STIJENA, MONTENEGRO

Bao, Yige (University of Minnesota) - Collins, Matthew (University of Cambridge; University of Copenhagen) - Morin, Eugène (Trent University) - Munoz-Alegre, Marta (University of Cambridge) - Tostevin, Gilbert (University of Minnesota) - Monnier, Gilliane (University of Minnesota)

The site of Crvena Stijena, situated in Montenegro, features extensive Middle Paleolithic deposits, making it one of the most important sites in Southeast Europe. Research at Crvena Stijena began in the late 1950s. However, the faunal collections from the early excavations have been dispersed or lost, while the later excavations have focused on the most recent Middle Paleolithic layers, leaving the faunal data prior to MIS 3 uncertain. To remedy this problem, vertical excavation of the south and east profiles was carried out in order to produce faunal samples from earlier layers (back to MIS 4 and possibly MIS 5). Unidentifiable bone fragments underwent analysis through ZooMS (Zooarchaeology by Mass Spectrometry), offering preliminary faunal sequence information. By comparing the faunal data from the Crvena Stijena site with the published data from contemporaneous sites in the western Balkan Peninsula, this study provides a forward-looking perspective on the early sequence at the CS site.

6 PLAYING WITH FIRE - A DISCIPLINARY APPROACH AIMED AT RESEARCHING THE FIRE THROUGH THE STUDY OF BURNED LITHICS

Dobos, Adrian (Institute of Archaeology “Vasile Parvan”, Bucharest)

Fire has long been supposed as an essential tool for Late Pleistocene hominins in Europe, but the specifics of its use, particularly in the Upper Paleolithic Balkans, has remained understudied. We report on an experimental research project in which burned lithics were used as proxies for the investigation of the fires which have altered them. Specifically, we study the physical changes occurring at different temperatures and identify patterns that could be correlated with temperatures and duration of open fires.

We used cherts with the same properties as those knapped by the Paleolithic communities from the investigated sites and replicated fire exposure at several temperatures and for different time durations. We examined and quantified the changes occurred to the lithics in terms of color, density, and crazing and found that certain colorations can be correlated to high fire temperature and others to low temperature, crack patterning is indicative of temperature range, and density loss is both dependent of fire temperature and fire duration. Following the same criteria, we applied these results to two Paleolithic sites from Romania; Românești-Dumbrăvița and Bistricioara-Lutărie 3, spanning the proto-Aurignacian to the Epigravettian. These sites have been excavated in the past five years with point-proveniencing. The results indicate that heavy combustion areas were present in the proto-Aurignacian level of Românești, and could only be identified through the properties of the burned lithics, as other features related to fire (charcoal, ashes) have not preserved. At the site of Bistricioara-Lutărie 3, despite of hearth preservation, the use of fire seems scantier.

Our research has implications on fuel economy research in the Upper Paleolithic, as well as on the behavior related to the fire. The research was funded through the CNCS – UEFISCDI grant TE 99/2022.

7 RECENT CONTRIBUTIONS TO LITHIC RAW MATERIAL RESEARCH AT CRVENA STIJENA (MONTENEGRO)

Marojevic, Vasilije (University of Minnesota) - Kilibarda, Zoran (Indiana University Northwest) - Siurek, Alec (Indiana University) - Monnier, Gilliane (University of Minnesota) - Tostevin, Gilbert (University of Minnesota)

Crvena Stijena houses one of the most prominent Neanderthal occupations in SE Europe. The site is located on the border between Montenegro and Bosnia and Herzegovina, in a landscape that geographically and geologically belongs to the Outer Dinarides. This area has been recognized as Europe's most extensive continuous karst landscape, exhibiting a sheer diversity of landforms whose formation predates the onset of Pleistocene glaciations. Even though Crvena Stijena has been an object of anthropological inquiry since its discovery in 1954, it remains unknown how the diverse geological, topographic, and ecological setup of the Outer Dinarides influenced site frequentation and human migratory potential. Here, we discuss recent contributions from an ongoing lithic raw material study that is part of a broader collaborative endeavor to investigate off-site behaviors practiced by Neanderthal groups settling the landscape around Crvena Stijena during MIS 3. The preliminary phase of the project incorporated fieldwork activities conducted in the summers of 2022 and 2023 focused on locating and sampling sources of chert and other knappable raw materials in Western Montenegro within a 50 km radius from Crvena Stijena. We present the spatial distribution of these outcrops and use data from geochemical (XRF) and petrographic studies to discuss their potential utility for prehistoric tool production. We also outline future steps necessary for reconstructing Neanderthal off-site behaviors and addressing anthropologically relevant topics such as lithic raw material procurement taskscape, land use, and the directionality in mobility.

8 THE IMPACT OF SIZE CUTOFFS IN ARTIFACT RECOVERY AND LITHIC ANALYSIS FOR THE MICRO-MOUSTERIAN AT CRVENA STIJENA (MONTENEGRO)

Tostevin, Gilbert (University of Minnesota) - Marojević, Vasilije (University of Minnesota) - Monnier, Gilliane (University of Minnesota)

The term Micro-Mousterian has long been applied across Europe to label Mousterian assemblages characterized by small dimensions. In the Balkan Peninsula, a number of Middle Paleolithic industries have been assigned to the Micro-Mousterian, despite wide technological and typological variation among assemblages. While researchers generally apply the label to Mousterian assemblages composed of smaller-than-average cores, flakes, and retouched tools, opinions about the label's fundamental meaning are widely divergent. Is the Micro-Mousterian the inevitable result of raw materials that do not allow the production of large flakes, due to small package sizes and/or low quality? Does it reflect limited local toolstone availability that encourages extensive resharpening of retouched tools and the prolongation of core use-lives? Or, does it reflect hominins' intentional exploitation of small cutting edges? Within the Balkan Peninsula as well as within the Old World archaeological literature on lithic miniaturization (sensu Pargeter & Shea 2019) in general, each hypothesis may adequately explain a particular assemblage, while other assemblages are best accounted for by a combination of the factors. Yet the predictions for all of these hypotheses are impacted by how archaeologists limit assemblage composition through size cutoffs for both artifact recovery and lithic analysis. How does our understanding of lithic economy change depending on analytical size cutoffs? If one recovers and studies lithic artifact production below 2cm or even 1cm, how does this change our potential identification of a given Mousterian facies in relation to the Micro-Mousterian? To explore this question at the interface between behavioral archaeology & geoarchaeology, we report on the analysis of the Late Middle Paleolithic layers at Crvena Stijena, Montenegro, excavated by a large interdisciplinary team since 2017, using an excavation protocol of 100% flotation and double-redundant recovery of lithic artifacts to a 1mm minimum size limit.

553 ADVANCING PALEOLITHIC INTRA-SITE SPATIAL ANALYSIS: NEW METHODS, APPLICATIONS, AND INTERPRETATION

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Cobo-Sánchez, Lucía (The Interdisciplinary Centre for Archaeology and the Evolution of Human Behavior (ICArEHB), Universidade do Algarve) - Arteaga-Brieba, Andion (Universidad Rovira i Virgili, Departament d'Història i Història de l'Art; Institut Català de Paleoeologia Humana i Evolució Social (IPHES)) - Merino-Pelaz, Amanda (Universidad de Alcalá, Departamento de Historia y Filosofía) - Moclán, Abel (Institute of Evolution in Africa (IDEA)) - Villaescusa, Lucía (Universidad de Alcalá)

Session format: Regular session

The exploration of spatial patterns within Paleolithic sites is a fundamental aspect of archaeological research. It serves as a critical lens through which to explore site utilization and site formation processes. Archaeologists have long employed spatial analysis, but recent advancements in spatial statistics and modeling have significantly enriched their

interpretive potential. This session seeks to address pivotal questions surrounding the detection, analysis, and interpretation of intra-site spatial patterns in Paleolithic contexts, and invites researchers to contribute to a dialogue on recent methodological advancements and diverse applications of intra-site spatial analysis in Paleolithic archaeology.

This session has a dual focus. On the one hand, we aim to explore methodological innovation, and welcome presentations and discussions on new approaches, including GIS analysis, cluster detection, and spatial statistics, among others. The goal is to assess the efficacy, applicability, challenges, and pitfalls of these methodologies in order to foster methodological language consistency and rigorous applications to the archaeological record, alongside inspiring further methodological advancements. On the other hand, we aim to highlight and understand the potential interpretative power and boundaries of spatial analysis in addressing and advancing our understanding of site formation processes, palimpsests, and behaviors in Paleolithic sites.

Additionally, experimental work in the field of spatial analysis is an issue that has been underexplored thus far. Likewise, we have limited knowledge about the spatial patterns resulting from the activities of modern hunter-gatherers. Therefore, experimental, or ethnographic proposals that help us gain a better understanding of past behaviors will be greatly valued.

In summary, this session aims to facilitate knowledge exchange and collaboration among researchers in the field of spatial analysis in Paleolithic archaeology. We anticipate a mix of methodological, experimental, and case study presentations that together will enhance our understanding and methods for analyzing spatial patterns of Paleolithic sites.

ABSTRACTS

1 EVERYTHING EVERYWHERE ALL AT ONCE. THE IMPORTANCE OF MULTIDISCIPLINARY IN PALAEOOLITHIC SPATIAL STUDIES: THE CASE OF COVA GRAN

Sanchez-Romero, Laura (Centre d'Estudis del Patrimoni Arqueologic, Autonomous University of Barcelona; Human Evolution Research Center, University of California, Berkeley) - Benito-Calvo, Alfonso (Centro Nacional de Investigación sobre la Evolución Humana) - Martinez-Moreno, Jorge (Centre d'Estudis del Patrimoni Arqueologic, Autonomous University of Barcelona) - Mora Torcal, Rafael (Centre d'Estudis del Patrimoni Arqueologic, Autonomous University of Barcelona)

Spatial analyses are characterized by the use of multiple and diverse tools to analyze data from all the different disciplines that converge in the study of a site. With these tools and data, spatial studies aim to infer the processes, both cultural and natural, that have intervened in the formation of a deposit and its preservation until the time of its excavation and study. Therefore, both the excavation and data collection in the field, as well as the processing of data from different disciplines and the tools used for their analysis are equally key to spatial studies.

In this sense, the Cova Gran site is an example of the consistency of data collection in the field and its subsequent processing in the laboratory. This is essential to address all following studies, because without a good and careful recording nothing that is done afterwards is valid, since we cannot "re-excavate" and take these data again.

The spatial analysis of level 497D of Cova Gran has allowed us to work with a huge database that includes data from fauna, lithics, hearths, geology and sedimentology, and refitting analysis, which have been integrated to infer the moments of occupation and the activities carried out in the rock shelter. This study, in line with many others, highlights the importance of integrating geostatistical tools along with the rest of the tools used for data analysis interpreting site formation processes. It also focuses on the fact that these statistical data lose certain meaning if they are not supported and contrasted with field data and the data obtained by the other disciplines that are also involved in the analysis of the site.

2 BEYOND LITHOSTRATIGRAPHY: EXPLORING VERTICAL DISTRIBUTION OF ARTIFACTS AS A PROXY FOR FORMATION PROCESSES AT THE UPPER PALAEOOLITHIC SITE OF VALE BOI

Galfi, Jovan (Interdisciplinary Center for Archaeology and Evolution of Human Behaviour (ICArEHB)) - Barbieri, Alvisé (Interdisciplinary Center for Archaeology and Evolution of Human Behaviour (ICArEHB)) - Gomes, Ana (Interdisciplinary Center for Archaeology and Evolution of Human Behaviour (ICArEHB)) - Bicho, Nuno (Interdisciplinary Center for Archaeology and Evolution of Human Behaviour (ICArEHB)) - Cascalheira, João (Interdisciplinary Center for Archaeology and Evolution of Human Behaviour (ICArEHB))

The interpretation of archaeological materials often relies on their association with lithostratigraphic units. While this association is a vital aspect of any archaeological excavation, the definitive interpretation of these units is only achieved after the excavation has concluded, often differing from the preliminary units identified during the excavation process. This discrepancy poses a challenge to our interpretation of the archaeological materials and significantly impacts our understanding of the human past. Addressing these issues can be done through spatial analysis of the vertical distribution of archaeological materials. Despite the widespread adoption of Total Station for artifact docu-

mentation and the extensive data it generates, the vertical projections of points are rarely used for anything other than plotting them within their litho-stratigraphic units. By examining the vertical variability of artifacts and comparing it with other proxies for site formation (including artifact orientations and geoarchaeological data), we conducted a thorough study of the Terrace area of Vale Boi, a multi-component site located in Southern Portugal. Our approach allowed us to discuss the differences between litho-stratigraphic and density-based horizons and how this impacts site-use interpretations.

3 SPATIAL ORGANIZATION OF THE GRAVETTIAN MAMMOTH HUNTERS' SITES

Wilczynski, Jaroslaw (Institute of Systematics and Evolution of Animals) - Novák, Martin (Institute of Archaeology, Czech Academy of Sciences, Brno) - Händel, Marc (Austrian Archaeological Institute, Austrian Academy of Sciences, Vienna) - Lengyel, Gyorgy (Magyar Nemzeti Múzeum, Budapest) - Matyaszczyk, Lena (Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Kraków) - Oszczepalińska, Oliwia (Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Kraków) - Oberc, Tomasz (Institute of Archaeology and Ethnology, Polish Academy of Sciences (IAE PAS), Kraków) - Boriová, Sonia (Institute of Archaeology, Czech Academy of Sciences, Brno)

Gravettian layers at loess localities in the Western Carpathian forelands in particular Dolní Věstonice I (Czech Republic) and Kraków Spadzista (Poland), provided assemblages of Late Pleistocene fauna with thousands of bones and teeth of mammoth. According to various studies carried out over the course of more than 100 years, interpretations for the formation of these assemblages range from human transport of body parts and/or skeletal elements from other locations, to hunter-gatherer use of bones and ivory from carcasses of naturally deceased mammoths, and to interpreting the remains as direct consequence of a hunting strategy specialised on mammoth. Therefore, according to the present stage of research, both natural and/or anthropogenic agents may account for the creation of the archaeological sites, which in addition may have seen recurrent human occupations that eventually produced stratified deposits and/or palimpsests of mixed assemblages reflecting many different episodes of activities.

In our lecture, we would like to present the results of fieldwork conducted at Dolní Věstonice I and Kraków Spadzista sites recently, which shed light on the interpretation of these accumulations. For the purposes of our work, we used a dataset obtained from excavations where all artifacts and bones were recorded in three dimensions. We observed refittings of lithic artifacts and bones both horizontally and vertically. We compared the density of artifacts within individual trenches as well as the types of artifacts and bones deposited in specific places. Additionally, we prepared rose diagrams showing azimuths of long axes of long bones and ribs for mammoth bone accumulations. On this basis, we were able to trace the spatial and horizontal distribution of all materials and the post-depositional arrangement of cultural layers, which had a significant impact on the information obtained during excavations.

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4 ASSESSING THE SPATIAL FEATURES OF NEANDERTHAL OCCUPATIONS AT NAVALMAÍLLO ROCK SHELTER (SPAIN): IDENTIFICATION OF A SINGLE-CLUSTER PATTERN THROUGH SPATIAL MODELLING

Moclán, Abel (Institute of Evolution in Africa (IDEA), University of Alcalá de Henares) - Huguet, Rosa (IPHES-CERCA, Institut Català de Paleoeologia Humana i Evolució Social; Departament d'Història i Història de l'Art, Universitat Rovira i Virgili; Unit associated to CSIC. Departamento de Paleobiología, Museo Nacional de Ciencias Naturales) - Márquez, Belén (Archaeological and Paleontological Museum of the Community of Madrid) - Álvarez-Fernández, Ana (Laboratorio de Evolución Humana, Dpto. de Historia, Geografía y Comunicación, Universidad de Burgos) - Martín-Perea, David Manuel (Departamento de Geodinámica, Estratigrafía y Paleontología. Universidad Complutense de Madrid, F. C. Geológicas; IPHES-CERCA, Institut Català de Paleoeologia Humana i Evolució Social; Institute of Evolution in Africa (IDEA), University of Alcalá de Henares) - Laplana, César (Archaeological and Paleontological Museum of the Community of Madrid) - Pérez-González, Alfredo (Institute of Evolution in Africa (IDEA), University of Alcalá de Henares; Asociación Nacional El Hombre y el Medio) - Arsuaga, Juan Luis (Centro Mixto UCM-ISCI de Evolución y Comportamiento Humanos; Departamento de Geodinámica, Estratigrafía y Paleontología. Universidad Complutense de Madrid, F. C. Geológicas) - Baquedano, Enrique (Archaeological and Paleontological Museum of the Community of Madrid; Institute of Evolution in Africa (IDEA), University of Alcalá de Henares)

Spatial intra-site analyses of Palaeolithic sites are a tool traditionally used inductively to examine the spatial characteristics of human occupations. These approaches often involve a high degree of subjectivity, as the researcher visually analyses the results of spatial tests. However, this method of statistically analysing spatial data is not the standard approach in other fields using spatial analyses. In addition to the typical tests used in Archaeology, spatial modelling is often performed, allowing for a deep analysis of spatial point patterns. These modelling techniques also help to verify if visually made observations indeed hold statistical significance.

In this presentation, we show one of the first archaeological approximations conducted on a Neanderthal site, the Navalmaillo Rock Shelter (Pinilla del Valle, Madrid, Spain). Through various regressions, we analysed the distribution of faunal remains and lithic tools in the F level of the site, considering the spatial distribution of hearths. This has allowed us to statistically demonstrate that the spatial distribution of the level, previously identified as a hunting camp, can be statistically characterized as a 'single-cluster spatial pattern'. This pattern results from a combination of factors, such as the arrangement of hearths and the topography of the shelter.

This aspect holds significant interest in deciphering the spatial behaviours of Neanderthals, showing their remarkable adaptability to the utilized space based on the nature of occupation and its functionality.

5 TRACING THE HUNTER: SPATIAL ANALYSIS OF A KILL-BUTCHERING SITE. THE CASE OF TD10.2-BB, GRAN DOLINA, ATAPUERCA

Arteaga Briebe, Andion (Departament d'Història i Història de l'Art, Universitat Rovira i Virgili (URV), Tarragona, Spain; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain) - Cobo-Sánchez, Lucía (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour, Universidade do Algarve, Faro, Portugal) - Rodríguez-Hidalgo, Antonio (Consejo Superior de Investigaciones Científicas, Instituto de Arqueología de Mérida (CSIC-Junta de Extremadura), Mérida, Spain; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain) - Saladié, Palmira (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain; Departament d'Història i Història de l'Art, Universitat Rovira i Virgili (URV), Tarragona, Spain) - Mosquera, Marina (Departament d'Història i Història de l'Art, Universitat Rovira i Virgili (URV), Tarragona, Spain; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain) - Ollé, Andreu (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain; Departament d'Història i Història de l'Art, Universitat Rovira i Virgili (URV), Tarragona, Spain)

In recent years, the field of prehistoric intrasite studies has witnessed a significant increase in spatial geostatistical analyses, offering new perspectives on the spatial organisation of ancient populations. This research explores the application of spatial point pattern analysis to sublevel TD10.2-BB in Gran Dolina site, Atapuerca. Dated to approximately 400 ka., this deposit is characterised as a monospecific bison kill-butcher site, indicative of mass-communal predatory behaviours. The primary aim of this study is to assess the spatial integrity and resolution of the site, and to analyse the spatial imprint of the activities carried out, attempting to ascertain the extent to which it is feasible to discuss a structured use of space.

To achieve this, the research examines the distribution of lithic and faunal assemblages and their spatial correlation, using a comprehensive dataset that includes raw material characterisation, technological analysis, zooarchaeological insights, and taphonomic data, further enriched by including lithic refits. Various analytical tools, such as Kernel density estimation, modified K-function, relative risk, and nearest-neighbour analyses, are employed to address spatial intensity, correlation, and multitype analyses.

The research has delineated distinct activity areas within the site, highlighting a clear spatial segregation between knapping and butchering activities. Additionally, results reveal a consistent pattern of use of the space over different occupation events, interpreted as a pragmatic adaptation to the cavity's physical constraints. This recurrent behaviour suggests an intentional organisation of activities within the available space, even in the absence of anthropogenic structures that typically serve as the backbone of spatial organisation.

Nevertheless, the study confronts interpretative challenges, particularly concerning the lack of positive correlations in areas of high intensity, which exhibit regular patterns. This discrepancy may potentially be attributed to the weak clustering strength within these zones, pointing to a complexity in spatial dynamics not fully captured by the current analytical approaches.

6 NEANDERTHALS INDOORS. CONTRIBUTIONS OF FAUNAL REFITTING TO THE INTRA-SITE SPATIAL ANALYSIS OF LEVEL Q AT ABRIC ROMANÍ

Gabucio, Maria Joana (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA). Zona Educativa 4, Campus Sescelades URV (Edifici W3), 43007, Tarragona, Spain; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002, Tarragona, Spain) - Téllez, Edgar (Centro Nacional de Investigación sobre la Evolución Humana (CENIEH), P.º Sierra de Atapuerca, 3, 09002 Burgos, Spain) - Marín, Juan (Department of Prehistory and Archaeology, Universidad Nacional de Educación a Distancia, UNED, Madrid, Spain; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA). Zona Educativa 4, Campus Sescelades URV (Edifici W3), 43007, Tarragona, Spain; UMR7194 – HNHP (MNHN–CNRS –UPVD– Sorbonne Universités), IPH, 1 rue René Panhard & Musée de l'Homme, 17 Place du Trocadero, 75116, Paris, France) - Pineda, Antonio (UMR7194 – HNHP (MNHN–CNRS –UPVD– Sorbonne Universités), IPH, 1 rue René Panhard & Musée de l'Homme, 17 Place du Trocadero, 75116, Paris, France; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA). Zona Educativa 4, Campus Sescelades URV (Edifici W3), 43007, Tarragona, Spain) - Chacón, María Gema (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA). Zona Educativa 4, Campus Sescelades URV (Edifici W3), 43007, Tarragona, Spain; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002, Tarragona, Spain; UMR7194 – HNHP (MNHN–CNRS –UPVD– Sorbonne Universités), IPH, 1 rue René Panhard & Musée de l'Homme, 17 Place du Trocadero, 75116, Paris, France) - Vallverdú, Josep (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA). Zona Educativa 4, Campus Sescelades URV (Edifici W3), 43007, Tarragona, Spain; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002, Tarragona, Spain; Unit Associated to CSIC. Departamento de Paleobiología. Museo Nacional de Ciencias Naturales, C/ José Gutiérrez Abascal, 2, 28006, Madrid, Spain) - Saladié, Palmira (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA). Zona Educativa 4, Campus Sescelades URV (Edifici W3), 43007, Tarragona, Spain; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002, Tarragona, Spain; Unit Associated to CSIC. Departamento de Paleobiología. Museo Nacional de Ciencias Naturales, C/ José Gutiérrez Abascal, 2, 28006, Madrid, Spain)

In Palaeolithic research, intra-site spatial analysis is a crucial topic as it contributes significantly to the study of both formation processes and human behaviour. Refitting studies are particularly interesting because they provide unequivocal evidence of a direct relationship between several remains. Refits offer spatiotemporal information, linking different areas and demonstrating synchronic or diachronic relationships within the record. However, the time, space and effort required has slowed down their generalisation, especially in the case of bone refits.

This work presents the faunal refitting analysis of level Q (ca. 58 ky BP) at Abric Romaní (Capellades, Catalonia, Spain), a key site to understand Neanderthal behaviour. This analysis includes anatomical and mechanical refits. GIS and geostatistical methods are applied to explore the distribution, density, clustering and orientation of the refits. The zooarchaeological and taphonomic data of the remains are considered. The objectives are: 1) shedding light on the formation processes, 2) determining which connection lines are due to human activity and interpret them, 3) contributing to the interpretation of the occupational dynamics.

The refits identified so far (108 groups, 254 remains, and 163 connecting lines) yield interesting results. Most of the connecting lines are short, especially between the mechanical refits broken when dry, indicating excellent preservation. However, several lines are > 2 m. Some of them link Qa (in situ subassemblage) with Q (subassemblage with evidence of taphonomic remotion), but they are few and < 2.3 m, suggesting that the formation of the travertine platform above the level caused limited short-distance movements. In contrast, connections > 2.3 m between different accumulations correspond to mechanical refits broken when green and, once natural causes are ruled out, may be related to anthropogenic activity. These results are crossed with those from other disciplines to reconstruct the settlement dynamics that gave rise to level Q.

7 STATISTICAL MODELLING FOR QUANTIFYING CLUSTERING IN PALEOLITHIC ASSEMBLAGES: CHARACTERIZING HIGH-DENSITY AREAS OF ABRIC ROMANÍ QA

Merino-Pelaz, Amanda (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili (URV)) - Cobo-Sánchez, Lucía (The Interdisciplinary Centre for Archaeology and the Evolution of Human Behavior (ICArEH), Universidade do Algarve) - Saladié, Palmira (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili (URV); Unit Associated to CSIC, Departamento de Paleobiología. Museo Nacional de Ciencias Naturales) - Chacón, M. Gema (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili (URV); UMR 7194 - Histoire Naturelle de l'Homme Préhistorique (CNRS/MNHN/UPVD), Musée de l'Homme) - Vallverdú, Josep (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili (URV); Unit Associated to CSIC, Departamento de Paleobiología. Museo Nacional de Ciencias Naturales)

The detection of clusters in Paleolithic sites usually relies on visual methods lacking statistical significance (intensity analyses, K-means) or requiring quantified variables for mapping them (Getis-Ord G_i^* , Anselin Local Moran's I). Additionally, mixing high-density areas (where numerous remains accumulate in specific locations) with clusters (where those remains exhibit spatial statistical correlation) is common, complicating accurate clustering characterization within archaeological assemblages.

Fitting spatial data into explicitly formulated models is a robust statistical approach to better understand archaeological patterns. Modelling processes involve creating a representation that approximates the underlying pattern, obtaining several metrics (e.g., cluster strength, sibling probability) that assess its clustering degree. Unlike other methods, no estimation of individual clusters is required, providing a genuine approximation to the clustering of the pattern.

This study quantifies and characterizes clustering at a Neanderthal campsite in Abric Romaní's Qa stratigraphic unit (Spain). The excellent preservation and resolution of this unique settlement make it an ideal candidate. Bones, lithics, and overall patterns are modelled to discern differences among remains. Four fitting methods are tested to optimize modelling for Paleolithic assemblages. Finally, results are compared with other Upper Paleolithic campsites analogous in terms of functionality and preservation to reveal spatial behavior disparities between Neanderthal and Anatomically Modern Human (AMH) hunter-gatherers.

Results indicate a medium to high clustering in Abric Romaní's Qa level. Bones exhibit stronger clustering, and mean distances suggest smaller lithic clusters. Significant differences between Abric Romaní and sites like Pincevent or Etiolles indicate more concentrated and isolated clusters among Upper Paleolithic campsites. This could imply greater structuring of the space among AMHs and differing social organizations between both groups, although it is currently unclear what those differences might entail. While site context and taphonomic processes may affect clustering, results are consistent with previous hypotheses regarding the differences in Neanderthals and AMHs spatial organization.

8 SPATIAL MODELING OF EXPERIMENTAL KNAPPING DISTRIBUTIONS: REFINING THE CHARACTERIZATION OF PALEOLITHIC ACTIVITY AREAS

Cobo-Sánchez, Lucía (The Interdisciplinary Centre for Archaeology and the Evolution of Human Behavior (ICArEH), Universidade do Algarve) - Merino-Pelaz, Amanda (Institut Català de Paleoeologia Humana i Evolució Social (IPHES); Universitat Rovira i Virgili) - Arteaga-Bribea, Andion (Universitat Rovira i Virgili; Institut Català de Paleoeologia Humana i Evolució Social (IPHES))

Understanding spatial distributions of lithic artifacts within Paleolithic sites is essential for interpreting past human behaviors. A major challenge lies in accurately distinguishing between areas of high artifact density and true clusters. This is critical for identifying specific activity areas and their unique spatial signatures in the archaeological record. Our analysis of spatial patterns from experimental knapping aims to establish a reference baseline for precise comparisons with archaeological artifact distributions.

We selected 13 planimetries from published knapping experiments covering a range of raw materials, techniques, and knapper positions. Utilizing the inhomogeneous L-function along with statistical modeling techniques for cluster analysis, we examined spatial distributions to ascertain if high-density areas constitute actual clusters or are more accurately represented within an inhomogeneous Poisson pattern. Subsequently, we conducted a Hierarchical Clustering on Principal Components (HCPC) analysis with the derived cluster parameters to classify and compare experimental outcomes with knapping activity areas in the Upper Paleolithic sites of Etiolles and Pincevent, assessing if these experiments spatially align with archaeological lithic assemblages.

Results reveal that experimental lithic distributions exhibit strong clustering, despite L-functions being unable to capture agglomerative tendencies at short distances. For Etiolles, the delimited knapping areas significantly diverge from the experimental reference sample, aligning more closely with inhomogeneous Poisson patterns, suggesting potential factors not captured in the experiments, such as taphonomic processes or movement of lithics to other areas.

Conversely, the clustering observed at Pincevent resembles that of the experimental data, indicating consistency in knapping practices between the experiments and this site.

This study sets a comparison baseline for identifying knapping areas in archaeological contexts, enhancing intra-site spatial analysis, and advancing our understanding of early human activities. Future research should aim to incorporate greater experimental variability to increase the accuracy and robustness of these analyses.

9 TWO METHODS AND TWO SITES: A COMPARISON OF INTRA-SITE SPATIAL ANALYSIS METHODS AT TWO LATE PLEISTOCENE OPEN-AIR SITES

Clark, Amy (Harvard University)

One of the difficulties with intra-site spatial analysis is that the methods utilized are often site specific. There are numerous reasons for this, including site formation processes, type of features, characteristics of the excavated remains, and the nature of the recorded data. Methods that are tailored to a single site can often be very productive and reveal patterns not otherwise detectable. However, there is also a need for methods which serve to directly compare the spatial patterning at multiple sites. In my own intra-site analysis of open-air Paleolithic sites, I strove to develop methods which could be applied at numerous site types. These methods helped me to understand the formation of spatial patterning through onsite lithic production and use. However, because I was focusing on data pertaining to lithic density and lithic refitting, these methods could not provide information on other types of behaviors. In this presentation, I will contrast my own methods with those developed by Todd Surovell for the terminal Pleistocene site of Barger Gulch in Wyoming. Surovell focused on the relative frequencies of burned artifacts which provided information about hearth use, cleaning, and the existence of structures – very different kinds of information from those yielded by my own methods. To explore the relative merits of these two methods, and to see what they reveal about spatial organization, I apply my methods to Barger Gulch, and Surovell's methods to Landry, a Solutrean site which produced particularly clear results from my own analysis.

10 DEVELOPING STANDARDISED GEOSPATIAL ANALYSIS PROCEDURES: A METHODOLOGICAL FRAMEWORK FROM THE LOWER GALLERY OF LA GARMA (SPAIN)

García-Noriega, Carlos (University of Cantabria; International Institute for Prehistoric Research of Cantabria (IIIPC)) - Portero, Rodrigo (University of Salamanca) - Ruiz-Cabanzón, Alba (University of Cantabria; International Institute for Prehistoric Research of Cantabria (IIIPC)) - Ontañón, Roberto (International Institute for Prehistoric Research of Cantabria (IIIPC); Prehistory and Archaeology Museum of Cantabria) - Arias, Pablo (University of Cantabria; International Institute for Prehistoric Research of Cantabria (IIIPC))

In the digital era, our ability to manage and analyse large volumes of data has increased significantly, allowing for complex computational processes. However, we still face the lack of a standardised and accessible method that offers a uniform system for the collection, management, preservation, and analysis of data, adaptable to any type of research. To address this need, this paper introduces an innovative methodology for the collection and analysis of archaeological geospatial data, with a special focus on the floors of two Palaeolithic structures, I-A and I-C, from the Lower Gallery of La Garma (Cantabria, Spain). The main objective is to establish a methodological guide that integrates advanced digital techniques and open source-based programming, aiming to standardise the collection and analysis of geospatial data, providing tools for the development of customised methods and the automation of analytical processes.

The results include the development of a robust and adaptable method, applicable both in the field and in the laboratory, and designed to meet specific needs in geospatial characterisation, management and analysis. This methodology is presented as an accessible model, integrating advanced in situ spatial analysis techniques such as Ring and Sector analysis, Kernel analysis, Moran I spatial autocorrelation and clustering techniques. The effectiveness and robustness of this method are reinforced by its foundation in open-source software and the support of a large user community, ensuring its sustainability and continuous improvement.

11 3D RECONSTRUCTION AND SPATIAL ANALYSES: AN INTEGRATED APPROACH TO EXPLORE THE PALAEOLOGIC USE OF LIVING SPACE AT SAMBUCCO CAVE (ITALY)

Pizzolo, Giovanna (University of Siena - Department of History and Cultural Heritage) - Tessaro, Carlo (University of Siena - Department of History and Cultural Heritage) - Faraoni, Matteo (University of Ferrara Dipartimento di Studi Umanistici - Sezione di Scienze Preistoriche e Antropologiche) - Galiberti, Attilio (University of Siena - Department of History and Cultural Heritage)

The paper discusses some experiences related to intra-site analysis and 3D reconstruction of the Grotta del Sambucco, a cave inhabited by Man since the Upper Palaeolithic. The cave is located in Massa Marittima (Grosseto District, Central Italy) and is accessible through a central conoid. The cavity was formed due to the collapse of the vault's summit in ancient times opened in a travertine formation. Over the millennia, the conoid has allowed not only the en-

trance of Man but also, by water, of various materials that have formed the whole archaeological deposit, comprising a series of layers, ranging from the Historic period to Prehistory (Neolithic and different phases of Upper Palaeolithic: Gravettian and Epigravettian).

The recording activities of the excavation recently include the acquisition of the vault and base of the cave through three-dimensional documentation. This need had arisen with regard to the development of the intra-site GIS aimed at a contextualisation of the prehistoric paleosurfaces within the cavity.

The integration of features related to different categories of finds and layers in a three-dimensional space has been accomplished. This process allows for the identification of cluster distributions and possible functional focus. The characterisation of these areas can provide greater insight into the human activities that took place in the cave. Moreover, one goal of this integrated approach is to split up, decompose and recombine the archaeological palimpsests in a dynamic way.

In this perspective, we need to reconstruct the internal layouts of the cavity to investigate the dynamic of the hypogeal environment. Such virtual reconstruction, obtained through photogrammetry, allows us to explore the morphological characteristics that set the scene for the interaction between Man and cave during the Upper Palaeolithic. In this way we can set up an integrated system to analyse site formation processes, palimpsests, and Upper Palaeolithic behaviours.

556 EXPLORING ANCIENT SOLUTIONS FOR MODERN CHALLENGES: ARCHAEOLOGICAL INSIGHTS INTO FOOD SYSTEMS AND ADAPTATIONS TO CHANGING ENVIRONMENTS

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Depaermentier, Margaux (Vilnius University, Faculty of History, Department of Archaeology, Lithuania) - Kempf, Michael (University of Basel, Department of Environmental Sciences, Quaternary Geology, Switzerland) - Motuzaite Matuzeviciute Keen, Giedre (Vilnius University, Faculty of History, Department of Archaeology, Lithuania) - Spengler, III, Robert (Max Planck Institute of Geoanthropology)

Session format: Session with presentation of 6 slides in 6 minutes

The world is facing intensified rates of adverse climate and environmental change, population growth, and food insecurity. However, challenges that face us today are not totally new and many past societies have struggled with similar issues. But perspectives from the past remain underutilized. In this context, studying human-environment interactions, subsistence strategies, and human and plant response to changing environmental conditions is the most obvious way for archaeology to contribute to the global quest for sustainable solutions to cope with current challenges.

In this session, we are seeking to put together interdisciplinary studies that investigate past food systems in the light of deteriorating paleoclimatic and paleoenvironmental conditions. We focus on two major directions:

- 1- Which methods, models, and datasets are actually suitable to investigate system changes (i.e., the introduction or abandonment of crops, a shift to new agricultural strategies)?
- 2- What are examples of past system changes and how can these contribute to current debate on food security and adaptation to changing environmental conditions?

Building on these two pillars, we would like to discuss perspectives in interdisciplinary palaeoenvironmental archaeology and archaeobotany.

We appreciate a balance between local, regional, and supraregional studies to integrate various spatial scales into the discussion. Diachronic studies are particularly welcome to investigate transformation processes over time.

ABSTRACTS

1 DOMESTICATING EARTH: RETHINKING THE ORIGINS OF AGRICULTURE

Spengler, Robert (Max Planck Institute of Geoanthropology)

The origins of agriculture have long been depicted as one of the greatest innovations of humanity, a humanist approach that rose to prominence in archaeology during the latter half of the twentieth century. During this time, several push and pull models for the origins of agriculture were developed, all of which were formulated as responses to the question of “why humans invented farming”. Models that rely on ecological principles, protracted processes, and an unconscious role for humans have gradually replaced this conscious view of agriculture. Over the past twenty years, a new array of theories regarding the processes that drove early agriculture have been published. Despite the recognition of an overarching change in views, there has been little discussion about the ways these new views can impact modern plant breeding programs, including attempts at resurrecting lost crops or breeding new crops de novo.

Additionally, the new understanding of early domestication should feed into conservation programs, especially in relationship to anthropogenic-driven evolution or attempts at rewilding ecosystems. In this talk, I will explore some of the assumptions that persist about what early domestication looked like and how these ideas are hindering attempts at making agriculture more sustainable today.

2 THE HOLOCENE CLIMATE AFFECTING ANCIENT CULTURES IN THE STEPPE BELTS OF UKRAINE

Gerasimenko, Natalia (Taras Shevchenko National University of Kyiv)

Material cultures in the steppe of Ukraine were significantly affected by climatic changes, which have been reconstructed based on pollen and soil studies at 27 archaeological sites. The Neolithic developed first (after 8.2 ka) in the west of present-day steppe, which had then a benign environment: broad-leaved woodland on Phaeozems and mesophytic steppe on Chernozems. The heyday of the Trypillia culture (the beginning of the IV M BC) also corresponded to the spread of forest-steppe in the modern steppe under rather humid climate. After 5200 BP, aridification and cooling led to the northward spread of steppe which at the beginning of the III M BC (the driest phase), penetrated even to the west of the modern forest-steppe. The final decline of the Trypillia agriculturalists happened then.

The economies of the Bronze and Early Iron Age were strongly controlled by climate. During the wet phases of 4600-4300 BP and 3500-3000 BP, forest-steppe spread south, steppe was mesophytic, and plant farming existed in the modern dry steppe. During the arid phases of 4200-3600 BP and 2900-2700 BP, xeric steppe with Kashtanozems existed, and only temporary camps of cattle breeders occurred in the modern chernozem grassland. The wet phase of 2700-2300 BP supported the mesophytic steppe of the Scythians and the plant farming of Greek colonies. During the warm arid phase of 2200-1800 BP, grassland and the nomadic Sarmatian tribes spread far north within the modern forest-steppe. The environments of the climatic phases are reconstructed on the maps.

3 THE MODEL AND THE BEAST: ARCHAEOLOGY IN LIGHT OF A SUSTAINABLE FUTURE

Kempf, Michael (University of Basel)

Buzzwords like sustainability are currently everywhere in the sciences, leading to the assumption that we all perfectly know what we are talking about. But the more complex the topic the more simplified the discussion because lack of basic knowledge only leads to simplification and not greater knowledge. In science we are, however, inherently dependent on expert knowledge, particularly in current geopolitical, geoeconomic and geosocial agenda. In such reality, current mega-crisis, like climate changes or the desperate search for a sustainable future found their way into all disciplines across the sciences and the humanities – with growing debate on what each discipline can contribute to the challenges the world is facing. Particularly in archaeology, we are dealing with deep-time and deep-space analyses on various scales with multiproxy datasets. That sounds and often is overwhelming. Ultimately, we subset into subdisciplines, coming from and increasingly merging into the environmental sciences, e.g., bioarchaeology, geoarchaeology, or environmental archaeology. But the boundaries between these subsets are not always clear cut or straightforward. Working with environmental data in archaeology is highly recommended but does not make the entire process a detailed environmental analysis. All too often, environmental data (whatever that actually is) is used as canvas via push-button applications to model a pattern against a background variable. Without understanding the variable's internal noise and variation, however, this becomes a challenging endeavour if conclusions want to be drawn from past socio-environmental variability towards future projections. In this paper, I want to address overarching environmental and economic driving factors that are inherently linked to past socio-cultural development on multiple time and spatial scales and to critically reflect on the contribution of archaeology to the current concept of sustainability.

4 BROOMCORN MILLET, A TAIL OF RAPID DISPERSAL IN HISTORY, ECOLOGICAL ADVANTAGES FOR FOOD SECURITY IN A WORLD OF RISING TEMPERATURES

Zach, Barbara (Max Planck Institut of Geoanthropology, Jena, Germany) - Spengler, Robert (Max Planck Institut of Geoanthropology, Jena, Germany) - Fernandes, Ricardo (Max Planck Institut of Geoanthropology, Jena, Germany; Masaryk University, Brno, Czech; Princeton University, US)

Food security is one of the five fundamental needs of humanity, encompassing access to adequate sustenance, clean water, shelter, clothing, and heating fuel. Throughout history, food storage has been crucial for survival. Cultivating food plants and achieving surplus harvests have played pivotal roles in enhancing food security.

Among the earliest domesticated grass species is broomcorn millet (*Panicum miliaceum*). Archaeobotanical evidence indicates that its cultivation began simultaneously at sites across northern China around 5800 calBC, with full domestication traits, such as increased seed size, evident by 3300 calBC. Yuezhuang in Shandong stands as the oldest site with clearly domesticated broomcorn millet, dating back to 5876-5718 calBC. The emergence of sedentary lifestyles and small-scale villages approximately 6,500-5,000 years ago coincided with the earliest evidence of domesticated crops at sites like Cishan, Dadiwan, and Peiligang.

The rapid dispersal of broomcorn millet from its region of origin in today's North China to Inner Asia to Europe during the Late Bronze Age raises questions. Modelling based on directly dated millet seeds reveals it to be among the quickest dispersing traits in the ancient world. Its spread followed an ecological belt from east to west, diffusing through established farming communities across West Asia and Europe at an average rate of 5.3 km per annum. In contrast, estimates suggest that Neolithic peoples took approximately 4,000 years to disperse from the Fertile Crescent to regions like central Spain and southern Scandinavia by 5,000 years ago.

Unlike wheat, barley, rye, oats, maize, and other grass-derived crops, broomcorn millet exhibits unique ecological demands, thriving in warm, dry climates and poor soils. This specialization facilitated its rapid adoption by developed agricultural communities along its westward expansion, contributing to food security. These ecological advantages hold significant potential in a world grappling with rising temperatures.

5 MOUNTAINS - A LAND OF FARMING? THE EXAMPLE OF CEREAL CROPS IN THE WESTERN ALPS DURING LATE PREHISTORY

Martin, Lucie (University of Geneva, laboratory of Prehistoric Archaeology and Anthropology; University of Savoie Mont-Blanc, UMR 5204 EDYTEM)

Today, cereal crops have almost disappeared from the western Alps, whereas less than 100 years ago they were part of the landscape. Today, the Alps are largely devoted to tourism, and agriculture is largely dominated by livestock farming. With a few exceptions, cereal crops are represented by little more than small fields of rye, set against a backdrop of snow-capped peaks.

And yet, from the appearance of the first Neolithic agropastoral communities in southern Europe, the Alps, including the inner valleys, were occupied and cultivated, even at altitude. Numerous cereals have been found in occupations dating back to 5200-5000 BCE: barley, einkorn, emmer, naked wheat, and later spelt and millet. Far from the clichés of isolated lands unsuitable for agriculture, the mountains were in fact exploited very quickly in this sense, and even early on, with a diversity that has nothing to envy of the large-scale cultivation of the fertile plains.

Archaeobotany and isotopic biochemistry are invaluable tools for addressing both the presence of cereals on alpine occupations and agrarian practices (fertilization and irrigation). Using data from bioarchaeology, this paper will attempt to show that mountain environments offer a very good example of adaptation to sometimes extreme climatic conditions.

With global warming having a major impact on glaciers and the Alpine environment in general, we may well ask ourselves what use these mountain lands should be made for: what if ski slopes (re)became cereal fields?

6 TOWARDS A DIACHRONIC VISION OF CORSICAN CAPRINES HUSBANDRY SYSTEMS

Fabre, Mélanie (National museum of natural History, UMR 7209 AASPE: Archaeozoology, Archaeobotany: Societies, Practices and Environments) - James, Hannah (Research Unit: Analytical, Environmental & Geo-Chemistry, Dept. of Chemistry; Maritime Cultures Research Institute, Dept. of Art Sciences and Archaeology Vrije Universiteit Brussel, Belgium.) - Vigne, Vianney (National Institute for Preventive Archaeological Research – Midi Méditerranée TRACE UMR 5608; TRACE UMR 5608) - Ranché, Christophe (National Institute for Preventive Archaeological Research – Midi Méditerranée TRACE UMR 5608; TRACE UMR 5608) - Istria, Daniel (Aix Marseille Univ, CNRS, LA3M, Aix-en-Provence, France) - Fiorillo, Denis (National museum of natural History, UMR 7209 AASPE: Archaeozoology, Archaeobotany: Societies, Practices and Environments) - Snoeck, Christophe (Research Unit: Analytical, Environmental & Geo-Chemistry, Dept. of Chemistry; Maritime Cultures Research Institute, Dept. of Art Sciences and Archaeology Vrije Universiteit Brussel, Belgium.) - Cucchi, Thomas (National museum of natural History, UMR 7209 AASPE: Archaeozoology, Archaeobotany: Societies, Practices and Environments) - Vigne, Jean-Denis (National museum of natural History, UMR 7209 AASPE: Archaeozoology, Archaeobotany: Societies, Practices and Environments) - Balasse, Marie (National museum of natural History, UMR 7209 AASPE: Archaeozoology, Archaeobotany: Societies, Practices and Environments)

Nowadays, the caprine farming system in the Mediterranean island of Corsica is mostly oriented toward sheep milk production. Sedentarized on the coastal plains, this dairy farming is governed by a specific calendar, with most births scheduled for autumn, to provide milk in winter, i.e. out of season. However, the pre-industrial dairy system was characterized by mixed herds of both sheep and goats, with the main birth season in late winter for sheep and autumn for goats, and more importantly: a transhumance between littoral plains and inland mountains. This recent change raises questions about the long-term permanence of so-called traditional zootechnical systems, dependent on socio-economic and environmental factors. This purpose requires a long-term approach, and in this respect, we combined osteological analyses, and isotopic analyses of tooth enamel on two Neolithic sites (Araguina-Sennola and Montlaur, 5th – 3rd cal BC) and two medieval sites (Rostino and Litala, 14th century). The former, construction of caprines mortality profiles, reveals demographic management and production orientation. The latter, the sequential oxygen (seasonal marker), carbon (vegetation marker) and strontium (geological marker) isotope ratios analyses enable us to

respectively determine the birth season, feeding variability and flock mobility from a single tooth sample. Our findings show that while the production orientation and the calendar of births vary according to socio-economic factors, from the Neolithic period to industrialization, livestock farmers have adapted their zootechnical systems to the contrasting climates and landscapes of the Mediterranean thanks to seasonal mobility. A diachronic vision is necessary to encompass the nonlinear, long-term trajectory of husbandry systems in the Mediterranean area. Such an understanding of the adaptation of past pastoral practices can help broaden zootechnical scenarios for adapting livestock farming to current changes, such as the use of transhumance during the summer, which is locally a multi-millennial response to heat.

7 UNRAVELING THE RELATIONSHIP BETWEEN PALEOCLIMATIC CHANGES AND BROOMCORN MILLET CULTIVATION IN NORTH-EASTERN AND CENTRAL EUROPE

Abdrakhmanov, Meirzhan (Vilnius University, Faculty of History, Department of Archaeology) - Jacob, Jérémy (Laboratoire des Sciences du Climat et de l'Environnement) - Pokorný, Petr (Center for Theoretical Study, Charles University & Czech Academy of Sciences) - Gauthier, Caroline (Laboratoire des Sciences du Climat et de l'Environnement) - Motuzaitė Matuzevičiūtė, Giedrė (Vilnius University, Faculty of History, Department of Archaeology)

In recent years, molecular biomarkers have garnered significant attention for their utility in tracing past human land use, particularly in the context of agricultural activities, where conventional methods often yield limited information or are hampered by the absence of settlements and macrobotanical remains. Concurrently, the analysis of sediment records has emerged as a pivotal approach in investigating the intricate correlation between past agricultural practices and climatic conditions. Our methodology is centered on understanding the complex interplay between paleoclimatic conditions and the cultivation of broomcorn millet (*Panicum miliaceum*) in northeastern and central Europe. In this context, the miliacin, a pentacyclic triterpene methyl ethers found abundant in broomcorn millet, can serve as a tracer of its cultivation.

We seek to address the three main questions regarding the insights gleaned, or limitations encountered, from miliacin in sediments:

1. What insights can be derived from miliacin records about the timing and intensity of millet cultivation?
2. Can we correlate the millet cultivation fluctuations and paleoclimatic conditions throughout different historical periods?
3. What are the limitations and challenges associated with reconstructing past climate conditions and their relation to millet cultivation?

Understanding the past environmental conditions under which millet was cultivated and subsequently abandoned could offer valuable insights into the ongoing discourse about future sustainable agriculture in the face of predicted global climate change.

8 POLYCULTURE OF CEREALS IN VILLAMAGNA (MARCHE REGION, ITALY): A RESILIENT CHOICE AT THE DAWN OF THE LATE ANTIQUE

Carmenati, Riccardo (University of Macerata) - Fiorentino, Girolamo (University of Salento) - Perna, Roberto (University of Macerata)

The Roman villa of Villamagna, in the Marche region (central Italy) at few kilometres from the Roman colony of Pol-lentia-Urbs Salvia, is one of the most investigated historical regional contexts for archaeobotanical analyses. More than twenty-six thousand macroremains were analysed covering a long period between the 1st century BC and the 7th century AD.

The study of seeds and fruits has highlighted a marked change in cereal crops cultivation since the beginning of the 5th century AD: until the 4th century AD we find mainly *Triticum* and *Hordeum* but, from about 420, *miliaceae* caryopses are prevalents.

The cross-study of archaeological context and archaeobotanical data, allow us to insert the area of Villamagna and central Piceno within the cultural context of northern Italy during the roman and Late Antique periods, where polyculture of cereals and the massive presence of caryopsis of *Setaria* and *Panicum* are attested.

The adaptive and resilient strategy adopted at Villamagna in the 5th century AD can be tentatively associated also to the LALIA climate variation, but we need further isotopic analysis.

9 FOOD SECURITY THROUGH CROP DIVERSIFICATION: FRUIT AND NUT CULTIVATION IN MEDIEVAL CENTRAL ASIA

Mir Makhamad, Basira (Domestication and Anthropogenic Evolution Research Group, Max Planck Institute for Geoanthropology, Department of Archaeology; Ancient Oriental Studies Department, Friedrich Schiller University) - Spengler III, Robert (Domestication and Anthropogenic Evolution Research Group, Max Planck Institute for Geoanthropology, Department of Archaeology)

Central Asia encompasses nearly 4 million hectares of diverse ecosystems, serving as a crucial germplasm reservoir for many local nut and fruit crops and their progenitors. This region serves as a center of origin and harbors remarkable genetic diversity for at least eight economically significant fruit and nut species, thus boasting highly diverse gene pools of global significance. Intensive arboriculture in Central Asia appears to have started in the foothills, particularly in the foothills, as early as the end of the first millennium CE, characterized by a dry climate in southern Central Asia. Available paleoenvironmental studies indicate that a marked decrease in precipitation began in the second half of the first millennium CE and reached its lowest point in the tenth to eleventh centuries CE. Concurrently, archaeobotanical data suggests that agricultural diversification began in the region as early as the fifth century CE, characterized by significant arboriculture development; however, the proliferation of the most variable crops occurred during the tenth century CE. Crop diversification correlates with urbanization, large-scale trade, and the development of political hierarchies. However, this discussion seeks to broaden the temporal perspective, discussing crop diversification as a response to environmental changes. It is plausible, that faced with dwindling precipitation and other environmental stressors, communities turned to cultivating an array of long-generation perennials and more diverse annual crops. This diversification expanded dietary options and bolsters food security amidst challenging conditions.

10 QUINOA AND THE POLITICS OF THE NEGLECTED AND UNDER-UTILIZED CROP

McDonell, Emma (University of Tennessee, Chattanooga)

During an era of growing concern about the impact of global climate change on food supply, agricultural development agencies have turned their attention to so called “neglected and under-utilized species” (NUS) as key tools for adapting regional food systems to climate extremes. The NUS discourse, which began developing in the 1980s, was initially based on a critique of the green revolution development paradigm and its reliance on only a small number of crop species. NUS proponents advocated for more research on the many crop varieties that had been excluded from agricultural research and that had potential to help solve development problems. While the NUS discourse began as an alternative development paradigm, today some of the most powerful international development institutions, from the World Bank to the UN Food and Agriculture Organization, now promote NUS as climate change adaptation tools. This paper traces the historical construction of quinoa as an NUS and the conflicting visions of quinoa’s development potential. Exploring the historical development of a powerful socio-technical network surrounding quinoa, the tensions between different ideas about what proper “utilization” might look like, and the ways the quinoa boom and bust revealed contradictions between different visions of quinoa’s future, this paper offers a critical reflection on the role of NUS. It argues that while these species certainly offer useful tools for adapting agricultural systems, we should not see them as simply as technical solutions, and instead need to foreground questions of power and access.

11 LONG-LIVED LANDSCAPE MANAGEMENT IN THE LAKE TITICACA BASIN, BOLIVIA

Hastorf, Christine (University of California Berkeley) - Bruno, Maria (Desert Research Institute) - Capriles, José (Pennsylvania State University)

The Andean high plain is a cool, steppe location of early domestication and residence. There, both important plants, such as the potato and quinoa were domesticated as well as the camelids, llama and alpaca. Once the Holocene began, plants, animals and people moved in, to reside in the diverse lake shore/valley zone. Topographic, archaeological and ecological investigation at the early monumental center of Chiripa, Bolivia by the Taraco Archaeological Project sheds new light onto a complex palimpsest of long-term management and interaction with the surrounding area, especially the lake and its marshes. A multidecadal-scale lake-level reconstruction for the southern basin lake (Wiñaymarka) based on diatoms, situates the sequence of interaction, that allow us to track the resident’s interactions with changing wetlands, springs, lake and terrestrial resources as people settled on the landscape and became farmers, herders and fisherfolk. We present this complex landscape by examining several hydraulic features modified by generations of Chiripa residents on the lakeshore, streams, and raised-fields in addition to the evidence for fishing and agriculture throughout the pre-hispanic time frame. This evidence reveals a dynamic history of lake engagement, from the first settlement up to the present-day Chiripa residents.

"TAKE ME TO THE PAST": NEW CIRCULAR FOOD SYSTEMS FOR AN AGRICULTURAL TRANSITION FROM HISTORICAL INSIGHTS

Teira-Brión, Andrés (University of Oxford) - Groba, Mercedes (EIT Food; University of St. Andrews)

Farmers have always tried to maximise the use of available resources. Although over time there have been advances in technology, the evolution of farming techniques and even changes in the labour force, either products, by-products or waste have been incorporated into the food system.

Historical food systems broke down with the advent of market agriculture. The circular model transitioned to a linear production-consumption-waste model. A model that requires high inputs of fertiliser, pesticides, herbicides, and irrigation to ensure high yields. From the circularity of production, we move to the circularity of profit. The control of the production chain, with the sale of patented seeds and the crops within established distribution circuits, was intended to ensure customer loyalty and guarantee revenues. However, linear production has harmful consequences, such as soil pollution, depletion of water resources, loss of biodiversity, effects on the climate and, moreover, endangers food security on a planet that is growing out of control.

In the past, the cultivation of local crops - landraces - and the management of wild plants, reduced uncertainty in greater flexibility in food supply, reduced uncertainty in the production of surpluses and opened a window for the use of diverse landscapes/seasons. The recovery and breeding of landraces, together with practices to maintain soil health, can address the pressing concerns of food-security, sustainable agriculture and the EU's policies aimed at achieving climate neutrality by 2050, by improving and reducing the impact on ecosystems and increasing alternative plant-based products on the markets. Through this presentation, we aim to identify some challenges of circular production models and explore basic solutions to enhance urban-rural integration through food supply chains.

PAST, PRESENT AND FUTURE FARMING SYSTEMS: A PERSPECTIVE FROM THE CROPREVIVE PROJECT

McClatchie, Meriel (University College Dublin) - Collins, Adam (University College Dublin) - Negrão, Sónia (University College Dublin) - Vargas Sielfeld, Sofia (University College Dublin)

The CROPREVIVE project is examining the extensive archaeological evidence for farming in ancient Ireland and merging findings with data from modern farming systems to help plan for the future. The project focuses on three crops that were popular in the past, but have fallen from favour in Ireland: emmer wheat, rye and peas. These crops have great potential because they are nutrient-dense, suited to European climates and environments, and viable for sustainable production. The project aims to determine how these crops became underutilised, and how they can be revived. This requires interdisciplinary and intersectoral collaboration and consultation, working with archaeologists, farmers, seed merchants, agronomists, economists, food processors and producers, and state agencies. The Croprevive project is mapping where and in what circumstances these crops were successfully grown and continue to be grown, and where they have disappeared. This is intended to help farmers learn what was grown in their area beyond community memory, enable farmers to foster a reconnection with these 'lost' crops and encourage more sustainable farming practices into the future. The CROPREVIVE project is funded by the Irish Research Council Coalesce Scheme. For further information, see the project website, <https://www.ucd.ie/archaeology/research/croprevive/>.

EXPLORING THE SPREAD OF MILLET TOWARDS NORTHERN EUROPE

Pospieszny, Lukasz (University of Gdansk; University of Bristol) - Depaermentier, Margaux (Vilnius University) - Kolaczek, Piotr (Adam Mickiewicz University) - Kempf, Michael (University of Basel; Vilnius University) - Motuzaitė Matuzeviciute, Giedre (Vilnius University)

Millet is receiving increasing attention in research focused on past, current, and future contexts. Besides being a highly nutritious and healthy crop, millet is drought-resistant, salt-tolerant, heat-tolerant, and has better water use efficiency than most crops cultivated in Europe. It is therefore considered a well-suited crop to adapt to changing climatic conditions and to meet the food requirements of an ever-growing population. In current agricultural and food sciences across Europe, the focus is on the southern regions. This study aims to integrate Northern European regions into this discussion and provide new perspectives on the spread of millet and its possible (re-)introduction further north. To achieve this, the ERC-funded project "MILWAYS – Past & Future Millet Foodways" combines various approaches to explore the introduction processes of millet in Northern Europe, starting from Poland in the Middle Bronze Age (15th century BC). By using carbon and nitrogen stable isotope measurements in human bone and dentine collagen, paired with radiocarbon dates and compared with the distribution of radiocarbon dated charred millet grains, we can track the spread of millet consumption and/or cultivation with high temporal resolution and on the long-term perspective. Isotope data derived from dentine and dental enamel of these Middle Bronze Age societies and the archaeological context further highlight the socio-cultural background of millet spread and (non-)adaptation. Moreover, the integration of multivariate environmental and climatic records into the analyses enables tracking potential correlations between changes in climate and the environment and transformations in prehistoric subsistence

strategies. The combination of multiple proxies not only produce new insights into millet dispersal across Bronze Age Europe but also forms the basis for modeling potential areas that are or will be suitable for millet cultivation under present and future climatic conditions.

NEW FRONTIERS IN STABLE ISOTOPE RESEARCH OF BIOARCHAEOLOGICAL REMAINS: PROGRESS AND PITFALLS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Soncin, Silvia (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAREA) centre, Sapienza Università di Roma, Rome, Italy) - Coccozza, Carlo (Department of Archaeology, Max Planck Institute of Geoanthropology, Jena, Germany) - Fernandes, Ricardo (Department of Archaeology, Max Planck Institute of Geoanthropology, Jena, Germany; Faculty of Archaeology, University of Warsaw, Warsaw, Poland; Faculty of Arts, Masaryk University, Brno, Czech Republic; Climate Change and History Research Initiative, Princeton University, Princeton, USA) - Craig, Oliver (BioArCh, Department of Archaeology, University of York, York, UK) - Tafuri, Mary Anne (University of Rome La Sapienza)

Session format: Session with keynote presentation and discussion

Stable isotope analysis on bioarchaeological remains is a powerful tool offering unprecedented insights into lifeways, economies, and environmental living conditions of ancient human populations. Advancements in analytical protocols and mass spectrometry, coupled with reduced costs of analysis, have increased awareness of isotopic proxies in archaeology. However, following exponential growth there is now increasing recognition of their inherent interpretative limitations.

As a result, isotopic research has necessitated venturing into new avenues of investigation. For example, compound-specific stable isotopes of collagen amino acids have proven effective in delineating the contributions of various dietary sources at a high resolution, mitigating well-known constraints associated with bulk analysis. Calcium and zinc stable isotopes measured in tooth enamel or bone bioapatite offer a valid alternative to detect specific food components. The meta-analysis of large volumes of isotopic measurements enhanced by advanced modelling tools, have enabled the exploration of past dynamics at different spatio-temporal scales. These examples represent just a glimpse of the ongoing developments in this evolving field.

Although great leaps have been made methodologically, it is essential to acknowledge that these novel techniques introduce new uncertainties, primarily due to our limited understanding of their fundamental mechanisms and the scarcity of comparative data. Additionally, the high costs and lengthy analysis times, coupled with a lack of readily available analytical facilities, pose considerable challenges.

In this session, we aim to promote a fruitful dialogue among archaeologists who are applying innovative isotopic approaches to address old and new archaeological questions. We aim not only to learn from successful applications but also to provide a platform for addressing emerging challenges associated with these new methodologies. This will foster a meaningful discussion regarding the past and future of the archaeological stable isotope research.

ABSTRACTS

COMPOUND SPECIFIC ISOTOPE ANALYSIS OF AMINO ACIDS FROM HUMAN BONE COLLAGEN: WHY BOTHER?

Craig, Oliver (BioArCh, University of York)

It has been three decades since the first stable isotope study of amino acids from ancient human bone collagen was published. Such compound specific isotope analyses (CSIA) have promised much. In theory, amino acids can be traced to dietary components with much greater certainty than bulk protein offering more detailed insights into ancient diets. Yet, in practice, it is noticeable that CSIA has not seen the meteoric rise that early proponents predicted and the approach has yet to find routine application. This is partly due to the longer analysis times, higher costs and requirements for specialist instrumentation and expertise. Indeed, some have questioned whether the investment justifies the reward. Does CSIA really provide information above and beyond what can already be easily obtained through bulk isotopes?

Here, I will outline some of the reasons why I think it is worth 'bothering' with this technique. Drawing upon a range of case studies, mainly focused on coastal populations with partial aquatic diets, I will show how isotope variation at the amino acid level, at the very least, provides greater certainty to our estimations. Furthermore, in certain cases, I argue that interpretations based on bulk collagen not only lack resolution needed to address the research question posed, but are misleading. I will propose a strategy for the most efficient deployment of CSIA so that major gains can

be quickly made, and outline where our theoretical knowledge, for example regarding metabolism, is still lacking and should be the focus for further study.

2 HIGH-RESOLUTION DIETARY RECONSTRUCTION OF PREHISTORIC POPULATIONS FROM KOREA USING COMPOUND-SPECIFIC STABLE ISOTOPE ANALYSIS

Choy, Kyungcheol (Department of Anthropology, Hanyang University ERICA) - Yun, Hee Young (Department of Marine Sciences and Convergence Engineering, Hanyang University ERICA) - Fuller, Benjamin (Department of Archaeology and Heritage Studies, School of Culture and Society, Aarhus University) - Mannino, Marcello (3Department of Archaeology and Heritage Studies, School of Culture and Society, Aarhus University)

In the last decades, bulk carbon and nitrogen stable isotope ratio analyses have become a common method to investigate dietary patterns and subsistence activities in ancient populations. Despite their importance for reconstructing palaeodiets, bulk isotopic results have limitations in dietary interpretations when various complex diets were consumed. Recently, compound-specific stable isotope analysis of amino acids (CSIA-AA) is applied to reconstruct more accurate dietary patterns and trophic position in past populations. Here CSIA-AA is applied to human (n=32) and animal (n=17) remains from the Mumun and Imdang archaeological sites in South Korea to reconstruct more accurately dietary sources in these prehistoric populations. The Mumun sites are all from the Middle Mumun Period (535-635 BC) and the Imdang site is from the Proto-Three Kingdoms Period (BC 80 - 394 AD). Along with CSIA-AA, the Bayesian mixing model MixSIAR is used to estimate the proportional contribution of different food sources for each individual. Results of estimated trophic positions (TP) show that Imdang people obtained dietary sources from both terrestrial and aquatic sources. All EAA proxies revealed that there is a different dietary pattern at Mumun and Imdang. The MixSIAR model output revealed that the Mumun humans had a high contribution from C4 plants. On the other hand, the Imdang humans consumed foods from diverse sources, mainly from terrestrial and marine animals. Our study demonstrates that all EAA proxies using CSIA-AA provide us with more detailed information on palaeodiets in ancient populations than bulk studies alone.

3 DIFFERENCES IN AMINO ACID CARBON ISOTOPE VALUES OF DOMESTIC AND WILD FAUNA, BUT HOW DO WE EXPLAIN THEM?

Smith, Colin (Laboratorio de Evolución Humana, Universidad de Burgos, Spain; Department of Archaeology and History, La Trobe University, Australia) - Crombie, Maddison (Department of Archaeology and History, La Trobe University, Australia; School of Geography, Earth and Atmospheric Sciences, The University of Melbourne, Australia) - Iriarte, Eneko (Laboratorio de Evolución Humana, Universidad de Burgos, Spain) - Valdiosera, Cristina (Laboratorio de Evolución Humana, Universidad de Burgos, Spain; Department of Archaeology and History, La Trobe University, Australia) - Galindo, Marian (Centro Mixto UCM-ISCIII de Evolución y Comportamiento Humanos, Spain) - de Gaspar-Simón, Ignacio (Departamento de Anatomía y Embriología, Universidad Complutense de Madrid, Spain) - Arsuaga, Juan Luis (Centro Mixto UCM-ISCIII de Evolución y Comportamiento Humanos, Spain; Departamento de Paleontología, Universidad Complutense de Madrid, Spain.) - Carretero, José-Miguel (Laboratorio de Evolución Humana, Universidad de Burgos, Spain)

There is a growing body of work using bulk stable isotope analysis specifically to investigate past animal management and feeding practices, as this can help us to infer aspects of ancient economic systems, resource availability, landscape use, attitudes towards animals and concepts such as wild and domestic animals. But can single compound specific approaches help with this research?

While contextualising some data from the Spanish Holocene site of the El Portalón de Cueva Mayor from the Sierra de Atapuerca, we noticed some unusual patterns in ^{13}C values of some amino acids obtained using LC-IRMS. Following this data driven approach, we cautiously propose some amino acid indicators that could potentially be used to differentiate wild and domestic fauna in some instances. We will also speculate on some explanations for the observed phenomena.

Compound specific stable isotope analysis of amino acids might be a useful path forward in this area, but it is a technically challenging endeavour, requiring advanced equipment and skills and determined approaches to data processing. We will discuss the advantages and disadvantages of this approach as well as perspectives on other aspects of research design that might improve stable isotope applications to archaeozoological research.

4 ISOMEMO: ADVANCING GLOBAL ISOTOPIC DATA THROUGH COLLABORATION AND INNOVATION

Fernandes, Ricardo (Max Planck Institute of Geoanthropology) - Hixon, Sean (Oregon State University) - Cocozza, Carlo (Max Planck Institute of Geoanthropology)

IsoMemo is a global network of autonomous isotopic data communities facilitating collaboration and data integration across various disciplines, including archaeology. Developed under the ethos of decentralization, IsoMemo adheres

to a distributive model where all partner databases are treated with parity, fostering an inclusive and equitable knowledge-sharing environment. This presentation will present recent and ongoing developments in the initiative.

Significant emphasis is placed on balancing the need for standardized isotopic data representation against the specific metadata requirements of each partner database. This has involved multi-tiered quality control measures and extensive dialogue with partner databases, ensuring high-quality, accurate, and comprehensive isotopic data sets.

IsoMemo's global scale carries profound implications for isotopic research, bridging geographical and disciplinary divides to make isotopic data universally accessible. This entailed the development of advanced software platforms, providing a variety of isotopic modelling tools that further the scientific analysis and interpretation of the integrated data.

The presentation will also highlight ongoing research projects relying on broad partner isotopic databases, reinforcing the significant potential of such a globally integrated isotopic network.

5 A BAYESIAN 'BIG ISOTOPIC DATA' CONTRIBUTION TO THE SOCIO-ECONOMIC IMPACT OF ROMANISATION

Cocozza, Carlo (Max Planck Institute of Geoanthropology; Ludwig-Maximilians-Universität München; Università della Campania) - Formichella, Giulia (Sapienza università di Roma) - Soncin, Silvia (Sapienza università di Roma) - Tafuri, Mary Anne (Sapienza università di Roma) - Lubritto, Carmine (Università della Campania) - Fernandes, Ricardo (Max Planck Institute of Geoanthropology; University of Warsaw; Masaryk University; Princeton University)

Isotopes have emerged as a crucial tool unraveling the complexities of ancient climates, lifeways, economies, and migratory patterns. Their efficacy significantly enhances when compiled into comprehensive databases, facilitating researchers in conducting robust comparative analyses and meta-analyses across different epochs and geographical areas. In our presentation, we pursue a 'Big Isotopic Data' approach to investigate the effects of Romanisation—a transformative process that generated profound cultural and economic shifts across the Roman Empire. Despite being a subject of extensive scholarly studies for many years, Romanisation continues to be a topic for debate and exploration.

By employing stable isotope data recovered from Isotopia and CIMA—two comprehensive isotopic databases for Antiquity and Medieval Europe and the Mediterranean—and using Bayesian models (<https://isomemoapp.com/>), we explore spatiotemporal shifts in food production, trade networks and dietary habits within the Roman Empire.

Our results suggest a large availability and consumption of wheat and terrestrial proteins, as well as marine resources, among communities incorporated into the empire. This trend seemingly diminishes during periods of crises and the empire's eventual decline. This points to the significant role that the cohesive socio-economic structure of the Roman Empire played in the subsistence practices of its inhabitants and how disruptions in political and economic stability impacted these practices. Our research also emphasizes the potential of re-using extensive isotopic datasets and merging these with archaeological and historical records through Bayesian analysis for identifying broad-scale human societal trends. This approach enhances the comprehension of complex historical transformations.

6 WHAT ARE WE MISSING? BIG DATA APPROACH TO ISOTOPIC DATA IN PREHISTORIC MEDITERRANEAN

Farese, Martina (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAReA) Centre, Sapienza University of Rome, Rome, Italy) - Soncin, Silvia (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAReA) Centre, Sapienza University of Rome, Rome, Italy) - Tafuri, Mary Anne (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAReA) Centre, Sapienza University of Rome, Rome, Italy)

Biological (human, animal and plant) remains represent an excellent proxy to answer archaeological questions on the cultural, social and economic evolution that interested our ancestors. Through the analysis of isotopic data, in particular, we are able to obtain direct information on time periods for which written sources are not present. Over the past 30 years, more than 300 studies dealing with stable isotope analysis in Mediterranean Prehistory have been published. However, many data gaps still need to be addressed, both time- and space-wise.

In this study, we focus on the use of Big Data approaches to frame and contextualise these gaps. A database has been built by collating isotopic data ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^{34}\text{S}$, $\delta^{18}\text{O}$ and $^{37}\text{Sr}/^{36}\text{Sr}$) available in the literature, obtained from archaeological sites encompassing the whole Mediterranean and dating from the beginning of the Neolithic to the end of the Iron Age (ca. 6000 - 600 BCE). This database - the Mediterranean Archive of Isotopic dAta (MAIA) - is now available in open access through the Pandora platform. By including 25,417 isotopic data (from human, animal and plant remains), MAIA allows us to investigate the state of isotopic research in the Mediterranean basin at a glance. It is possible to immediately pinpoint areas, like the Northern African shore, as well as time periods, like the Late Neolithic/Copper Age, lacking data. Even though we are aware that considerable factors can affect the investigation of

specific areas and materials, with this study, we want to promote isotopic research in those marginal areas as it would significantly improve our understanding of prehistoric lifeways.

7 INSIGHTS INTO HUSBANDRY PRACTICES USING STABLE ISOTOPES AND ZOOMS AT PHOENICIAN TAVIRA BETWEEN 8TH - 5TH CENTURY BCE

Paladugu, Roshan (Max Planck Institute for Evolutionary Anthropology) - Covaneiro, Jaqueline (Município de Tavira) - Cavaco, Sandra (Município de Tavira) - de Sousa, Elisa (Universidade de Lisboa) - Arruda, Ana (Universidade de Lisboa) - Warinner, Christina (Harvard University; Max Planck Institute for Evolutionary Anthropology) - Barrocas Dias, Cristina (Universidade de Évora)

Phoenician colonization of the Iberian Peninsula started in the 9th century BCE, with commercial activities and mineral resources being widely accepted as the main driving forces. The city of Tavira, located on the right bank of the Gilão River on the Southern Portuguese coastline, was a crucial urban nucleus and part of the Phoenician network during the 1st millennium BCE. While importing food and other manufactured products from other regions of the Mediterranean, Tavira was also a centre of commercial activities, including metallurgy and fishing. The animal husbandry at Tavira has received very little attention. The faunal remains of this study originate from two localities: antigo Parque de Festas and Travessa dos Pelames. Zooarchaeological analysis revealed that ovicaprids, cattle and pigs were the domesticated taxa. Red deer and rabbits are the only wild mammalian fauna recovered. The bird remains primarily consist of chicken bones. Zooarchaeology through Mass Spectrometry (ZooMS) was used to increase the taxonomic resolution of the traditional zooarchaeological analyses. Goats were more abundant than sheep amongst ovicaprids. Cattle and pigs were the next most species. Based on stable carbon and nitrogen isotope data, ovicaprids and cattle seem to be on a diet of vegetation enriched by artificial manuring. Pigs have stable carbon and nitrogen isotope values similar to cattle due to an herbivorous diet, a departure from the omnivorous diet reported in the Neolithic and Chalcolithic Periods. The differences from stable isotope data of domesticated fauna suggest a diverse management strategy for different species based on their economic importance and capitalizing on animal byproducts such as wool and dairy products.

8 ISOTOPIC EVIDENCE FOR NURSING, WEANING, AND CHILDHOOD DIETS AT A GREEK SICILIAN COLONY (7-5TH C. BCE)

Reitsema, Laurie (University of Georgia) - Gancz, Abigail (Pennsylvania State University) - Kyle, Britney (University of Northern Colorado) - Vassallo, Stefano (Soprintendenza BBCCAA di Palermo)

This study reconstructs aspects of weaning using stable nitrogen isotope ratios from bone collagen in order to investigate diversity in child rearing at a multicultural ancient Greek Sicilian city, Himera (7-5th centuries BCE). Fifty subadults under age 10 years and 26 adult females yielded nitrogen isotope ratios that were analyzed using the Weaning Age Reconstruction with Nitrogen Isotope Analysis (WARN) R statistical package, an approximate Bayesian computation model that deals explicitly with the problem of variable bone turnover rates in subadults.

Nitrogen isotopic enrichment of all young infants suggest breastfeeding was the normative practice for early infant care at Himera. Results suggest initiation of supplemental feeding around 3 months and cessation of weaning around 3.5-4 years. The total breastfeeding period at Himera, upwards of 3 years, is longer than the recommendations of ancient authors, longer than what is documented in ancient wet nurse contracts, and slightly longer than other Classical and Hellenistic Greek cities. Despite the general trends identified by quantitative modeling, there is considerable variability among subadults at Himera, suggesting coexistence of multiple childrearing practices.

Overall, the evidence points to some shared childrearing tendencies among ancient Greek cities, but also illuminates variability suggestive of the coexistence of multiple practices, which we discuss in the context of cultural hybridity in classical antiquity. We also discuss how different approaches to translating age-at-death ranges into single numbers influences results of quantitative models such as WARN, and the consilience between quantitative models for weaning chronologies and research questions that emphasize variation over generalization.

9 SULPHUR ISOTOPES IN BIOARCHAEOLOGY: NAVIGATING CHALLENGES AND EXPANDING INSIGHTS THROUGH THE CASE OF SLOVENIA

Leskovar, Tamara (Centre for interdisciplinary Research in Archaeology, Department of Archaeology) - Poročnik, Doris (Department of Environmental Sciences, Jožef Stefan Institute, Slovenia) - Ogrinc, Nives (Department of Environmental Sciences, Jožef Stefan Institute, Slovenia) - Snoeck, Christophe (Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, Belgium) - T. Gerritzen, Carina (Analytical, Environmental & Geo-Chemistry Research Unit, Vrije Universiteit Brussel, Brussels, Belgium) - Goderis, Steven (Analytical, Environmental & Geo-Chemistry Research Unit, Vrije Universiteit Brussel, Brussels, Belgium) - Toškan, Borut (Institute of Archaeology, ZRC SAZU, Slovenia) - Črešnar, Matija (Centre for interdisciplinary Research in Archaeology, Department of Archaeology)

Sulphur isotopes are increasingly becoming integral to bioarchaeological investigations. However, when compared to the extensive studies employing isotopic analyses of carbon, nitrogen, strontium, and oxygen, sulphur lags behind, likely due to the challenges associated with its measurement and the complexity of interpreting the obtained results.

Despite the proven benefits of multi-isotope analyses, there exists a common practice of artificially categorizing elements into two groups: “dietary” and “migration and mobility.” In this context, sulphur emerges as an amphibious element. Though measured from collagen and employing methodological procedures same or similar to those for carbon and nitrogen, the results can serve as indicators for both dietary habits and migration/mobility patterns. Consequently, assigning sulphur isotope values to either dietary differences or migration and mobility poses a significant challenge.

The inclusion of sulphur isotopes in our multi-isotope research on archaeological animal and human remains originating from geologically and geographically diverse Slovenia has raised numerous questions. Through the presentation of our results, we aim to shed light on the encountered challenges and initiate a dialogue on potential solutions. By addressing these complexities, we hope to contribute to a more comprehensive understanding of sulphur isotope analysis in bioarchaeological studies.

10 UNRAVELLING PAST AGRICULTURAL SYSTEMS IN ARID ENVIRONMENTS: ADVANCES AND LIMITS IN ISOTOPIC ANALYSIS AND MODELLING

Varalli, Alessandra (CASEs-Culture, Archaeology and Socio-Ecological Dynamics Research Group, Department of Humanities, Universitat Pompeu Fabra. Barcelona. Spain; Aix Marseille Univ, CNRS, Minist Culture, LAM-PEA, Aix-en-Provence, France) - D'Agostini, Francesca (CASEs-Culture, Archaeology and Socio-Ecological Dynamics Research Group, Department of Humanities, Universitat Pompeu Fabra. Barcelona. Spain) - Jiménez Arteaga, Carolina (CASEs-Culture, Archaeology and Socio-Ecological Dynamics Research Group, Department of Humanities, Universitat Pompeu Fabra. Barcelona. Spain) - Heidgen, Shaddai (CASEs-Culture, Archaeology and Socio-Ecological Dynamics Research Group, Department of Humanities, Universitat Pompeu Fabra. Barcelona. Spain) - Bouchaud, Charlene (Archéozoologie, Archéobotanique: Sociétés, Pratiques et Environnements (AASPE, UMR 7209), Muséum National d'Histoire Naturelle, CNRS, France) - Antonites, Annie (National Museum of Natural History, Pretoria, Republic of South Africa) - Lucarini, Giulio (Institute of Heritage Science, National Research Council of Italy, Rome, Italy; Department of Asian, African, and Mediterranean Studies, University of Naples L'Orientale, Naples, Italy) - Usai, Donatella (Istituto Italiano per l'Africa e l'Oriente, Roma; Centro Studi Sudanese e Sub-Sahariani, Treviso, Italy) - Madella, Marco (CASEs - Culture, Archaeology and Socio-Ecological Dynamics Research Group. Departament d'Humanitats, Universitat Pompeu Fabra. Barcelona, Spain; ICREA - Catalan Institution for Research and Advanced Studies. Barcelona, Spain; Department of Geography, Archaeology and Environmental Studies, University of Witwatersrand, Johannesburg, South Africa) - Lancelotti, Carla (CASEs - Culture, Archaeology and Socio-Ecological Dynamics Research Group. Departament d'Humanitats, Universitat Pompeu Fabra. Barcelona, Spain; ICREA - Catalan Institution for Research and Advanced Studies. Barcelona, Spain)

Since prehistoric times, C4 plants like millets have been widely cultivated in arid environments, serving as a crucial foodstuff for communities facing challenging environmental conditions, and playing a key role in local economies. However, the agricultural strategies employed for cultivating these plants remain unclear. Traditionally, ensuring water supply through methods like river floods or maintaining consistent water sources has been considered crucial for arid-region farming. Nevertheless, contemporary examples reveal successful rain-fed cultivation systems, where crops thrive solely on natural rainfall, even in hyper-arid environments. Our research aims to shed light on agricultural practices for C4 crop cultivation, with a specific emphasis on water management. Isotope analysis has emerged as a powerful tool for estimating past plant water levels in archaeobotanical remains.

We analyzed carbon and nitrogen stable isotopes of grains from various experimental and archaeological C4 plant species, notably pearl millet (*Pennisetum glaucum*), sorghum (*Sorghum bicolor*) and different small panicoids. Regarding the experimental samples, we selected grains from over 500 millet plants cultivated under controlled hydric conditions. These modern samples allowed us to develop a model for interpreting stable isotope values of archaeological remains. As for the archaeological assemblage, we selected grains from diachronic sites in Egypt (Farafra), Paki-

stan (Bando Qubo, Taloor Je Bhatt), Sudan (Al-Khiday, Mouweis), and South Africa (Schroda, Mutamba). The results demonstrate the feasibility of reconstructing water management practices and changes in handling through stable isotopes, offering an innovative perspective in interpreting archaeological sites. Quantifying these practices not only has the potential to reshape our understanding of human adaptation and agriculture but also emphasizes the necessity of incorporating plant isotopic analysis as a crucial proxy in archaeology. This approach deepens our understanding of past socio-economic dynamics and human-environment interactions across various spatio-temporal scales.

11 RECONSTRUCTING SUBSISTENCE STRATEGIES OF THE NEOLITHIC COMMUNITY IN THE SOUTHERN ARABIA – CHALLENGES OF A BIOAPATITE APPROACH

Danielisova, Alzbeta (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic) - Šneberger, Jiří (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic) - Daněček, David (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic) - Maiorano, Maria (Goethe University Frankfurt) - Arppe, Laura (Finnish Museum of Natural History LUOMUS, University of Helsinki) - Garba, Roman (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic; Nuclear Physics Institute of the CAS, Prague)

The Neolithic period in South Arabia is characterised by high population movement along the coast and complex cultural and technological innovations. However, despite the growing number of Neolithic sites, little has been done to elucidate dietary trends during this period. Conventionally, the subsistence of local communities is being interpreted as relying on a combined hunter-fisher-gatherer economy with a growing importance of local pastoralism. However, the arid conditions in central Arabia present obstacles to collagen preservation, impeding the analysis of local diets through stable isotopes.

During the recent archaeological campaigns in the coastal alluvial plain of south-central Oman a unique megalithic burial structure was excavated that contained evidence of long-term burial activities of a large local community. Radiocarbon dating places the period of collective burials between 5000 and 4600 cal. BCE. The comprehensive analysis of the burial community involved provenance assessments using strontium and oxygen isotopes, along with an analysis of local subsistence strategies. To overcome the limitations caused by no collagen preservation, our approach involved isotopic ($\delta^{13}\text{C}$, $\delta^{18}\text{O}$, $87\text{Sr}/86\text{Sr}$) and concentration (Sr, Ba, Ca) analysis of enamel bioapatite. The primary objective was to evaluate the feasibility of this combined methodology in assessing the coastal Neolithic communities' reliance on marine resources. Comparisons were conducted with published bioapatite data from sedentary agricultural communities in a similar region. This paper contributes to an ongoing project focused on understanding the long-term socio-economic development of communities in Arabia.

12 ISOTOPE ANALYSES ON DIET AND MOBILITY IN NORTHERN ITALY

Tykot, Robert (University of South Florida) - Vianello, Andrea (University of South Florida) - Eck, Christopher (FEMA) - Maxwell, Ashley (Washburn University)

For >30 years, stable isotope research has been done on human remains from Italy, representing different time periods and geographic areas, yet the actual number of sites/individuals is quite limited by time and geographic areas, especially north of Rome. In addition, when interpreting results and drawing conclusions, e.g. about similarities/differences, there are limitations when comparing several important issues. In particular, there is significant variation in the baseline values of the food being consumed, due to natural/geographic variability, and especially human involvement in agricultural fields and animal foddering.

New C, N, O, and Sr isotope studies have been done in northern Italy, including for neolithic sites in the Po Valley, Early Medieval & Langobard sites in the Veneto, and others in Ravenna. Analyses were conducted at the University of South Florida, using well-established sample preparation methods, allowing more detailed interpretation of plants and animals in the diet. It appears that in all time periods seafood was rarely a dietary staple, if consumed at all, even in coastal zones. Freshwater fish, however, were important in some locations near rivers, especially in Roman times. Millet, a C4 plant, was of minimal use in the Neolithic, but more widely spread by the Bronze Age, and especially important in northern Italy in post-Roman times. There also seems to have been negligible differences based on status prior to Roman times, while sex-based differences also appears to develop with more complex labor patterns.

Mobility has also become an important aspect of dietary studies, with strontium isotope analyses used to address seasonal patterns in animal husbandry, long-distance cultural migration, and international movement due to military activities. The combined multi-method and interdisciplinary studies of zooarchaeology and macrobotanical finds, pollen and phytolith studies, ceramic residues, and osteoarchaeological analyses are critical for our best understanding of the past.

13 LASER ABLATION ANALYSIS OF LOW STRONTIUM BIOAPATITES: WARNINGS AND OPPORTUNITIES

Rogers, Bryony (Department of Archaeology, Durham University; School of Earth Sciences, University of Bristol) - Horstwood, Matthew (NEIF, British Geological Survey) - Pashley, Vanessa (NEIF, British Geological Survey) - Nowell, Geoff (Arthur Holmes Laboratory, Department of Earth Sciences, Durham University)

Using strontium isotope ($87\text{Sr}/86\text{Sr}$) analysis in low strontium concentration bioapatite samples (i.e. human and animal tooth enamel) to assess mobility and provenance is becoming increasingly common in the literature. The use of laser ablation MC-ICP-MS can reduce the complexity of sample preparation, cost of analysis and increase the speed of data acquisition and therefore sample throughput. However, this in-situ analytical approach is usually accompanied by a sacrifice in the precision, accuracy, and reproducibility, and can increase the bias of the acquired data. In regions of high biosphere strontium isotope variability this increased uncertainty and decreased level of accuracy of LA-MC-ICP-MS Sr isotope data can often be tolerated whilst still enabling useful interpretations. However, in regions with low biosphere strontium isotope variability the tolerance for imprecision is much lower. Here we address the question: 'how low can we go?' with current instrumentation. Additionally, we look forward to the potential opportunities for laser ablation strontium isotope analysis of low concentration tooth enamel using newer instruments with mass filters and/or collision cells which are becoming more widely available.

14 BEYOND MIGRATIONS: THE USE OF $87\text{Sr}/86\text{Sr}$ VALUES IN RESEARCH ON DIET AND SUBSISTENCE

Soltysiak, Arkadiusz (University of Warsaw)

Due to its variability in bedrock and water sources, $87\text{Sr}/86\text{Sr}$ values in human tissues (mainly enamel) are used by bioarchaeologists to identify non-local individuals at the cemeteries. As strontium isoscape maps are available now for many regions and new Bayesian tools have been recently introduced, in some cases also probable directions of migration may be identified. However, there is also growing awareness that strontium in human tissues does not come directly from bedrock, but indirectly through consumed food and water, and therefore $87\text{Sr}/86\text{Sr}$ values reflect the origin of subsistence resources and not the residence of humans themselves.

This observation is bad for provenance studies but good for research on food exchange in past human populations. There is a growing number of studies that exploit this potential, especially through the combination of $87\text{Sr}/86\text{Sr}$ values and light stable isotopes ($\delta^{13}\text{C}$, $\delta^{15}\text{C}$, $\delta^{34}\text{S}$) that are routinely used as proxies for diet. In this paper, some examples of such research will be presented, covering the Near East and Mediterranean where relatively abundant textual and archaeological context sometimes enables reliable distinction between the migration of humans and food importing.

15 EXPLORING NEOLITHIC OVICAPRINE HUSBANDRY THROUGH STABLE ISOTOPE ANALYSES AT THE SITE OF EL PORTALÓN DE CUEVA MAYOR (ATAPUERCA, BURGOS)

Antolinos-Díaz, Juan Antonio (Laboratorio de Evolución Humana, Departamento de Historia, Geografía y Comunicación, Universidad de Burgos, 09001, Burgos, Spain.) - Smith, Colin (Laboratorio de Evolución Humana, Departamento de Historia, Geografía y Comunicación, Universidad de Burgos, 09001, Burgos, Spain.; Dept. Archaeology and History, La Trobe University, Melbourne, VIC, 3086, Australia.) - Galindo-Pellicena, Maria Angeles (Centro Mixto UCM-ISCI III de Evolución y Comportamiento Humanos, Spain.) - Carretero, José-Miguel (Laboratorio de Evolución Humana, Departamento de Historia, Geografía y Comunicación, Universidad de Burgos, 09001, Burgos, Spain.) - Iriarte, Eneko (Laboratorio de Evolución Humana, Departamento de Historia, Geografía y Comunicación, Universidad de Burgos, 09001, Burgos, Spain.) - Pérez-Romero, Amalia (Laboratorio de Evolución Humana, Departamento de Historia, Geografía y Comunicación, Universidad de Burgos) - Valdósera, Cristina (Laboratorio de Evolución Humana, Departamento de Historia, Geografía y Comunicación, Universidad de Burgos)

Stable isotope analyses have proven to be a valuable method in researching livestock management during prehistoric times. However, there are few studies focused on Neolithic ovicaprine management in the Iberian Peninsula, despite this being a period when, groups of farmers and herders introduced new resource management dynamics, e.g. secondary products from sheep (*Ovis aries*) and goats (*Capra hircus*). The Neolithic layers from the site of El Portalón de Cueva Mayor (Sierra de Atapuerca, Burgos) exhibit a record of nearly 2500 years of livestock management (ca.7400-5000 cal BP) containing abundant well preserved bones and teeth from livestock. This long record, together with the sites geographical location, helps us to understand the process of implementation and expansion of animal husbandry across Europe, and the Iberian Peninsula.

Through the analysis of enamel oxygen (^{18}O) and carbon (^{13}C) stable isotope sequences in dental series (first, second, and third lower molars) combined with zooarchaeological analysis, we infer the seasonal management of births

and livestock management for meat or secondary products such as milk. Additionally, this study is complemented with the analysis of carbon (13C), nitrogen (15N), and sulfur (34S) stable isotope ratios in bone collagen, providing further information concerning their diet and mobility.

The isotopic results suggest an anthropogenic management of the birth season, a diet based on uniform locally sourced plants and overall low mobility for the ovicaprines. This would imply a sophisticated sheep and goat husbandry in the Iberian hinterland during the Neolithic period compared to other taxa. As a result, diverse animal resources would be available for a year-round cave occupation.

16 THE USE OF NEODYMIUM ISOTOPES IN HUMAN MOBILITY STUDIES: TESTING A POTENTIAL NEW TOOL

Rosselet-Christ, Déborah (Archaeology of Africa & Anthropology Laboratory, University of Geneva, Switzerland) - Chiaradia, Massimo (Department of Earth Sciences, University of Geneva, Switzerland) - Desideri, Jocelyne (Archaeology of Africa & Anthropology Laboratory, University of Geneva, Switzerland)

The use of isotope geochemistry to study past population mobility has been a well-established tool for several decades. Until recently, analyses have been able to differentiate 'local' and 'non-local' individuals, and the emergence of models and isoscapes has even made it possible to determine the regions of origin of these 'non-local' individuals. The use of strontium, carbon, oxygen and, more recently, sulphur isotopes has proved successful, but only when the 'homogeneity' of the environment allows it. In mountainous regions, and especially in the Alps, the complexity of the outcropping rock formations and the biotopes associated with different altitudes mean that the values are extremely heterogeneous, and the notion of an isotopically similar environment can be extremely difficult to define. For example, a "non-local" value may be characteristic of a place that is only a few kilometers or up to 100 kilometers away, making it impossible to discuss its origin.

As part of the Swiss National Research Fund project "Towards a renewed vision of the early alpine agro-pastoral societies", we are trying to refine our interpretations of the mobility of these populations by adding the study of the neodymium isotopes. Neodymium isotopes have been used for many years as process tracers in geology and have recently been tested in forensic cases. In our project, we combine it with 87Sr/86Sr, $\delta^{13}C$ and $\delta^{18}O$ analyses and test it on dental and bone tissues of human and animal remains of archaeological and modern origin. The study is still ongoing, but we have already been able to establish novel sampling and analysis protocols, and the initial results are promising. The use of neodymium isotopes has enabled us to obtain a new range of environmental values and has added to the interpretations of past population mobility.

17 RECONSTRUCTING WATER MANAGEMENT WITH SILICON STABLE ISOTOPES: RESULTS OF IN SITU ANALYSIS IN SORGHUM PHYTOLITHS AND THEIR SIGNIFICANCE FOR ARCHAEOLOGY

D'Agostini, Francesca (CASEs – Culture, Archaeology and Socio-Ecological Dynamics Research Group, Universitat Pompeu Fabra, Barcelona, Spain) - Frick, Daniel A. (Institute of Geosciences, Kiel University, Kiel, Germany) - Varalli, Alessandra (CASEs – Culture, Archaeology and Socio-Ecological Dynamics Research Group, Universitat Pompeu Fabra, Barcelona, Spain; LAMPEA, Aix-Marseille Université, CNRS, Ministère de la Culture, Aix-en-Provence, France) - Madella, Marco (CASEs – Culture, Archaeology and Socio-Ecological Dynamics Research Group, Universitat Pompeu Fabra, Barcelona, Spain; ICREA – Catalan Institution for Research and Advanced Studies, Barcelona, Spain; Department of Geography, Archaeology and Environmental Studies, University of Witwatersrand, Johannesburg, South Africa) - Lancelotti, Carla (CASEs – Culture, Archaeology and Socio-Ecological Dynamics Research Group, Universitat Pompeu Fabra, Barcelona, Spain; ICREA – Catalan Institution for Research and Advanced Studies, Barcelona, Spain.)

Phytoliths, plant microremains whose formation is directly associated to the cells where they originated, have been identified as proxies for foodways and agricultural practices. Because of the occurrence of their deposition, phytoliths have been also suggested as a potential indicator of environmental conditions during plant development and consequently of agricultural management. In this framework silicon stable isotope analysis of phytoliths has emerged as a pivotal method for elucidating the mechanisms behind phytolith formation. In this paper we present preliminary results on the analysis of silicon stable isotopes on phytoliths of *Sorghum bicolor* L.Moench, aiming at better understanding phytolith deposition in relation with plant water availability, especially in agricultural arid contexts.

Sorghum was grown in lysimeters under different water regimes. Plants were watered according to their transpiration rate to simulate different conditions: from water abundance to extreme water stress. Phytoliths were extracted from leaves and chaff and analysed by femtosecond laser ablation multi-collector inductively coupled plasma-mass spectrometry (fsLA-MC-ICP-MS). This method allows the measurement of individual phytoliths thus increasing the interpretation potential. We analysed 24 samples for bulk (i.e., clusters of phytoliths) and for specific morphotypes within silica skeletons for a total of 717 data points of bulliforms, elongates and stomata phytoliths. Preliminary results suggest significant differences among morphotypes and plant parts and water treatment. Indeed the outcomes

revealed that the $\delta^{30}Si$ of elongates of sorghum chaff and leaf blades, as well as the stomata in the leaves, varies between plants cultivated in well-watered and water-scarce conditions, emphasising the potential use in interpreting the context of origin regarding both environmental conditions and water agricultural handling for agriculture. Simultaneously, these promising results on distinct morphotypes pave the way for the utilisation of stable silicon isotopes in studies aimed at understanding the environment in which societies of the past developed.

559 THE MEDITERRANEAN(S) IN TRANSITION: GLOBAL PERMANENCE(S), MATERIAL CULTURE(S), AND RESILIENCE BETWEEN 5TH AND 10TH CENTURY AD

Session theme: 6. The Mediterranean from Within

Session organisers: Pini, Nicolo (CReA-Patrimoine – Université libre de Bruxelles (ULB); FNRS) - Marchand, Julie (Royal Museums of Art and History, Brussels (KMKG-MRAH); CReA-Patrimoine – Université Libre de Bruxelles (ULB)) - Carabia, Alessandro (University of Birmingham, Centre for Byzantine, Ottoman and Modern Greek Studies)

Session format: Session with keynote presentation and discussion

The peoples and cultures of the Mediterranean are often compared on the basis of their geographical origin, whether Eastern or Western. Especially for the period between the 5th and 10th centuries, this comparison is mainly based on political distinctions and often ignores material aspects. But are identities around the *mare nostrum* really based on political boundaries, or should we seek regional specificities using different interpretative media? In particular, the distinction between the Western and Eastern Mediterranean appears to be particularly marked in the scholarly debate and attempts to bring together evidence from these "two worlds" are rare and not systematic.

The questions that arise then are: can we still speak of a single Mediterranean during Late Antiquity and Early Medieval times? Are East and West following completely different trajectories? Is it possible to compare their respective historical processes and material cultures? Or can some common features be identified, despite regional particularisms? Is trade global or does it mutate according to political factors affecting local identities? To this sense, different forms of resilience and adaptation and the potential development of one or more transitional cultures are fundamental interpretative keys.

In this Call for Papers, we invite scholars and archaeologists to bridge the scholarly division between East and West and present research focusing on material evidence from the 5th until the 10th century AD from all around the Mediterranean.

ABSTRACTS

1 ECONOMICS AND SOCIETY IN EARLY MEDIEVAL GREECE: THE CHANGING FACE OF CORINTH

Valente, Rossana (Università degli Studi di Roma Tre; Scuola Archeologica Italiana ad Atene)

This paper aims to provide an overview on diverse perspectives of research on the emergence of Medieval cities in the Eastern Mediterranean world, with major focus on the case of Corinth (Greece). The archaeological evidence at the core of this paper have been brought to light by the excavations conducted by the American School of Classical Studies at Athens since 1896.

The traditional focus of the archaeological investigation has been on the core of the ancient city – the area of the Forum – and was driven by major interests in the literary texts pertaining to the historical reconstruction of the Antique urban topography. This has led to the conclusion that there was a major disruption and abandonment of the city from the sixth century onwards. The archaeological evidence from the Roman forum seemed to support this vision, since it ceased to maintain its previous political and economic significance and the core of the Late Roman city was reduced in size due to the pressure of socio-economic transformations.

However, over the last few decades, systematic excavations in Ancient Corinth have significantly improved the current understanding of the development and typology of the urban topography of this city, which underwent significant changes since Late Antiquity.

On the basis of new and unpublished dataset put in context with archival documentation, this paper aims to propose an alternative and more articulated historical reconstruction of the urban topography and socio-economic structure of Corinth from Late Antiquity to the Medieval period, in order to discuss how diverse forms of urbanization may have taken place beyond the perimeter defined by the Late Antique city walls.

2 SURVIVAL AND ADAPTATION: BATH-GYMNASIUM COMPLEXES IN LATE ANTIQUE ASIA MINOR

Kalfa-Atakli, Basak (Cankaya University)

The Bath-Gymnasium complex, unique to Asia Minor, represents a fusion of Eastern and Western influences, blending Greek gymnasia with Roman baths. Introduced as a building typology by Fikret Yegül in the 1970s over the case of Sardis, these structures embodied the geographical and cultural complexities of their context.

This study aims to revisit Bath-Gymnasium complexes, focusing on their evolution during the transitional period of Late Antiquity. While the bathing sections persisted into the Eastern Roman Empire, ancillary spaces such as palaestrae and colonnades underwent adaptations to meet changing societal needs. Encroachments by artisanal workshops and squatters often led to subdivisions or dismantling for reuse in other constructions, further shaping their architectural legacy.

Despite their prevalence in Asia Minor, Bath-Gymnasium complexes are often overlooked in scholarly discourse. This paper seeks to rectify this oversight by revisiting this rare and understudied building typology, particularly focusing on its evolution through the transitional period of Late Antiquity. By examining the interactions between architecture, society, and culture, the paper aims to enrich our understanding of Asia Minor's architectural heritage and its significance in the broader Mediterranean context.

Furthermore, through an architectural and conservation lens, this study aims to contribute to a deeper understanding of the dynamic nature of Late Antique society in Asia Minor and the multifaceted roles of Bath-Gymnasium complexes within it.

3 WEAK LINKS: SOME REFLECTIONS ON TRADE AND CRISIS ACROSS THE TYRRHENIAN AND AEGEAN GRAIN ROUTES IN THE 6TH-7TH CENTURIES

Carabia, Alessandro (University of Birmingham)

By the end of Late Antiquity, the Tyrrhenian and Aegean sea routes might look like two very different and separated trade systems. However, Deligiannakis's 2016 book on the Dodecanese and East Aegean islands shows the existence of different connection points.

Undoubtedly, it isn't easy to compare the two Mediterranean areas from the point of view of trade volumes and the consequential richness of local societies. It is possible to discuss some general trends which affected the two sea routes and the plethora of settlements and people whose lives revolved around or were impacted by their existence. Both networks were indeed connecting production centres (North Africa and Egypt) with consumerist capitals (Rome and Constantinople); both partially extended beyond those destinations (Provence and Gaul on one side and the Danube frontier on the other); furthermore, the success of several communities occupying the network's links was entangled with "their structural integration" in the network itself.

The fact that the crisis of both these systems between the late 6th and the early 7th centuries produced some similar effects (even if on different scales) is relevant in understanding how communities heavily dependent on a single source for their sustainability might react when faced with the sudden reduction of that source. By comparing some of the weakest links of these networks (Liguria and the Aegean islands), this paper will seek to outline the reaction of "vulnerable" communities to a crisis.

4 NOUVELLES DONNÉES SUR LA REPRISE DU COMMERCE DANS LA MÉDITERRANÉE CENTRALE ALTO-MÉDIÉVALE : ARCHÉOLOGIE ET ARCHÉOMÉTRIE DES ÉPAVES PROVENÇALES

Richarte-Manfredi, Catherine (INRAP - National Institute for Preventive Archaeological Research; CIHAM UMR 5648)

La contribution proposée, envisagée de manière pluridisciplinaire, repose sur des travaux archéométriques à la croisée d'études historiques, archéologiques et économiques portant sur le commerce en Méditerranée occidentale entre la fin du IXe et le début du Xe siècle de notre ère. Si, celle-ci prend pour base documentaire un ensemble d'épaves du haut Moyen Âge retrouvées le long des côtes de la Provence, la nature du fret (conteneurs et denrées) suggère quant à elle, un approvisionnement pour ces navires à des points réguliers et le parcours de véritables circuits marchands. Les résultats novateurs de cette enquête impliquent l'existence de réseaux méditerranéens actifs durant le premier Moyen Âge et invalident l'hypothèse de submersions résultant des conflits ou de la seule piraterie, dont les références historiographiques durant les IXe et le Xe siècles mentionnent essentiellement les conflits opposant les Latins, Byzantins et Musulmans dans le bassin méditerranéen, mais dans une moindre mesure les activités commerciales.

Communication en français / pptx en anglais.

5 EARLY MEDIAEVAL HANDMADE POTTERY WITHIN BYZANTIUM'S EAST AND WEST. SOME PRELIMINARY REMARKS OF AN ANALYTICAL STUDY FROM GREECE AND CYPRUS

Vasileiou, Theodore (University of Cyprus)

Historically, the transition from the Late Antique to the Early Middle Ages in the Mediterranean broadly appears disparate in the archaeological literature, with a clear east-west geographical distinction. Following, comparisons and associations of material culture(s) within this framework have shaped our archaeological perception. However, such an approach also seems seminal on a smaller scale. Even within the Eastern Mediterranean, the "Byzantine world", east-west dichotomies persist, mainly attributed to political particularities, invasions, disasters, and population movements. One aspect of material culture where such a dichotomy is evident is the emergence of handmade pottery in Early mediaeval Byzantium. Recently, several studies have moved away from established culture-historical narratives and shifted our perception of this pottery to issues of "shared" local responses to global phenomena.

By sharing this viewpoint, this study offers some preliminary remarks and aims to contribute to the ongoing discussion of handmade pottery technology and production in the Eastern Mediterranean through an analytical approach. Two archaeologically distinct pottery groups have been included; samples recorded as "Slavic ware" from the Greek west and handmade vessels from Cyprus (east). Moving further from a typological viewpoint and through an object-oriented laboratory-based approach (ceramic petrography and pXRF analysis), this study goals a) to initially explore compositionally and technologically the assemblages in an intra-site level b) compare aspects of western/eastern handmade pottery chaîne opératoire(s) within the Byzantine territories, and c) argue whether the analytical profile of these groups could infer common responses to broader new conditions pressing Byzantine Early Mediaeval communities.

6 THE "ROMANISATION" OF EGYPTIAN POTTERY: A NEW INSIGHT ON LATE ROMAN PRODUCTIONS

Marchand, Julie (ULB & RMAH, Brussels)

In 2000, Sheila McNally and Ivančica Schrunk published an important article about Rome's impact on the Egyptian pottery industry. The assumption is that Rome, particularly through its military, disseminated a new type of ceramic, the sigillata, to its outlying provinces. Egyptian potters quickly copied and adapted these new red slip forms to produce a local repertoire, which would also spread: this phenomenon, one of many, is part of the Romanisation of Egyptian material culture. In this analysis, a large series of diagrams illustrate the evolution of types, imported from East, West and North Africa, alongside the Egyptians.

More than 20 years later, new data is available and new stratigraphic material has been published, allowing us to go further than the authors' conclusions. Beyond the changes in types, the diagrams illustrate above all the political phenomena that shook the Mediterranean until the 10th century, as well as the trends that developed there. By examining a corpus of Egyptian tableware (sigillata) and amphorae, this paper seeks to review the impact of Rome on ceramic production in a reconsidered Mediterranean historical and economic context. Since Egypt is just one example, this paper examines the unity of Mediterranean production and trade between the 5th and 10th centuries.

7 THE ARCHAEOLOGICAL EXPLORATION OF LATE ANTIQUITY: TRACING TRAJECTORIES IN THE LEVANT

Dolci, Jacopo (University of Nottingham)

The concept of Late Antiquity has been at the centre of historical discussions for at least half a century, with its chronology fiercely debated. As time progresses, reaching an agreement and harmonizing historical models with ever-changing archaeological evidence becomes increasingly complicated. This paper addresses and reviews the theoretical aspects of research related to Late Antiquity and the late antique Levant. It provides an overview of the origins and evolution of the Late Antiquity concept, as well as the role of archaeological research in shaping it. The paper examines crucial turning points in the historiographical debate and focuses on state-of-the-art research in the Levant. Supporting a regional approach to Late Antiquity, it delves into the length and nature of Late Antiquity in the Levant. This allows for a discussion on the pivotal role of cities between the fourth and eighth centuries, particularly in retaining urban monumentality (e.g., churches, mosques, palaces) and in continuing to apply orthogonality (e.g., Sergiopolis, Anjar). The archaeological reassessment suggests a different trajectory for the late antique Eastern and Western Mediterranean. Specifically, it highlights a prolonged Late Antiquity in the Levant that extends into the eighth century, making the region unique within the former Roman Empire.

566 MULTIPLE SCALES IN THE MANIFESTATIONS OF THE ISLAMIC

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Carvajal Lopez, Jose (Incipit-CSIC) - Shingiray, Irina (University of Oxford) - Hernández Robles, Alicia (University of Granada) - Zivkovic, Jelena (The Cyprus Institute)

Session format: Regular session

The question of scale is all too often left outside when scholars, and particularly archaeologists, deal with Islam. Different attitudes to Islam, often qualified in terms of orthodoxy/heterodoxy, seem to apply when focusing on complex networks across territories (e.g. trade partnerships vs law schools), political entities (states and tribal confederations), on medium to small communities (cities to neighbourhoods and villages, tribal groups) or on individual attitudes (where factors like ethnicity, gender or socioeconomic class complicate matters).

In this session we aim to discuss the materiality of multiscalar manifestations of Islamic societies, and how they generate sociocultural variation. The weaving of the different scales creates spaces where innovation and originality are more frequent. Scales here are understood in different dimensions: time and space. Time scales include événements vs conjunctures vs longue durée, space scales encompass the local, the regional and the global and combinations of space and time allow for more nuances: e.g. seasonality in a site vs conjunctural transformations in a state, events in a transregional network vs long term changes in urban layout.

We invite colleagues to present case studies where materiality of Islamic/Islamicate societies is informative of how relations across different scales affect the cultural manifestations of Islam. There are classical examples, like the influence of the border phenomenon in small communities, or the effects of connectivity across vast expanses of space in the development of urban or rural communities. But we would also like to see innovative perspectives, perhaps emphasizing the influence from the bottom (small scale) to the top (large scale): how did changes in local ceramic traditions, for example, relate to larger networks of trade and contact? How did the development in the materiality of the fringe societies, or even of intersectionality, in Islam impact the core Islamic societies of their time?

ABSTRACTS

1 THREADING AND WEAVING MULTISCALAR FIELDS IN ISLAM: SOME EXAMPLES IN CERAMICS

Carvajal Lopez, Jose (Incipit-CSIC)

One of the key concepts about Islamization is connectivity. Islam expanded very fast over extensive territories, and time proved that it can find its way into the most diverse cultural backgrounds. In this paper, which I propose to offer as presentation of the session, I suggest that Islam managed to become threaded and interwoven with different fields of reality.

I will offer some examples of thinking across interrelated fields of different scales in Islamic societies, with a system of concepts in which I will differentiate between interwoven fields and threaded fields. The general aim is to present a set of concepts useful to describe historical changes in Islam and that at the same time overcome the limits of a quantitative idea of "connectivity" in search of meaning in the connections themselves.

To explore these ideas I will revisit some early Islamic assemblages of archaeological ceramics that I have looked at in the past and that I know very well: the assemblages of the Vega of Granada, in Spain, and of the archaeological site of Yughbi, in Qatar. In this presentation I will show how these Islamic assemblages can be looked at at different scales, and how the meaning of "woven" and "threaded" scales affect our understanding of them.

2 EARLY ISLAMIC ISBILYA (SEVILLE) - HOW TO RECOGNIZE THE ISLAMIC?

Mateos-Orozco, Ana (University of Seville)

Seville is considered one of the most relevant cities in the first moments of al Andalus. It is continuously mentioned in written sources about the conquest and the following years. Even though its relevance and the number of publications about the Late Antique city, the early Islamic period seems to have vanished generating a gap in the research that has led to the continuous non-identification of this period through the archaeological record. That is due to a varied casuistry: a very diverse material record resulting from a polyedric and complex Islamisation process; lack of information and material parallels for the 7th to the 9th century and consequently the impossibility of identification without stratigraphy; the prevalence of commercial archaeology in the urban layout and associated with this is the absence of studies of materials deposited in museums; and finally, the popularity and impact on the city of other historical moments, like the Almohad Empire or Rome.

In this work, we present an overview of the city of Seville during the Early Islamic period reviewing different archaeological interventions, using a georeferenced database that also allows us to observe urban planning issues, and finally focusing on the Mosque of Ibn Adabbas, the first main mosque built in the year 214H/829AD. The intervention in

the mosque and its results allow us to analyse different factors like ceramics and other objects, building materials, architecture, and the location of the mosque in the urban design of the city. Understanding the place from a micro to a macro scale. The building as a mosque is a reflection itself of Islam, and at the same time, the analysis of those single factors gives us an insight into different aspects of the early Islamic city, reconstructing the process of Islamization of Ispali into the new madina, Isbilya.

3 FROM SUBURBAN TO INLAND SPACES: ASSESSING MULTISCALAR APPROACHES IN ISLAMIC ARCHAEOLOGY OF WESTERN SICILY

Castrorao Barba, Angelo (Escuela de Estudios Árabes, Consejo Superior de Investigaciones Científicas (EEA, CSIC))

This paper explores the Islamic archaeology of Western Sicily, traversing from the suburban landscapes to the inland regions, with a focal analysis on recent research in the suburbs of Madīnat Šiqilliya/Balerm (Palermo) and the rural landscapes of Qurliyūn (Corleone). The aim is to assess multiscalar approaches for a deeper understanding of the varied socio-cultural dynamics prevalent during the Islamic period in these distinct areas.

Employing an interdisciplinary methodology, this study integrates the analysis of archaeological findings, historical records, environmental and spatial data to unravel the complex dynamics of Western Sicily under the Islamic rule across different scales. In the suburban area of Madīnat Šiqilliya/Balerm, recent excavations have highlighted an increase in occupation, illuminating the material culture and everyday life of Islamic communities in this area.

Extending the investigation to the inland area of Sicani Mountains, the territory of Qurliyūn (Corleone) reveals the complexity of Islamic settlement patterns in terms of continuity, resilience, and change, in relation to the Roman and Byzantine periods. This is particularly evident also on a site-based scale of the excavation in Contrada Castro, where a distinct sequence of occupation crucially spans the transitional phase from the Byzantine to the Islamic period.

Through a multiscalar perspective, the paper aims to contribute to a nuanced understanding of the Islamic archaeological footprint in Western Sicily, emphasizing the different scales of changes between phenomena of continuity, change and innovation.

4 WHAT DEATH TELLS ABOUT LIFE: FUNERARY MATERIAL EXPRESSIONS IN THE MEDIEVAL HORN OF AFRICA

Gómez, Carolina (Incipit - Institute of Heritage Sciences)

The funerary practices of a human group often tell us more about the living than about the dead themselves. In the case of the Horn of Africa, the arrival of Islam in medieval times produced a series of changes in the social, political, cultural and, of course, religious dynamics of the region. Not all the changes that take place in this period have the same relationship with the introduction of this new religion in the area or are not so clearly an effect of this process, but most of them share a common characteristic: they are embodied in material expressions and, therefore, can be documented through archaeological methodology.

In this communication, I will focus on one of these material expressions: funerary structures and practices. The aim, therefore, is to describe their main modifications with respect to the pre-medieval period, as these are a reflection of how the communities of the Horn of Africa underwent a process of progressive Islamisation without totally abandoning their pre-existing cultural identity. A typological proposal of the new forms of burial that appeared between the 13th and 16th centuries will also be presented. Thus, the study of the changes in medieval funerary material culture in this area allows us to construct narratives about the interaction between various factors such as Islam, the state, sedentarisation, etc. and to characterise whether this interaction occurs in the same way at different scales (within a specific human group, regionally, at the state level, etc.). This interaction results in a series of material expressions that are the fruit of the hybridisation of all these factors and which will be the subject of analysis in this presentation.

5 LOST IN THE IN-BETWEEN. THE FUSION BETWEEN LOCAL CULTURE AND ISLAMIC IMPERIAL INFLUENCES ON THE RANIA PLAIN IN IRAQI KURDISTAN

Németh, Fruzsina (Eötvös Loránd University, Doctoral School of History)

The regions inhabited by Kurds still exhibit diverse cultural characteristics, which have emerged from centuries of influence from Islamic empires and a blend of local traditions. The Zagros ranges acted as a natural buffer between the borders of the great Islamic empires, while the local population played a mediating and synthesizing role among these cultural entities.

Islamization of the region commenced in the 7th century. The new religion and its associated socio-cultural framework initially took root in the larger cities of the area and the lowland areas to the west. Despite this, the population largely adhered to its former religion until the Abbasid period, and it was not until the 12th century that the Muslim

population became dominant in the region. The valleys, concealed between mountain ranges, were geographically and politically distinct, occupying a peripheral role.

This dichotomy has engendered two parallel narratives in the region. The settled population of the cities and their environs became integrated into the orthodox Sunni Muslim branch. Local religious centers soon sprouted, becoming part of the extensive religious-cultural system of the Islamic world. Rural areas, on the other hand, retained their former beliefs and customs, paving the way for the emergence of syncretic religious traditions.

Historical-ethnographical research has frequently explored the religious composition of the Kurds and the interrelationships between various branches of beliefs. From an archaeological perspective, I aim to address several questions: How did Islamic religion and culture emerge and manifest in the everyday life of the population in the mountainous parts of the area? How closely linked were the more Islamized western regions to the more secluded eastern regions? Was the culture of isolated valleys more localized or heavily influenced by external Muslim factors? Can archaeological remains provide insights into what Muslim identity meant to the inhabitants of specific areas?

6 THE INTERSECTION OF ISLAM AND NOMAD CART TECHNOLOGY IN QIPCHAQ AND MONGOL PERIOD BURIALS IN THE WESTERN EURASIAN STEPPE

Shingiray, Irina (University of Oxford)

Mobility and travel defined the lifestyle of the medieval Eurasian pastoral nomads. These activities were the means by which nomads were able to unite, maintain, and command large political confederations keeping them interconnected at different scales. It was made possible by transport animals and nomadic carts. While medieval nomads of the Eurasian Steppe are often praised for their 'horse culture,' it is rarely mentioned that they were also a remarkable 'cart culture.' Nomads used their carts in everyday life, in seasonal migrations, in war, trade, rites of passage, for personal conveyance, and for burial and ancestral practices. When nomads of the Western Eurasian Steppe embraced Islam, their technologies of mobility and nomadic Muslim practices produced a peculiar intersectionality which is manifested in nomadic burial rites during the Qipchaq and Mongol periods, especially during the 12th-14th centuries.

In this presentation, I will discuss several archaeological cases, as examples, where we find the aforementioned intersection in a ritual context of Islamic funerary rites and nomad cart technology. These data derived from a corpus of kurgan burials in the Pontic-Caspian Steppe. I will argue that such archaeological evidence on par with textual and visual data demonstrate that carts played a paramount role at different scales of nomadic connectivity and power during that time period. I will focus mainly on personal carts, their technology, and their wide range of uses. Serving as portable private spaces, carts were a medium for cultural and personal expression, through which vital concerns and concepts were communicated, e.g., identities, protective magic, and aesthetics of movement and a mobile way of life. I will also argue that this cart culture encouraged personal mobility of nomads of different ages, genders, and states of health, and thus contributed to social inclusivity and participation in the political life in the steppe.

7 MULTI-SCALAR APPROACH TO THE STUDY OF CRAFTS IN THE OTTOMAN EMPIRE: LOCAL PRACTICES IN THE IMPERIAL NETWORK

Živkovic, Jelena (The Cyprus Institute)

The place of crafts in the economy and society of the Ottoman Empire has been thoroughly discussed in historiography. This resulted in the definition of craft production modes that are expected to be representative of the Empire, although the available/studied archival documents usually concern major cities only. For archaeology, the proposed dichotomy between urban and rural economies is particularly relevant because it assumes differences in craft organization, social relations between artisans and links with the state that should manifest on the macro-scale.

This paper aims to offer an archaeological view on this dichotomy by using three case studies of micro-scale craft practices in the Ottoman Balkans and the Eastern Mediterranean developed between the 15th and 19th centuries. The focus is on the common pottery production studied by interdisciplinary methods that combine archaeology and materials science. Three case studies are embedded into different historical, environmental and cultural settings, representative of a large city in the core of the Empire (Thessaloniki), medium-size town on the Danubian frontier (Belgrade) and island villages (Cyprus). The paper will compare patterns of ceramic production technologies in those places for the observation of potential differences that will be discussed in the context of macro-scale network of the Ottoman Empire.

8 ALL THINGS SMALL AND SMALLER. A SCALE-PERSPECTIVE OF THE STUDY OF ISLAMICATE MEDIEVAL GLASS

Hernández Robles, Alicia (University of Granada) - Govantes-Edwards, David (University of Cordoba) - Velo Gala, Almudena (Research Unit VICARTE, NOVA University of Lisbon) - González Ballesteros, José Ángel (ARHIS Research Group, University of Murcia)

Dubbed by Kristiansen as the "third science revolution" archaeology has in these opening decades of the 21st millennium fully embraced archaeometric techniques, which are by now part of pretty much every archaeological project worth its salt. However, why these techniques are used, and how they are incorporated into the project's broader theoretical stance is seldom considered or, at least, made explicit, and this is beginning to cause some discomfort among a growing number of archaeologists.

This presentation takes data from a sample of 12th-13th-century glass from the urban site of San Esteban, Murcia (Spain), analyzed for major, minor, and trace elements, to illustrate the radical differences that the scale of observation can make for the interpretation of the data as evidence for past craft practices. The results of the analysis are observed locally and in a broader pan-Islamicate perspective, both of which are transversally affected by what we could call a meta-perspective: the harder we squeeze the archaeological material for chemical data (major elements: > 1% wt. %; minor elements: 1%-0.1% wt. %; trace elements: <0.1 wt. %) the further we move from the power of observation of the actual medieval glassmakers, a fact that is rarely taken into account in the interpretation.

9 MADE ELSEWHERE: WHAT DO IMPORTS REVEAL ABOUT THE EVOLUTION OF CULTURAL PRACTICES IN AL-ULA (HEJAZ) DURING THE ISLAMIC PERIOD?

Pellegrino, Maria Paola (Archaios) - Tourtet, Francelin (Archaios; Freie Universität Berlin) - Furstos, Cassandra (Archaios) - Guedeau, Nolwenn (UMR 7298 LA3M; Islamic Archaeology Unit, BIGS-OAS, Bonn University) - Kanhoush, Yasmin (Archaios; UMR 5133 Archéorient) - Charbonnier, Julien (Archaios)

As evidenced by the survey conducted in the framework of the Al-Ula Cultural Oasis Project (led by Archaios, funded and steered by the French Agency for AIUla Development on behalf of the Royal Commission for AIUla), the Al-Ula region (Hejaz, Kingdom of Saudi Arabia), has been continuously settled for at least 3,000 years. Material remains (pottery, glass artifacts, tobacco pipes, stone vessels, coins etc.) of non-local origin collected during the UCOP survey and dated from the Early Islamic to the Late Ottoman period (7th - 20th centuries CE) provide evidence of contacts with neighboring regions (e.g. Egypt, the Levant, and Mesopotamia) as well as more distant ones (e.g., Eastern Asia, Europe). Quantifying the imported objects and tracing their provenance along with possible maritime and overland routes to Al-Ula contributes to investigating the relations between this oasis and the "outer world" in a diachronic perspective. Through the analysis of imported artifacts, this article will also shed light on related cultural practices in local Arabian societies, such as tobacco, coffee, and tea consumption.

10 MULTISCALE MANIFESTATIONS OF ISLAMIC CULTURE IN THE HISTORY OF UKRAINE: CURRENT THEORETICAL AND METHODOLOGICAL APPROACHES

Biliaieva, Svitlana (Institute of Archaeology of National Academy of sciences of Ukraine)

The geopolitical position of the territory of Ukraine as a transition zone (vast Steppe, numerous rivers and seas) opens great possibilities for the movement of various peoples and a variety of multiscale manifestations in their materiality, especially when it comes to their interactions with Islamic culture. The most significant material manifestations of Islam in Ukraine were associated with the polyethnic nomadic populations who inhabited that region during a lengthy period: from the arrival of the Turk tribes (the Seljuks, the Kipchaks) to the Mongol invasion and the Crimean Khanate, and lastly, to the Ottoman invasion and co-existence of Ukrainian and Ottoman societies from the end of the XVth to the end of the XVIIIth centuries. In the Russian Imperial and Soviet historiography of the XIXth-XXth centuries, Islamic culture was often interpreted as a negative phenomenon, and its hostility towards Slavonic society was emphasized. This theoretical position prevented an objective evaluation and appreciation of the real place of Islamic culture in Ukraine. In the post-Soviet period, during the last decades of the XXth and the beginning of the XXIst century, this situation has changed, as new methodological approaches in archaeological investigations have allowed us to focus on numerous monuments influenced by Islam in Ukrainian culture at various scales. The major task of the current investigation in this field is the creation of a model of material examples and manifestations of Islamic culture in Ukraine spanning the periods of pre-Islamic and Islamic culture and its co-existence with Ukrainian societies. The present database of archaeological artifacts includes information about different kinds of materialities: social, economic, cultural, religious, ethnic, etc., the study of which can provide a new understanding of Islamic culture and how it operated at multiple scales in the history of Ukraine.

11 ACTS OF ART(E)FACTS : VIKING AGE MANIFESTATIONS OF HOLY ISLAMIC INSCRIPTIONS IN THE TEXTILE ART

Larsson, Annika (Uppsala University; The Society for Textile Archaeology & Culture Studies) - Pallin, Karolina (The Society for Textile Archaeology & Culture Studies) - Guennoun, Mohamed (The Society for Textile Archaeology & Culture Studies)

We suggest that a rich Scandinavian heritage of Islamic expressions in artistic crafts, stretching back in time to the Golden Age of Islamic Art, is represented in almost all textile art preserved from the contemporary pre-Christian Viking Age. Starting from the religious Square Kufic expressions preserved in Scandinavian folk art textiles, we can trace Islamic manifestations in time and space that did not care about either geographical or cultural boundaries of today.

Already in 1958 the Swedish ethnologist Sigfrid Svensson studied the connection between folk costume and fashion. He claimed that ancient details in folk costumes reflect historical symbols from a certain period of social and economic prosperity when the fashion was not only favored by the elite but was more general. Anna-Maja Nylén argued in 1974, as a complement to this explanatory model, that the phenomenon is evident in a rich range of folk art textiles and costume details associated with long-lived ceremonial traditions, such as weddings and funerals – which is the exact opposite to the everyday tools and craft techniques that due to poverty has been preserved within the folk culture.

Thus, according to this model, the Scandinavian heritage of Islamic expressions of Square Kufic patterns in folk art textiles should reflect a certain époque in history when Islamic manifestations were socially integrated. Through amounts of archaeological textile finds all over Scandinavia, the phenomenon can be traced to the Viking Age. Shortly thereafter, the Square Kufic expressions were abandoned in their Islamic homelands, and there is therefore no reason to connect these patterns to a second boom of Oriental patterns which, in the form of Turkish floral motifs, was integrated into the Western fashion in the 18th century.

In conclusion, we will show examples not only from Scandinavia but also from Russia and Mexico.

12 THEATRE OF ASPENDOS AND ITS ENVIRONS UNDER SELJUK CONTROL: OBSERVATIONS BASED ON FERNAND BRAUDEL'S THREE PLANES OF HISTORICAL TIME

Akture, Zeynep (Izmir Institute of Technology)

Seventh-century Arab invasions are widely accepted to have started the Anatolian Middle Ages which are characterized by ethnic plurality. Yet, popular narratives on medieval Anatolia rather highlight “Turkification” and “Islamization”, through the arrival first of Muslim Turkoman tribes and then of Seljuk conquerors in the eleventh century. This grand narrative has long overshadowed the multiscalar material manifestations of the incomers’ interactions with the vast and diversified cultural landscapes of Anatolia that lend themselves to an analysis based on Braudel’s three timescales (of events, conjunctures, and the *longue durée*). This formulation enables framing, in the same picture, exceptional people such as the Seljuk Sultan Alā ad-Dīn Kayqubād I (1188-1237) and his unique residences in several locations, the settlement and communication networks he and his successors transformed to channel trade through Anatolia in a period when Constantinople was under Latin control, and the (still) nomadic Turkomans.

This proposed paper attempts to construct such a picture from a number of scholarly research outcomes on and around the Roman Theatre of Aspendos in Antalya province along the Mediterranean coast which is one of the best preserved of its kind. The inspiration has been Turkish Ministry of Culture and Tourism’s official website where this good state of preservation is attributed to thirteenth-century Seljuk sultans’ preservationist policy of repair and reuse as a caravanserai, pavilion, or palace, according to different interpretations. Unfortunately, traces of this adaptive reuse (including tiles decorating a masjid installed in the stage building well into the 1930s) were almost totally removed to restore the “grandeur” of the Roman Theatre. Echoing undocumented removal of the medieval layers also in other popular archaeological sites including Ephesus, this enables discussing, among concluding remarks, the contribution of archaeological research and interventions in the loss of granularity in our current vision of Early Islamic traces in Anatolia.

569 UNEARTHING THE ECHOES OF VIOLENCE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Casimiro, Tania (FCSH-UNL) - Santos, Joel (University of Leicester)

Session format: Regular session

The archaeology of violence is a multidisciplinary field that seeks to understand and contextualize the myriad expressions of human aggression and conflict throughout history. By adopting an archaeological lens, we can delve deeper into the past, unraveling the layers of violence and understanding how it shaped human societies. Examining both the physical and non-physical dimensions of violence in the archaeological record permits a more nuanced understanding of the complexities surrounding aggression. There are different ways to analyse violence, and different societies

observe and deal with different scales of violence, emphasizing the need to investigate and interpret the material remnants of violence to reconstruct the complex narratives of past societies.

This session aims to explore how archaeology can study the motivations, technologies, strategies, and consequences of violent acts. By examining the physical evidence left behind by acts of aggression, we can discern patterns of social organization, inequality, and power dynamics within different societies, unveiling a rich tapestry of human experiences, stretching far beyond physical confrontations and discussing symbolic and structural violence. Such studies not only contribute to a deeper understanding of the past but also help us reflect on contemporary issues related to violence and conflict, but also the way that archaeologists see themselves as agents in the construction of past narratives and how violence is sometimes used by, against and within our community.

ABSTRACTS

1 VIOLENT DEATHS INTEGRATED IN THE CEMETERY AT NEOLITHIC KADRUKA-23 (UPPER NUBIA)

Sellier, Pascal (CNRS, UMR7206 Eco-Anthropologie; Dpt ABBA Anthropologie Biologique et Bio-Archéologie) - Aoudia, Louiza (Centre National de la Recherche Préhistorique, Anthropologique et Historique (CNRPAH); UMR7206, Dpt ABBA Anthropologie Biologique et Bio-Archéologie)

In the the Kadruka-23 burial ground in Upper-Nubia (Sudan, Northern State, Dongola Reach) 172 buried individuals have been excavated since 2014 by the MaFSàK (Mission archéologique Franco-Soudanaise à Kadruka). Organized as a genuine cemetery, the burials are dated from the second quarter of the 5th Millenium BCE. The overall mortality profile is pointing to a natural, “attritional” mortality: The burial-ground includes every age-group and both sexes, without any kind of selection, and is consistent with a typical ancient mortality profile. Yet three of the buried individuals are showing clear marks of violence. Two women and one man, all middle-aged, show perimortem fractures and they died because of blunt-force traumas related to interpersonal or organised violence. Those lethal blows are located on the cranium (several blows in one case), inside the pelvis (inner part of the ilium of os coxae), and inside the abdomen (reaching the last thoracic vertebrae and damaging abdominal aorta). In all the cases, we can reconstruct the edge of the blunt instrument which seems to have been a stone hand axe very similar to those that can be found in tombs as grave goods, but probably hafted at the end of a long shaft, like a pike. As far as funerary practices are concerned, those three assaulted individuals are fully integrated within the cemetery, with the same grave-goods and burial practices as all the others. All that is asking a question about those three subjects as being (or not part) of the group.

2 THE DEHUMANIZING VIOLENCE INDEX: AN OLD WORLD/NEW WORLD COMPARISON OF OVERKILL IN ARCHAEOLOGICAL CONTEXTS

Moriarty, Paul (University of Wisconsin-Milwaukee)

Extreme forms of violent behavior appear in various cultural contexts throughout human history. This study compares so-called “overkill” sites from the late Central European Neolithic and the Pueblo Period of the American Southwest to develop a systematic approach to distinguishing between the levels of violence exhibited in overkill assemblages, compare and define possible motivations and choices for extreme violent behavior, and determine whether the purposeful use of extreme violence in temporally and spatially distant cultures has predictive value today. The skeletal data from six overkill sites, three from each geographic context, were compared by means of an ordinal index, the Dehumanizing Violence Index (DVI), that incorporates variables across age and sex categories, including injury and trauma types and locations, evidence for perimortem torture and mutilation, and systematic extreme processing of the body. Although some overkill sites in the geographically and temporally distant contexts compared here appear similar in the treatment of victims, there are clear distinctions in local expression. Resource unpredictability during times of climatic instability was revealed as a strong predictive indicator for the manifestation of extreme violence, with outsider groups often serving as the main targets of such treatment.

3 STRUCTURAL VIOLENCE IN ANCIENT ATHENS – A BIOARCHAEOLOGICAL APPROACH

Liedl, Hannah (Department of Archaeology, Durham University) - Gowland, Rebecca (Department of Archaeology, Durham University) - Buikstra, Jane (School of Human Evolution and Social Change, Arizona State University)

There are different forms of violence, from direct inter-personal attacks (e.g. warfare) to systematic oppression and exploitation, resulting in structural inequalities that cause harm. This form of structural violence prevents equal access to basic needs and places individuals in circumstances of elevated bodily and psychological risks. Structural violence is harder to identify in archaeological settings than direct violence but has been the focus of increased bioarchaeological study in recent years.

Classical Athens is considered the first example of a democratic society that was built on equality. However, access to political participation was highly restricted, and Athenian society was far from a classless egalitarian system. During the Archaic and Classical period, Athens relied heavily on forced labour and enslavement for its development and prosperity. Historical evidence for the lives of those of lower socio-economic status remains scarce in comparison to the elite. Bioarchaeological research has the potential to fill this gap. The human remains excavated from the cemetery at Phaleron, Athens, hold potential for exploring the lives of those ancient Greek people whom history has forgotten. The simplicity of pit graves, the lack of burial organisation, and limited amounts of grave goods, as well as the presence of several mass burials containing shackled individuals indicates people of low socio-economic status, including potential convicts and/or enslaved individuals. Analysis of their skeletal remains, when integrated with the contextual and historical data for this period, provides a new line of evidence to investigate structural violence in Archaic and Classical Athens.

4 **UNEARTHING THE VICTIMS OF THE FIRST BATTLE OF THE FIRST JEWISH REVOLT AGAINST ROME**

Aviam, Mordechai (Kinneret Institute for Galilean Archaeology, Kinneret College)

In the summer of 67 CE, the first battle between the Roman army, 4 legions led by future emperors Vespasian and Titus, took place at the small, fortified Jewish town in the Galilee named Yodfat (Jotapata). The town was besieged for 47 days, and finally conquered. The Jewish commander was Josephus Flavius, who fell into Roman hand at the end of the siege, and later wrote a detailed report of the battle.

His description displayed a lot of casualties in the actual battle on the walls, during the heavy bombardment by the catapult, but mainly a heavy and cruel massacre of civilians after the conquest.

During the years, most scholars rejected Josephus' disruption and some even suggested that it is all from his imagination.

The town was excavated by the author from 1992-1997, and in 2022-2023. During the excavations we found many human bones in the debris, on the floors but mainly buried as mass grave of gathered bones in cisterns and caves, some of which carry heavy marks of violence.

5 **THE MILITARY HOSPITAL AND CEMETERY OF SÃO JORGE CASTLE (LISBON): THE MATERIALITY OF VIOLENCE**

Henriques, Susana (CIDEHUS)

At the end of the 16th century (1580) the brothers of the Hospitaller Order of Saint João de Deus arrived in Lisbon with the Spanish Armada. Historical documents refer that six brothers went to the city castle in order to cure soldiers. In 1592, during the Iberian Union (1580-1640), a Military Hospital at Lisbon Castle began its administrative and care service under the regulations of the aforementioned religious order. During the Portuguese Restoration War (1640-1668) the geographical location of the Military Hospital of São Jorge Castle although strategic, was not in the battlefield front. Recently an archaeological excavation identified the first military hospital of São Jorge Castle which was partially annulled to give place to the hospital cemetery.

This presentation aims to pursue an analytical view of this specific archaeological context and explore its relationship with the concept of violence and the materiality of violence: Firstly, is it possible to access a Military Hospital as part of the materiality of violence? Secondly, even though not at the battlefield during the Restoration War, what role did this institution play during this conflict? Can we acknowledge the loss of individuality in the militaries buried at the hospital cemetery as violence? What meanings can we give to the materiality or lack of materiality of violence found at this site? Lastly, are there any historical documents about this hospital that can be considered materiality of violence?

Literature says that even though most violence present in human societies is considered a deviant behavior in certain occasions, like maintaining social, economic and political stability is seen as necessary as it was during the Iberian Union and the Portuguese Restoration War. How can we debate this archaeological context as part of the materiality of violence in its relation to the conflicts between Portugal and Spain?

6 **THE FINAL ACT OF THE "SPANISH ULCERA", VITORIA, 1813. ARCHAEOLOGY, HISTORY AND MEMORY**

Carrasco Gómez, Pablo (University of Barcelona) - Martín, Gorka (University of the Basque Country)

The Spanish War of Independence, also known as Peninsular War (1808-1814), was a crucial conflict in the recent history of Spain. The Napoleonic invasion was characterized by high levels of violence including battles and activities of rearguard violence: executions, tortures, and crimes against civilians. It is considered as the beginning of the Contem-

porary Era in Spain. What is more, the war started one of the most conflictive phases of the recent Spanish history, with a large succession of civil wars.

Many specialists had studied the Peninsular War from written sources. However, little attention had been paid to the material remains of the conflict. In this oral presentation we expose the primary results of the first archaeological campaign of Vitoria battlefield. Dated in 1813, this battle and the subsequent allied victory, lead to the end of the French supremacy in the Peninsula. We aim to provide new insights of the battle by presenting the results of the archaeological surveys in one of the battlefield sectors. Additionally, the study of the battlefield includes an exhaustive spatial analysis. The presentation will also highlight the role of this historical event in Spanish and European history. For that reason, we analyzed the impact of the centenary commemoration, the monument that has been built for this occasion, and the historical reenactments.

7 **NOT A PLACE FOR US. HOSTILE ARCHITECTURE AS SYSTEMIC VIOLENCE**

Bucchioni, Marianna (University of Bologna)

Hostile architecture is a strategy of violence through which urban planning or private realities inhabiting the fabric of the cities prevent a certain section of society (deemed unseemly) from freely using urban space.

The shapes of hostile architecture are varied in their form and purpose, and their presence in cities is centuries old: from punched arches or deflectors that prevent people from approaching and urinating on a certain corner, to single-seat, sit-stand or tube-shaped benches, to spikes that arise in the vicinity of shops, banks, administrative buildings, to steep walls that prevent people from leaning on a surface.

Hostile architecture manipulates, along with configuration, the intentions and meanings of the cities we inhabit, together with being a material agent of social exclusion on the basis of income, which is a systemic violence typical of western capitalist society. The presented paper intends to highlight this phenomenon together with the normalisation of this kind of materiality in cities' landscape and in citizens' perceptions. Diachronic examples of hostile architecture (from the 19th century to the present) recorded in three different European cities (Turin - Italy, Barcelona - Spain - and Lisbon - Portugal) will be presented.

8 **SILENT AGONY - EXPLORING THE HIDDEN VIOLENCE OF SOCIAL ISOLATION AND LONELINESS**

Santos, Joel (University of Leicester) - Casimiro, Tania (CFE-HTC Nova University of Lisbon) - Agosto, Frederico (UNIARQ - Center for Archaeology of the University of Lisbon; CFUL - Center of Philosophy of the University of Lisbon; FCT - Foundation for Science and Technology)

This paper delves into the pervasive yet often overlooked forms of violence inflicted upon individuals subjected to social isolation and the resultant feelings of profound loneliness. Beyond physical harm, the emotional and psychological toll of enforced isolation can be deeply damaging, constituting a form of silent aggression. This research seeks to shed light on the various dimensions of violence embedded in the solitary experience, examining its impact on mental health, emotional well-being, and overall human flourishing.

Drawing from psychological, sociological, and obviously archaeological perspectives, our paper investigates the intricate ways in which isolation operates as a catalyst for the erosion of self-worth, social connectedness, and cognitive stability. By exploring empirical evidence coming from some Portuguese case studies, such as the lives of Portuguese nuns in the modern age and the lives of Portuguese elderly that live alone in their houses, and framed by a strong theoretical framework, we aim to unveil the hidden dynamics of this nuanced violence and its implications for individual and societal health.

71 **DEBATING BEST PRACTICES AND NEW APPROACHES FOR A SUSTAINABLE STUDY OF ROCK ART**

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Gallinaro, Marina (Dipartimento Scienze dell'Antichità) - Radchenko, Simon (University of Stavanger) - Bonneau, Adelphine (Department of Chemistry, University of Sherbrooke) - Cucci, Costanza (Istituto di Fisica Applicata N. Carrara Consiglio Nazionale delle Ricerche (CNR-IFAC) Firenze) - Domingo Sanz, Ines (ICREA, Secció de Prehistòria i Arqueologia, Universitat de Barcelona)

Session format: Regular session

Over the past ten years, there has been a significant increase in scientific approaches to study rock art. This has led to an improved understanding of this critical area of cultural heritage, which provides a glimpse into the ancient visual and symbolic world of ancient humans. Thanks to the progressive adoption of advanced digital imaging methods and physicochemical and isotopic analysis, the role of rock art in archaeological and anthropological debates is changing. However, there is still a dearth of commonly accepted experimental protocols for in-field campaigns, alongside a

lack of reference material databases to facilitate data interpretation. Thus, many challenges persist regarding data recording, documentation, dating, and reconstruction of production processes, even due to the endangered state of preservation of engraved and painted motifs and the supporting rocks. Critical in this sense is the need to perform accurate analyses, including physicochemical and microbiological ones, with a sustainable approach guaranteeing the accuracy of results and preservation of rock art.

The main objective of this session is to bring together researchers exploring innovative methods, including non-invasive and micro-invasive techniques, for studying any form of rock art. This includes methods like photogrammetry, microtopography, portable spectroscopic techniques, multi- and hyper-spectral imaging, metagenomics, proteomics, and Artificial Intelligence algorithms for data processing. The session is open to scholars worldwide interested in the field with no restrictions of time or place. The focus will be to identify and assess novel and/or improved technologies, tools, and techniques offering new insights into motif identification, techno-functional analysis, and physicochemical and biochemical characterization. The session will also provide an opportunity to discuss protocols and best practices for a reliable and sustainable study of rock art.

ABSTRACTS

1 ECHOES OF A REVOLUTION-DIALOGUES BETWEEN THEORY AND PRACTICE IN THE STUDY OF THE LATE PREHISTORIC ART IN THE CÔA VALLEY

Alves, Lara (CEAACP | University of Coimbra (Portugal)) - Rivas, Teresa (University of Vigo (Spain)) - Caetano, Vera (CEAACP | University of Coimbra (Portugal)) - Ramírez, Fernando (Rock art Conservation (Spain)) - Reis, Mário (Côa Park Foundation. CEAACP | University of Coimbra (Portugal)) - Pozo-Antonio, Santiago (University of Vigo (Spain)) - Martins, Andrea (UNIARQ | University of Lisbon (Portugal)) - Castro, Pablo (University of Vigo)

In the mid/late 1990s, new approaches to rock art addressed the long biography of sites, inciting dialogues between past and present and the exchange of ideas between Archaeology, Social Anthropology and Anthropology of Art, thus stimulating new ways of thinking our study object. Refusing the excessive centrality of the analysis of motifs, these approaches impelled researchers to look at everything else around them: to the backdrop, the rock, to the way in which motifs were arranged and interacted with the surface, to the architecture of the place, the landscape and to related archaeological contexts. Rock art started to be studied in the symbiotic relationship between art and rock, thus providing full meaning to the concept. This was also the time when new digital recording techniques started to be used in rock art research. For some, these were not only a means of enhancing visualization but also a means of transmitting and illustrating theoretical and interpretative hypotheses.

Over the last 3 years, a research was carried out in the Côa valley aiming to study the rock art traditions succeeding the well-known Upper Palaeolithic Art cycles. The LandCRAFT project applied a multi-proxy interdisciplinary approach to the long biography of rock art sites, from the moment of their creation to the present-day. The research strategy was designed to promote a continuous exchange of knowledge from the multiple scientific areas involved and guided by specific research questions of mutual interest to the teams working on rock art recording, conservation and physicochemical analysis. Research conveyed the analysis of pigments, of accretions that developed on the surface after the rock art was produced and the geological backdrop, using non-invasive, micro-invasive and portable spectroscopic techniques. Also, a protocol was established for the digital recording of extremely faint and near-invisible prehistoric rock paintings with ground-breaking results.

2 PORTABLE REFLECTANCE HYPERSPECTRAL IMAGING FOR NON-INVASIVE INVESTIGATIONS OF ROCK ART

Cucci, Costanza (CNR-IFAC) - Picollo, Marcello (CNR-IFAC) - Bekele, Tadele (Ethiopian Heritage Authority) - Gallinaro, Marina (Dipartimento Scienze dell' Antichità - Università di Roma "La Sapienza")

Reflectance Hyper-Spectral Imaging (HSI) is today a well-established technique that is widely applied in the field of Cultural Heritage for both non-invasive diagnostics and documentation of polychrome surfaces. HSI provides at once spectroscopic and spatial information on the imaged surface, thus enabling not only pigments and materials identification, but also visual representation of their distribution on the surface, through false color maps and elaborated images, which can highlight details not visible to the naked eye. Although so far HSI has been mainly applied to the investigation of museum objects (paintings, manuscripts, etc.), the recent availability of portable HSI cameras has encouraged exploring novel approaches based on remote-sensing modes to extend HSI applications outdoors, such as archaeological contexts, including rock art sites. However, application of HSI technique to rock paintings is technically challenging and requires experimentation in-field.

This paper aims to discuss the current state of HSI applications to rock art studies, from initial approaches to recent experiments carried out with compact HSI cameras, pointing to the need to improve the accuracy and resolution of

non-invasive techniques to better understand the pigments used in rock art and gain a deeper understanding of the cultural and historical significance of these artworks.

The focus is on the preliminary results of recent experiments carried out in contexts of different rock art traditions in southern Italy (Ranaldi rock-shelter) and southern Ethiopia (Borana zone).

3 TAPHART: AN EXPERIMENTAL APPROACH TO THE IMPACT OF WIND EROSION AND MARINE AEROSOL DEGRADATION ON COASTAL ROCK ART SITES

da Rosa, Neemias (UMR5199 PACEA - University of Bordeaux (France)) - d'Errico, Francesco (UMR5199 PACEA - University of Bordeaux (France); Centre National de la Recherche Scientifique - CNRS (France); Centre for Early Sapiens Behaviour - SapienCE, Department of Archaeology, History, Cultural Studies, and Religion, University of Bergen (Norway)) - Maguregui, Maite (Department of Analytical Chemistry, University of the Basque Country (Spain)) - Wiesinger, Florian (Institute of Solar Research, German Aerospace Center (Germany)) - Fiore, Danae (Consejo Nacional de Investigaciones Científicas y Técnicas - CONICET (Argentina)) - Queffelec, Alain (UMR5199 PACEA - University of Bordeaux (France); Centre National de la Recherche Scientifique - CNRS (France)) - Courtenay, Lloyd (UMR5199 PACEA - University of Bordeaux (France)) - Caruso, Francesco (Department of Analytical Chemistry, University of the Basque Country (Spain)) - van Niekerk, Karen (Centre for Early Sapiens Behaviour - SapienCE, Department of Archaeology, History, Cultural Studies, and Religion, University of Bergen (Norway); Archaeology Division, School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand (South Africa)) - Henshilwood, Christopher (Centre for Early Sapiens Behaviour - SapienCE, Department of Archaeology, History, Cultural Studies, and Religion, University of Bergen (Norway); Evolutionary Studies Institute, University of the Witwatersrand (South Africa))

The production of painted images is generally considered a hallmark of cultural and cognitive modernity. Through its study, archaeologists attempt to explore how prehistoric populations shared social conventions, beliefs, and identities that were paramount in the creation and maintenance of their cultures. Conducting rock art research in sites located in coastal areas, however, is a challenging endeavour, mainly due to preservation problems allegedly related to the action of wind and marine aerosol. Despite the apparent relevance of these agents, their impact on the taphonomy of prehistoric paintings has not been systematically studied, and the extent of their influence on the preservation of coastal rock art remains largely unknown. In this paper, we delve into this fundamental issue and present the preliminary results of accelerated ageing experiments conducted within the scope of the MSCA TaphArt project. Employing wind tunnels with particle injection and a climatic chamber, we simulated the effects of wind erosion and marine aerosol degradation on a set of experimental paintings produced on calcarenite with different pictorial recipes. The deterioration process observed in the experiments was recorded through confocal microscopy, micro EDXRF mapping, and hyperspectral imaging, with the collected data being modelled through artificial intelligence techniques to determine how long and under which environmental conditions rock art paintings can survive these taphonomic phenomena. Building on the findings of this study and taking as reference the archaeological and paleoenvironmental context of Blombos Cave, we discuss whether the apparent absence of rock art paintings in coastal Middle Stone Age sites of southern Africa is more likely the product of cultural choices, or the result of a taphonomic bias introduced by time-dependent destructive processes.

4 MICROARCHAEOLOGICAL METHODOLOGY FOR THE CHARACTERISATION AND IDENTIFICATION OF RELATIVE SEQUENCES BETWEEN ROCK PAINTINGS

Ruiz-López, Juan (Universidad de Castilla-La Mancha) - Muñoz-Soto, Camila (Universidad de Castilla-La Mancha, Fac. de Ciencias de la Educación y Humanidades; Université Paris 1 Panthéon-Sorbonne, ED112, UMR 8068 TEMPS) - Amer-Veny, Josep Lluíz (Universidad de Castilla-La Mancha, Fac. de Ciencias de la Educación y Humanidades) - Hernáiz-Prieto, Paula (IIIPC Universidad de Cantabria)

The determination of the relative seriation in a rock art panel is one of the basic procedures on which the temporal ordering between phases of a style, or between different rock art styles, has been based. These sequences are usually based on the analysis of overlaps, either through direct observations, often with the naked eye, or by means of thin slices of samples taken from the paintings, which involves a deterioration that is not always ethically acceptable. The additive nature of paintings makes it difficult to determine the seriation. This is a consequence of the thinness of the pictorial layers, their degree of transparency or density, the low chromatic contrast, and their preservation. Despite the intrinsic difficulties in defining these superimpositions, this is a key task that requires its own methodology.

In this paper we present an innovative microarchaeological methodology designed to determine the superimposition seriation between rock paintings. This cutting-edge methodology is based on basic archaeological principles such as surface distribution, texture, or stratigraphic arrangement, and relies on non-invasive or microinvasive procedures. Thus, hyperspectral imaging, microphotography, particle analysis, and LIBS (Laser Induced Breakdown Spectroscopy) technology are combined to define pictorial phases and the seriation in a rock art panel. From these procedures, an

accurate approximation can be made of the spatial distribution of phases on a panel and the agency associated with the action of superimposition. The results obtained so far, in assemblages with Levantine art in the Iberian Peninsula, Spain, demonstrate the viability of this microarchaeological methodology, and its capacity to obtain consistent explanations in contexts of open-air rock art.

5 TRACING THE PAINT: HYPERSPECTRAL CHARACTERISATION OF LEVANTINE ART. THE CASE OF THE SIERRA DE LAS CUERDAS

Hernaiz Prieto, Paula (Universidad de Cantabria.; Instituto Internacional de Investigaciones Prehistóricas de Cantabria) - Ruiz López, Juan (Universidad de Castilla-La Mancha)

Stylistic variability is a common phenomenon in rock art. Given that it responds to cultural and chronological factors, its analysis is an unavoidable task. One of the graphic expressions which is particularly affected by this problem is Levantine art. This has traditionally been divided into a series of regional nuclei, based on shared stylistic characteristics. However, in order to approach a dimension as complex as this, it is necessary to address the intrinsic characteristics of this materiality, and of the social practice through which it is defined.

In this sense, the techniques of photography and analysis of hyperspectral images are an ideal tool to address this issue. It is a non-invasive technique that makes it possible to characterise the painting according to the spectral behaviour of the colouring matter. By classifying the figures on the basis of their spectral signature, we can read the panels and shelters at different levels: study the distribution of the figures on the panels, map the pictorial phases, identify patterns that allow us to connect shelters and, finally, make a first approximation to the diachronic process of the construction of a panel.

We present here the preliminary results of a case study focused on the Levantine art nucleus located in the Sierra de las Cuerdas, (Cuenca, Spain) which some researchers have connected to the Albarraçín nucleus (Teruel, Spain). We are currently carrying out a research with which we intend to find common patterns between both nuclei in their materiality, analysed through hyperspectral techniques and analysis, allowing us to defend or reject this connection.

6 NOT TOO MUCH, NOT TOO LITTLE: STRATEGIES FOR SELECTING RELEVANT SAMPLES FOR ART DATING

Vandeveld, Ségolène (Laboratory of Climate and Environment Sciences (LSCE UMR8212); Université du Québec à Chicoutimi) - Bonneau, Adelphine (Université de Sherbrooke) - Bédard, L. Paul (Université du Québec à Chicoutimi) - Langevin, Erik (Université du Québec à Chicoutimi)

The degradation of open-air rock art sites, sometimes accelerated by climate change or by poor choices made in the past to preserve them, makes their study urgent and crucial. However, this sense of urgency must not allow us to disregard these, sometimes sacred, sites and to sample more than needed: we cannot destroy without conscience in the name of conservation. Limiting the invasive impact of our analyses on ornate sites is therefore a central point. This can also sometimes mean that it is better to take enough material to be able to carry out the analyses envisaged, rather than taking too little, and ultimately damaging the site for nothing. Areas in the process being eroded (i.e. wall crumbling) and destined to be altered in the short term may also be preferred for sampling. But most importantly, the site must first and foremost be well known, and the methods tested and optimized for the type of site studied, before any invasive actions are undertaken.

We will present a case study of two rock art sites on the Canadian Shield (in the province of Quebec, Canada) that we are studying to determine the age of artworks, in order to link them to the history of Canada's First Nations. In this presentation, we will outline the complementary strategies we are developing to overcome the limitations that currently prevent us from dating these sites or understanding their creation temporalities. We will therefore discuss the need for sampling, the size of samples, the order in which to carry out the analyses to optimize the protocol and alter the samples as little as possible, and finally the conservation and accessibility of the samples.

7 THE SAN ARTISTS' PALETTE: AN UPDATE

Bonneau, Adelphine (Université de Sherbrooke) - Green, Dawn (University of Cape Town) - Pearce, David (Rock Art Research Institute, University of the Witwatersrand)

For over 10 years, a joint international research project has been investigating rock paintings created by San people in southern Africa, with an emphasis on pigment procurement and processing. Through detailed multi-analytical characterization and color preparation experiments, initial results were published for a valley in Lesotho and sites in the Eastern Cape. This presentation will unveil new findings from sites in the Stormberg district, the Maloti-Drakensberg, and from two painted slabs currently exhibited at the Iziko Museum in Cape Town. The previously established protocol, which relied on optical and electron microscopy, Raman and FTIR spectroscopies, has been enhanced with micro-XRD, providing an even more comprehensive understanding of the paintings. Furthermore, comparisons with

coloring materials from 19th and 20th-century Europe shed light on recipes that may have originated from European rather than local sources. Finally, previously undocumented types of coloring materials have been identified, enriching the palette used by the artists.

8 SUPERPOSITIONS AND SUPERIMPOSITIONS IN NORDIC BRONZE AGE ROCK ART: ADDITIVE PROCESSES AND MARITIME RITUALITY IN WESTERN BOHUSLÄN (CA. 1700-500 BC)

Moyano Di Carlo, Julián (University of Gothenburg, Dept. of Historical Studies) - Horn, Christian (University of Gothenburg, Dept. of Historical Studies) - Ling, Johan (University of Gothenburg, Dept. of Historical Studies) - Liebl, Carina (University of Gothenburg, Dept. of Earth Science) - Peternell, Mark (University of Gothenburg, Dept. of Earth Science) - Green, Ashely (University of Gothenburg, Dept. of Historical Studies) - Meijer, Ellen (University of Gothenburg, Dept. of Historical Studies) - Lindhé, Cecilia (University of Gothenburg, Dept. of Literature, History of Ideas, and Religion)

The overlap of figures on Nordic Bronze Age rock art panels has traditionally been used to analyze transformations and define chronological sequences. However, the reason why carvers initially overlapped figures remains unclear. Following the paper by Gunn and colleagues (2022), "Superpositions and superimpositions in rock art studies: Reading the rock face at Pundawar Manbur, Kimberley, northwest Australia", we distinguish between superpositions (the overlay of one thing on another) and superimpositions (the intended and meaningful rework of previous figures or features). The goal of this paper is to use this distinction to explore and understand the distribution and meaning of superpositions in the region. To achieve this, we examined 14 large panels in central and northern Bohuslän (Sweden), which were documented using non-invasive archaeological and geological techniques. The rocks were scanned with high-resolution 3D technology (SfM and OLS) and explored with image-enhancing techniques like digital frottage or vRTI. Additionally, we applied non-destructive ultrasonic soundwave techniques to characterize the Bohus granite and investigate the near-surface structure. From the analysis, it seems as though the geological properties of the rocks cannot account for all the superpositions in the panels. Moreover, the statistical analysis shows that superpositions in the region concentrate in specific panels and show clear associations between specific motifs such as ships, humans, and cupmarks. Furthermore, the exploration of high-resolution documentation suggests that some of these superimpositions targeted specific parts of figures, maybe as a part of apotropaic maritime rituals in connection with (long-distance) sailing activities. We conclude that the distribution and type of superimpositions support the idea that panels were created by additive processes involving several generations of carvers, who did not discard previous carving events but kept them alive for future generations.

9 EACH SITE HAS ITS METHOD: DEBATING BEST PRACTICES FOR STUDYING ROCK ART, CASE STUDIES IN THE ALPS AND ITALY

Arcà, Andrea (Footsteps of Man archaeological society; S.Va.P.A. - Société Valdôtaine d'Archéologie et Préhistoire) - Sigari, Dario (MUSE-Museo delle Scienze di Trento; Università degli Studi di Ferrara; Coimbra University, Geosciences Center)

Rock Art researchers and professionals are often asked what the best method of documentation can be. Besides an unavoidable scientific, archaeological, and multidisciplinary approach, involving both the humanities and the hard sciences, field experiences show that rather than a 'method', it is better to refer to an operational chain that considers the use of a series of techniques (photographic and meta-photographic documentation, iconographic tracing, 3D modelling, interactive virtualisation, etc.) and a rich toolbox. These include manual and digital tools to process numerical and textual data and to create reliable two-dimensional, three-dimensional, and environmental reproductions.

Starting from important and differentiated case studies faced by the authors, relating to open-air and cave petroglyphs, under-shelter paintings, portable art, and even dubious or fake engravings, it becomes clear that for each site a specific operational chain is required. In other words, it is necessary choosing each time the most appropriate tools, taking into account several parameters: for instance, the environmental context, geomorphological conditions, the petrography of the lithic supports, the engraving and painting techniques, the preservation status of the iconic finds, and even the communication needs.

Conversely, we recognise as unifying elements: the opportunity to proceed with expertise and accuracy, the need to produce graphic and visual recordings – for which iconographic tracing is the fundamental tool – the cataloguing of surfaces and figures, the archaeological study, and the dissemination activities including scientific publications and communications aimed at valorisation. Underlying everything is the comprehensive sharing of data, to enable/facilitate the study of the iconic elements even without autopsy observation, which in the field of rock art is often challenging and problematic.

10 STRUCTURE FROM MOTION, CHAOS FROM NUMBERS, KNOWLEDGE FROM ELSEWHERE. METHODOLOGICAL AWARENESS ABOUT PHOTOGRAMMETRY FOR ROCK ART RESEARCH

Radchenko, Simon (University of Stavanger)

Photogrammetry became as trivial for rock art research practice as the statement of its triviality is a banal opening for the texts on the topic. As the variation in hardware, software, and research tasks increased, a whole spectrum of applying the SfM method to the study of ancient art — from “Black Box” to the incredibly accurate self-adjusted toolkits — emerged. Evidently, this is positive news for a community of rock art scholars: by utilizing digital methods, we all fostered the rapid methodological and conceptual development of our field that happened in the last decade.

However, as we routinize the tool, the details and technicalities of its use get shaded and disappear from the discourse. In other words, the more we “just put 3D models in use,” the less time we spend thinking through their crucial parameters, such as accuracy, precision, and how they affect our research results. In the same way, the more we use established software solutions, the less control we have over the quality of our data.

As I aim to show in this talk, the use of 3D modeling in rock art research came to a level when all these details might affect the scientific outcomes of research. By going through the overview of these basic concepts, I'll show how they interact with the specific software solutions and, more importantly, with our research questions. Finally, I'll introduce a case study to reveal the interdisciplinary perspectives of photogrammetry when applied with relevant control over the data quality. This study of the engraving technology through the detailed analysis of the 3D modeled surfaces outlines the peculiarities of one of the rock art research development lines I invite to discuss and approach.

11 USING BIG DATA TO STUDY ROCK ART: A PIPE DREAM OR A PROMISING FIELD?

Lahaye, Romain (University of Sherbrooke; University Paris 1 Panthéon-Sorbonne) - Bonneau, Adelphine (University of Sherbrooke)

Technological advances now make it possible to produce extremely accurate 3D models and redrawings while improvements in digital imagery, and even more so hyperspectral analysis, are revealing more and more features that were previously invisible to the naked eye.

The constant improvement of these different techniques is providing more and more data, to the point where it is becoming difficult to relate them all. In other words, there is a gap between the generation of ever-increasing amounts of data on the one hand, and the exploitation, linking and interpretation of this data on the other.

This goes hand in hand with the credo of the archaeological discipline, which has always been to accumulate as much data as possible in the hope that technical and technological advances will one day make it possible to use it. But what if the time had finally come to serialise this vast amount of disparate information and use it in a holistic way?

If the time has indeed come to create multiscale databases in the style of Geographic Information Systems (GIS), we propose that they should now be developed in the form of PostgreSQL/post-GIS databases. Instead of connecting fragmented site data at map scale, the different data (3D models and redrawings, information from image enhancement and hyperspectral imagery, surface conditions and areas of alteration, physico-chemical sampling sites, etc.) will be available at different scales (panels, sites, regions, etc.). By combining all these data, the aim is to create the most accurate databases possible, which can be accessed and modified by all specialists. This requires the harmonisation of data formats and a collegial agreement on the standards and broad choices to be made.

12 CONNECTING PEOPLE TO PLACE: A GIS BASED SPATIAL AND CONTEXTUAL ANALYSIS OF PREHISTORIC ROCK ART IN BRITISH AND IRISH LANDSCAPES

O'Neill, Kaitlin (University of York)

This study examines the potential role of geographic information systems (GIS) and highly detailed three-dimensional modelling software as a means of both visualizing and contextualising the landscape alteration and socialisation of Neolithic and Bronze Age open-air rock art landscapes in Britain and Ireland.

In conjunction with environmental and excavation records, GIS was used in this research to simulate potential palaeoenvironmental conditions at rock art sites to examine the use patterns and placement of rock art in these landscapes. Three-dimensional modelling and palaeoenvironmental reconstruction in GIS are avenues that have not been widely explored but have the potential to profoundly impact understandings of the ways space was shaped.

Through this methodology, the viability of three-dimensional modelling in GIS as a means of providing an immersive look into the environmental alterations made by ancient peoples at these sites was assessed. The findings provided insight into a pattern targeting or emphasis on specific features in the landscape which may have assisted in the development of Neolithic and Bronze Age trade and social networks.

Additionally, the impact that visualized palaeoenvironments have on modern archaeological interpretations of sites was examined. These findings provided insights into the shortcomings of ancient landscape analysis through a modern

lens and ways this methodology can be used, in conjunction with other technologies, to create a comprehensive understanding of both the physical and social landscape changes at these sites over time.

13 ONE STEP FURTHER IN GIS APPLICATIONS TO ROCK ART ANALYSIS

Sanchez-Hernandez, Alfredo (Universitat Jaume I. Pre-EINA Research Group) - Roman, Dídac (Universitat Jaume I. Pre-EINA Research Group) - Domingo, Inés (ICREA; Universitat de Barcelona)

Over the last few decades, archaeology has increasingly implemented Geographic Information Systems (GIS) tools to develop new methods of analysis and expand the possibilities for studying several aspects of the archaeological record. Furthermore, GIS can be applied to other areas related to archaeological heritage at various scales (zoning of protected areas, conservation, risk assessment, etc.).

Regarding rock art, GIS has primarily been used to analyse how human groups have perceived and used the landscape through multi-scale analysis, and occasionally to define and delimit protected areas.

GIS offers a wide range of possibilities, including tools for topographical analysis, closely linked to Digital Elevation Models (DEMs). DEMs generated through photogrammetry have been used for years in other research areas to monitor the effects of geomorphological phenomena related to topography and for other purposes, such as quantifying the effects of moisture or the sublimation of snow-covered surfaces. GIS DEM analysis has primarily been used in rock art research for mapping territories and analysing local topographies. However, these tools have also been combined with 3D models to improve the visualisation of painted motifs and even to monitor potential physical changes in the rock surface. Recently, some researchers have tested the application of DEM analysis to enhance the visualisation of engraved rock art.

The aim of this presentation is to go one step further and introduce other potential applications of GIS in research on prehistoric art (specifically Levantine Art) and its surroundings. This will be achieved through topographical analysis of Digital Elevation Models generated from photogrammetric documentation.

575 ABANDONMENT AND OPPORTUNITIES? RESPONSES TO THE LATE MEDIEVAL DESERTION

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Nettet, Therese (Museums of Sogn og Fjordane) - Heinonen, Tuuli (University of Helsinki)

Session format: Regular session

In recent studies of the late medieval crisis, new methods and source materials have been introduced, and new theoretical frameworks have been applied. Moving away from the traditional deterministic point of view, researchers are now interested in studying the resilience and complexities of settlements, communities, and subsistence strategies, identifying reasons for survival and seized opportunities, or failure and desertion. Approaches include interdisciplinary macro-level surveys with sources ranging from historical records to scientific data. This has brought the research on the late medieval crisis forward and offered a glimpse into a diverse period.

This session wishes to follow up on last year's EAA session “Reshaping medieval desertion in Europe”. We ask for papers with human-level perspectives, that address either one of the following themes or connect the two:

- 1) Experiences connected to leaving home and a way of life. What can the archaeological record tell us about people's actions and decisions when abandoning a place?
- 2) How did others perceive abandoned places? Who reused these sites and how?

We are interested in different strategies connected to abandonment and re-settlement and how these are manifested in the archaeological material depending, for instance, on different cultural and social spheres, and different settlement types such as a farm, a village, a small town, or a town plot. We also welcome examples that include long-term studies, including the 16th and 17th centuries that can provide information on the later life histories of people who had to leave their homes for different reasons.

We ask for papers that emphasize a human-level approach. The aim is to illustrate different responses to the crisis, focusing on agency, resilience, or mentalities, for example, to highlight further the complexity of the period shown in large-scale studies.

1 AFTER THE FIRE. HOW DID TOWNSPEOPLE IN MEDIEVAL NORWAY ACT IN THE AFTERMATH OF SUDDEN CATASTROPHIC INCIDENTS?

Hansen, Gitte (University Museum of Bergen, University of Bergen, Norway)

The medieval town Bergen in western Norway was hit by large scale fires time and again throughout the Middle Ages. Archaeologists have characterized the archaeology of Bergen as favored by a 'Pompeii-situation', where fire-layers lay as blankets of charcoal and ashes across the devastated settlement, preserving the moment of destruction - and waiting for archaeologists to uncover and harvest the fruit. The actual archaeological sources, however, tell a story of intense activity in the aftermath of fires. So the fire-layers are far from intact and the material records are far from undisturbed by medieval hands. The paper explores how medieval townspeople from different levels of society handled the situation after sudden catastrophic destruction. From the perspective of property-owners and -users it explores how valuables were salvaged and who went into the ruins. From a methodological perspective the paper explores what specter of material culture we, as archaeologists, can expect to find, or not to find, in ruins after unexpected catastrophic incidents.

2 HOW DOES A TOWN DIE? THE PUZZLING FATE OF MEDIEVAL GUTENWERD

Predovnik, Katarina (University of Ljubljana, Faculty of Arts, Department of Archaeology)

In 1473, the small market town of Gutenwerd in the historic Margraviate of Carniola was attacked and burned to the ground by Ottoman troops raiding the border provinces of the Holy Roman Empire. According to a contemporary report, more than 3,000 people sought refuge in the town and were either slaughtered or taken into captivity by the Ottomans. This disastrous event resulted in the complete abandonment of the town. The once settled area reverted to farming and the only building still standing on the site today is the former parish church of St. Nicholas.

The narrative of the catastrophic, sudden end of the town has dominated the understanding of Gutenwerd's history until recently. It was not even questioned by the archaeologists Vinko Šribar and Vida Stare, who excavated parts of the site from 1967 to 1984. Since 2021, A new research programme has been underway, which includes the documentary and scientific analyses of the legacy archaeological data and some 14.000 finds kept at the Slovene National Museum, but also fieldwork, such as field walking, geophysical prospection, ALS and coring. One of the aims of the current research programme is to question the interpretative framework that has shaped previous research on Gutenwerd. As the evidence for the continuation of life in Gutenwerd after 1473 accumulates, the concept of catastrophe loses significance. In order to understand the fate and afterlife of Gutenwerd and to explain the present landscape with its resilient features, it is far more useful to focus on the gradual processes of settlement contraction and restructuration.

3 ECHOES OF LIFE: CHALLENGING THE 'STOPPED LIFE' NARRATIVE FOR CZECH MEDIEVAL DESERTIONS

Holata, Lukáš (University of South Bohemia)

Long-term historical and archaeological investigations into deserted medieval settlements have yielded a robust database comprising thousands of sites. Many of them are preserved beneath woodland cover. Traditionally, these environments have been seen as empty spaces, prompting a deep-rooted narrative of 'stopped life'; the burnt layers overlaying the destruction of rural homesteads then tempted the perception of these places as 'zones of destruction.' Both evoke that something extremely negative happened that led to a place becoming abandoned.

However, holistic landscape-scale analyses integrating archaeological, geoarchaeological, and paleoenvironmental data have demonstrated that the traditional perception is completely wrong. Evidence of the survival of settlements in shrunken form into the later period has been obtained alongside numerous and varied activities and exploitations even after the villages' disappearance. So, the areas of deserted villages were full of life, offering new opportunities.

These findings paint a vivid picture of life persisting beyond the perceived desertions, offering new insights into resource diversification and community resilience. Ultimately, this research underscores the extraordinary adaptability of rural communities and the dynamic evolution of landscapes, challenging conventional narratives and revealing a more nuanced understanding of medieval desertion.

4 RESILIENCE AND SETTLEMENT DESERTION - AN EXAMPLE FROM SOUTHERN FINLAND

Heinonen, Tuuli (University of Helsinki)

It is often difficult to determine the reasons behind desertion of rural settlement sites in the Middle Ages, as these have rarely been documented in written sources. This is especially true for Finland, where only a small number of

medieval written documents have been preserved. However, the early modern written records provide plenty of examples of the difficulties the farmers faced. When the historical sources are combined with archaeological records, it is possible to study the different ways that rural inhabitants responded to challenges. In this paper, I will discuss rural resilience and settlement desertion using the case of Mäkylä, a small village located in southern Finland, as an example. In the Middle Ages, the village was inhabited by freeholders, who owned their farms. In the 16th century, the villagers faced several difficulties, but survived many of these. However, by the early 17th century the village was deserted. In this paper, using historical and archaeological records, I will consider the reasons why the villagers could survive some of the challenges and what finally caused the village to be abandoned.

5 EXPERIENCES OF ABANDONMENT AND ABANDONED RURAL LANDSCAPES

Nesset, Therese (Musea i Sogn og Fjordane)

The traditional textbook narrative of the late medieval abandonment process in Norway is the abandonment of farms due to the demographic crisis, which led to available resource areas for the survivors, who then utilised these areas for grazing and gathering fodder. Most farms became re-settled during the 16th and 17th centuries, and some farms did not. Historical research has widely discussed the reasons for the demographic crisis and its societal effects. In addition to, for example, climate change and the over-use of natural resources, research suggests that one-third to two-thirds of the Norwegian population died of the Black Death and the following waves of pest epidemics during the late Middle Ages. This was also a period of political unrest.

In this paper, archaeological and palaeobotanical sources from three farms with different social and geographic conditions within western Norway will be used to discuss the experience of abandonment and what came after at these specific sites. With recent archaeological and interdisciplinary research on this period as a backdrop, and from the actors' perspectives, the aim is to look at examples of abandonment and discuss different responses to the late medieval crisis, how the abandoned farms were later perceived, and the character of the following human activities (or the lack of them) at the sites. What affected people's responses to the challenges of the period, and how is this manifested in the source material from the farms? What ideas can be identified that are connected to the abandoned settlement and the surrounding agrarian landscape?

577 FOLLOWING THE RIVER: FLOWSCAPES AS CLUSTERS OF COMMUNICATION IN THE ANCIENT MEDITERRANEAN WORLD

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Franceschini, Mariachiara (Albert-Ludwigs-Universität Freiburg, Abteilung Klassische Archäologie) - Abbondanzieri, Elisa (Sapienza Università di Roma, Dipartimento di Scienze dell'Antichità)

Session format: Regular session

Considering communication routes as networks of multiscalar interaction, rivers play a crucial role in facilitating the penetration of people, goods, technologies, and ideas into the inland regions.

Regardless of river length, navigability, catchment area dimensions, and seasonal character as well as environmental changes rivers and river valleys offer optimal conditions for mobility even in challenging landscapes. Thus, rivers create flowscapes, forms of socio-natural networks, linking environmental and natural factors with the social and historical background.

By changing perspective and putting rivers at the centre of research, the inland regions not only animate themselves with a network of fluid movements, but this also opens up the possibility of considering clusters of communication at a wider range and scale, offering multiscalar interaction from the small and fragmented local landscape, to the wider Mediterranean. Rivers provide for a rhizomatic and branching penetration of the landscape, enhancing lively interactions and cultural exchanges, thus being fluid, nonlinear boundaries, and elements of social unity and integration rather than static borders.

This session approaches riverine landscapes from a diachronic perspective - from the Bronze Age to the Middle Ages - highlighting transversal and constant dynamics in different periods and environments in the Mediterranean area.

Papers are welcome that address the topic from different angles regarding:

- riverine landscapes as networks of multiscalar interactions, affecting ancient communities at the social and historical level;
- rivers as ways of exchange and transit of goods, technologies, and ideas - thus flowscape as a promoter of the economy of inland regions;
- rivers as inter- and transcultural elements, affecting the ways of integration and cooperation between different communities;
- river ways as dialectic clusters with both environmental and social implications.

1 THE FORTRESS OF ROFALCO IN THE TERRITORY OF VULCI. AN ETRUSCAN HUB ON THE OLPETA VALLEY IN THE MID-REPUBLICAN PERIOD

Abbondanzieri, Elisa (Sapienza Università di Roma, Dipartimento Scienze delle Antichità) - Cerasuolo, Orlando (Parco Archeologico di Cerveteri e Tarquinia) - Freixas Roig, Tania (Grup de Recerca en Arqueologia Protohistòrica - Universitat de Barcelona) - Papa, Chiara Martina (Sapienza Università di Roma, Dipartimento Scienze delle Antichità) - Pulcinelli, Luca (Soprintendenza Archeologia Belle Arti e Paesaggio dell'Umbria) - Sabbatini, Martina (Università degli Studi di Torino) - Somma, Lorenzo (Independent researcher) - Valerio, Marta (Università degli Studi di Torino; Université Paul Valéry-Montpellier 3)

Rofalco is an Etruscan fortress located at the north-east border of the territory of Vulci. The settlement was established in the second half of the 4th century BC and was subsequently destroyed during the Roman occupation of Vulci around 280 BC. Rofalco stands out as one of the most strategically significant sites discovered in southern Etruria, dominating the Olpeta Valley along the natural route between Vulci and Volsinii.

Despite its military nature, excavations at Rofalco have uncovered a significant quantity of pottery vessels used for storing food (including domestic amphorae, dolia, honey pots, and vases for breeding dormice), as well as evidence related to textile production. Together with the discovery of several stone weights for scales, a bronze ingot, and a coin these archaeological finds point to a bustling economic activity that was conducted within the settlement.

Therefore, thanks to the long-term excavation project and the good preservation of archaeological evidence, Rofalco serves as an ideal case study to analyze various social-economic aspects. Starting with a synchronic analysis of the material culture, this paper aims depict the key role of Rofalco in managing the economy within the internal area of Vulci during the mid-Republican period, specifically focusing on its location along the Olpeta River towards Bolsena Lake and Volsinii.

2 NEW APPROACHES TO THE ETRUSCAN RIVERINE LANDSCAPE OF THE FIORA AND PAGLIA VALLEY

Franceschini, Mariachiara (Albert-Ludwigs-Universität Freiburg)

Rivers in antiquity have mostly been considered static entities from the point of view of the ancient communities. People living in riverine landscapes have used rivers by exploiting and modifying them to enhance production, communication, and trade. Rivers are thus perceived as resources and means for controlling and exploiting the landscape. However, a new perspective is needed to better understand the role of rivers from a broader environmental viewpoint that will highlight the fluid entanglement of ancient communities and riverine landscapes, and the effectancy of rivers themselves on human activities, beliefs, and ideas. Based on recent environmental and anthropological studies on the materiality of water, I propose a new methodological approach. By examining the relationship of different archaeological key factors (such as infrastructures, settlements, and sepulchral and cult places) with rivers, I aim to elaborate a more comprehensive analysis of human interactions with the landscape and hydrography, emphasizing the importance of rivers as catalysts for social and cultural changes. The valley of the Fiora and Paglia in the Etruscan landscape will serve as an example to highlight how rivers shaped different aspects of the lives of the nearby communities and both their actions in and perceptions of the landscape.

3 ALONG THE NERA RIVER. THE SITE OF MARATTA BASSA IN TERNI DURING THE ORIENTALIZING PERIOD

Sabina, Nicolò (Sapienza Università di Roma) - Materazzi, Filippo (Sapienza Università di Roma)

The 116-km-long Nera River is one of the main waterways of central Italy and the main tributary by flow of the Tiber River. Because of its extension through the Apennines, it has always been a fundamental route of communication between the two sides of the peninsula. Along its banks developed, during the first millennium BC, the pre-Roman center of Terni, which, after the discovery of necropolis in the late 19th and early 20th centuries, is now experiencing a new season of systematic research thanks to the Interamna Nahars Project, coordinated by the chair of pre-roman Italy of the Department of Science of Antiquities of Sapienza University of Rome, in collaboration with the Soprintendenza Archeologia Belle Arti e Paesaggio dell'Umbria and the Direzione Regionale Musei Umbria, and financed by the CARIT Foundation.

The purpose of this contribution is to provide an alternative perspective on the relations between pre-roman Terni and the multiple neighbouring centers, highlighting the importance of the Nera as the main communication route.

After providing a brief overview of the main sites along the water network of the Terni valley, attention is directed towards the site of Maratta Bassa, located near the Nera and investigated during the late 1990s and early 2000s. The

analysis focuses on its apparently isolated location and proposes a reinterpretation of the Orientalizing phase through a preliminary reexamination of the findings, which indicate the existence of an extremely dynamic reality. Terni during the Orientalizing period appears not only receptive to external influences but also seems to disseminate typical elements of its own material culture to neighbouring districts. Hence, it is necessary to reevaluate Terni's relations through a new perspective, emphasizing mutual exchanges stimulated by the presence of the Nera, not one-way but multidirectional.

4 AFFLUENT TRIBUTARIES? THE CHIANI RIVER (ANCIENT CLANIS), ITALY

Alcock, Susan (University of Oklahoma) - Bizzarri, Claudio (CEE Orvieto) - Williams, Joey (University of Oklahoma)

Much attention has rightly been paid to the Tiber River and its place in the evolution of Rome and its imperial networks. Yet other rivers fed the Tiber and extended the city's reach into the Italian peninsula. The Chiani River (ancient Clanis), a tributary to the Paglia River (itself a tributary to the Tiber), was in antiquity navigable, running in relative parallel with the Via Cassia. This Paglia-Chiani 'flowscape' is currently under broader diachronic examination, through the work of (among others) Dr. Jacopo Tabolli at San Casciano dei Bagni.

Since 2023, the University of Oklahoma has been working at Pian de Mealla, near Ficulie in Umbria. Findings at the site, previously explored in the 19th century, point to a villa complex close to the banks of the Chiani, with clear signs of 1st and 2nd century CE occupation, agricultural production, and religious dedication.

This paper will present results of this work within a more general analysis of the networks and infrastructure of the Chiani river corridor in the early imperial period. Conditions of settlement, economy, and ritual will all be brought into play – not least in the riverine dynamics of local versus imperial initiatives and of local versus external actors.

5 THE URBS OF AMITERNUM AND THE ATERNUM FLUMEN BASIN. LIDAR ANALYSIS OF THE ARCHAEOLOGICAL SITE AND ITS FLUVIAL CONTEXT

Lagóstena, Lázaro (Universidad de Cádiz) - López-Medina, María (Universidad de Almería) - Rondán-Sevilla, Isabel (Universidad de Cádiz) - Aragón-Núñez, Enrique (Universidad de Almería) - Molina-Vidal, Jaime (Universidad de Alicante)

The ancient urbs of Amiternum, near to present-day L'Aquila, is closely linked to the Aternum flumen basin, being, together with Ostia-Aternum (Pescara) and Teate Marrucinorum (Chieti), one of the main urban centers of this river valley of Abruzzo region. Although important public buildings from the Roman Imperial period are known, such as the Amphitheater and the Theater, as well as other private places, much of the urban planning of Amiternum is still unknown to us. On the other hand, the environment of the city on the banks of the Aterno river is occupied by thick riverside vegetation, in addition to being located next to a flood plain whose sediments make it difficult to understand the urban organization with respect to the paleochannels of the ancient river. In the framework of two ongoing research projects (Excavations and non-invasive archaeology in Amiternum (L'Aquila, Italy): ancient building systems in areas of high seismicity and AQVIVERGIA: Society-environment interaction in river basins: conceptualization and praxis) LiDAR flights have been carried out over the site and its surroundings. In this communication we advance the results of these non-invasive surveys focusing on the problem of ancient urbanism, its relationship with the river and the fluvial basin as the main route of communication in the region.

6 FROM ROME TO THE PORT OF VERDUN-SUR-LE-DOUBS (BURGUNDY, FRANCE): TWO CENTURIES OF TRADE AT THE END OF THE IRON AGE

Taillandier, Valérie (InSitu Archeologie SA; UMR 6249 Chrono-Environnement) - Perruche, Rebecca (DRAC SRA Bourgogne Franche-Comté; UMR 6249 Chrono-Environnement) - Olmer, Fabienne (UMR 7299 Centre Camille Jullian) - Rolland, Joëlle (UMR 8215 Trajectoires) - Barral, Philippe (University of Franche-Comté; UMR 6249 Chrono-Environnement) - Deblois, Mathilde (University of Franche-Comté) - Hamon, Emmanuel (University of Franche-Comté; UMR 6249 Chrono-Environnement) - Thivet, Matthieu (University of Franche-Comté; UMR 6249 Chrono-Environnement)

The Late Iron Age Settlement of Verdun-sur-le-Doubs "Petit Chauvort" is located downstream of the confluence of the Saône and Doubs rivers.

It was established within a meander of the Saône during the 2nd century BC and its occupation is attested until the beginning of the 1st century BC. It was not founded ex nihilo, as there is evidence of a first settlement north of this meander between the 6th and 5th centuries BC.

Its location at the confluence of these two rivers as well as at the crossroads of land routes in the La Tène area made it a strategic location for trade and exchange between the Mediterranean and the inland regions.

Excavations which have been carried out since the late 1960s and are still ongoing have revealed evidence of the import or export of foodstuffs, especially Italian wine, manufactured goods, raw materials, but also exogenous currencies and maybe slaves.

However, this settlement is not only an important trading centre but also a major centre for the production of hand-craft. The products made from the processing of imported raw materials (raw glass, iron ore, soft black rock) are then sent back on the trade routes.

The aim of this paper is to bring the agglomeration of Verdun-sur-le-Doubs back into the limelight as a market and craft centre and to show how its geographical location between the two banks of the river contributed to its development and its reach over medium and long distances.

7 RIVERSCAPE GEOGRAPHY AND SETTLEMENT CLUSTERS IN WESTERN ANATOLIA DURING THE LATE BRONZE AGE

Köknar, Nuray Nisan (University of Cyprus)

Western Anatolia lies in modern Turkey, in the north, south of the Marmara Sea and the Dardanelles, comprises a coastal and an inland section along the eastern part of the Aegean Sea, down to Kaş, Antalya in the south on the coast. The inland of Western Anatolia extends from Bursa and the Eskişehir in the north, down to Manisa and Afyon-karahisar in the middle-east of the inland section. The Bakır Çay (Kaikos), and the Gediz (Hermos), Küçük Menderes (Kaystros), and Büyük Menderes (Maeander) Rivers cross the inland of Western Anatolia and flow to the Aegean Sea. This research aims to map the effects of riverscapes and their geomorphology in the alluvial plains on the coast and the inland sites that shaped culture and interaction between the settlements in Western Anatolia during the Late Bronze Age. One of the main topographical parts of the region is the river valleys in the western lowlands, and the alluvial plains in the eastern highlands. Many connected rivers, creeks, and water channels caused the formation and reformation of settlement patterns by changing the extent of alluvial plains and river valleys during the Middle and Late Bronze Age. The Geographical Information System (GIS) is applied to test and interpret the data from the littoral and inland sites in this research. Viewshed and Least Cost Path analyses results reveal the modes of coastal and inland connectivity and settlement patterns by the rivers during the Late Bronze Age.

8 THE LOWER ANDARAX RIVER BASIN AS THE AXIS OF THE TERRITORIAL ORGANISATION OF THE CIVITAS URCI (ALMERÍA, SPAIN)

López-Medina, María-Juana (University of Almería) - Aragón-Núñez, Enrique (University of Almería) - Rondán-Sevilla, Isabel (University of Cádiz)

The identity of the historical landscape is defined by the cultural characteristics of human intervention in the territory. The Roman presence in present-day Almería has shaped the spatial organisation and management of its occupation based on its landscape characteristics, among other issues, defining the different settlement mechanisms in each historical phase. The present paper analyses the occupation of the current province of Almería during the Roman period in general and specifically the case study of the so-called civitas of Urci (El Chucho, Benahadux) together with the binomial that it generates with the lower basin of the Andarax river, which allows us to identify a particularly robust distribution pattern compared to the rest of the territory, but also variable in time. This conjunction of Urci with its river allows us to approach the socio-economic realities that will enable us to ensure critical resources (lead, lapis specularis, purpura, salted fish, salt), to materialise the territorial management during the Roman presence in the study area. Our contribution, therefore, is based on the analysis of archaeological evidence and its integration into the historical framework (from literary and epigraphic sources), in addition to the incorporation of new data obtained through the application of non-invasive techniques in the context of the Aqvivergia project. In this sense, the results obtained using GIS and Social Network Analysis tools allow us to evaluate the implications of processes that operate at multiple levels in the interaction of the Andarax river landscape and help better characterise the settlement and occupation patterns of the Almería territory.

9 NEVER CHANGE A FLOWING SYSTEM? WHEN THE GUADALETE RIVER BECAME "ROMAN"

Lehmann, Janine (Kiel University)

Rivers are the routes connecting land and sea, making them also important instruments of territorial exploitation. The control of rivers can result in new ways of communication and abruptly change of existing structures. However, the ancient flowscape along the river Guadalete in southern Spain is characterized by a certain continuity, which will be focussed in this lecture. Although the region was already part of the Imperium Romanum after the Second Punic War, the settlement pattern indicates no major intervention on the initiative of the new rulers. Already in Phoenician times, the founding of Agadir (today Cádiz) at the estuary created an important hub for maritime trade, which opened up new routes of communication. The rest of the landscape along the river was dominated by hilltop settlements (oppida). Contrary to a rather common practice of transferring such settlements to the plain and near rivers in the course

of the Roman occupation, these oppida remained with a long history. The Roman "restraint" in a conquered area raises several questions: Were the infrastructural conditions and connectivities along the Guadalete simply adopted, as there was no need for change and what already existed was considered suitable? Or to put it another way: What role did the "Roman Impact" play, i.e. which clusters of communication can be identified before and after the Roman conquest? Using selected case studies in the Guadalete river valley, the aim is to determine which specific developments can be identified at the micro level and how a river shaped as an active element the landscape from a diachronic perspective.

10 URBAN NETWORK AND COMMUNICATION DURING ANTIQUITY IN THE GUADALETE RIVER BASIN (CÁDIZ, SPAIN)

Rondán, Isabel (University of Cadiz) - Aragón-Núñez, Enrique (University of Almería)

The management and control of ancient communities over river basins are an essential part of these societies' urban implantation and communication networks. In our work, we analyse this duality, hydrological basin, and urban and communication networks through the case of the basin or sub-basin of the Guadalete, the main river of the province of Cadiz, Spain. The historical analysis and study of the Guadalete river basin from the perspective of territorial cohesion and connection in ancient times involves the relationship with the two most relevant geostrategic areas in this Territory: the mouth and paleo-estuary of the Guadalquivir River and the Atlantic front through the Strait of Gibraltar. Our methodological approach is based on the territorial analysis at a macro scale using Digital Terrain Models, spatial calculations from urban nodes and network analysis, focusing on the double connection of the Guadalete and its basin with the mouth of the Baetis River, the lacus Ligustinus, and the frentum Gaditanum.

579 DIGITAL APPROACHES IN TEXTILE ARCHAEOLOGY FROM THE FIELD TO THE MUSEUM

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Gleba, Margarita (University of Padua) - Yvanez, Elsa (University of Copenhagen) - Shaheen, Islam (Sapienza University of Rome) - Lukesova, Hana (University of Bergen)

Session format: Workshop

Organised by the EAA Community for Textile Archaeology and Conservation, the proposed workshop focuses on digital approaches in imaging, documenting, analysing, curating and digital reconstruction of archaeological textiles. Some advances in the field of computer sciences which have contributed to a boost in cultural heritage research represented by regular conferences such as Archiving, are only beginning to make their way into textile studies. Archaeological textile research takes place in different contexts: studying textiles in the field is often vastly different from a museum, and our practices need to answer different challenges. Harnessing the power of digital tools, this workshop will help in formulating different strategies for better and more sustainable quality research in all settings. The workshop thus aims to explore new technologies, strategies, policies, as well as methodologies through collecting examples of good practice. The workshop goal is to bridge the gaps in current practices by adopting, whenever possible, standardised protocols and by adhering to the international standards of the International Council of Museums (ICOM) International Committee for Documentation Conceptual Reference Model. These practices should respect the current norms in Digital Humanities regarding data standards, data management and FAIR (Findable, Accessible, Interoperable, and Reusable) principles.

The workshop will include mini-talks on case studies divided into three main themes:

1. Archaeological textile documentation: including developing protocols for quick documentation using digital tools when time is of the essence; portable microscopy; 3D scanning; computed tomography scanning; multispectral imaging; Reflectance Transformation Imaging; and other techniques;
2. Archaeological textile and textile tool databases;
3. Digital reconstruction of archaeological textiles.

The final session will involve working groups consisting of diverse representatives in the field of textile research and conservation, which will address specific questions, followed by a discussion of recommendations presented by each group and further planning of ComTex activities.

588 STUDIES OF MIGRATION PERIOD AND EARLY MEDIEVAL POPULATIONS: INTEGRATING NATURAL SCIENCES AND HUMANITIES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Palmowski, Valerie (University of Bonn) - Sasso, Stefania (University of Tartu) - Gneccchi-Ruscione, Guido (Max Planck Institute for Evolutionary Anthropology) - Lacher, Laura (Max Planck Institute for Evolutionary Anthropology) - Moilanen, Ulla (University of Helsinki)

Session format: Regular session

The Migration and Early Medieval Period are characterized by changes in the demographic, economic, political and sociocultural landscapes of Europe. Since the last decade, bioarchaeological studies, especially of (stable) isotopes and ancient genomics, have yielded fresh insights into diets, kinship, lifeways, and mobilities, among other things. This body of data laid a foundation for comparative studies of skeletal remains, material culture, burial practices, and texts, which are suitable to detect patterns of correlation at various scales, thus offering a reflection of the intricate networks and dynamics characterising this time of transitions. However, the combination of diverse approaches, methodologies, and sources has become increasingly complex and revealed the need for promoting more interdisciplinary communication as well as a careful re-evaluation of comparative approaches and data set collection.

This session aims to bring together researchers working with biomolecular methods (isotopes, aDNA), and material as well as immaterial culture (artefacts, archaeological features, texts) to discuss and develop new directions of research together. Methodological considerations are emphasised, also including the establishment of data standards as basis of big data comparative studies and the (re-)use of master narratives to frame the dynamic processes of these periods.

Furthermore, the session opens a dialogue to identify challenges across linguistic, institutional, and geo-political borders, and how to tackle them in the future. We invite researchers from all spectrums of (bio-)archaeology and history to submit contributions, so we can connect perspectives of the natural sciences and the humanities, and reflect on the synergy and challenges of such endeavours.

ABSTRACTS

1 AN ARCHEOGENETIC ANALYSIS OF LATE ANTIQUE SITES AT THE BORDER OF LONGOBARD AND BYZANTINE TERRITORIES IN CENTRAL ITALY

D'Atanasio, Eugenia (Institute of Molecular Biology and Pathology, CNR) - Ravasini, Francesco (Dept. of Biology and Biotechnology "Charles Darwin", Sapienza University of Rome) - Risi, Flavia (Dept. of Biology and Biotechnology "Charles Darwin", Sapienza University of Rome) - Mei, Oscar (Dept. of Communication Sciences, Humanities and International Studies, University of Urbino) - Delpino, Chiara (Superintendence Archaeology, Fine Arts and Landscape for the Provinces of Frosinone, Latina and Rieti, Ministry of Cultural Heritage) - Niinemäe, Helja (Institute of Genomics, University of Tartu) - Metspalu, Mait (Institute of Genomics, University of Tartu) - Micarelli, Ileana (McDonald Institute for Archaeological Research, University of Cambridge) - Manzi, Giorgio (Dept. of Environmental Biology, Sapienza University of Rome) - Trombetta, Beniamino (Dept. of Biology and Biotechnology "Charles Darwin", Sapienza University of Rome)

The period from the 5th to the 8th centuries (cc.) CE, also referred to as Late Antiquity or Migration Period, was characterized by political instability, socio-economic changes and massive migrations of people in Western Europe and, in particular, in the Italian peninsula. In order to understand the impact of such events on the Italian population, we perform an archeogenetic analysis on a total of 32 individuals from two sites in the modern Marche region in central Italy: Fossombrone (21 individuals) and Castel Trosino (11 individuals). The former site represents a funerary area of the Roman city of Forum Sempronii (5th-6th cc. CE), that was one of the main centers of the Exarchate of Ravenna, under the rule of the Eastern Roman (Byzantine) Empire. The latter site (6th-8th cc. CE) was part of the Duchy of Spoleto, in the Longobardia minor, and is characterized by four chronological layers corresponding to different Longobard generations, possibly the residence of the families of military leaders, according to the archaeological interpretations. Both sites were located in strategic positions in their territory and have been the theater of different peaceful and belligerent interactions between Romans/Byzantines, Goths and Longobards, representing excellent case-studies to unveil the population dynamics of this period under a genetic perspective.

2 DIETARY CHANGES DUE TO THE COLLAPSE OF THE WESTERN ROMAN EMPIRE: A CASE STUDY FROM NORTHERN ITALY (4TH-7TH CENTURIES)

Schmidtova, Dominika (Department of Archaeology and Museology, Masaryk University, Arna Nováka 1/1, 602 00 Brno, Czech Republic; Max Planck Institute of the Geoanthropology, Kahlaische Str, 10, 07745 Jena, Germany) - Vyskočilová, Gabriela (Department of Chemistry, Masaryk University, Kotlářská 267/2, 611 37 Brno, Czech Republic) - Kočergina, Julie (Czech Geological Survey, Geologická 6 152 00 Prague 5, Czech Republic) - Čejková, Bohuslava (Czech Geological Survey, Geologická 6 152 00 Prague 5, Czech Republic) - Garbaras, Andrius (Center for Physical Sciences and Technology Sauletekio av. 3, LT-10257 Vilnius, Lithuania) - Klontza, Věra (Department of Archaeology and Museology, Masaryk University, Arna Nováka 1/1, 602 00 Brno, Czech Republic) - Hukelová, Zuzana (Institute of Archaeology of the Slovak Academy of Sciences, Akademická 2, 949 21 Nitra, Slovakia) - Gil, Joan (Department of Archaeology, University of Hradec Králové, Rokitanského 62/26, 500 03 Hradec Králové, Czech Republic) - Manzelli, Valentina (Soprintendenza Archeologia Belle Arti e Paesaggio per la città metropolitana di Bologna e le province di Modena, Reggio Emilia e Ferrara) - Fernandes, Ricardo (Max Planck Institute of the Geoanthropology, Kahlaische Str, 10, 07745 Jena, Germany; Department of Archaeology and Museology, Masaryk University, Arna Nováka 1/1, 602 00 Brno, Czech Republic; Climate Change and History Research Initiative, Princeton University, USA)

The decline of the Western Roman Empire was a historical period marked by political and economic instability that influenced various aspects of society. The primary objective is to determine whether these social changes were reflected in human lifeways, specifically examining their impact on the dietary habits of the populations in northern Italy.

To conduct an analysis of dietary shifts, we sampled three different populations buried in distinct urban cemeteries in Imola for stable isotope analysis. Studied grave contexts are approximately dated from the 4th to the 7th century, spanning the period before and after the collapse of the Western Roman Empire. Through stable isotope analysis of carbon and nitrogen, our aim is to unveil insights into the dietary practices and adaptations made by these communities during this transformative period.

This paper contributes to a broader understanding of social change following the collapse of the Roman Empire. Furthermore, the results from the Imola cemeteries will be contextualized within the results from the broader geographical area, providing a comprehensive view of dietary trends during this pivotal moment in history.

3 MULTIDISCIPLINARY BIO-ARCHAEOLOGICAL APPROACH TO STUDY THE POPULATION TRANSFORMATIONS DURING THE MIGRATION PERIOD IN THE EASTERN CARPATHIAN BASIN

Traverso, Luca (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, 04103, Leipzig, Germany) - Rácz, Zsófia (Institute of Archaeological Sciences, ELTE - Eötvös Loránd University, 1088, Budapest, Hungary) - Knipper, Corina (Curt Engelhorn Center for Archaeometry gGmbH, 68159 Mannheim, Germany) - Gneccchi-Ruscione, Guido (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, 04103, Leipzig, Germany; Department of Archaeology and Museology, Faculty of Arts, Masaryk University, 60200, Brno, Czech Republic) - Faragó, Norbert (Institute of Archaeological Sciences, ELTE - Eötvös Loránd University, 1088, Budapest, Hungary) - Hajnal, Zsuzsanna (MNM NRI, Régi Régészeti Gyűjteményi Osztály) - Krause, Johannes (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, 04103, Leipzig, Germany) - Vida, Tivadar (Institute of Archaeological Sciences, ELTE - Eötvös Loránd University, 1088, Budapest, Hungary; Institute of Archaeology, HUN-REN Research Centre for the Humanities, 1097, Budapest, Hungary) - Hofmanová, Zuzana (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, 04103, Leipzig, Germany; Department of Archaeology and Museology, Faculty of Arts, Masaryk University, 60200, Brno, Czech Republic)

Archaeological and historical sources describe a relatively stable scenario in the Tisza region at the beginning of the first millennium, with four centuries of continuous presence of "Sarmatian" communities reported in Roman written sources as in archaeological finds.

With the beginning of the 5th century, the fall of the Western Roman Empire and the extension of the Hunnic influence to this region, two centuries of power instability are reported in historical sources. This is also reflected in changes in settlement structure and burial tradition, but it is questionable whether the changes from the Sarmatian period were mostly cultural or involved a significant change in genetic structure.

In particular, during both the 5th and 6th century, the ethnonym "Gepid" appears for the first time to describe one of the populations in this region. This term was used to identify one of the "Germanic" peoples that allied with Attila during the Hunnic empire in Europe, but also to denote the kingdom at the Eastern part of the Carpathian Basin that played an important role between the centuries, appearing in both the history of the Eastern Roman Empire and of the Langobards Kingdom in the Eastern part of the Carpathian Basin.

A comprehensive analysis of these transition periods through a deep sampling of entire cemeteries in the frame of the HistoGenes project is presented, combining genome-wide analyses of more than 500 individuals with isotopic and archaeological analysis of the sites.

Multiple lines of evidence point at an increase in short- and long-scale mobility, emerging also from an increase in genetic diversity, highlighting a compound scenario of continuity and discontinuity.

Thanks to the sampling strategy, these observations emerge both as overall patterns and single stories of burials and cemeteries, narrowing the distance between large-scale and small-scale events in the history of this region.

4 SOCIAL ORGANIZATION AND MARRIAGE STRATEGIES IN AVAR-PERIOD COMMUNITIES

Rácz, Zsófia (Institute of Archaeological Sciences, ELTE – Eötvös Loránd University) - Gneccchi-Ruscione, Guido (Max Planck Institute for Evolutionary Anthropology; Department of Archaeology and Museology, Faculty of Arts, Masaryk University) - Traverso, Luca (Max Planck Institute for Evolutionary Anthropology) - Szeniczey, Tamás (Department of Biological Anthropology, ELTE – Eötvös Loránd University) - Takács, Balázs (Institute of Archaeological Sciences, ELTE – Eötvös Loránd University) - Faragó, Norbert (Institute of Archaeological Sciences, ELTE – Eötvös Loránd University) - Samu, Levente (Institute of Archaeological Sciences, ELTE – Eötvös Loránd University) - Hajdu, Tamás (Department of Biological Anthropology, ELTE – Eötvös Loránd University) - Vida, Tivadar (Institute of Archaeological Sciences, ELTE – Eötvös Loránd University) - Hofmanová, Zuzana (Max Planck Institute for Evolutionary Anthropology; Department of Archaeology and Museology, Faculty of Arts, Masaryk University)

In a previous study, we reported on the archeogenomic analyses of four fully sampled Avar-period cemeteries from Hungary (Rákóczi-falva, Hajdúnánás, Kunszállás, and Kunpeszér). These analyses provided an opportunity to study social organization in the Carpathian Basin between the sixth and ninth centuries. We discovered that these communities of Eastern Steppe and Pontic Steppe origin were structured in a very similar way: there was a strong patrilineal kinship structure with female exogamy and patrilocality, and levirate unions and multiple reproductive partnerings were common. Moreover, we found that exogamous females were crucial in connecting the various patrilineal lines both within and between sites.

Here we will try to broaden our horizon by investigating further sites in the Great Hungarian Plain. Firstly, we examine how the data from previously published studies using smaller sample sizes (and not focusing on social organization) fit into this picture. On the other hand, data from a recently studied population (Tiszabura) from the same region, but with European genetic background will be compared with the earlier ones. Attention would also be paid to exceptional cases that differ from general patterns (e.g. exogamous males, matrilineages) and to changes over time. The analysis of archaeological data can shed light on the question of how the characteristics of social organization are related to other cultural features in Avar-period communities.

Our research is part of the HistoGenes ERC Synergy project. The physical anthropological study was supported by the Bolyai Scholarship of the Hungarian Academy of Sciences and by the National Research, Development and Innovation Fund.

5 UNVEILING THE SOCIAL AND GENETIC LANDSCAPES OF THE AVAR PERIOD SOUTHERN-TRANSDANUBIA: A MULTIDISCIPLINARY STUDY OF THE KÖLKED-FEKETEKAPU CEMETERY

Gyuris, Balázs (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary; Department of Genetics, ELTE-Eötvös Loránd University, Budapest) - Hajnal, Zsuzsanna (Hungarian National Museum) - Szeniczey, Tamás (ELTE Department of Biological Anthropology, ELTE-Eötvös Loránd University, Budapest) - Jakab, Kristóf (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary) - Koncz, István (Institute of Archaeological Sciences, Eötvös Loránd University, Budapest) - Mende, Balázs (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary) - Krause, Johannes (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Rácz, Zsófia (Institute of Archaeological Sciences, Eötvös Loránd University, Budapest) - Vida, Tivadar (Institute of Archaeological Sciences, Eötvös Loránd University, Budapest) - Szécsényi-Nagy, Anna (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary)

The Kölked-Feketekapu cemetery, with its more than 1300 graves, stands as one of the most significant burial sites from the Avar Period in the Carpathian Basin. This archaeological site encompasses a variety of grave groups, ranging from large cemeteries to smaller, household related burials. Used between the mid 6th and late 8th centuries AD, the site shows various cultural influences, reflecting the dynamic historical milieu of the Early Medieval period. The presence of Late Antique, Merovingian, and Eastern nomadic cultural elements underscores the site's importance and prompts a reevaluation of social structures within this diverse context. Wide-scale ancient DNA (aDNA) analysis offers unprecedented opportunity to investigate the relationship between social and biological kinship through the examination of large pedigrees and the identification of more distant genetic relations via IBD (identity by descent) sharing analysis. In pursuit of these insights, approximately 350 human DNA samples have been sequenced from

Kölked, targeting 1.2 million polymorphic sites. Our multidisciplinary research aims to resolve questions around the founding of the site and the impact of the later newcomers on the life of the community. By exploring the connections among different sections of the cemetery, we intend to unveil the complex nature of interactions among individuals of varying cultural and biological backgrounds. This investigation into the cemetery's social and kinship dynamics not only shed light on the local social structure but also contributes to a broader understanding of the historical transformations within the wider period and region.

6 PEOPLE FROM THE EARLY-MEDIEVAL ARCHAEOLOGICAL SITE NITRA-ŠINDOLKA, SLOVAKIA

Krošláková, Mária (Institute of Archaeology, Slovak Academy of Sciences) - Ruttkay, Matej (Institute of Archaeology, Slovak Academy of Sciences)

Archaeological human skeletons provide direct evidence of how our ancestors lived, what their physical features were, what lifestyle they led, and what health issues they had to face. Yet, without a multidisciplinary approach, the image remains incomplete and the lives of neither individuals nor populations are understood at their full potential. The presentation deals with the population of Nitra-Šindolka (Slovakia). The small early-medieval burial ground discovered in 2004 has been dated to the 9th century, or the 9th – 10th century. At the time, Nitra was an important power center related to Great Moravia. Twenty-one graves from the archaeological site Nitra-Šindolka were osteologically analyzed and evaluated within the archaeological and historical contexts. By connecting the pieces of information from the three disciplines, the relations between individuals inhumated at the cemetery were estimated. The synthesis of osteological, archaeological, and historical data provides a good ground for ongoing genetic research aimed at unraveling interactions of European populations at the mentioned historical period.

7 GENETIC MAKEUP AND CHANGE IN THE MEDIAEVAL COMMUNITIES OF THE CARPATHIAN BASIN

Szeifert, Bea (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary) - Gerber, Dániel (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary) - Csáky, Veronika (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary) - Gyuris, Balázs (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary; Doctoral School of Biology, Institute of Biology, ELTE Eötvös Loránd University, Budapest, Hungary) - Jakab, Kristóf (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary) - Szőke, Béla (Institute of Archaeology, HUN-REN Research Centre for the Humanities, Budapest, Hungary) - Mende, Balázs (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary) - Sinika, Vitalij (Pridnestrovian State University named after T. G. Shevchenko, Tiraspol, Moldova) - Türk, Attila (Institute of Archaeological Sciences, Faculty of Humanities and Social Sciences, Pázmány Péter Catholic University, Budapest, Hungary; Hungarian Prehistory Researchgroup, HUN-REN Research Centre for the Humanities, Budapest, Hungary) - Szécsényi-Nagy, Anna (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities, Budapest, Hungary)

Despite its eventful history, Transdanubia in the Carpathian Basin (CB) has been underrepresented in mediaeval genetic research. The analysis of the region's communities is important to describe the area's population structure prior to the arrival of the Hungarians and to understand their genetic and cultural impacts during the 10-11th centuries AD. Moreover, the delineation of the Hungarian conquerors' diverse origins and population structure is still to be achieved.

Here we present whole genome level data for 103 individuals (6-11th c. AD) from today's Western Hungary for general description of population events in the area in the studied period, supplemented with 50 individuals connected to the Hungarian conquerors from the CB and the so-called Etelköz region in the Dniester Valley (present-day Ukraine and Moldova). The latter is believed to be the early Hungarians' last settlement area before their arrival into the CB. In addition to standard population genomic methods we applied IBD analysis as well to reveal possible distant biological relatedness within our dataset throughout the studied period and region. Radiocarbon dating was employed to enhance the classification of poorly documented but valuable graves.

Our results delineate the CB's general population structure and its changes in the Middle Ages. We show the re-organisation processes predominantly associated with the 10th century Hungarian conquest period, as well as the dynamics of spread and admixture of Hungarian conquerors-related ancestry. We reveal significant links between the communities in the CB and Etelköz as well as the Ural region. The population makeup in Etelköz is a mixture of various distant and local elements, which is consistent with the assumed melting process taking place in this area of the early Hungarians' migration.

Our results contribute to our understanding of the Carpathian Basin's genetic history and the role of the populations of the Etelköz region in its context.

8 BETWEEN DIVERSITY AND HOMOGENEITY – THE ARCHAEOLOGICAL AND GENETIC ASPECTS OF MÉNFŐCSANAK-BEVÁSÁRLÓKÖZPONT (HUNGARY) DURING THE 7TH CENTURY

Blay, Adrienn (Eötvös Loránd University) - Samu, Levente (Eötvös Loránd University) - Tian, Yijie (Stony Brook University) - Koncz, István (Eötvös Loránd University) - Vyas, Deven (Stony Brook University) - Tomka, Péter (Rómer Flóris Museum, Győr) - Vida, Tivadar (Eötvös Loránd University) - Geary, Patrick (Institute for Advanced Study, Princeton) - Veeramah, Krishna (Stony Brook University)

With the arrival of the Avars to the Carpathian Basin and Pannonia in 568 AD started a new political era in the Middle-Danube region. A new power- and ruling structure was established, which also had his specific economic system. The new circumstances necessarily influenced the local population as well. There were communities, which were able to adapt themselves to the new social order and also prosper. The various communities – especially on the territory of the former province Pannonia – could have very specific material culture and burial customs, including and representing several cultural influences.

We have chosen one archaeological site called Ménfőcsanak-Bevásárlóközpont from the territory of the Little Hungarian Plain, Hungary to study this period and their specific local communities. The material remains of the community buried here during the 7th century is very diverse. Based on the network of artefacts there was a highly diverse group of people, who had connections both inside and outside the Carpathian Basin. The genetic analysis of the site can help us to understand the social pattern which helped the community to maintain itself and prosper in the Avar period. It may also help us to understand better the long-distance connections of the community. The presentation will focus on the correspondence between pedigrees and archaeological material.

9 ARCHAEOGENETIC INVESTIGATIONS RECONSTRUCT MOBILITY OF CENTRAL EUROPEAN POPULATIONS REPRESENTED BY THE RHINELAND REGION DURING THE MIGRATION PERIOD

Lacher, Laura (Max-Planck Institute for evolutionary Anthropology) - Nieveler, Elke (Landesmuseum Bonn) - Schmauder, Michael (Landesmuseum Bonn; University of Bonn) - Pääffgen, Bernd (Ludwig-Maximilians University Munich) - Krause, Johannes (Max-Planck Institute for evolutionary Anthropology; Friedrich-Schiller University Jena) - Schiffels, Stephan (Max-Planck Institute for evolutionary Anthropology)

The political and sociocultural changes during the Migration Period and the Early Middle Ages in Europe have been the focus of investigations in cultural sciences for many decades. However, even though historical and archaeological sources can provide insights into cultural processes, reconstructing individual mobility and group-based migration is still challenging. For a few years now, archaeogenetic studies have started contributing to detangle the complex dynamics present during this time and especially tackling questions of mobility and migration. Here, we study genetic data from 122 individuals from the Rhineland region in northwestern Germany close to Cologne. By employing high resolution genetic datasets of both modern and ancient DNA as well as new computational methods and visualization techniques, we gain new insights with respect to mobility and migration. Generally, we find patterns of individual-level mobility to be highly dependent on the temporal and archaeological context. Specifically, we observe individuals with ancestry from South-Eastern Europe, which could indicate movements of people in association with the political changes accompanying the collapse of the Roman Empire. Furthermore these connections seem to be temporally asynchronous between sites, potentially corresponding to different political structures within sites. The study promises new insights into the transformation process of the late Roman province of Germania II into the Early Medieval Francia rhinensis.

10 LIFE AND DEATH IN THE MEDIEVAL VILLAGE OF VILVENICH: AN ANTHROPOLOGICAL AND BIOMOLECULAR APPROACH

Pathé, Leonie (Bonn Center for ArchaeoSciences (BoCAS), Institut für Archäologie und Kulturanthropologie, Rheinische Friedrich-Wilhelms-Universität Bonn; Vor- und Frühgeschichtliche Archäologie, Institut für Archäologie und Kulturanthropologie, Rheinische Friedrich-Wilhelms-Universität Bonn) - Rüniger, Torsten (Vor- und Frühgeschichtliche Archäologie, Institut für Archäologie und Kulturanthropologie, Rheinische Friedrich-Wilhelms-Universität Bonn) - Toso, Alice (Bonn Center for ArchaeoSciences (BoCAS), Institut für Archäologie und Kulturanthropologie, Rheinische Friedrich-Wilhelms-Universität Bonn)

The history of large cities in medieval Germany is well-known, but the social and economic structures of rural settlements are poorly understood in regions like the Rhineland, where the presence of Loess sediments significantly hinders the preservation of any organic material.

The skeletal assemblage (9th and 12th c.) here presented was recovered in Vilvenich, a medieval village located between Cologne and Aachen and provides the unique opportunity to study human remains using anthropological and isotopic methods to contribute to local history. The combined application of these methods can determine environmental stressors and dietary consumption, helping to reconstruct past environments, dietary practices, and health

profiles of past populations. However, not many studies have comprehensively assessed pathologies and nutritional habits in rural medieval communities. Correspondingly, this project addresses a gap in the current knowledge and will provide additional insights into the population of Vilvenich and this specific region, a continuously inhabited area of the Rhineland from Roman times to the Middle Ages.

This research study presents preliminary results that combine data from biological and health profiles with isotopic analysis of $\delta^{13}C$, $\delta^{15}N$ and $\delta^{34}S$ ratios of a selected group of individuals. The aim is to explore 1) the lifeways and health conditions in medieval Vilvenich, and 2) their correlation with their nutritional status and practices.

Skeletal remains provide a direct connection between archaeological sites and the surrounding environment, as well as with material finds such as artefacts and grave goods. Each individual, with their unique biological profile, contributes to reconstructing a more comprehensive picture of past lifeways and helps identify patterns of diversity in age, sex, diet, health, and development.

11 RATHER PIGS THAN FISH – THE DIET OF THE EARLY MONASTIC COMMUNITY ON THE ISLAND OF REICHENAU IN LAKE CONSTANCE

Lehn, Christine (Institute of Legal Medicine, Ludwig-Maximilians-University of Munich, Germany) - Trixl, Simon (State Office for Cultural Heritage Management Baden-Württemberg, Osteological Department, Archaeozoology) - Alterauge, Amelie (Institute for Pre- and Protohistory and Medieval Archaeology, University of Tübingen)

Monasteries are traditionally regarded as the main consumers of fish in the Middle Ages. In order to test this hypothesis, we investigated early medieval monks' diet and specific living conditions on Reichenau Island, Lake Constance, Germany, by means of an interdisciplinary approach, including physical anthropology, radiocarbon dating, archaeozoology and stable isotope analyses on 12 selected burials from a cemetery at Reichenau-Mittelzell. The human remains were characterized by exclusively male sex, advanced age at death, elevated body height and good nutritional status, suggesting a monastic background. Based on radiocarbon dating, the burials were determined to originate from the 7th or 8th centuries AD. This time frame would align with the foundation of Reichenau Abbey in 724 AD, potentially even earlier. Our stable isotope investigations on potential food animals revealed that fish was of little importance for the nutrition of the individuals. They covered their caloric needs rather through a terrestrial-based diet, containing a considerable amount of animal proteins, especially from pigs, as revealed by the archaeozoological analyses of animal remains recovered in and around the graves. The individuals may have belonged to an early – likely monastic – population on Reichenau Island.

12 COMMUNITY FORMATION IN THE EARLY MEDIEVAL NETHERLANDS: AN INTEGRATED BIOARCHAEOLOGICAL CASE STUDY NEAR NIJMEGEN

Altena, Eveline (Leiden University Medical Center) - Kootker, Lisette (Vrije Universiteit Amsterdam) - Olalde, Iñigo (University of the Basque Country UPV/EHU; Harvard Medical School; Ikerbasque—Basque Foundation of Science) - van der Linde, Constance (Fysisch antropologisch onderzoeksbureau Tot op het Bot) - Hendriks, Joep (Nijmegen municipality) - Theuvs, Frans (Leiden University) - Reich, David (Harvard Medical School; Broad Institute of MIT and Harvard; Harvard University; Howard Hughes Medical Institute)

We present a multidisciplinary study on a 6th century Merovingian cemetery in Lent, just north of the former Roman city Nijmegen, the Netherlands. The Late Roman Netherlands was characterized by economic, political, and social instability. Consequently, the transition period from the Roman era to the Early Middle Ages, also known as the Migration period, was marked by substantial depopulation of large parts of the country. To understand how new communities were formed in the Netherlands in the early stages of the newly emerging early medieval society, we applied an integrated bioarchaeological approach (archaeology, osteology, isotopes, and genetics) on the more than 50 inhumed individuals, with the aim to reconstruct the demography, kinship ties, genetic ancestry and mobility patterns of this population, and ultimately the social structure of the community that used this cemetery.

Our results indicate a scenario wherein a heterogeneous group of people, both in terms of geographic origin and genetic ancestry, coalesced into a rural community in Lent, and founded new families amongst each other. We observed relatively few close kinships within this cohort, juxtaposed with abundant distant kinship ties. This suggests that rather than large families traveling together, the migration comprised smaller groups from specific communities, possibly already connected prior to their relocation. Furthermore, distant kinships can also be traced further into Europe, with notable concentrations in specific regions, including contemporary Italy, Hungary, Germany, and Great Britain. These observations reveal intricate mobility patterns and social networks among Early Medieval Europeans.

13 WHAT ISOTOPES HAVE TO OFFER IN MIGRATION PERIOD STUDIES IN SWEDEN?**Anagnostou, Eirini (Stockholm University)**

The end of the Migration period in Sweden is marked by vital changes in the archaeological record (e.g. settlement and farm abandonments, burial declines etc.). Those changes have been interpreted in various ways, and an ongoing debate in the Swedish archaeological research about what caused these changes has been going on, from the early 20th century until our days. Recent studies have suggested that a long-lasting cold event, which was caused by several volcanic eruptions and referred to as the AD 536 event or Fimbulwinter or Late Antique Little Ice Age (LALIA), was the prime cause for the observed changes in the archaeological record in the middle of the 1st millennium AD in the region of Sweden. The suggested impact of this climatic event includes crop failure and spread of diseases, which leads to famine, population decline and settlement abandonments. Therefore, the dependence of arable farming could be a crucial factor in increasing vulnerability for these populations. However, whether or not this climatic event had a major impact on Swedish societies remains undetermined. Stable isotope analysis is a unique tool for investigating diet, movement, and climate. It can provide us with the missing link to better understand the Migration period and what caused the significant changes at that period in Sweden. In this presentation, I will talk about my PhD project, the changes that occurred in the middle of the first millennium AD, the debate around the role of the climate in the observed changes, and I will discuss what isotopic studies could offer in the studies of this period. Furthermore, some preliminary isotope results will be presented.

14 VIKING AGE BIOARCHAEOLOGY – STATE OF RESEARCH AND POSSIBLE FUTURE PERSPECTIVES**Palmowski, Valerie (University of Bonn)**

The Viking Age recently is a focus of international archaeological debates as well as the public interest. Modern reconstructions of Viking Age life have been rewritten and complemented within the last decades, and especially since the 2010s, in which bioarchaeological results were and still are accumulated in unprecedented extend. Using the toolkit of the natural sciences, new perspectives on mobilities and exchange, identities and kinship, as well as diets and subsistence strategies among others were explored.

Due to the nature of the subject, research is being practiced in joint projects of an increasingly connected international scientific community across institutional, geographical and / or linguistic borders – A welcome modern reflection of the manifold networks of the Viking Age with its trans-European and proto-global phenomena. Comparative studies of burial practices, material culture, texts, and skeletal remains have been applied to detect correlation patterns. Sex, age, health, stature, genetic and isotopic signatures are used to identify particular groups within Viking Age societies and explain individual find contexts. The combination of various approaches and sources, as well as the synthesis of the different research traditions of the natural sciences and the humanities, however, remain a complex process.

Based on data from the author's PhD, examples of both successful comparative approaches as well as open questions and challenges regarding the reconstruction of diets, identities and mobilities between Viking Age Hedeby, Gotland and Gnezdovo are presented. Archaeological data (objects from graves, grave constructions) as well as osteological data and isotope analyses ($^{87}\text{Sr}/^{86}\text{Sr}$ measured in tooth enamel, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ measured in bone collagen) are combined to offer multifaceted results. By including a selection of data from recent publications, new developments and possible future perspectives of Viking Age Bioarchaeology are presented.

15 SEX DETERMINATION OF CHILD SKELETAL REMAINS: AN INTEGRATIVE APPROACH**Ivarsson-Aalders, Marieke (Stockholm University)**

Traditionally, Viking Age (c. 750 – 1050 CE) societies have been regarded as heavily dominated by men. Marginalised groups (e.g. women, children, the elderly, and the disabled) either played inferior roles, or were left out altogether in many representations of Viking Age society. However, research in the last decade has seen a shift towards more nuanced studies focussing on gender, ethnicity, and intersectionality. This presentation focuses on one of these marginalised groups, namely the children, and aims to demonstrate how the analysis of ancient DNA can enhance archaeological narratives as well as osteological methods. Even though the last two decades have seen an increase in studies regarding children and childhood during the Viking Age, in-depth analyses of the lives of young boys and girls remain complicated due to the problematic nature of sex determination of child skeletal remains. Eighty-nine individuals of the Ihre grave field on the Swedish island of Gotland, located in the Baltic Sea, are included in this study. Through the analysis of mortuary profiles (i.e. burials, burial expressions, burial practices and burial assemblages) and skeletal remains, archaeological and osteological sex are compared with biological sex confirmed by genomics. The results are interpreted in relation to the archaeological narrative and the implications for osteological methods of sex determination of child skeletal remains are discussed. Furthermore, opportunities and challenges will be highlighted as well as suggestions for future research.

16 A FRESH LOOK INTO THE MEROVINGIAN PERIOD INHUMATION GRAVES IN FINLAND**Moilanen, Ulla (University of Turku)**

The first Iron Age inhumation cemeteries appeared in Southwestern Finland in the Merovingian Period (550 - 800 CE), during the early phase of it. The burial customs in these cemeteries were significantly different from those in the surrounding areas, where cremation was the most common way of handling the dead until the end of the Viking Age (800 - 1050 CE). The Finnish Merovingian Period inhumation cemeteries were mainly excavated in the early and mid-20th century, and the excavated material has been stored in museum collections ever since. What is this material like and how well is it suited for modern scientific research methods? Is it possible to approach the graves from new perspectives, or is it most useful to approach them with traditional humanistic methods? In this paper, I will introduce the material and discuss the problems encountered when studying the graves, and also the preliminary results obtained so far.

591 BEYOND THE WALLS. INTERROGATING THE WIDER LANDSCAPES OF IRON AGE COMMUNITIES IN TEMPERATE EUROPE**Session theme: 1. The Material Record: Current Trends and Future Directions****Session organisers: Parcero-Oubiña, César (Instituto de Ciencias del Patrimonio (INCIPIT), Consejo Superior de Investigaciones Científicas (CSIC)) - Moore, Tom (University of Durham) - González-Álvarez, David (Instituto de Ciencias del Patrimonio (INCIPIT), Consejo Superior de Investigaciones Científicas (CSIC))****Session format: Regular session**

Iron Age landscapes in most of temperate Europe are characterised by the spatially dominant and persistent presence of fortified sites. Built as landmarks to organize the landscape, their imposing visibility has made them the prevalent focus of archaeological research for some time. However, Iron Age landscapes consisted of much more than that. Advances in fieldwork methods have allowed an increasing availability of data about many other types of elements beyond the hillforts, many of which have been under-researched: open settlements, agrarian structures, linear earth-works, complex settlement patterns, routeways, specialised craft-making centres. Challenges remain, however, to (1) better characterize the diversity of the rural Iron Age archaeological record and (2) understand the interpretive implications of the vast amount of new evidence that has been collected in recent decades.

The aim of this session is to reflect on these topics. Papers are welcome that address (1) methodologies to better characterise and understand off-site archaeological record, (2) discuss social interpretations of such evidence and/or (3) present regional case studies from across temperate Europe.

ABSTRACTS**1 IRON AGE ON THE SURFACE. INVESTIGATING THE RURAL LANDSCAPE OF THE IRON AGE WITH NON-DESTRUCTIVE METHODS ALONG THE VÁLI-VÍZ (HUNGARY)****Gergácz, Rebeka (Hungarian National Museum; Eötvös Loránd University) - Czajlik, Zoltán (Eötvös Loránd University) - Rupnik, László (Eötvös Loránd University)**

When discussing the Iron Age, many people think of fortified settlements as well as fascinating princely burials. While these sites are important, a more comprehensive understanding of Iron Age life requires expanding research efforts to include as much information as possible about the surrounding hinterland. Fortunately, in the 21st century, there is a growing focus on rural landscapes, with researchers employing both destructive and non-destructive methods to gather data.

As part of this trend, a new project in Hungary has recently launched with the aim of investigating Early and Late Iron Age rural settlement patterns using topographical research methods. The targeted area is along a stream, Váli-víz in Northeast Transdanubia, Hungary, which seems ideally suited for prehistoric habitation. Despite being relatively unexplored, ongoing fieldwork has already uncovered several new Iron Age sites, greatly enhancing our understanding of the area's protohistory.

What makes the research particularly intriguing is the absence of any previously known fortified settlements from the Iron Age in the explored region. Consequently, the study is not centred on the surrounding areas of one or more specific central settlements, but rather on a network of rural unenclosed settlements throughout the flatlands. In this presentation, we will explore the potential of non-destructive methods for rural landscape studies and showcase the first findings of the research project.

2 IRON AGE SETTLEMENTS BEYOND THE WALLS: NEW PERSPECTIVES FROM NORTHERN BRITAIN

McDonald, Sophie (SUERC (University of Glasgow)) - Hardwick, Ian (University of Edinburgh) - Fernández-Götz, Manuel (University of Edinburgh) - Hamilton, Derek (SUERC (University of Glasgow)) - Cowley, Dave (Historic Environment Scotland)

Hillforts have traditionally characterised our view of Iron Age communities in northern Britain, with over a thousand fortified sites of the period having been identified in northern England and Scotland. However, Iron Age settlement patterns were much more complex and included a large number of small, rural sites. In this paper we will present evidence for these rural settlements derived from the Leverhulme-funded project “Beyond Walls: Reassessing Iron Age and Roman Encounters in Northern Britain”, which has been running from 2021 to 2024. In particular, we will focus on how the analysis of LIDAR data has led to the discovery of numerous small sites, which represented farmsteads and hamlets where the majority of the Iron Age population would have lived. We will also present evidence on how palaeoenvironmental data can contribute to our broader understanding of settlement landscapes in this northern frontier zone during the period of Roman presence there.

3 ASSESSING ARCHAEOLOGICAL TRACES BEYOND THE WALLS OF THE HILLFORTS IN NW IBERIA: PRELIMINARY RESULTS FROM THE HINTERLAND PROJECT

González-Álvarez, David (Institute of Heritage Sciences (INCIPIIT), CSIC) - Parcero-Oubiña, César (Institute of Heritage Sciences (INCIPIIT), CSIC)

Archaeological research on Iron Age landscapes in the North-West of the Iberian Peninsula has witnessed a remarkable impulse in the last decades. Nowadays, we have a much better knowledge of what happened within the limits of the castros – the fortified settlements that constitute the vast majority of sites from that period. However, we still know very little of what happened beyond the walls and ditches demarcating those sites, and how Iron Age communities shaped the lands surrounding those fortified hilltop sites. The HINTERLAND project aims to identify and characterise the archaeological traits of human activity around the hillforts in order to adequately address the forms of production and reproduction of those Iron Age communities, in addition to approaching the monumentalization processes shaping social and political landscapes during the First millennium BC.

Our ongoing investigations rely on non-invasive methods for archaeological prospection, including ground-truthing throughout excavations at a handful of representative case studies. This paper presents the preliminary results of the project, including the discovery of new sites and hundreds of traits with potential archaeological interest in the vicinity of already-known hillforts. We also describe the outcomes of detailed investigations conducted on the ground deploying various survey methods and techniques. As a result, the project is contributing to assessing the potential of survey methods to discover and analyse off-site archaeological remains from the Iron Age in rural landscapes of NW Iberia. Also, the outcomes of the HINTERLAND project emphasise the need to review the policies of heritage management in the surroundings of hillforts beyond their currently visible limits of walls and ramparts.

4 THE MICRO-REGION OF BALTINAVA HILLFORTS (LATVIA): LANDSCAPE, SPACE AND CONNECTIONS

Meinerts, Janis (Latvian Academy of Culture) - Urtāns, Juris (Latvian Academy of Culture)

Since the mid-19th century hillforts have been one of the most popular topics of archaeological research. Although many hillforts have been excavated, paradoxically they have rarely been interpreted in context with the surrounding landscape and other archaeological sites. The research done by the team of researchers from the Latvian Academy of Culture during the IDEUM project (Landscapes of Identities: History, Culture, and Environment, No. VPP-LE-TONIKA-2021/1-0008) tries to bridge the gap between hillforts, their surrounding archaeological landscape and folklore narratives.

The IDEUM project chose a micro-region (apr. 7x2 km) centred around the four hillforts in Baltinava parish in Eastern Latvia for an in-depth case study. The steps taken included a thorough mapping of all the known archaeological evidence in a 15-20 km range around the micro-region in a GIS database. Together with LIDAR data, this database was later used in a series of fieldwalking expeditions that resulted in several newly discovered archaeological sites. In the summer of 2023, small scale excavations and series of drillings were made in all four hillforts to ascertain their dating and the cultural affiliation of the inhabitants. Information obtained from the excavations, including 14C dates, provide anchorage points for interpreting other archaeological sites in the micro-region to reconstruct the ancient archaeological landscape and understand the settlement dynamics.

The reconstructed archaeological landscape and spatial structure of the micro-region in the Iron Age show it as a densely populated, hierarchical landscape, in which several nodal points of chronologically contemporary habitation and use can be discerned. Furthermore, certain zones within the micro region can be connected to burial practises

and sacredness, although the latter’s precise meaning is hard to interpret. In a regional context, the micro-region of Baltinava hillforts, with its long habitation history and dense population, can be viewed as a regional central place.

5 MONUMENTALITY AND LANDSCAPE: EXPLORING THE ROLE OF MONUMENTAL EARTHWORKS IN LATER PREHISTORIC BRITAIN

Moore, Tom (Durham University, Department of Archaeology) - Harris, Barney (Bournemouth University) - Reynolds, Andrew (University College London)

Monumental linear earthworks are found across many parts of Europe, defining communities, channelling movement and inscribing the landscape. Yet our understanding of the roles of these features remains dominated by interpretive frameworks grounded in antiquarian traditions. Our recent Leverhulme funded Monumentality and Landscape project has sought to reassess these monuments. The project has recorded over 700 such earthworks across Britain and, while dating of most remains poor, current evidence points to peaks of their construction in the first millennium BC and mid-first millennium AD. Despite their prevalence, and scale of many Late Bronze Age and Iron Age examples, recent discussions have, however, been relatively quiet on the significance of these features for understanding social and landscape organisation. Using the evidence from the MAL project and focused on several case studies, this paper will explore the important role monument linears had in shaping movement through Iron Age landscapes and as displays of changing forms of power.

6 UNDERSTANDING THE DUERO VALLEY OPPIDA THROUGH THE POLITICAL LANDSCAPE

García Sánchez, Jesús (ArchaeologyHub.CSIC)

The Duero river valley, central Spain, is characterized during the Late Iron Age by the massive presence of fortified large hillforts, often termed oppida in the archaeological literature. One of the main characteristics of this settlement pattern is the control of large void spaces from the oppida, thus the absence of a secondary settlement site network between the Early Iron Age (8-6th cent. AD) until the beginning of Roman presence in the area (2-1 cent. AD).

Despite research on these oppida has been slowly ongoing during the last decades there is a lack on research in the countryside.

This paper tackles the landscape, as political and archaeological entity, in which the fortified sites reflect elements of social organization, control of resources and warfare against other oppida-based groups. Will use methods such as field survey (Castarreño, Sasamón), geopropection and analysis of other proxies of social organization as the well-known Late Iron Age necropolis of key-sites (Villamorón).

7 ANCHORING ECONOMIC AND SOCIAL STRUCTURES OF RURAL COMMUNITIES (PARIS REGION, 5TH-1ST CENT. BCE)

Qatreuvre, Carole (Christian-Albrecht Universität zu Kiel (DE); CNRS UMR 8546 Aoroc (FR))

Thanks to ongoing construction projects, vast areas of the Paris region (France) have been systematically excavated by archaeologists in the last 30 years. The abundant Iron Age sites they documented encompass all kinds of remains of human occupation, from well-established settlements to “simple” linear features. My current research addresses this wealth of information in a synthetic way, to make sense of past land use and to chart social, economic, or even political processes in rural La Tène communities of the Paris region.

Mostly based on unpublished archaeological reports, my dataset includes all archaeological features dated to the Second Iron Age, from settlements and necropolises to isolated structures. Many of these isolated structures are listed as “secondary facilities”, for which no residential function can be identified. They are used on a more or less frequent basis, and thus contribute to the continuous use of the landscape: storage structures and sheds, land parcels, roads, etc. In order to fully appreciate their diversity, the classification of settlements and secondary facilities relies on correspondence analyses and clustering methods. These statistical tools effectively reveals several unsuspected types of sites for the Paris region such as villages, redistribution centers as well as different levels of agrarian structures.

Spatial analysis then connects all the components of the human landscape. Traditional distribution maps are supplemented with contextual profiles. These profiles highlight the evolution of specific combinations of sites and features and help characterize social and economic structures. New phenomena are identified, such as the higher complexity of territorial development South of Paris throughout the whole period, the resilience of rural communities in the 4th century BCE in the face of general depopulation in Gaul or the shift from community-based to aristocratic management of agricultural products in the 3rd century BCE.

8 TERRITORIALIZATION, HUMAN MOBILITY, AND SOCIAL INEQUALITIES IN NE IBERIA DURING THE IRON AGE: ISOTOPIC ANALYSIS FROM ULLASTRET (GIRONA, SPAIN)

de la Fuente Seoane, Rubén (Unitat d'Antropologia Biològica, Universitat Autònoma de Barcelona) - Díaz-Zorita Bonilla, Marta (Institut für Ur- und Frühgeschichte und Archäologie des Mittelalters, University of Tübingen) - Nieto-Espinet, Ariadna (Grup d'Investigació Prehistòrica (GIP), Universitat de Lleida) - Subirà, M. Eulàlia (Unitat d'Antropologia Biològica, Universitat Autònoma de Barcelona)

In the late first millennium BC, the societies of NE Iberia underwent rapid transformations due to their interaction with Mediterranean groups and their exchange networks. The archaeological record reflects incipient processes of territorialisation and the emergence of social inequalities through the appearance of fortified settlements, presence of iron weapons, as well as an increase in structures for the accumulation of agricultural surplus. However, the adoption of cremation as the funerary ritual which complicates the understanding of the biological characteristics and social structure of Iron age human communities.

Archaeological finds such as the nailed heads from Ullastret not only reflect a unique symbolic practice in the Iberian world, but also represents an exceptional opportunity to analyse the human communities of this period and their interactions. According to some authors, these could have been either protective relics from ancestors or war trophies of foreign enemies. But who were these people really, and what relationship did they have with the territory?

This paper provides new data to understand how interactions between human communities linked to the territory of the NE Iberia were articulated during a period characterized by strong local territorialisation. This has been possible thanks to the analysis of three nailed skulls from the Ullastret site, with a multiproxy approach combining physical anthropology, $\delta^{18}O$ and $87Sr/86Sr$ isotope analysis. The integration of the anthropological and isotopic data of individuals and their correlation with the results obtained from the archaeozoological remains and the local baseline has provided valuable information on the degree of connectivity and the impact of mobility on local Iron Age communities.

592 DECISION-MAKING AND ASSESSING AND ARTICULATING ARCHAEOLOGICAL SIGNIFICANCE

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Verschuur, Marjolein (Cultural Heritage Agency of the Netherlands; European Archaeological Council) - Hjaltalin, Thor (The Cultural Heritage Agency of Iceland; European Archaeological Council)

Session format: Regular session

The Europae Archaeologiae Consilium (EAC) has done extensive work on assessing and articulating significance. Significance is a primary consideration in heritage management and informs decisions about what will be considered an archaeological heritage resource worthy of protection, conservation, and management. By summing up specific values, significance gives a statement about why a site or a monument should be the subject of preservation and conservation (or not) and guides management action. The assessment of significance is thus a key tool which shapes the material archaeological record, and forms a basis for subsequent actions and interactions with archaeological heritage.

Significance itself is a dynamic concept that changes over time. Significance places relative values on the material record and is by its very nature subjective. Archaeological heritage benefits society in many different ways, and assessing significance should take into account a wide range of different values. It should be a reflective and critical process that allows more voices to be heard.

These developing considerations operate within international, national and regional legislative frameworks that may not accommodate these multiple voices, and in the face of many economic, societal and other pressures on archaeological heritage. The huge growth in techniques available to detect, record and interpret individual sites and monuments and wider archaeological landscapes also presents data-based challenges to heritage management agencies and all archaeologists charged with assessing archaeological significance.

The complex process of assessing archaeological significance provides the foundation for all decision-making in heritage management. Understanding and exploring it is vital to questions such as why we preserve archaeology, how we articulate the relationship between past and present, and how archaeological heritage can benefit society.

Aim of the session is to share the EAC results and to share experiences and good examples. We invite speakers to present their own research regarding this theme.

ABSTRACTS

1 ARTICULATING SIGNIFICANCE OF ARCHAEOLOGICAL SITES

Hjaltalin, Thor (EAC; Cultural Heritage Agency of Iceland)

The EAC working group on articulating significance of archaeological sites is one of three groups that started following the "Making Choices" survey which was sent out to the EAC member states. The results of the survey, which was published in 2017 has helped to identify areas in which EAC could help to develop guidance in archaeological heritage management to improve consistency and transparency. The working group on significance's main objective is to provide guidance on articulation of significance of heritage assets to ensure that the values of each site are clearly articulated when needed. The aim of the group is to give a comprehensive discussion on the philosophical problems heritage managers are facing when dealing with significance of sites and to give a good overview of methods used for evaluating significance in different countries of Europe. We hope that the ideas and different systems described will be useful for caretakers of sites and even give some useful guidelines and serve as a working tool for decision-making when change management is required, or because of other reasons. Traditions differ somewhat between countries in Europe when evaluating significance of sites and in the presentation structure and outcome of the project will be discussed, comparison of different approaches and questions asked like; are all cultural remains equally valuable and if not, what makes the difference? Can remains have more value in some regions than others and can the value of a site change in time – be less or more important for the public or even archaeologists? The aim of the group is to give a comprehensive discussion on the philosophical problem we are facing when dealing with the significance of sites and try to find a common ground and useful guidelines and working tool for decision-making.

2 OUTSTANDING UNIVERSAL VALUE IN WORLD HERITAGE – A USEFUL COMPARATIVE RESOURCE FOR THE ASSESSMENT OF HERITAGE SIGNIFICANCE AT NATIONAL LEVEL

Gowen Larsen, Margaret (University College Dublin)

Outstanding Universal Value (OUV) in UNESCO World Heritage (WH) is the conceptual standard used to determine the global heritage significance of properties that are inscribed on the WH List. The UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (1972) was devised as a global treaty because "...parts of the cultural or natural heritage are of outstanding interest and therefore need to be preserved as part of the world heritage of mankind as a whole". OUV is thus legally recognised as an international standard for heritage, that is inclusive of all other heritage values around the world. The Convention does not define OUV. That task was left to the elected representatives of the Convention's States Parties on the WH Committee. Article 11.5 however states that the definition of OUV will be determined by criteria. The Convention's Operational Guidelines set out these criteria and define OUV as "...cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity. As such, the permanent protection of this heritage is of the highest importance to the international community as a whole....(Op. G., Para 49). The guidelines have developed from 28 paragraphs in 1977 to 290 paragraphs in 2021, seeking to cater for an increasingly plural understanding of heritage values globally, from state to local community level. Despite geopolitical dynamics in decision-making associated with the inscription of properties on the World Heritage List and concerns about credibility and governance, this paper identifies some of the general concepts and technical principles of used in the definition and assessment of OUV that may be usefully integrated into the assessment of archaeological heritage significance at national level.

3 MOUNTAINS OF MEANING. ADDRESSING ARCHAEOLOGICAL SIGNIFICANCE IN AUSTRIA

Picker, Andreas (Federal Monuments Authority Austria)

Within the framework of the EAC's working group on significance, members of the Austrian Federal Monuments Authority have re-evaluated the country's approaches on assessing the significance of archaeological monuments. In doing so, some new criteria of evaluation were explored and the question was raised, whether it is possible to define sites of highest significance in Austria. Case studies range from the lowlands along the Danube to the Alpine mountaintops, and it has become clear that these monuments represent many (metaphorical) layers of meaning that make up their significance.

The Austrian Monument Protection Act (in existence since 1923) emphasizes the constitutive process of expert opinion and assessment. Not the monuments significance alone, but the arguable public interest in its preservation constitutes the protection status legally. The only requirements given by the law are the "significance criteria" (does the monument possess historical, artistic or other cultural meaning?) and the "evaluation criteria" (does the monument contribute to the quantity, diversity and distribution of the country's cultural heritage?).

Arguably, the term used in this context may be understood as the object's "meaning", rather than its "value" or "importance". With full respect for the monuments' (often ambiguous) semantics, we took a closer look at a possible framework for assessment criteria applicable to a larger number of objects. In this paper the possibilities (and short-comings) of such an approach will be explored. Can significance be based on a ranking by evaluation? Is this data even quantifiable? What insights can a relative qualitative analysis reveal?

Even if we assess "mountains of meaning" regarding our sites and monuments, it may be argued that the objects' individuality and diversity are what make them significant.

4 **BACK TO THE FUTURE. RECOGNISING AND ASSESSING THE SIGNIFICANCE OF THE ARCHAEOLOGICAL HERITAGE AT DIFFERENT TIMES**

Makowska, Agnieszka (National Institute of Cultural Heritage (Poland))

Usually, the starting point for assessing anything, including the significance of an archaeological sites, is what it means to the person making the assessment, here and now. The title of the well-known film in the heading announces an attempt to see the archaeological heritage through the eyes of people living in different times - contemporaries, our great-grandparents and not-so-distant descendants. We can only hypothesise what reality will be like in 50 years, what the technical possibilities will be and what will be important to people then. This article aims to show that it is still worth trying. As we are only the custodians of what we have inherited from the past, we need to focus on strategies to preserve more than just a representative sample of the heritage. By noting the differences in the perception of the archaeological heritage in Poland today and 70 years ago, I will try to put forward theses on the needs of future generations. My approach is to consider both the voice of the public and the archaeological community, drawing on the results of recent surveys and archival information. The results of this 'time travel' are intended to support heritage decision making. The key is that such decisions should be based on knowledge gained at a much earlier stage. Therefore, the systematic identification of the archaeological heritage by non-invasive or low-invasive prospection methods is crucial.

5 **MECHANISM FOR LONG TERM PRESERVATION BY INVESTMENT-LED ARCHAEOLOGY IN HUNGARY**

Koller, Melinda (Hungarian National Museum) - Wollák, Katalin (heritage expert)

The process of archaeological site assessment is particularly important in the context of the excavations managed by the investment. The different categories of protection and other legal statuses theoretically ensure the protection and in situ preservation of sites of high importance. However, no new scheduling process has been carried out in the last seven years, despite the fact that the mapping of archaeological potential, which is part of the preliminary archaeological impact assessment required for major projects, may reveal new sites of high archaeological significance worthy of preservation. Avoiding such sites through the investment is only possible with certain compromises.

The contribution presents, through two case studies, the tools used to assess registered (non-protected) important sites and the steps taken to reconcile the values of the different actors in order to achieve long-term preservation.

The first example describes the ranking of thousands of tumuli in Hungary dating from the Copper Age to the Roman period. They stand next to streams, ancient roads, along historical and occasionally still existing borders. These archaeological and natural phenomena, which are often visible in the landscape, are not just grave mounds, but archaeological and historical values that are associated with historical legends, folk traditions, and beliefs. The second example concerns a built heritage feature (medieval church) in a wooded area, not visible on the surface, where a water supply system was to be built. The local community has been involved in the survey and considers it important to preserve the church in situ, which dates to the 14th and 15th centuries. In this case, the long-term conservation objective is to ensure the scientific investigation of the undisturbed site.

6 **MANAGING SIGNIFICANCE IN ENGLISH TOWNS - STAYING, LEAVING AND ARRIVING**

Allen, Tim (Historic England)

In articulating significance as part of designation and planning processes heritage professionals and others with a voice in the system weave assets out of the values people hold for the material world. Significance falls between the diffuse world of socially constructed values and the relative worth asserted communally as importance - significance is where the alchemy happens. In writing about significance, one is drawn to ask whose and which values for place are to be articulated and given precedence in producing a rational and structured text to support public decision making. People leave, people stay, people arrive, archetypes and stereotypes frame how we ascribe sophistication, authenticity and legitimacy to these voices. The ideas of the Italian anthropologist Vito Teti offer an opportunity to place the biographies of a community at the centre in understanding how they construct discourse about heritage and conservation and new development. As Teti observes - home is transformed (perhaps as much) for those who stay-on as for those

who leave or arrive. The towns of the English Midland counties have a rich architectural and archaeological heritage. Through case studies in Midlands town this paper explores how to construct significance that is richer and more attuned to the individually situated experiences and memories of dwelling in a place.

7 **VALUES OF THE ARCHAEOLOGICAL HERITAGE LANDSCAPE IN SWEDEN**

Nelson, Matthew (Linnaeus University)

In this paper I'm looking at how different values of landscape, heritage and contract archaeology relate in what I call the archaeological heritage landscape, using the theoretical concept of critical heritage studies. This is done with the aim of showing how the practice could be used in a more beneficial way for strengthening heritage work and becoming a valuable resource for the wider society. By looking at previous research from an interdisciplinary viewpoint together with conducting a survey directed towards the county administrative boards in Sweden, I analyze the concept and values of contract archaeology and the archaeological heritage landscape to get a better understanding for how multivocal perceptions and evaluations are formed and the underpinning dynamics. I also look for deficiencies in, and forces that impact on, the often-polarized view on contract archaeology in Sweden and how this heritage-making process can compromise diverging views while becoming more relevant for the wider current society. I furthermore argue for improving the awareness among colleagues for the potential beneficial or negative impacts contract archaeology might have on society, both for the values of the archaeological heritage landscape and for cultural and economic effects. I conclude that the view and values of the archaeological heritage landscape must improve recognition of a wider array of subjective values beyond antiquarian and economic perspectives, and instead be more attuned to for instance identity or community interests, together with the understanding that the landscape values are dynamic and always changing.

8 **A CRITICAL ANALYSIS OF THE "ARCHAEOLOGICAL ZONES" DEFINITION PROCESS IN FRANCE: THE ZONES OF PRESUMPTION OF ARCHAEOLOGICAL PRESCRIPTION**

Duval, Mélanie (EDYTEM CNRS USMB) - Gauchon, Christophe (EDYTEM CNRS USMB)

The aim of this paper is to present the first results of a research project that has begun in January 2024 on the construction of a form of zoning specific to France: the zones of presumption of archaeological prescription (les zones de présomptions de prescription archéologique). These zones delimit areas within which, depending on the development projects envisaged, the French State, through the Prefectures and the Regional Archaeological Services, may request a prescription for archaeological diagnosis, which may in return lead to modifications to the development projects.

The objective of this research project is to analyse the factors involved in defining the spatial extent of these zones. To what extent is the definition of these zones the result of the state of knowledge at a given time (archaeological map), other pre-existing protection measures and the stakeholders involved in the zoning process (government departments, INRAP, CNRS, universities, local authority departments, voluntary associations)?

On the basis of initial semi-directive interviews and analysis of the grey literature (administrative documents), it emerges that these types of archaeological zoning are strongly constrained by the areas in which they are located. In return, this analysis of this type of zoning provides information on the way in which the archaeological value attributed to an area, over and above the archaeological characteristics of the site (type of site, period, state of conservation) is a function of territorial contexts and the interplay of multi-scalar stakeholders.

593 **WHITHER EVOLUTIONARY ARCHAEOLOGY?**

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Bortolini, Eugenio (Dept. of Cultural Heritage, University of Bologna, Italy) - Crema, Enrico (Dept. of Archaeology, University of Cambridge, United Kingdom)

Session format: Round table (without formal abstracts)

Since the mid-1980s Cultural Evolutionary Theory (Boyd and Richerson 1985) has ignited and fueled the cross-pollination between biological and social sciences at a global scale, often leading to the emergence of well-established subfields and research agenda. The impact of cultural evolutionary theory on the social sciences has been mixed. On the one hand, it shed light on the variety of social learning processes underpinning change in the frequency of past and present cultural traits, on the diffusion of culture and behaviour over time and space, on the impact of such mechanisms on the differential persistence of subsistence strategies as well as social, economic, and political responses. It helped introduce concepts of uncertainty, data quality, and lack of resolution in archaeological assemblages.

On the other hand, the success of Evolutionary Archaeology (i.e. the application of this framework to the study of material culture and its links to biological, social, demographic, and environmental processes; e.g. Shennan 2008) is nowhere close to what is being achieved by evolutionary anthropology. Although a number of active practitioners exist, its impact on the broader field has not achieved what was initially envisioned. Most archaeologists are simply

not aware of its underlying theoretical framework, and at worst Evolutionary Archaeology is still confused with some modern form of Spencerian social Darwinism. This round table will reflect on why after at least three decades, Evolutionary Archaeology failed to reach its initial goals, whether its primary contribution will be forever limited to the introduction of few theoretical concepts and statistical methods, whether it needs radical rethinking or rebranding, and whether all this matters.

594 "ALL ROADS LEAD TO THE SOUTH", FACING THE EUROPEAN PALAEOOLITHIC FROM THE SOUTH OF THE IBERIAN PENINSULA

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Medina-Alcaide, M^a Ángeles (University of Bordeaux, UMR CNRS 5199 PACEA; University of Cordoba, Department of History, HUM-781) - Bernal Gómez, Marco Antonio ("Paleomagina" Research Centre) - Nabais, Mariana (IPHES-CERCA - Institut Català de Paleoecologia Humana i Evolució Social; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art) - Rodríguez Castro, Eva (University of Cordoba, Department of History)

Session format: Regular session

The south of the Iberian Peninsula has geographical and physical singularities that must not have gone unnoticed by the human groups that inhabited this European region thousands of years ago (wide climatic and landscape biodiversity, extensive coastal strip that combines the Mediterranean and Atlantic slopes, proximity to the African continent, mild climate in adverse periods, etc.). Studies on archaeopaleontological Pleistocene sites in the region are currently proliferating, either through the re-study of known sites or through the discovery of new sites. Together, these are favoring new readings for a comprehensive and updated understanding of Palaeolithic activity in this unique region. In this context, reaching out between southern Portugal and southern Spain, and welcoming other regions of southern Europe with similar characteristics and problems, we propose this session with the aim of increasing and actualizing the knowledge of Palaeolithic settlement in this geographical area.

We welcome oral communications on the following topics related to Palaeolithic sites in Southern Europe, in particular in the South of the Iberian Peninsula:

- Re-study of classical sites, through interdisciplinarity and new technologies.
- New sites and recent discoveries, looking beyond the tip of the iceberg.
- Regional identity? Readings beyond a position of marginal periphery.

ABSTRACTS

1 BARRANCO LEÓN, A 1.4 MA HUMAN GATHERING SPOT IN SOUTHERN EUROPE

Solano García, José (University of Granada) - Yravedra, José (Universidad Complutense de Madrid) - Tilton, Stefania (Institut Català de Paleoecologia Humana i Evolució Social) - Sánchez-Bandera, Christian (Institut Català de Paleoecologia Humana i Evolució Social) - Ochando, Juan (Universidad de Murcia) - Serrano, Alexia (Universidad de Granada) - Herránz, Darío (Universidad de Granada) - González-Quñones, Juan (Universidad de Granada) - Barsky, Deborah (Institut Català de Paleoecologia Humana i Evolució Social) - Jiménez-Arenas, Juan (Universidad de Granada)

Barranco León (Guadix-Baza basin, Spain) is a key archaeological site for the knowledge of the first inhabitants of Southwest Eurasia during the Early Pleistocene. It has not only yielded a deciduous lower hominid molar but also boasts an exceptionally rich collection of faunal and lithic remains and a fertile palynological record. Recent research has led to the development of new interpretative models regarding the formation of the site, the behaviour of hominins and carnivores, and the reconstruction of a new climatic and environmental framework for the Guadix-Baza basin.

Our studies point to a typically Mediterranean climate, albeit slightly warmer, specifically in winter, and more humid, in a lakeside margin area where we have discerned different instances of activity, both primary and secondary. The convergence and recurrence of agents and biological activity suggest that we are dealing with a hotspot for resource provisioning for different biotic agents, among which hominins and canids (*Canis mosbachensis*) played a prominent role.

Until recently, it was believed that humans had a much more passive and dependent behaviour, relying on external agents such as large carnivores in a hostile environment, where they would make quick incursions to obtain resources. However, our results suggest a much more complex scenario of interaction and flexibility with the environment, with more organized and multifunctional groups. Humans played a more important role than previously thought.

2 REVISITING THE ACHEULEAN OCCUPATIONS OF VALE DO FORNO (LOWER TAGUS, ALPIARÇA, PORTUGAL)

Ferreira, Carlos (UNIARQ - Centre for Archaeology of the University of Lisbon) - Raposo, Luís (ICOM - International Council of Museums) - Cunha-Ribeiro, João Pedro (UNIARQ - Centre for Archaeology of the University of Lisbon) - Méndez-Quintas, Eduardo (GEAAT - Grupo de Estudos de Arqueología, Antigüidade e Território, University of Vigo; UNIARQ - Centre for Archaeology of the University of Lisbon)

Fluvial archives play a crucial role in comprehending human behaviour in the Iberian Peninsula during the Middle Pleistocene and, specifically, in discussing the technological and chronological trends of the Iberian Acheulean techno-complex. In the Iberian Atlantic Margin, work carried out during the 1940s by Georges Zbysewski and Henri Breuil in the Lower Tagus Valley led to the identification of several Acheulean archaeological horizons. Amongst the areas surveyed by these researchers, Vale do Forno, located near Alpiarça (Santarém, Portugal), stood out for having a significant concentration of Acheulean assemblages in a rich stratigraphic section that quickly became a key reference in subsequent research. After these earlier reports, the study of the Acheulean occupations of Vale do Forno entered a new stage in the last two decades of the 20th century, as a result of archaeological research directed by Luís Raposo. Specifically, this led to the identification and excavation of three main sites - Vale do Forno 1, 3 and 8 - chronologically framed between MIS 9-6, that became classical references of the Acheulean techno-complex in the current Portuguese territory and were proposed (based on typological assumptions) to reflect an evolutionary trend within the Iberian Acheulean.

Since 2021, initially as part of a master's thesis and now in the framework of a PhD project, we have been conducting a systematic revision of Vale do Forno Acheulean sites, based on new theoretical and methodological assumptions in line with current trends in the characterisation of Acheulean assemblages. In this work, we present updated data concerning the above-mentioned sites, discussing the evolutionary perspective previously suggested, and highlighting the potential of this classical area of Portuguese archaeology for studying the human occupations of the second half of the Middle Pleistocene in the westernmost part of Europe.

3 THE LAST ACHEULEANS OF WESTERN IBERIA: THE ARCHAEOLOGICAL SITE OF ENTRADA DO VALE DA SERRA (ALMONDA KARST SYSTEM, PORTUGAL)

Varanda, Alexandre (UNIARQ) - Souto, Pedro (Paleoalmonda) - Rodrigues, Filipa (UNIARQ; Municipio de Torres Novas) - Zilhão, João (UNIARQ) - Deschamps, Marianne (TRACES - CNRS 5608; UNIARQ)

For a long time, the study of the Iberian Acheulean was constrained by the sites' lack of reliable dating. However, during the last decade, the number of age measurements available for Acheulean sites has grown considerably. We now know that the technocomplex minimally spans the MIS 12 to MIS 6 interval. The Entrada do Vale da Serra is one such dated site: it belongs in the last stage of the regional Acheulean.

Located deep inside the underground course of the Almonda river, the site was discovered in 1989 and the finds were collected in the course of fieldwork conducted between 1989 and 1991. The site consists of an enormous éboulis cone and the associated, fluviially remobilized deposits. The sedimentary accumulation results from the collapse of a sinkhole via a shaft that once connected the river with the ground surface, ca. 50 m above. Dating of animal bone retrieved on the éboulis cone shows that cluttering-up of the shaft occurred sometime after 30,000 BP.

The lithic assemblage includes handaxes and the fauna includes a molar fragment of *Elephas antiquus*. Assignment of the assemblage to the Acheulean is supported by the U-series dating of associated horse teeth to between 170,000 and 136,000 years ago, among the latest occurrences of the technocomplex in the Iberian Peninsula.

Despite a bad surface and edges preservation and small missing items, due to the fluvial context of the finds, the lithic assemblage (including several handaxes, cores and flakes) is homogenous and its composition is giving an interesting overview of the MIS 6's last Acheulean's technological background in the southwestern Atlantic fringe of Europe.

4 NEANDERTHAL OCCUPATION IN LA SIMA CAVE (SEVILLE, SPAIN): GEOARCHAEOLOGICAL INTERPRETATION THROUGH PHYSICAL-CHEMICAL ANALYSIS OF SEDIMENT

Medina Luque, Eusebio Jesús (Universidad de Córdoba) - Caro Gómez, José Antonio (Universidad de Córdoba) - Álvarez García, Genaro (Sociedad Espeleológica Geos (Exploraciones e Investigaciones Subterráneas)) - Recio Espejo, José Manuel (Universidad de Córdoba) - Borja Barrera, César (Universidad de Sevilla) - Díaz del Olmo, Fernando (Universidad de Sevilla) - Riquelme Cantal, José Antonio (Universidad de Córdoba) - Garrido Anguita, Juan Manuel (Universidad de Córdoba) - Cañete Gómez, Marta (Universidad de Córdoba)

The physico-chemical analysis of a sedimentary profile in the La Sima cave (Constantina, Seville, Spain) is carried out. The results reinforce its usefulness in geoarchaeological studies and support findings from previous archaeological research, since parameters such loss on ignition, phosphorus and magnetic susceptibility reveal the degree of

anthropization in karst environments. On the other hand, pH (H₂O), granulometry, total carbonates and electrical conductivity offer valuable information about the natural processes occurring within the karstic environment.

The stratigraphy of the site is composed of 6 geoarchaeological units (GU) with a thickness of 4m. GU.1 and GU.2 represent a modern phase of spoliation, GU.3 a natural fill, while GU.4 and GU.5 exhibit numerous Mousterian lithic industries, faunal remains and evidence of ephemeral burning structures, dated to the Upper Pleistocene (ca. 45 ka). Finally, GU.6 shows evidence of alternating use either as a hyena den or as a short-term human habitat.

It is concluded that the sequence in the stratigraphic fill follows a uniform trend in most of the parameters analysed. However, alterations are observed at the base of GU.4 and GU.5, interpreted as indicative of a phase of stability in the natural dynamics of the cave, favouring occupation by Neanderthal human groups.

Within UGA.5, which hosts Middle Palaeolithic hearths and other archaeological artefacts, increases in parameters such as loss on ignition (4,33%), phosphorus (23,6 P₂O₅ mg/100g) and magnetic susceptibility (9067 X 10⁻⁹ m³/kg), high values influenced by anthropogenic actions, are recorded.

5 CURRENT WORK AND RESEARCH DIRECTIONS ON THE EARLY UPPER PALAEOLITHIC SITE OF COVA FORADADA (XÀBIA, ALICANTE, SPAIN)

Fernández-López de Pablo, Javier (I.U. I en Arqueologia y Patrimonio Histórico (INAPH), University of Alicante) - Casabó i Bernad, Josep (Generalitat Valenciana) - Gómez-Puche, Magdalena (I.U. I en Arqueologia y Patrimonio Histórico (INAPH), University of Alicante) - Mayor Benadero, Alejandro (I.U. I en Arqueologia y Patrimonio Histórico (INAPH), University of Alicante) - Montero-Buch, Oriol (I.U. I en Arqueologia y Patrimonio Histórico (INAPH), University of Alicante) - Moya Ruiz, Raquel (I.U. I en Arqueologia y Patrimonio Histórico (INAPH), University of Alicante) - Romero, Alejandro (Rameta)

Over the past decade, the chronology of human dispersals South to the Ebro Valley and subsequent population dynamics during the Early Upper Palaeolithic (EUP) have been subject of an intense debate. This paper introduces on-going work on a classic Early Upper Palaeolithic (EUP) site, Cova Foradada cave (Xàbia, Alicante, Spain), excavated by Josep Casabó from 1992 to 2003. Our research aims to create a multi-proxy record of high chronological resolution for this important site. The first phase of this project involves the revision of old excavations to better understand site formation processes as well as the chronological boundaries and cultural taxonomy of the EUP occupations. Particularly, this translates to (i) the archaeostratigraphic analysis of archaeological features and lithic artifacts; (ii) the definition of raw material units for conducting and lithic taphonomic studies intra-site spatial analysis; and (iii) the revision of the chronostratigraphic sequence based on an updated AMS radiocarbon dating program.

We expect our work will improve our current understanding on EUP cultural and population dynamics in the Central Mediterranean region of Iberia and beyond, allowing a better synchronization between archaeological and paleoclimate proxies.

6 RETHINKING LAMINAR KNAPPING DURING THE EARLY UPPER PALAEOLITHIC IN THE CENTRAL IBERIAN MEDITERRANEAN BASIN

Martínez-Alfaro, Álvaro (Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València) - Vadillo Conesa, Margarita (Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València) - Bel, Miguel Ángel (Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València; UNIARQ-Centro de Arqueologia da Universidade de Lisboa, Faculdade de Letras de Lisboa, Universidade de Lisboa) - Sanchis, Alfred (Museu de Prehistòria de València, Servei d'Investigació Prehistòrica, Diputació de València) - Villaverde, Valentín (Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València) - Eixea, Aleix (Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València)

Aurignacian and Gravettian sites in the Valencian region have been the subject of re-evaluation and new fieldwork in recent years. Over and beyond the question of the timing of the start of the Upper Palaeolithic in central and southern Iberia, the features of the lithic techno-typology have been precisely defined. These reveal differences in regional trajectory and a common substrate in relation to other areas like northern Iberia or the Aquitaine Basin.

The laminar knapping process is defined by various methods, the main schemes being determined from prismatic and carinated cores. Moreover, the bipolar knapping is present in numerous sites with different frequencies, and is consistently seen across time. The bipolar method has long been considered expeditious and opportunistic, but it may reveal an adaptation to local raw materials to obtain blanks with specific morphometric characteristics. In this regard, we focus the study on bipolar laminar cores, blanks and anvils. The main objective is to define a reduction method often not identified in the assemblages or confused with pieces used with a bipolar dynamic. We present an approach that combines data from technological analysis, experimentation and use-wear analysis from Cova Foradada (Oliva, Valencia). The first archaeological activities date back to 1975 and 2013, and in 2023 we began a new fieldwork phase. Here, we present the results from the latest field seasons including a review of the previous assemblages. In the same way, we have considered other key regional sequences such as Cova de les Malladetes (Barx, Valencia), Cova de les

Cendres (Teulada-Moraira, Alicante) and Abric de la Ratlla del Bubo (Crevillent, Alicante). All this will allow us to establish a characterisation of the laminar technology during the Early Upper Palaeolithic in the Valencian region.

7 LITHIC TECHNOLOGICAL VARIABILITY DURING THE EARLY-UPPER PALAEOLITHIC IN SOUTHERN IBERIAN PENINSULA: THE CASE OF LA BOJA ROCKSHELTER (MURCIA, SPAIN)

Gomes, Luís (UNIARQ - Centro de Arqueologia da Universidade de Lisboa; Paleoalmonda - Associação de Estudos Científicos)

La Boja rockshelter is an archaeological site in the Rambla Perea valley, part of the Mula river basin. It preserves a 6m thick deposit encompassing dozens of Middle and Upper Palaeolithic occupation surfaces defined by a high density of knapped flints associated with hearths. The 1.5m thick pre-Solutrean Upper Palaeolithic sequence (levels OH20/IL4-OH12a) revealed over eleven occupation events ranging from the Evolved Aurignacian to the Late Gravettian. The chronometric data derived from this sequence, one that yielded the earliest unambiguous dates for the Aurignacian (37.5 kyr cal BP) and Gravettian (31.0 kyr cal BP) technocomplexes in southeastern Spain, is coherent with the typologically diagnostic lithic remains. This factor sustains the high integrity of the deposit and calibrates the on-site occupation sequencing, making La Boja a key-site for understanding the Early Upper Palaeolithic (EUP) techno-typological variability in Southeastern Spain and elsewhere in the Iberian Peninsula.

With the purpose of contributing to the discussion of the regional and supra-regional EUP technological variability and historical transformation of the lithic systems, we aimed at reconstructing the chaînes-opératoires at each occupation level of La Boja's EUP sequence through a techno-typological and taphonomical analysis aided by systematic lithic refitting. The results reflect major differences in lithic reduction systems between different techno-cultural phases, corroborating the techno-cultural occupation sequence originally proposed. Furthermore, distinct, functionally complementary lithic reduction sequences were identified within most of the occupation phases (often corresponding to potentially contemporaneous activity loci), which furthers our understanding of the variability of on-site knapping activities and lithic resource management. Finally, both the technological and typological analysis agree with the hypothesis of a progressive transition between the EUP technocomplexes, sustaining a local, slow-paced transition, in line to what has been proposed for other regions of southwestern Europe.

8 THE GRAVETTIAN OCCUPATION OF THE CUEVA DEL ARCO (MURCIA, SPAIN) THROUGH LITHIC TECHNOLOGY AND COPROLITE ANALYSIS

Sánchez Martínez, Noelia (University of Murcia, Prehistory Area) - Ochando, Juan (Department of Plant Biology (Botany Area), Faculty of Biology, University of Murcia; Sapienza University of Rome, Department of Environmental Biology) - Carrión, José S. (Department of Plant Biology (Botany Area), Faculty of Biology, University of Murcia) - Martín-Lerma, Ignacio (University of Murcia, Prehistory Area) - Román, Dídac (University Jaume I de Castelló)

The Cueva del Arco (Cieza, Murcia) is a site where several occupations belonging to the Upper Pleistocene and early Holocene have been located. The remains from the Early Gravettian period are particularly interesting, including a group of lithic tools and five coprolites. In this paper we will focus on the results obtained after the technological study of the lithic industry and the palynological analysis of the coprolites, as well as the initial interpretation of the site.

We have analysed 681 lithic pieces, through which we have been able to make a first approximation to the management of the raw materials, as well as to determine the main objective, development, methods and techniques of the knapping. We have also analysed the preparation and morphology of the cores, the conditioning techniques and the characteristics of the pieces extracted. This information has made it possible to study the operational chain in depth.

The analysis of the coprolites has allowed us to extend the information on the plant context in the environment. There is a notable diversity of tree species, accompanied by shrubs and grasses, with an abundant representation of mainly Mediterranean taxa and xerothermophytes. It has been possible to reconstruct the palaeoecological environment of the site, with the presence of steppes or open areas, accompanied by coniferous forests (mainly Pinus and Juniperus). Furthermore, the species identified indicate that the climatic conditions at the time were not excessively severe.

With the presentation of these results, we can learn more about the Gravettian occupation of the Cueva del Arco and the palaeoenvironment in which its inhabitants lived. It also allows us to place it in the context of the southeast of the Iberian Peninsula, making it possible to establish comparisons with contemporary sites in terms of adaptation to the environment and management of lithic resources.

9 LITHIC TECHNOLOGY AT THE END OF UPPER PALAEOLITHIC: CUEVA DE NERJA (MARO-NERJA, MÁLAGA, SPAIN)

Vadillo Conesa, Margarita (Universitat de València) - Aura Tortosa, J.Emili (Universitat de València)

Cueva de Nerja is a coastal site located in the south-east of the Iberian Peninsula (Maro-Nerja, Málaga, Spain). It is a large cave in which rich archaeological deposits are preserved in its external chambers: Vestibule, Mine and Torca

chambers. The calibrated 14C datings of the three chambers place the stratigraphic sequence of Cueva de Nerja between the end of the upper Pleistocene and the middle Holocene, from 30 to 3.5 ka cal BP, covering recent moments of the Pleniglacial, much of the Late Glacial (GS 3, GS 2, GI 1 and GS 1) and the Holocene (Jordá Pardo & Aura Tortosa, 2006, 2008, 2009; Aura Tortosa & Jordá Pardo, 2014). The data used in this study resulted from the project led by prof. F. Jordá Cerdá (Universidad de Salamanca) between 1979 and 1987 on the Epipalaeolithic occupations of the Vestibule chamber, layer NV4.

Between the end of the Pleistocene and the beginning of the Holocene, no major changes have been observed in the objectives of the productions, being the bladelets the supports on which mainly backed pieces will be configured. The application of the technological reading in sites of similar chronology in other regions, such as that in the central area of the Iberian Mediterranean region (Vadillo & Aura, 2020), indicates that this perspective allows us to appreciate changes that are not so evident at the typological level. The objectives of the review of the lithic assemblage associated with these moments is to obtain information on the technologies developed by the southern Iberia palaeolithic-epipalaeolithic groups. The scarce regional data available on this aspect make this study relevant.

10 THE PORTILLO CAVE, A NEW MAGDALENIAN ARCHAEOLOGICAL SITE IN THE HIGH GUADALQUIVIR (BEDMAR, JAÉN)

Bernal, Marco (Centro Paleomágina)

The Portillo Cave is a new site of Magdalenian occupation that provides new information on the last groups of hunter-gatherers of the late Upper Palaeolithic inland of the southern peninsular. The site can be interpreted as a bivouac, a place of sporadic occupation, frequented as a refuge and oriented towards a high mountain hunting economy, where the hunter-gatherer groups left a record of their domestic and economic activities at different times of recurrent seasonal occupation.

The lithic assemblages they produced were oriented towards hunting, due to the presence of points and backed bladelets used as projectiles, and end scrapers for working meat, skin and wood. The fauna brought into the cave in the greatest proportion was ibex and rabbit, with the presence of a high level of fracturing and signs of rubefaction. The cave space was structured by hearths and an abundance of lithic and faunal remains were documented around them. These hearths occupied the central place in the cave, where groups of Magdalenian hunters and gatherers sat down to carry out their domestic and social activities. With the presence of marine malacofauna species, we can interpret that these communities either came from the coast on a seasonal basis or exchanged inland products for marine products with the coastal communities somewhere between the inland and the coast. They handled and used ochre, they had different types of ornaments.

The climate in which the groups or bands that occupied the Portillo Cave lived corresponded to a Mediterranean climate according to anthracological and zooarchaeological studies.

In short, the Portillo Cave has become one more piece of information in the mosaic that is gradually being formed of the last groups of Magdalenian hunter-gatherers from the late Upper Palaeolithic inland of the southern peninsular.

11 NAVARRO CAVE (MALAGA, SPAIN): AN EXCEPTIONAL SITE WITH PALAEOLOGICAL ART IN SOUTH OF IBERIAN PENINSULA

Medina-Alcaide, M^a Ángeles (Université de Bordeaux - PACEA UMR 5199) - Ferrier, Catherine (Université de Bordeaux - PACEA UMR 5199) - Torres, Antonio (University of Cantabria - IIIIPC) - Rodríguez, Eva (University of Cordoba, Department of History (Prehistory section)) - Intxaurbe, Iñaki (Department of Geology, UPV/EHU) - Arriolabengoa, Martin (Department of Geology, UPV/EHU) - Romero, Antonio J. (University of Basque Country (UPV/EHU)) - López, Antonio (LabCertis company) - Garate, Diego (University of Cantabria - IIIIPC) - Sanchidrián, José Luis (University of Cordoba, Department of History (Prehistory section))

The Navarro Cave (Malaga, Spain) is one of the best-preserved caves with Palaeolithic Art in the Iberian Peninsula and southern Europe. Despite this, it is still largely unknown to the general public and to the scientific community. A yellow aurochs, with Gravettian and Solutrean techno-stylistic conventions, clouds of dots, strokes and other simple signs in red and black, decorate a small room today full of whimsical eccentric and fistulous stalagmites. In 2023, we have initiated an interdisciplinary project for the comprehensive re-study and its virtual dissemination. In the framework of 30th EAA Annual Meeting - Rome, Italy we will present the first results of this subterranean scientific activity. In particular, this includes a geomorphological and topographical approach, that it has characterize an origin of the cave as "Flank-margin-cave", as well as different anthropic modifications of subterranean spaces (fractures, speleothems movements and structures). Besides, we will present the results of the survey made below the main rock art panel, together with hundreds of combustion and lighting remains located in surface or semi surface in the paleo floor, and new C14-AMS dating, among others available interdisciplinary analysis of this exceptional prehistoric subterranean context (microsedimentology, anthracology, SIG, etc.). All this will be evaluated within the geographical, palaeoenvironmental and chrono-cultural particularities of the southernmost part of Europe in the Iberian Peninsula.

12 ARCHAEOLOGICAL DISCOVERIES IN NERJA CAVE: NEW PALAEOLOGICAL ROCK ART AND INTERDISCIPLINARY STUDY OF THE INTERNAL-ARCHAEOLOGICAL-CONTEXT

Rodríguez Castro, Eva (Universidad de Córdoba, Department of History (Prehistory section)) - Medina Alcaide, M^a Ángeles (Université de Bordeaux - PACEA UMR 5199) - Torres Riesgo, Antonio J. (University of Cantabria - IIIIPC) - López, Antonio (LabCertis company) - Vandeveld, Ségolène (Université Paris-Saclay - Laboratoire des Sciences du Climat et de L'Environnement, LSCE/IPSL, CEA-CNRS-UVSQ) - Pons-Branchu, Edwidge (Université Paris-Saclay - Laboratoire des Sciences du Climat et de L'Environnement, LSCE/IPSL, CEA-CNRS-UVSQ) - Valladas, Hélène (Université Paris-Saclay - Laboratoire des Sciences du Climat et de L'Environnement, LSCE/IPSL, CEA-CNRS-UVSQ) - Sanchidrián Torti, José Luis (Universidad de Córdoba, Department of History (Prehistory section))

The Nerja Cave (Málaga, Spain) is one of the reference sites in the South Iberian Peninsula for studying Upper Palaeolithic societies. In the rooms closest to the exterior, there is an extensive and widely known archaeological deposit with remains dating between the Gravettian and the Copper Age. The cave also has an outstanding collection of prehistoric art, with parietal graphic representations from different stages of the Upper Palaeolithic and Holocene chronologies. In recent years and within the framework of the current General Research Project, we are especially focusing on the study of the so-called "Internal-Archaeological-Context" through an innovative and interdisciplinary approach, as well as developing a re-reading of the rock art based on new methods. At the 30th Annual Meeting of the EAA in Rome, Italy, we present the latest advances of this project, including new units of figurative Palaeolithic art, the expansion of the prehistoric cave occupation through Bayesian analysis of C14-AMS dating of remains associated with different cave lightning systems, the study of the visit recurrence via interdisciplinary analysis of soot levels present in stalagmites, among other aspects regarding the symbolic Palaeolithic activity in this underground environment.

13 THE FUTURE OF THE PAST: SCIENTIFIC VIRTUAL REALITY FOR PALEOLITHIC ROCK ART EXPERIENCE IN THE SOUTH OF THE IBERIAN PENINSULA

Torres Riesgo, Antonio (University of Cantabria) - Garate, Diego (University of Cantabria) - Medina-Alcaide, María (University of Bordeaux; UMR CNRS 5199 PACEA) - Sanchidrián, José (University of Córdoba) - Intxaurbe, Iñaki (University of the Basque Country) - Arriolabengoa, Martin (University of the Basque Country) - Liñán, Cristina (University of Málaga; Nerja Cave Foundation)

The Nerja and Navarro Caves (South of the Iberian Peninsula) have been used to carry out a scientific virtual reconstruction of the contexts of Paleolithic rock art creation within the framework of the project "Scientific virtual reality for the study and dissemination of the scenarios of artistic creation in Palaeolithic caves (RealCaveART)," led by D. Garate.

This type of reconstruction begins with a high-resolution 3D virtualization using Structure from Motion and laser scanning. The resulting 3D models are modified based on existing scientific knowledge to approximate historical reality as closely as possible. Thus, the geomorphological alterations of the cavity have been taken into account, and modern anthropic alterations have been removed. Additionally, the lighting conditions for the creation and/or frequentation of rock art have been recreated based on the analysis of the Internal Archaeological Context, anthracological studies, and an experimental program on lighting systems used during the Upper Paleolithic.

The inclusion of these modified 3D models and the creation of an interactive space in the Unreal Engine 5 graphics engine allow for the creation of digital environments that faithfully reconstruct the cave as it was at a specific moment in the past based on available scientific data, thus achieving an immersive and multisensory real-time experience.

As a result, we have developed a highly versatile tool as a support and means of disseminating the most up-to-date scientific information, which also serves for the generation of historical knowledge by allowing researchers to observe firsthand and collectively the current state of scientific knowledge of a rock art site.

595 THE LIVING HERITAGE: ARCHAEOLOGICAL CULTURAL ROUTES IN THE CONTEXT OF CULTURAL TOURISM NETWORKS

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Rakvin, Marta (University of Zagreb Faculty of Humanities and Social Sciences; Iron Age Danube Route Association) - Balen, Jacqueline (Archaeological Museum in Zagreb; Iron Age Danube Route Association) - Vougioukas, Manos (Pafos Regional Board of Tourism; European Cultural Tourism Network (ECTN))

Session format: Regular session

Archaeological heritage hides a huge potential for the development of cultural tourism. Managed in the right way, it can be transformed into a sustainable cultural resource capable of creating added value to the communities which live in its vicinity. However, successful incorporation of archaeological heritage into cultural tourism flows is hindered

by a number of obstacles. Although they are highly specific to every region and site in question, the usual common denominator that binds them is the inability to achieve long term sustainability on a local level. Practice has shown that cultural heritage monuments are often not the only reason why tourists visit a certain location. Therefore, it is important to fit archaeological heritage into the broader tourist experience that a certain region provides and to develop necessary infrastructure that visitors might need. In order to do so, strategic coordination, as well as the development of strong network of compatible partners and stakeholders from complementary fields is needed on local, national and transnational level. One of the more successful approaches of joining cultural heritage, local communities, cultural tourism and sustainable heritage management are the cultural routes, particularly cultural routes operating under the aegis of the Council of Europe.

This session looks to address various ways in which archaeological cultural routes can build, or take part in, strong long-term partner and stakeholder networks, develop tools and approaches capable of creating sustainable cultural tourism products, as well as the issues that arise from undertaking these tasks. The session aims to bring together experts from various fields and disciplines, dedicated to presentation and promotion of archaeological heritage and those dealing with sustainable cultural tourism development, to discuss theoretical models, approaches and examples of good practices in developing new cultural tourism products based on archaeological heritage and creating added value for local communities.

ABSTRACTS

1 DUST OFF THE PAST - REVITALIZING ROMAN HERITAGE

Abonyi, Zsanett (Budapesti Történeti Múzeum/ Budapest History Museum)

The archaeological park of the Aquincum Museum covers almost 7 hectares, but there are many other Roman remains to be found along the Danube near Budapest. Despite its size and age, the institution is located in a less touristic area of the city, which is perceived as a remote and inaccessible place. In order to create a coherent picture of the Roman heritage of ours for foreign and domestic tourists, and even local residents, the museum offers a wide range of programmes, from full-day bus tours across the city to huge cultural festivals among the ruins of Aquincum.

The primary audience for archaeological sites nowadays is families, but their needs have changed. With rare exceptions, there is a desire to be entertained and relaxed rather than to learn. These groups have little needs for lengthy explanations; they want more action in a shorter amount of time with significantly less energy involved. The Aquincum Museum has the same problem as Roman archaeological parks in general, namely that its visitors find it difficult to make sense of the wall remains and the labyrinthine ruins and they refuse to accept having to figure out what they are supposed to see from the stone pits on their own. So, when we want to put together a tourist or cultural offer, one of our challenges is to include the fact that Aquincum is much more than ruins, although this is not an easy task.

The mission of our museum is to present the heritage that has been handed down to us in an experiential way, while interpreting the past without giving up authenticity. This is how we can build a working cultural tourism product closely linked to the archaeological heritage that creates value and connectivity for communities.

2 IN SEARCH OF THE MODEL FOR SUSTAINABLE DEVELOPMENT AND MANAGEMENT OF ROMAN BONONIA - THE CULTURAL HERITAGE IN MODERN VIDIN

Dimitrov, Zdravko (National Archaeological Institute with Museum)

Vidin is one of the most beautiful towns along the Danube. All cruise routes on the river pass here, from Germany to the mouth. The city has a huge cultural and historical heritage. The tourist flow is serious and almost continuous. But the most important emphasis for the development of the modern city is the proper management of cultural heritage monuments.

Vidin was built on the ruins of Roman Bononia, medieval Bulgarian Bdin (capital of Vidin Kingdom) and Ottoman fortress.

For 10 years now, Roman Bononia has been studied under a special work program, through regular archaeological excavations, supported by the Municipality of Vidin. Over 100 meters and two huge towers of the fortification have been uncovered. Excavations are planned for the entire northern wall of Bononia with the aim of a future archaeological park here to join the touristic Baba Vida Castle and nowadays riverside park.

That is why the aim of the proposed paper is to look for ways of stable development of the revealed cultural values after the excavations have been carried out. We would like to discuss with new partners from European countries what successful practices and approaches could be used. Certainly, the potential of the archaeological monuments from as many as three eras in Vidin (antiquity, medieval and Ottoman) are among the best.

It is extremely important the newly discovered archaeological heritage to be carefully directed to new life within the modern city.

The useful experience of similar cases from other European cities rich in cultural heritage can and should be used. Revitalizing archeology in modern urban environment is challenge. That is why the discussions and exchange of experience are of utmost importance for the future correct and sustainable management of the archaeological monuments, which will have strong effect on the development of modern Vidin.

3 CHALLENGES IN DEVELOPING UNDERWATER ARCHAEOLOGICAL HERITAGE INTO TOURISM PRODUCTS IN THE BALTIC SEA COUNTRIES

Roio, Maili (Muinsuskaitseamet)

The potential of archaeological heritage for the development of tourist attractions is great in Sea countries, it remains underrated. Often, the challenge lies in the perception of tourism developers who consider archaeology unattractive, focusing instead on other directions. However, local communities and museums show significant interest in developing archaeological attractions. Over the past decade, the Estonian National Heritage Board has actively participated in and initiated several international projects aiming to develop tourism related to underwater archaeological heritage in the Baltic Sea region. While the development of archaeological trails poses a challenge, the tourism development of underwater archaeological heritage requires even greater consistency and dedication.

In this presentation, I will share our experiences and challenges in developing archaeological tourism based on two examples. Firstly, in the northern part of the Baltic Sea, the development of historic shipwrecks as tourism attractions within the framework of two international projects. Secondly, the utilization of Stone Age settlements submerged in Lake Peipsi in collaboration with the local community to enhance the region's attractiveness. Archaeological findings have added approximately 8000 years to the local settlement history, deserving thorough presentation and interpretation. This also contributes to new knowledge about the formation of the Peipsi paleolandscapes and the entire historical background of the northern coast of Peipsi. This is valuable material that has been little introduced, published, and exhibited, and it has been underutilized for heritage tourism development.

4 DEBUNKING THE DA VINCI CODE: FINDING A BALANCE BETWEEN FACT AND FICTION AT HERITAGE SITES

Rinehart Macrae, Grace (University College Dublin; The Humanities Guild)

The Aude region in southwestern France is a battleground between medieval heretics, and modern tourists. Popular literature has only added to the issue, and now with the rise of social media and the ease of spreading misinformation, the heritage and history of the region has become muddled with fiction and hoax. This has caused damage to the built heritage and archaeology of the region, and led to a rise in conspiracy theorists and esoteric pseudoscientists claiming the history and archaeology for their own purposes. Since the publication of pieces like Holy Blood, Holy Grail and the Da Vinci Code, the line between fact and fiction has grown thin in spite of increased academic effort in putting forth historical and archaeological works. In 1965, excavations in the commune of Rennes-le-Château, the village which produced the original legend from which these fictions draw their fact, were banned. This stemmed from the multitude of treasure hunters who believed there were great stores of gold and riches to be discovered. Some of the most extreme acts of destruction involved breaking a church altar, and disrupting graves. Now modern day visitors come for the legends and romanticised versions of the Cathars and the Holy Grail, mixing myths and the history of a brutal genocide with esoteric assumptions, making it difficult for casual observers to tell fact from fiction. I seek to discuss the difficulty in presenting history to an audience to compete with myth, the challenge in deciphering a history riddled with fiction and conspiracy when traditional archaeology is banned, and our role as archaeologists in debunking these conspiracy theories.

5 APPLICATIONS OF VIRTUAL REALITY IN ARCHAEOLOGY AND CULTURAL HERITAGE

Vasilyan, Viktorya (Institute of Archaeology and Ethnography NAS RA; American University of Armenia)

In the last two decades, the use of digital technologies in the study, management and use of cultural heritage has reached enormous proportions, which in turn has led to the formation of a new interdisciplinary discipline, "virtual archaeology". "Virtual archaeology" is today considered one of the most promising scientific directions of the common European scientific and educational area. The purpose of this project is to introduce this new scientific direction in Armenia through the introduction of the latest methods and tools, the creation of a new research unit / center or laboratory / for the study of historical and cultural heritage, museumization, popularization, management and, especially, for touristic purposes.

In the context of the current geopolitical changes, we think it is important to emphasize how the virtual reality database can save the archaeological heritage. Just considering the wars and earthquakes that destroy our cultural heritage that has stood for millennia. On July 14, 2021, the American University of Armenia (AUA) signed a memorandum with the Institute of Archaeology and Ethnography of the National Academy of Sciences of Armenia. This project

began on the basis of a new archaeological and ethnographic project initiated by the late Professor Grigory Areshian. This project was designed to collect aerial images (drone and 3D orthophotos) of 100 archaeological sites in Armenia and create a comprehensive online database, which would include an accurate scientific description of the sites, as well as aerial videos, animations, virtual reconstructions, maps, photographs of the monuments (<https://ama100.am/en>). The project was implemented by specialists of Archaeology and Ethnography of the National Academy of Sciences of the Republic of Armenia. The project manager is the head of Scientific Organizational Department at the Institute of Archaeology and Ethnography, AUA lecturer, Ph.D. Viktorya Vasilyan.

6 NEW SKILLS FOR NEW TIMES: ARCHAEOLOGICAL HERITAGE PRESENTATION CHALLENGES IN LIGHT OF THE USE OF NEW TECHNOLOGIES

Rakvin, Marta (Iron Age Danube Route Association; University of Zagreb Faculty of Humanities and Social Sciences) - Balen, Jacqueline (Archaeological Museum in Zagreb; Iron Age Danube Route Association) - Šćukanec Reznicek, Porin (Iron Age Danube Route Association; Archaeological Museum in Zagreb)

During recent years we have witnessed an increase of new cultural heritage reconstructions and presentations using digital technologies (such virtual and augmented reality, different gamification tools...etc). These are particularly beneficial for archaeological heritage reconstructions and presentations, where they are often used for reuniting archaeological contexts (finds with sites and landscapes), with impressive and immersive effects for the visitors. In this way, new technologies are vital for creating new engaging and effective ways of awareness-raising and promotion of cultural heritage of a region, with the long-term consequences of attracting more visitors and creating added value to the local communities by integrating it into wider cultural tourism flows.

However, the development processes of such reconstructions and presentations are not always an easy task, as they involve close collaboration between experts stemming from very different backgrounds. As they are not proficient in the use of tools needed to keep pace with the constantly changing and competitive market, heritage experts often lack digital and transversal skills, especially in the field of technological innovation.

In this paper, we will tackle some of the most common challenges archaeological heritage professionals are dealing with in different stages of reconstructions and presentations development based on the experiences gathered in the Virtual Archaeological eLandscapes project.

In addition, we will present possible approaches to finding common solutions through the example of the Next Routes project partnership consisting of cultural routes of the Council of Europe. The project's objective is to upskill digital competencies of the cultural routes' staff through the implementation of an innovative toolkit based on gamification elements and to provide cultural routes with gamified solutions to improve their visibility in an engaging and effective way.

7 HERITAGE UTOPIAS? A CASE STUDY OF SUSTAINABLE CULTURAL ROUTE DEVELOPMENT IN NORTHERN NORWAY

Bentsen, Silje (Nordland County Council; University of the Witwatersrand) - Storsletten, Vivi Marie (Nord University) - Jakobsen, Ove (Nord University)

The cultural route "Fotefar mot nord" ("Trails to the North") was established in 1993-1998 to showcase 10 000 years of life in Northern Norway. Important keywords were cultural tourism, heritage management, and local development, and one important aim was to improve the knowledge and protection of the included sites. The route spans approximately 1800 km from north to south, encompassing hunter-gatherer-fisher sites, Iron Age burial mounds, Sami heritage, fishing villages, mines and industrial sites, museums, and World War 2 memorials. The four northernmost county councils and the Sami Parliament of Norway have since 2019 collaborated on revitalizing the route, aiming to improve visitor management, sustainability, and added value for local communities. Five pilot projects were selected in 2023, each project including one or more sites. To promote community-led development of sites along the route, each pilot was offered a utopia workshop. These workshops include a presentation on sustainability and utopia, value mapping, and a brainstorming session where participants discuss ideas for developing the site and the area.

Further development of communication methods and information material were essential to many of the participants and included in several ideas proposed at the workshops. Proposed activities at the sites included markets and plays, in addition to various forms of maintenance activities. Some of the ideas could not be implemented due to time and financial constraints. Nevertheless, the workshops proved productive for a sustainable development of the cultural route.

8 THERE ARE NO LIMITS HERE... LIVING HERITAGE ROUTES AS AN EXAMPLE OF CREATIVITY AND IMAGINATION IN CULTURE TOURISM

Chowaniec, Roksana (University of Warsaw) - Anđelković Grašar, Jelena (Institute of Archaeology, Belgrade, Serbia)

Living heritage is medium of historical-archaeological studies, interpretation and is characterized by some features that make it one of most powerful forms of communicating knowledge about past – it engages all senses, exists beyond academic archaeological and historical knowledge and offers a different insight by investigating, interpreting and discovering life in past. Although heritage is increasingly moving to digital world, cultural routes offer enormous opportunities for its promotion as well as for development of tourism in region/regions. Presentation focuses on few examples, from two different countries, Serbia and Poland, but all show how living heritage creates huge potential for the development of cultural tourism and education. These trails show how traditional and modern methods of communicating cultural heritage can be combined and how they have influenced development of tourism in areas through which they pass. These examples include: Piast Route – a sightseeing trail leading from one archaeological/historical site of Greater Poland and Kujawy to another, awarded in 2012 with Polish Tourism Organisation's certificate for the best tourist product, as it's unique and of exceptional importance for Polish heritage; Trail of the Eagles' Nests in SW Poland, a marked trail along a chain of 25 medieval castles; and Itinerarium Romanum Serbiae – Road of Roman Emperors in Serbia – a large, state-run touristic, but also socio-economically sustainable project that combines science and culture with modern research. It aims to revive and connect ancient Roman roads, many of which correspond to today's transportation links, as well as birth and death places of Roman emperors, 18 of whom were born on territory of present-day Serbia. This extensive heritage of Roman past is important to be recognised also in terms of Danube route, and so it's positioned as part of Danube Limes, Serbian section, at this moment on the UNESCO tentative list.

9 THE 'ARGONAUTICA CULTURAL ROUTE', AS A CATALYST FOR SUSTAINABLE CULTURAL TOURISM DEVELOPMENT AND PROMOTION

Vougioukas, Manos (European Cultural Tourism Network (ECTN); Argonautica Network)

A Cultural Route is developed, based on archaeological heritage, geomorphology, intangible heritage of traditions, ancient Greek theatre, poetry and literature, as well as visual and performing arts in several countries along the Argonautica Route.

The Argonautic expedition dating back to 1200 BC is the oldest legendary long-distance maritime journey in the world ever, covering several countries, seas, rivers, cities, places, referred to:

- in ancient Greek theatre tragedy 'Media' by Euripides, in 4th century BC
- in poetry 'Argonautica' by Apollonius Rhodius 250 BC, Orpheus 6th century BC and Pindar
- depicted at paintings and frescos of the Renaissance, also in modern art.

The mission of Jason and the Argonauts from Iolkos, present day City of Volos in Greece, to Colchis, present day Kutaisi in Georgia, to bring back the golden fleece has inspired several works of art, including poetry, literature, pottery, theatre, opera, paintings, sculptures, cinema, documentaries, music and publications.

Although a lot of attention has been given to the outbound journey from Iolkos to Colchis, the return journey of the Argonauts has not been given the exposure it deserves. This is despite the fact that the return journey accounted for over three quarters of the overall journey.

The return of the Argonauts from Georgia through Danube to the Mediterranean has left a cultural footprint in several places: Jason is considered to be the founder of Ljubljana, capital of Slovenia, there is legacy at the Dalmatian coast, Istria peninsula, in Croatia, as well as in Marseille in the south of France.

Tours operate in Georgia and a new museum is in progress in Volos, Greece.

The Argonautica Route can be a catalyst for sustainable cultural tourism development and promotion at the Black Sea, along the Danube river, the Adriatic and Aegean Seas destinations, also in celebrating ancient maritime heritage.

10 DIONYSIAN ARCHAEOLOGY: NAXOS ISLAND'S ALL-SEASON MYSTIQUE EXPLORED THROUGH ARCHAEOLOGICAL AND CARNIVAL TOURS

Anevlavis, Emmanouil (University of Patras) - Anevlavi, Vasiliki (Austrian Archaeological Institute/Austrian Academy of Sciences) - Argyropoulou, Maria (University of Patras) - Chatzopoulou, Evi (University of Patras)

The appeal of Greek islands extends far beyond the sun-soaked summer months, with their rich cultural heritage providing an all-season fascination. Drawing theories from Archaeology, Anthropology and Tourism, this study aims to unlock the secrets of Naxos Island by seamlessly weaving together its archaeological treasures, ethnography, intangible heritage, and mythological roots. The carnival, organised on the island, immerses participants in a three-day tourist experience, including an archaeological and cultural tour. Therefore, our focus is on the enigmatic deity of Dionysus through learning the complete history of Naxos.

Exploring Naxos reveals ancient Dionysos representations, merging history, artefacts, and island traditions. A holistic tour reveals the coexistence of past and present, exploring the vibrant carnival season on the island with Dionysos as a guide. Combining living heritage and archaeology, visitors uncover mythological aspects tied to the ancient marble quarries, Dionysos temple at Iria, and Apollon temple at Palatia. Days begin with ancient quarries, leading to a myth-themed parade on the first carnival day. The second day features the Dionysos sanctuary and an evening interactive dance parade. The final day includes a morning tour of the Apollon temple, delving into the Dionysos-Ariadne myth, culminating in the city's carnival parade, and concluding the three-day festivities.

This study results in proposals to the island's local community and tourism operators to highlight the archaeological and cultural routes and intangible cultural heritage, such as living heritage. In partnership with local authorities, a comprehensive guidebook for tourists is proposed to be produced, including detailed maps, captivating myths, and insightful archaeological details. Our research concludes with the importance of bridging the gap between academia and the lived experiences of the local community through a well-designed and organised archaeological and tourist experience. This tour promises an enhancing journey through time, inviting participants to witness the living legacy of Dionysos.

11 "HALLSTATT DAYS" - A SMALL FESTIVAL OF REVIVED HISTORY WITH GREAT POTENTIAL AND CHALLENGES

Rupert, Kristin (Zlatni Papuk Tourist Board)

In Early Iron Age, Kaptol (eastern Croatia, Slavonia) was princely center accompanied by elite burials and prestigious goods from distant areas. This means that it was an important trading center at the crossroads of traffic routes. Considering its great historical importance, many activities of popularization of archaeological heritage are carried out in this area. One of the ways is the organization of "Hallstatt Days.

Hallstatt days" is a festival of revived history, which aims to popularize archeology and the Kaptol archaeological site. It is based on the presentation of the daily lifestyle of the people who lived in this area about 2,500 years ago. It is organized every year on the third weekend in June as part of the Kaptol Municipality Day and the European Archeology Days in cooperation with the Archaeological Museum in Zagreb, the Department of Archeology of the Faculty Humanities and Social Sciences, University of Zagreb, the Center for Prehistoric Research, the Municipality of Kaptol, Iron Age Danube Route Association and the Zlatni Papuk Tourist Board. This presentation will discuss the origin of the idea of organizing a festival and its implementation in the local tourist offer. The importance of cooperation with local producers who tie their brand to the cultural heritage of their homeland will be highlighted. Cooperation with the local community in the organization of this activity will also be presented, as well as cooperation with local schools in the popularization of archaeological heritage. "Hallstatt Days" will be placed in the context of the functioning of the Cultural Route of the Council of Europe "Iron Age Danube Route," as a project of partner institutions from Croatia, as a tourist product based on archaeological heritage.

12 COMMUNICATION, CULTURAL HERITAGE AND SPORT. FONDAZIONE MONT'E PRAMA, DINAMO BANCO DI SARDEGNA, CAGLIARI CALCIO: TOGETHER FOR CULTURE IN SARDINIA (ITALY)

Camedda, Nicoletta (Fondazione Mont'e Prama) - Mureddu, Maria (Fondazione Mont'e Prama) - Orri, Ilaria (Fondazione Mont'e Prama) - Becciu, Marica (Fondazione Mont'e Prama) - Fadda, Sara (Fondazione Mont'e Prama) - Pitzalis, Matteo (Fondazione Mont'e Prama) - Murru, Giorgio Franco (Fondazione Mont'e Prama) - Muroni, Anthony (Fondazione Mont'e Prama)

The aim of the Fondazione Mont'e Prama, based in Cabras (Sardinia, Italy) is to promote the cultural heritage of the Archaeological Natural Parc of the Sinis Peninsula, in central-west Sardinia. The strategy, in almost three years of activity since the creation of the Foundation, has been based mainly on enhancing the system of communication, through multimedia channels, live conferences and events. An aspect of originality is the partnership established with the two main Sardinian sport societies: Dinamo Banco di Sardegna and Cagliari Calcio, engaged respectively in basketball and soccer.

Sport and culture represent the perfect combination for the promotion of Sardinia, and they have a great potential in the engagement of the public of the youngest. The collaboration started in October 2022: since then the Fondazione Mont'e Prama followed the teams during their national and European matches, giving lectures in cultural institutions, presenting the sites managed by the Foundation and general aspects of Sardinian archaeology. The great outcome obtained by the joint activities during the 2022/2023 season encouraged the renovation of the partnership during the following 2023/2024 annuality.

The brand of the Foundation, present as a sponsor in the uniforms of the two teams, and the events held in presence and shared through social media, brought the archaeological heritage of the Sinis Peninsula in prestigious cities of Italy and Europe, from Rome to Turin, from Napoli to Trento, from Szczecin to Athens, from Dijon to Malaga, contributing to the expansion of the target and increasing the number of visitors of the sites.

597 MIGRATION AND THE MAKING OF THE ANCIENT GREEK WORLD

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Mac Sweeney, Naoise (University of Vienna) - Mokrišová, Jana (University of Cambridge)

Session format: Regular session

The ancient Greek world by 500 BCE was a culturally integrated but geographically dispersed entity, comprising over a thousand autonomous communities scattered across the Mediterranean and the Black Sea. Migration was evidently crucial in its formation. But what was the nature and the scale of this migration? Who was moving, over what kinds of distances, and how often? To date, these questions been usually been approached either from the perspective of 'Greek colonisation', or from a perspective based on trade and cultural interaction. Both approaches, however, focus long distance movements, privileging inter-regional migration as key for understanding cultural and social change.

In contrast, this session considers to the role of local and regional migration in the making of the ancient Greek world, arguing that these smaller scale mobilities were much more important than has hitherto been assumed. In particular, it presents the work of MIGMAG (Migration and the Making of the Ancient Greek World), a project based at the University of Vienna and funded by the European Research Council, 2020-25. The project assesses evidence from five case-study regions: three traditionally associated with Greek 'colonisation', each of which developed along its own unique trajectory (Ionia, Cilicia, and Calabria); one on the Greek mainland that diverged from traditional models of polis formation (East Lokris); and one usually associated with Phoenician colonisation (western Sardinia). In some of these regions, long-distance migration has been used to explain urbanisation and state formation, while in others the same phenomena have traditionally been explained as internal developments involving regional mobilities. The work of the MIGMAG project demonstrates that in each case, a complex mix of multi-scalar mobilities was responsible for community formation.

ABSTRACTS

1 RETHINKING SYNOIKISMOS: EAST LOKRIS

Kopanaki, Eleni (University of Vienna)

Narratives of community formation in early Greece tend to focus on "the rise of the polis" and especially the concept of synoikismos (coming to live together). Models of dispersed vs nucleated settlements, internal colonization, emerging state-ness, and coalescence under first-order settlements are widely discussed, with particular reliance on the cases of Attica, Boeotia, and Argolis. However, another way to better understand the role of short-distance mobilities in the making of early Greek communities is to look beyond the usual suspects, incorporate alternative views and, to date, sidelined evidence in the discussion. By broadening our view, we can see that synoikimos worked differently in different parts of the early Greek world.

This paper discusses the diversity of synoikismos-type processes, touching briefly on all five MIGMAG case-study regions, but focusing on the poorly understood and seemingly anomalous case of East Lokris in Central Greece. Archaeological research in the region has largely been carried out from the 1970s onwards by the Greek Archaeological Service. An updated compilation of the accumulated evidence sheds new light on the character and development of the local communities. East Lokris diverges from the canon not only due to its development into an ethnos-state, as other scholars have well-highlighted before, but also because the processes involved in community formation over time seem to not slot neatly with the known archaeological models. The study of changing regional settlement patterns, as deduced from signs of habitation (mostly grave finds), together with evidence of landscape use, suggest a gradual, decentralized infill of the area and the co-existence of different types of settlement. On the other hand, site-based studies speak of dynamic communities, changing degrees of mortuary variability, and evidence of local and regional cult spaces. Is synoikismos the best way for us to model community formation on the Greek mainland?

2 RETHINKING APOIKISM: IONIA

Mokrišová, Jana (University of Cambridge)

The formation of Greek communities beyond the 'homeland' of the Aegean has traditionally been described in terms of apoikismos – a permanent settling "away from home" by long-distance migrants. This term has traditionally been used both of settlements founded in the 'migration era' of the 11th-10th centuries as well as in the later 'colonial' period of the 9th-6th centuries BCE. While the modern terminology of 'colonisation' has been comprehensively critiqued over the last four decades, more still needs to be done to complexify and unpick the ancient Greek concept of apoikismos. This paper considers the variety of apoikistic movements across the five MIGMAG case study regions, focusing on Ionia. The Early Iron Age is traditionally considered a time of heightened movement into Ionia, with the process often labelled as the 'Ionian Migration'. The Ionian Migration is not the only long-distance migration envisioned to have taken place at the dawn of the first millennium BCE, however, but the Aeolian and subsequent

Dorian migrations into southwestern Anatolia do not usually receive as much prominence in scholarship. This paper will explore the meaning and appropriateness of the term apoikismos for the Ionian case study, and will touch upon the artificial dichotomies that the term often introduces (Greeks versus non-Greeks, urban versus rural). It will do so by considering archaeological evidence for settlement continuity and change from the last stages of the Late Bronze Age to the Archaic period (1250 – 500 BCE). Combining settlement data from major Ionian sites as well as from archaeological surveys and landscape studies will allow to critically explore the hypothesis that Ionia experienced increased immigration in the coastal areas and that these areas were significantly different than settlements further inland. Is apoikismos the best way for us to model community formation in the Greek world beyond the ‘homeland’?

3 RETHINKING URBANISATION: MAGNA GRAECIA AND SICILY

Quondam, Francesco (Universität Wien)

The formation of non-Greek communities in the early 1st millennium BCE Mediterranean is often seen through the prism of urbanisation. The term is used to describe the formation of larger and more populous communities, replacing traditional and smaller-scale forms of spatial and social organisation typical of the 2nd millennium BCE. Processes of urbanisation are used to explain the development of the first territorial states of the Archaic period, all centered on the city-state model.

This paper will explore a range of processes considered under ‘urbanisation’, with reference to all five MIGMAG case study regions but focusing particularly on Magna Graecia and Sicily.

In peninsular Italy urbanisation is particularly well documented in the mid-Tyrrhenian district, as well as in Bologna and further north in the Veneto region: in all these areas the archaeological record in fact allows us to recognize a stage of formation commonly referred to as proto-urban, intermediate between the organization by villages and the flourishing of the Archaic city-states.

In southern Italy and Sicily in contrast the evidence for proto-urban developments is very scanty, while full development in an urban direction is actually believed to coincide with the arrival of Greek migrants and the foundation of Greek poleis between the late 8th and 6th centuries BCE.

This perspective does not, however, take due account of the processual dimension in the establishment of these communities. Drawing on the examination of case-studies from Magna Graecia and Sicily, this paper aims to address in a diachronic and processual perspective the emergence of the first ‘urban’ models in Southern Italy. The analysis will concern both ‘intrinsic’ parameters such as the size and density of the early poleis as well as their relationship with the surrounding territory, with the final aim of better defining the key features of urbanisation in the area.

4 RETHINKING THE GREEK-BARBARIAN DIVIDE: A NEW LOOK AT THE TEXTUAL SOURCES

Hansen, Clara Maria (University of Vienna)

Were the formation processes of Greek communities fundamentally different from the formation of non-Greek communities? Complementing the three archaeologically-focused papers that precede it, this paper considers and questions the dichotomy between the formation of ancient Greek and ‘Barbarian’ communities as depicted in ancient textual sources. The paper is based on a comprehensive analysis of primary texts written by over 180 ancient authors, including works by Herodotus, Thucydides, and others, using both qualitative and quantitative methods, and considering patterns in terminology and vocabulary, as well as theme and motifs. It emerges that neither the formation of ‘Greek’ communities nor the formation of ‘Barbarian’ communities were as homogenous as these terms indicate, and both types of communities are described in the literary texts as forming different types of communities through different processes. Although this paper will touch on all five of the MIGMAG study regions and other areas of broader Greek Archaic world, a special focus will be placed on the island of Sicily, where Greeks are said to have interacted with both the indigenous groups (Sikels) as well as Phoenician settlers.

5 BIG QUESTIONS – SMALL SOLUTIONS, OR ANY SOLUTIONS AT ALL?

Bernegger, Bettina (Universität Wien)

This paper focusses on the methodological issues that arise in multiscalar, database-rooted projects like MIGMAG. How to conduct work processes to obtain research results is crucial to every academic project and forms the backbone of scientific investigations. A good methodological framework is in theory a tool for research success, but in reality, researchers are constantly faced with unreliability, fragmentariness, constrictions or just different levels of comparability in archaeological datasets. With MIGMAG, all these issues and more are actively at work in one major database, that was created as an easy-to-administer tool to not only collect information, but also to analyse and compare it while doing so. The aim of this database is ultimately to build bridges between epigraphic and written sources, archaeobotanical and archaeological datasets. Rather than presenting results of this data-combination, this paper will focus on the hidden struggles of how to even try to bring together different datasets – from the Bronze Age to Hellenistic times in five completely different regions around the Mediterranean – in a comparable fashion. Highlighting

the methodological problems that databased archaeological projects are confronted with in their workflows, the paper focusses on discussing options for improving the archaeological digital skillset and solution-finding processes that are necessary for modern archaeological research. In this, the paper also aims to serve as a discussion opener for other similarly conducted projects and future projects to come.

6 MIGRATION AND THE MAKING OF THE GREEK WORLD: THE WORK OF THE MIGMAG PROJECT

Mac Sweeney, Naoise (Universität Wien)

The premise of the MIGMAG project is that migration is acknowledged to have been a crucial factor in the creation of the ancient Greek world, but that previous conceptual models for this migration – whether as ‘Greek colonisation’ or as ‘trade with indigenous interaction’ – are insufficient. Papers in this session will set out the workings of the MIGMAG project (Bernegger); explain key findings of the project concerning the foundation of individual settlements, whether through models of urbanisation (Quondam), apoikism (Mokrišová), or sunoikism (Kopanaki); and consider how these individual settlements developed either Greek or non-Greek identities (Hansen). In this concluding paper, I will pull together the various threads of the project, zooming out to consider what our results concerning the formation of individual communities tell us about the making of the ancient Greek world as a whole. From our work at a more micro level, wider patterns emerge and larger conclusions can be drawn.

598 THE ARCHAEOBOTANY OF CITIES AND URBAN LANDSCAPES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Riso, Federica (Istitut Català de Arqueologia Classica, Tarragona) - Livarda, Alexandra (Istitut Català de Arqueologia Classica, Tarragona) - Mueller-Bieniek, Aldona (University of Warsaw) - Rovira, Núria (Université Paul Valéry - Montpellier) - Vandorpe, Patricia (Istitut Català de Arqueologia Classica, Tarragona)

Session format: Regular session

Urban centres are focal points of multicultural, interactions and connections. They are dynamic sites, oftentimes the driving forces of changes of broader socio-economic settings. Their archaeological context is usually altered by cultural processes associated with their development, which poses a series of difficulties in disentangling the taphonomic processes of their archaeological assemblages. Archaeobotanists are increasingly aware of the potential of urban contexts, as large concentrations of organic material are being recovered, representing important archives for different types of environmental and cultural data. Urban archaeobotany focuses on the analysis plant materials from these environments and includes the examination of both macro-remains (seeds, wood, and other visible parts), and micro-remains (pollen, phytoliths and starch). The archaeobotany of urban centres and landscapes can shed light on a multitude of aspects, from the dietary habits of their inhabitants to trade, exchange, urbanisation, infrastructure development and environmental and sustainability issues.

This session offers the opportunity to discuss all aspects of scientific research related to the archaeobotany of urban centres, stimulating further development in this field. Detailed analyses of archaeobotanical remains and palaeoenvironmental data of urban centres have the potential to significantly improve our understanding of their origins, socio-economic, political and religious functions, but also of their relationship with other types of settlements and their agency in the creation of connections between all these different types of sites, between individuals and societies.

Topics that will be considered, include (but are not limited to):

- how and why the urban environment and/or local ecosystems have changed over time
- how and why people in urban settings managed and utilized plant resources for food and fodder
- insights into trade networks and the exchange of plant products within or between urban centres and other types of sites
- urban identities through the study of food plant remains.

ABSTRACTS

1 MORTUARY FEASTING PRACTICE IN THE FIRST URBAN CENTER IN THE NORTH LOESS PLATEAU, CHINA

He, Yahui (Stanford University)

During the late Neolithic period in the Yellow River region (ca. 5,000-4,000 cal. BP), a significant wave of urbanization unfolded, marked by the rapid development of settlement hierarchies, social stratification, and interregional interactions, which laid the foundation for the emergence of early state-level political structures. This period also witnessed the proliferation of sophisticated pottery types, notably vessels used for alcohol consumption and serving

purposes, including pitchers and cups, in north China. However, the role of pottery assemblages, plant exploitation, and related feasting practices in mediating and shaping socio-political dynamics within mortuary contexts in the northern Loess Plateau region remains largely unexplored. This study presents a microbotanical study of plants from elite mortuary contexts at the Shimao site in this region, to shed light on the plant composition and related feasting practices that shaped the social relationships, political structures, and urbanization processes in the region during the 5th millennium BP.

2 URBAN AGRO-ECOLOGY IN A POST-HITTITE WORLD: NEW EVIDENCE FROM THE CITY OF HATTUŞA

Diffey, Charlotte (University of Oxford)

The Hittite capital city of Hattuša was, at its peak, one of the largest Late Bronze Age cities in the Eastern Mediterranean and stood as the bureaucratic and symbolic heart of a flourishing empire. The city was first established in 1650 BC and is thought to have covered an estimated area of 1.8 km² with a population of c. 40-50,000 at its peak. Excavations at the site in 1999 by the Deutsches Archäologisches Institut recovered an unparalleled assemblage of exceptionally well-preserved plant material from this period. This included hundreds of tonnes of charred cereal grain found within the large underground silo complex, and analysis of this material has already provided a wealth of information about LBA large-scale extensive urban agro-systems (Diffey et al. 2020).

The Hittite empire finally collapsed during the 12th century BC, contemporary with the breakdown of several other states in the Eastern Mediterranean region, and the city of Hattuša was largely abandoned. Limited occupation at the site did continue through the Iron Age, however, although a lack of empirical evidence has prevented any examination of agricultural management during this period. This paper will present the archaeobotanical analysis of charred plant material recovered from Büyükkaya, another part of Hattuša located to the north of the city. Samples taken from this area extend chronologically from the Late Bronze Age to the Middle Iron Age and cover a range of contexts both domestic and administrative. This study has combined primary archaeobotanical analysis alongside the use of crop stable isotope analysis and functional weed ecology. The high-resolution record this provides, both spatially and temporally, has presented a unique opportunity to investigate urban agricultural practice and food procurement during the 2nd – 1st millenniums BC, including the period of the cities' collapse.

3 THE URBAN LANDSCAPE OF REGGIO EMILIA AS SHOWN BY PALYNOLOGY (I-XVI CENTURY A.D.; NORTHERN ITALY)

Furia, Elisa (Doctorate in Evolutionary Biology and Ecology, University of Rome Tor Vergata, Rome, Italy; Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università di Modena e Reggio Emilia, Modena, Italy) - Capurso, Annalisa (Soprintendenza Archeologia, Belle Arti e Paesaggio per la città metropolitana di Bologna e le province di Modena, Reggio Emilia e Ferrara, Settore Archeologia, Bologna, Italy) - Cremaschi, Mauro (Department of Earth Science "A. Desio", University of Milano, Milano, Italy) - Travaglini, Alessandro (Laboratory of aerobiology, Department of Biology, University of Rome Tor Vergata, Rome, Italy) - Mercuri, Anna Maria (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università di Modena e Reggio Emilia, Modena, Italy)

Archaeopalynology is an important instrument in reconstructing changes in vegetation, and in understanding how both climate and anthropic influence shaped landscapes. When considering urban deposits, it can be hard to disentangle anthropic pressure, always present in urban contexts, from climatic influence whose effects can be partially masked by human actions. To deepen our understanding of the evolution of urban areas we selected two sites located in the city centre of Reggio Emilia: Vittoria Park (24 samples) and San Prospero square (40 samples). In the first site, near the northwestern edge of the Roman town, the area was used for productive and later residential purposes (I B.C.-III A.D.); in San Prospero square, in the heart of the Roman town, a ditch and a burial ground dated to the early Medieval period, and, below layers of debris, there were residential structures from the early Imperial age. Pollen samples cover a period from around the I-II century A.D. to around the XVI century A.D. The data obtained describe a mostly open area, with low percentages of arboreal pollen (mean 14%) and oak woods, kept open during all the analysed periods. Some plants important for edible fruits are recorded, like *Castanea*, *Juglans* and *Vitis*. Most of the environmental changes were connected to the availability of water, while anthropic influence was constant during the analysed period. The main land use seems to have oscillated between cereal fields and pastoralism. This reconstruction allows for a better understanding of how citizens used the town centre of Reggio Emilia in the past and how the landscape around the town was shaped by anthropic and climatic influences.

4 AN ARCHAEOBOTANICAL EXPLORATION OF URBAN FOOD PRACTICES THROUGH TIME IN ROMAN ITALY

Riso, Federica (Istitut Català de Arqueologia Classica) - Livarda, Alexandra (Istitut Català de Arqueologia Classica, Tarragona)

This study employs one of the most extensive archaeobotanical datasets available for Roman Italy to shed new light into urban foodways. The study period ranges between 500 BC and 500 AD in an attempt to trace changes and continuities through time. The talk starts by discussing the nature of the archaeobotanical evidence, assessing any biases from the sampling and recovery of the ancient plant remains in the field to their laboratory processing, as well as the impact of taphonomy. Taking into account the identified gaps in the dataset we offer a discussion of dietary habits, in relation to food plants, across a variety of urban centres through the different phases of the Roman Empire until its final demise. Geographical location is first considered and then contextual information in order to highlight spatial, social and economic factors involved in the observed food plant choices. The urban foodways are discussed in the light of the local and 'global' commercial network under the Roman Empire and the acquisition, assimilation or rejection of new tastes. Patterns, cultural preferences and potential changes in the plant repertoire are finally discussed by comparing urban, with rural and religious sites.

5 SAMPLING URBAN SITES FOR ARCHAEOBOTANY: INSIGHTS FROM TARQUINIA (ITALY)

Schmidt, Frijda (University of Cambridge) - Marras, Gianbattista (University of Cambridge) - Marzullo, Matilde (University of Milan) - Motta, Laura (University of Michigan) - Gaveriaux, Fanny (Independent researcher) - Stoddart, Simon (University of Cambridge)

A recent intensification of archaeobotanical research at the Etruscan urban centre Tarquinia has produced a rich charred assemblage of over 30,000 vegetal plant remains, but simultaneously also revealed a series of issues about how to sample and interpret results from the yet rarely explored urban sediment formation processes of the Mediterranean. The site of Tarquinia was first inhabited during the Late Bronze Age and developed within a few centuries into an urban centre and seat of power over a large hinterland, until it was abandoned after the Roman conquest in the early Middle Ages.

Such long occupation sequences offer unique possibilities to track in-situ developments of farming practices, crop exploitation and foodways from a village to city economy, a process that in the Etruscan sphere, but also wider Italy, is yet poorly understood from an agricultural perspective. In search of such opportunities, the archaeological reality had to be confronted with a reworking of deposits with ambiguous formation histories, residuality and chronological uncertainty caused by phases of monumentalisation and reconstruction. Drawing on the archaeobotanical record combined with insights from micromorphology and material culture, this paper will discuss the nature of these deposits, the implications for subsistence reconstruction, and possible future pathways for urban sampling.

6 LATTARA: A MULTISECULAR HISTORY OF CROP PRODUCTION IN A SOUTHERN GAUL PORT BETWEEN THE IRON AGE AND THE ROMAN ERA

Rovira, Núria (University Paul Valéry-Montpellier 3, ASM UMR5140, Montpellier, France) - Alonso, Natàlia (University of Lleida, ARQHISTEC-GIP, Lleida, Spain) - Steiner, Bigna L. (Integrative Prähistorische und Naturwissenschaftliche Archäologie-IPNA-, Basel, Switzerland) - Tillier, Margaux (Ipsosfacto Scoop., Arles, France)

The port of Lattara (Lattes, France) was founded in the late 6th century BCE and actively occupied until at least the 2nd century CE. It was a crossroads of varied influences and exchanges between the Gauls and several Mediterranean societies including the Etruscans, Greeks, Iberians and Romans. If numerous archaeological remains bear witness to all these contacts and interactions, what about plants and plant products? Can we see any differences between crops cultivated during the Late Iron Age and those of the Early Empire? What about imports? Are we only finding derived products (wine, oil) or are new plants also being introduced? How are inhabitants exploiting the environment around the city from an agricultural point of view? These questions are among the main ones that we wish to address here. In addition, we will not only try to characterize the crop production of the inhabitants of Lattara over time, but also their access to these resources: are there differences between the inhabitants of the city?

Thus, in this communication we intend to present a synthesis of the archaeobotanical data currently available for the different phases of occupation of the city from its foundation to its abandonment in order to answer the questions addressed below. The basis of our work will be made up of the results obtained by the study of archaeological seeds and fruits remains, found in carbonized and waterlogged contexts. Since the beginning of the 1990s and until today, more than 800 samples, corresponding to approximately 450,000 seeds and fruits remains, have been studied in various publications (e.g. Buxó 1992, 1999, 2003; Alonso & Rovira 2010, 2016; Rovira & Alonso 2010, 2017; Steiner et al. 2020; Rovira et al. in press), doctoral theses (Pinaud-Querrac'h 2021; Tillier 2023) and master's theses (Roux 2018; Guizard 2021).

7 PLANT LANDSCAPE AND PLANT USES IN THE ANCIENT CITY OF LA CARIDAD (CAMINREAL, TERUEL, NE SPAIN)

Alcolea, Marta (University of Zaragoza) - Benedí, Nerea (University of Zaragoza) - Ezquerro, Beatriz (Museum of Teruel) - Vicente, Jaime (Museum of Teruel) - Herrero-Otal, María (Autonomous University of Barcelona) - Tarongi, Miguel (CNRS-ISEM) - Azuara, Sara (Museum of Teruel)

In this work we present preliminary results of the archaeobotanical analyses carried out in the ancient city of La Caridad (Caminreal, Teruel, NE Spain). Archaeological fieldwork at the site led by the Museum of Teruel began in 1984 and continues to this day. The name of the city in ancient times is unknown. The archaeological remains have allowed to place its foundation towards the last quarter of the 2nd century BC and its destruction during the Sertorian War, around the year 74 BC corresponding to a very short occupation of the city. The reliability of its archaeological documentation and the buildings morphology of make it the best example to illustrate the redefinition of place after local indigenous elites tried to adopt the Roman lifestyle on the edge of Celtiberia. The violent destruction on the city has allowed abundant archaeological material to be recovered among ruins and has favored the preservation of plant macro-remains (charcoal, wood, seeds and plant fibers). Preliminary results of the archaeobotanical analyses allow an approach to different aspects of daily life in this urban center concerning construction of buildings, management of the urban environment, artisanal and agricultural activities, as well as paleoenvironmental information in the central sector of the Ebro valley during the Roman climate optimum.

8 DIGGING IN THE WELLS: FOOD AND TRADE RELATIONS IN ROMAN GUISSONA

Baniou, Theoni (Landscape Archaeology Research Group (GIAP), Catalan Institute of Classical Archaeology (ICAC), Tarragona, Spain; University of Rovira i Virgili) - Livarda, Alexandra (Landscape Archaeology Research Group (GIAP), Catalan Institute of Classical Archaeology (ICAC), Tarragona, Spain; University of Rovira i Virgili) - Vadorpe, Patricia (Landscape Archaeology Research Group (GIAP), Catalan Institute of Classical Archaeology (ICAC), Tarragona, Spain) - Romani, Núria (Serra Hünter Fellow, Autonomous University of Barcelona, Spain)

The Roman city of Guissona (Ileso, Catalonia, Spain) was one of the main towns in the inland region in the north-east of the Iberian Peninsula, as its geographical location allowed the control of the link between the interior and the coast. The site is of great importance as it is one of the few, not only in the region but also in the Mediterranean, where archaeobotanical remains have been preserved under waterlogged conditions. In total, five wells have been identified and excavated. They were in use in different periods and located in different contexts (residential neighbourhood, domus, inn, garden area next to the public baths). So far, two wells have been fully studied, while two others are under study and will be discussed in this presentation. In particular, the results from the well associated with the inn (first half of the 1st century AD - late 2nd century AD/ early 3rd century AD) and the well which was located in the garden area of the public baths (1st c. ACE) will be discussed. The archaeobotanical analyses of these wells allowed us to reconstruct both the environment of the surrounding area and the dietary habits of the inhabitants of Roman Guissona. To conclude, trade relations between the different regions of the Roman Empire, as demonstrated by archaeobotanical finds, will be explored.

9 WALNUTS, PINE NUTS AND DOGS. STUDY OF ANCIENT RITES IN A ROMAN VILLA OF BARCELONA THROUGH BIOARCHAEOLOGY

Tarongi, Miguel (Universitat de Lleida; ISEM-UMR 5554, University of Montpellier, CNRS) - Triay, Vanesa (Atics SL) - Esqué, Miriam (Atics SL) - Bianco, Sabrina (Catalan Institute of Human Paleoeology and Social Evolution (IPHES-CERCA)) - Nadal, Jordi (SERP- IAUB. Department of History and Archaeology. University of Barcelona) - Miró, Carme (SERP- IAUB. Department of History and Archaeology. University of Barcelona) - Riera, Santiago (SERP- IAUB. Department of History and Archaeology. University of Barcelona)

New bioarchaeological studies are being carried out in the present-day Barcelona in the framework of PaleoBarcino project. The results obtained to date have great potential for understanding urban plant and animal resources, land management, agricultural activity and food processing around the colony of Barcino (Barcelona) as well as the ritual significance of some organic products in the religious beliefs of the city's inhabitants through time.

The archaeological intervention motivated by the urbanization of the surroundings of the former Can Batlló factory revealed the pars rustica of the Roman villa of Nostra Senyora del Port, which was in part documented in 1984, just few meters away. Notably, a small ritual structure dated to the first half of the 2nd c. CE was found, along with remarkable remains of food offerings, votive ceramics, combustion areas and a ritual well. From the late 2nd c. CE, the area was occupied by a small necropolis which seems in continuity with the previous ritual function of the space.

In the present work, we aimed to study and to interpret the numerous bioarchaeological remains recovered at Can Batlló excavation, which have an outstanding ritual significance.

In fact, we documented a large concentration of whole walnuts and pine nuts - not consumed or neither fragmented - deposited on a wooden structure interpreted as a table. Remains of two dogs resulted remarkable, together with other cereal and fruit species identified in various areas of the ritual building which were found to be common also in others ritual spaces around Roman Barcino.

These data are very relevant because shed light on the organic products involved in Roman rituals in the Mediterranean area. This topic is still scarcely explored up to date, in part due to the lack of established protocols in organic remains sampling in many urban archaeological excavations.

10 FOOD PLANTS AND SOCIAL DYNAMICS IN THE URBAN SETTLEMENTS OF THE NORTHERN ROMAN PROVINCES

Vadorpe, Patricia (Institut Català d'Arqueologia Clàssica) - Livarda, Alexandra (Institut Català d'Arqueologia Clàssica)

This talk will explore how cultivation, trade and consumption of food plants shaped the urban landscape of Roman Germania. Roman Germania includes the provinces of Germania superior and Germania inferior. Both provinces were characterized by a highly militarised zone of which the northern and eastern border (to Germania Magna) was secured by the limes, forts and legionary camps. The military presence had a major impact on the infrastructure, social dynamics and development of the area, and is also reflected in the range of food plants found.

By examining archaeobotanical evidence, we will outline the variety of crops grown, traded, and consumed in the urban centres of Roman Germania from the Early to the Late Roman period. We will place the spectrum of food plants found in these urban contexts in a broader framework by comparing it with those food plants observed in the military and rural settlements that existed in their surroundings. In doing so, we hope to shed light on dietary preferences of urban dwellers, rural communities, and military people, and the socio-economic factors that influenced these food consumption patterns.

11 ARCHAEOBOTANICAL PRELIMINARY RESULTS FROM THE HOLY SEPULCHER BASILICA (JERUSALEM, ISRAEL)

Cerafoli, Eleonora (Department of Environmental Biology, La Sapienza University, Rome; Department of Earth Sciences, La Sapienza University, Rome) - Moricca, Claudia (Department of Environmental Biology, La Sapienza University, Rome) - Masi, Alessia (Department of Environmental Biology, La Sapienza University, Rome) - Sadori, Laura (Department of Environmental Biology, La Sapienza University, Rome) - Stasolla, Francesca (Department of Classics, La Sapienza University, Rome)

With its 6000 years long history, the city of Jerusalem sparks particular interest for archaeobotanical studies. Throughout the millennia it was the scenery of many events, starting from the first settlement dated to the Chalcolithic, the Roman conquest and the foundation of Aelia Capitolina, the Crusades, the Mamluk conquest, until modern times. Currently, a new archaeological campaign is underway inside the Holy Sepulcher Basilica. Built by Constantine the Great about 326 AD, it replaced the area where the written sources recall the pre-existent Jupiter/Venus roman temple. Over the years, it underwent destruction and rebuilding cycles due to wars, earthquakes, and fires. The excavation is led by Sapienza University of Rome, as part of a project licensed by the Israel Antiquities Authority and requested by the Communities that have custody of the Holy Sepulchre. Although archaeobotanical studies were previously carried out within the city of Jerusalem, this is the first time an investigation has been carried out in a site that presents a very broad time span (from the medium Iron Age to the modern period) and considers multiple archaeobotanical proxies. Macro-remains recovered so far belong to four excavated areas inside the Basilica. The carpological assemblage shows the presence from both wild and cultivated plants with cereals and seed/fruit remains among which *Ficus carica* is the most abundant. Two loci revealed to be very rich in wood charcoals, ca. 20% of them being twigs, with numerous fragments of *Quercus evergreen*, *Rhamnus/Phillyrea* and *Olea europaea*. The study of pollen, although in low concentration and scarce preservation state, revealed a large amount of *Cichorioideae*, followed by *Asterioideae* and *Chenopodiaceae*. The study is still ongoing and will uncover both the plant usage and the vegetation history of the city through the millennia.

12 TO THE LOO! FRAMING PLANT DIET IN STUDIES OF THE ARCHAEOBOTANICAL REMAINS FROM LATRINES IN THE MEDIEVAL IBERIAN PENINSULA

Losilla, Nicolás (Departamento de Historia Medieval y Ciencias y Técnicas Historiográficas. Universidad de Granada) - Ros, Jérôme (Institut des Sciences de l'Evolution, CNRS, Université de Montpellier, France) - Pastor, Thierry (Institut des Sciences de l'Evolution, CNRS, Université de Montpellier, France) - Gilotte, Sophie (Ciham-UMR 5648, CNRS, Université de Montpellier, France) - García-Contreras, Guillermo (Departamento de Historia Medieval y Ciencias y Técnicas Historiográficas. Universidad de Granada) - Kirchner, Helena (Universidad Autónoma de Barcelona) - Alexander, Michelle (BioArCh, Department of Archaeology, University of York) - Pluskowski, Aleks (Department of Archaeology, University of Reading)

Latrines and cesspits have been the most useful architectural resource used in societies without sewage facilities. In these cavities drilled in the ground, at a certain distance from the water table to avoid contamination, urban populations have deposited both organic and inorganic remains resulting from their daily activities. These small dumps have become very important points of information for archaeologists to learn about the practices and diets of past societies.

In the present study, we have collated archaeobotanical materials identified in different latrines and cesspits from medieval contexts in the Iberian Peninsula (Catalonia, Andalusia, Extremadura), within the research framework of the MEDGREENREV REF. 101071726 funded by the Europe Research Council within the Synergy Grants programme. By focusing on the hundreds of thousands of archaeobotanical remains, we can discern the discards of culinary and food consumption processes within medieval urban societies. These results make it possible to draw up a list of the main consumed plants, but also to detect the presence of rare introduced taxa, potentially due to the privileged status of the sites' inhabitants. Each case study is unique, as each population has different agricultural, trading and gathering capacities, and this summary will highlight the similarities and differences between the sites and regions.

13 PLANT DIVERSITY AMONG CHRISTIAN, MUSLIM AND JEWISH COMMUNITIES IN URBAN SITES IN MEDIEVAL IBERIA

Peralta-Gómez, Antonio (Spanish National Research Council; MEMOLab-Laboratory of Biocultural Archaeology, University of Granada) - Peña-Chocarro, Leonor (Spanish National Research Council)

Medieval Iberian food and agriculture have been discussed at length in academic publications using mainly written sources. However, despite the enormous advances of medieval archaeology over the past decades, plant remains from medieval sites are rather scarce limiting our understanding of many aspects of the life of medieval communities. Archaeological excavations in recent decades have changed perceptions of the more significant role of plants in medieval economy. As part of an on-going ERC project (ERC-AdG101054883), MEDAPP (Medieval Appetites: food plants in multicultural Iberia (500-1100 CE)), we are studying archaeobotanical samples from numerous medieval sites among which there are several urban sites. Contexts such as latrines, rubbish dumps and domestic spaces have provided a wealth of information.

By analyzing plant remains from several urban sites distributed in northern (León, Basque Country) and southern Iberia (Córdoba, Almería), we investigate the role of plants in the diet and economy of the population inhabiting Iberia (Christian, Islamic and Jewish communities) and explore agricultural practices. These different contexts offer the possibility of comparing agricultural practices and dietary habits from different cultural groups. Moreover, the presence of novel crops such as Citrus fruits, rice, pearl millet among others provides information on trade and exchanges with distant places.

14 MEDIEVAL STRONGHOLDS AND TOWNS FROM THE TERRITORY OF TODAY'S POLAND - TOWN FOUNDATION AND ARCHAEOBOTANICAL DATA

Mueller-Bieniek, Aldona (Uniwersytet Warszawski)

In the studied area the first towns appeared in 13th century AD, however some urban-like settlements were known from the earlier, prehistoric times too. Most of the prehistoric buildings were constructed from wood thus their remains are usually not well preserved in the landscape. Towns that appeared during the Middle Ages, still exist, while several strongholds were abandoned. However long-lasting urban settlement usually strongly influenced the archaeological layers. Nevertheless, it is still possible to find areas of the town with preserved, intact layers of ancient sediment.

Several archaeobotanical assemblages derived from medieval strongholds and towns have been studied till now. Their direct comparison is difficult because of differences in sampling strategies, diverse types of fossilisation, and also diversity of historical and environmental backgrounds.

The aim of the research is to track selected plant taxa that were economically and probably culturally important and usually well preserved in archaeobotanical samples. In the studies of medieval Krakow it has already been observed

that proso millet (*Panicum miliaceum*) lost its importance after the city foundation under Magdeburg law. Was it a local phenomenon? Was it due to new city laws and perhaps related to maintaining order? Or maybe it was more related to a change in food preferences? While millet remains are usually well preserved and identifiable as charred, waterlogged and mineralized, tracking of other plants such as rye, wheat or peas is not so clear.

15 URBAN WASTE FROM THE MEDIEVAL RIVER SENNE IN BRUSSELS (BELGIUM)

Speleers, Lien (Royal Belgian Institute of Natural Sciences, OD Earth and History of Life) - De Cupere, Bea (Royal Belgian Institute of Natural Sciences, OD Earth and History of Life) - Deforce, Koen (Royal Belgian Institute of Natural Sciences, OD Earth and History of Life; Ghent University, Department of Archaeology, Belgium) - Ghesquière, Valérie (Art & History Museum – urban.brussels, Belgium) - Timmermans, Jullie (Art & History Museum – urban.brussels, Belgium) - Van Schepdael, Nina (Royal Belgian Institute of Natural Sciences, OD Earth and History of Life) - Vrydaghs, Luc (Archaeology, Environmental Changes & Geo-Chemistry Research Group, Vrije Universiteit Brussel, Belgium) - Devos, Yannick (Archaeology, Environmental Changes & Geo-Chemistry Research Group, Vrije Universiteit Brussel, Belgium)

The river Senne has disappeared from the urban landscape since it was vaulted over in the 19th century, but it played a crucial role in the origin and economic development of the medieval city. In 2019 the remains of the medieval port on the river Senne were brought to light during a large excavation (nearly 6000m²) in the city centre of Brussels. Besides the discovery of a 12th-13th century bank reinforcement and an impressive stone quay wall (mainly 14th-15th century), meters thick excellently preserved waterlogged fluvial deposits from different phases of the river were excavated. These layers, dating between the 10th and 15th century, were extensively sampled for archaeobotanical (macrobotanical remains, pollen and phytoliths), archaeozoological and geoarchaeological studies.

In this presentation we will discuss the results of the interdisciplinary study of these numerous samples, with a main focus on the plant remains. The assemblages consist of a mixture of naturally deposited material from the vegetation in the Senne valley and waste dumped in the river. Indeed, as urbanisation intensified, the river became used as an open sewer in which all kinds of refuse were disposed of. Thanks to the interdisciplinary approach and comparison with assemblages from several other sites in Brussels diverse types of waste could be distinguished, including artisanal (e.g. textile working and dyeing), domestic and consumption waste as well as remains of fuel and human and animal excrements. The exceptional diversity of the plant material (>300 taxa) recovered from this fluvial urban context and its perfect preservation offer a unique insight into various aspects of daily life in the city.

16 THE DIACHRONIC CHANGES OF CEREAL ISOTOPIC VALUES FROM VILNIUS CITY BETWEEN 14-18TH CENTURIES

Karaliute, Ruta (Lithuanian Institute of History) - Motuzaitė Matuzevičiūtė, Giedrė (Vilnius University; Lithuanian Institute of History)

A successful development and growth of cities depends on sufficient provision of calories to its residents. While urban units are primarily associated with merchantry, trade and crafts, farming and horticulture also took place within city limits across Europe. The continuous growth of population in cities inevitably led to land degradation and crop failure. In addition, climatic oscillations could also play a significant role in changes in crop repertoire over the time. Therefore, an inauspicious natural conditions and soil degradation had to be resolved through long-term agrarian strategies by: a) switching to more resistant crops; b) crop rotation; c) using additional fertilization and maintaining sufficient water. While some of agricultural changes can be identified with archaeobotanical investigation, the use of manure and irrigation maintenance may be confirmed by chemical analysis of cereal grain and weeds.

Northern European city Vilnius, a capital of former Grand Duchy of Lithuania, raised up as an urban entity in challenging period of transition from Medieval Warm Period to the Little Ice Age. By analyzing the ratio of carbon and nitrogen isotope on barley together with thorough archaeobotanical research, we aim to investigate the diachronic agrarian transformation and motives behind it that led to population growth in the medieval Vilnius city. Moreover, this study provides additional knowledge on people relationship with environment under a process of urbanization.

17 THE MIXING BOWL: WATERLOGGED PLANT FOODS IN RIVERSIDE LISBON EARLY MODERN PERIOD ARCHAEOLOGICAL SITES

Rodrigues, Mariana (NOVA University of Lisbon) - Bettencourt, José (NOVA University of Lisbon) - Tereso, João (CIBIO – Research Centre in Biodiversity and Genetic Resources - InBIO Associate Laboratory) - Freire, Dulce (University of Coimbra) - Mendes da Silva, Inês (ERA Arqueologia SA)

The Lisbon riverside in the Early Modern Period suffered major development due to the expansion of Portugal's maritime activity, including intercontinental travels. Tagus River's north bank was filled with ports, piers, markets, storage facilities, and shipyards. Ships brought new products from every corner of the globe and took others to the most varied destinations. At this time the city transformed into a mixing bowl of cultures, nationalities, new foods, resources,

materials, and objects. This resulted in the formation of rich riverside archaeological contexts, dozens of which were excavated in the last decades. In these excavations, a wide range of structures were identified, including abandoned ships, storage structures, piers, etc., and various finds were retrieved, among them, plant materials.

In this paper, we'll discuss the analyses of such plant materials, regarding four archaeological sites, namely, Boqueirão do Duro, Avenida 24 de Julho, EDP I, and EDP II (all excavated by ERA Arqueologia SA in cooperation with CHAM – Centre for the Humanities). These contexts are but a glimpse of the boiling mixture of experiences occurring in Early Modern Period Lisbon. Its study is essential to aid in our comprehension of existing social, economic, and cultural structures. The preliminary results of the archaeobotanical study in course show the presence of plant species from different geographical origins, with diverse uses. Among the species identified, we have coconut, sugarcane, and cacao, a debutant in Portuguese Early Modern Period archaeological contexts. Those results bring interesting hypotheses about food production, commercial routes, onboard feeding, the introduction of different food plants in Early Modern Age Europe, and more.

This work is supported by FCT (Foundation for Science and Technology), CHAM (Centre for the Humanities), BI-OPOLIS Association, and CEIS20 (Centre for Interdisciplinary Studies of the University of Coimbra).

600 CHURCHES AS RESOURCES FOR SOCIETY? CO-CREATING KNOWLEDGE AND CAPTURING SOCIAL VALUE

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Pickles, Thomas (University of Chester) - Chavarria Arnau, Alejandra (University of Padua) - Foster, Sally (University of Stirling)

Session format: Regular session

Across Europe churches have been enduring local institutions, representing a source of information about the past as well as a paradigmatic instance of archaeological heritage in society. Christianity is a global faith, practised locally: churches have been engines for the construction of local Christian identities through interactions between a global faith and local social conditions. Christian worship has involved communal participation: churches have been foci for local projections of wealth or social standing, or the exertion of power over local communities. Churches often received land to support the work of clergy and gifts from members of the local community, making them unusually wealthy and long-lived institutions. Churches have thereby become the focus for local settlements and drivers of economic development. The result is that churches always present key evidence for the history of local communities. Yet church buildings and monuments often represent a burden: they are expensive to maintain; they are sometimes sites of worship under ecclesiastical ownership, and sometimes no longer used; the responsibility for them is distributed between national heritage organisations, ecclesiastical bodies, charitable organisations, and local communities. To secure their future, it is necessary to promote an appreciation of them as resources for society. This session is inspired by work for the pan-European project *Corpus Architecturae Religiosae Europaeae* (CARE) in Italy, Britain, and Ireland, where we have collaborated with a range of stakeholders to generate new knowledge and understanding of early medieval churches. This session seeks to share the ways in which the collaboration of different stakeholders – academics, policy makers, educators, charities, members of local communities etc - is tapping new understandings of churches and harnessing appreciation of contemporary social value to bring public benefits. What strategies, such as co-production of resources, are being adopted to bring about such transformations, and what difference are they making?

ABSTRACTS

1 THE WIKICARE PLATFORM AND THE COLLABORATIVE CATALOGUING OF EARLY MEDIEVAL CHURCHES: FROM RESEARCH TO SOCIAL VALUE

Chavarria, Alexandra (Dipartimento dei Beni Culturali Università degli Studi di Padova)

The aim of the project CARE (*Corpus of Medieval European Christian Churches*), initiated in 2001, has been to catalog Italian churches from the 4th to the 10th centuries, providing accurate, uniform, and updated information on the early medieval ecclesiastical architectural heritage through the use of a common vocabulary and the sharing of methods, tools, and research themes. This has two implications: on one hand, to study and compare the phenomenon of Christianization and the creation of church networks at a European level with its political, economic, social, and obviously ideological-cultural consequences; on the other hand, to delve into the characteristics and developments of a series of artistic forms (in architecture, sculpture, painting, and more) up to the modern era, at a time when religious art constituted the main, if not the only, artistic form that has come down to us. CARE also aims to foster a debate that, through the standardization of the scientific glossary and census practices, offers an important stimulus for comparing realities that are geographically distant, both nationally and within Europe.

Within this project, the WikiCARE-Italy platform, developed since 2010, has not only promoted but also facilitated the development of a scientific community with similar research interests focused on the study of Christian meeting places. In this presentation, after describing the state of the research of the project and the information that has been included in the platform in recent years, I will reflect on the future prospects of WikiCARE, considering its potential from the perspective of wider sharing of research, mostly for educators as well as tourism experts.

2 EARLY CHRISTIAN CHURCHES AND LANDSCAPES (ECCLES) – CO-CREATING A WEB RESOURCE WITH STRATEGIC, EDUCATIONAL AND INFRASTRUCTURAL STAKEHOLDERS

Pickles, Thomas (University of Chester)

Within the pan-European network, *Corpus Architecturae Religiosae Europaeae* (CARE), Tom Pickles (Chester), Sally Foster (Stirling), and Tomás Ó Carragáin (Cork) have been devising a public web resource to present the evidence for churches before AD 1100 in Britain and Ireland. The role of churches as resources for society has been central to this work. To ensure the web resource meets the needs of all those with an interest in early medieval churches, they have pursued a process of co-creation with three types of stakeholders – strategic (policy makers), educational (using churches for education), and infrastructural (responsible for on-site presentation). This process has involved investigating how early medieval churches are resources for society, especially in education, and the social value people place on early medieval churches, especially those who care for and use such churches. This paper will outline the process and explore some of the results – the way the web resource has been adapted to meet stakeholder requirements, the way the Pilot Data has been adjusted to make it useful to different groups, and the resources which have been co-created with stakeholders for teaching at Primary and Secondary Schools and presenting early medieval churches to the public.

3 ARCHAEOLOGICAL RESEARCH, MONUMENT MANAGEMENT, AND PUBLIC RESPONSE CONCERNING THE PRE-ROMANESQUE CHURCHES IN MORAVIA (CZ)

Poláček, Lumír (Institute of Archaeology of the Czech Academy of Sciences, Brno)

The pre-Romanesque sacral architecture associated with the existence of the 9th-century power-political formation of the Western Slavs in the territory of present-day Moravia and southwestern Slovakia represents a small but coherent group of buildings. It contains the remains of around twenty churches situated mainly on the territory of three power centres: Staré Město – Uherské Hradiště, Mikulčice–Kopčany, and Pohansko near Břeclav. Most of the churches were discovered in the late 20th century and they went on to become one of the mainstays of the newly, sometimes uncritically, formed image of the Great Moravian Empire as a cultural “competitor” of the Frankish and Byzantine empires. Most of the churches were preserved in the form of archaeologically documented building foundations, which determines the possibilities of further research, heritage care, and interaction with the public. The remains of the buildings are to varying degrees owned and managed by state, regional, or municipal institutions, only rarely by the church or parastatal companies. The current form of research and heritage presentation of the churches is very diverse and depends on the circumstances; the optimum being the ownership and management by a single museum entity and archaeological research carried out by a specialised scientific institution (Mikulčice). However, there are other models and strategies with their advantages and disadvantages. In general, the 9th-century sacral architecture of the *Mojmírid* Moravia is an important part of local and national identities, both Czech (Moravian) and Slovak.

4 ENGLISH CHURCHYARDS: FROM LANDSCAPES OF MEMORY TO LANDSCAPES OF MEANING

Mytum, Harold (University of Liverpool)

Mortuary monuments inside and outside churches form a category of material culture easily accessible to the public both physically and emotionally, especially when they can read biographical details of those commemorated. Holy Trinity Church's Castle Street burial ground in Hull is a case study of an ongoing reinstatement programme following partial loss of the site to a road improvement scheme; here, innovative conservation and interpretation links the church to the burial ground, the dead to the living, the past to the present. Unlike some closed churchyards in English towns, this will be more than a ‘green lung’ but also a place of heritage value. In contrast to major schemes, low-cost investment in the rural churchyard can bring these often-underappreciated places into local awareness as a heritage asset. Graveyard memorials considered as cultural heritage can be combined with the natural heritage to create a holistic approach to managing, appreciating, and interpreting the churchyard. Involvement in recording and managing churchyards offers many social benefits for community members.

5 AUGMENTED REALITY, VIRTUAL REALITY, AND SOCIAL VALUE - RECONSTRUCTING ST JOHN'S CHURCH, CHESTER, TO INCREASE AWARENESS AND ACCESSIBILITY

Wilson, Katherine (University of Chester)

A key problem for churches in Britain is declining participation, sometimes resulting in difficulties maintaining churches and a growing number of redundant churches. For medieval churches, whose original function, form and fittings may have been quite different from what is visible today, it can be a particular challenge to communicate the significance of the church beyond its members, maintain a sense of its social value, and attract visitors. Within Chester, the two most important religious communities with outstanding medieval churches were St Werburgh's, now Chester Cathedral, and St John's. Whereas Chester Cathedral remains a collegiate church central to the civic identity of the city and a major, international tourist destination, St John's is struggling to remain open. To address this context, as part of a major UKRI AHRC funded project, Mobility of Objects Across Boundaries 1000-1700, we worked with Martin Moss of Dextra Visual, to create an Augmented Reality interactive 3D reconstruction of St John's and then a fully immersive Virtual Reality experience. This paper will explore the response to the use of the AR reconstruction in an exhibition at the Grosvenor Museum and Chester Cathedral as well as on the project website, and the user-testing of the VR experience.

6 CULINARY HERITAGE OF THE CISTERCIANS: WHEN FOOD HISTORY OPENS UP NEW WAYS TO RELATE TO MONASTIC SITES

Brauer, Michael (Department of History, University of Salzburg)

The Cistercians, a monastic order that profoundly shaped the religious and cultural landscape of medieval Europe, have rarely been analysed from the perspective of food history. This is partly due to the strict asceticism of the founding period, which saw food as a worldly danger to the pursuit of a religious life. In later centuries, however, Cistercian cuisine did not follow such strict rules. In the current EU Creative Europe project "Culinary Heritage of the Cistercians in Central Europe", three partner institutions in Germany, the Czech Republic and Austria are working with the network CISTERSCAPES (Cistercian Landscapes Connecting Europe), which includes numerous monastic sites in Central Europe. Within the network, some monastic sites still host living monastic communities, while others are cultural heritage sites under the supervision of district administrations. The paper will address the following points: 1. What were the general food trends in the Cistercian Order over the centuries (according to preliminary findings) and how can they be reconstructed today? 2. How can the scientific results be transformed into events that attract a wider public? 3. What is the role of culinary heritage in opening up new ways of relating to monastic sites, and which stakeholders are (or should be) involved in this process?

613 MAKING THE MOST OF WHAT WE'VE GOT: ACTIVATING MUSEUM COLLECTIONS, MONUMENTS AND BUILT HERITAGE

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Ebert, Bettina (Museum of Archaeology, University of Stavanger) - Mooney, Dawn (Museum of Archaeology, University of Stavanger) - Hollund, Hege (Museum of Archaeology, University of Stavanger) - Walser, Joe (National Museum of Iceland) - Mödlinger, Marianne (Università degli Studi di Genova)

Session format: Regular session

The archaeological record is a non-renewable resource. Material cultural heritage in public or private ownership, be it artefacts and ecofacts in museum collections or historic buildings and monuments, represents a huge archive of source material with enormous potential for improving our understanding of the past. However, these archives are often preserved as inactive matter rather than being actively incorporated into research programs. In the face of the so-called "curation crisis" and widespread funding cuts within the heritage sector, it is vital that we demonstrate the continuing research value of material cultural heritage and its relevance in the modern world. At the same time, a drive to conduct "sustainable archaeology", avoiding excavation unless a site is threatened by development or by environmental change, means that there is an increasing need to consider how new techniques and novel approaches can derive new information from existing collections.

In this session, we invite case studies using museum collection material, historic monuments and built heritage to explore traces of past human activity at all scales, from biomolecules to artworks, buildings and cultural landscapes. We also welcome papers exploring how archaeology as a discipline can better integrate studies of archived material and built heritage, especially so-called orphaned or legacy collections. We welcome interdisciplinary perspectives, especially those that bridge the humanities and sciences, and the material and the theoretical, as well as studies that demonstrate how knowledge of the past can contribute to current societal issues.

ABSTRACTS

1 FUTURE PRESERVATION OF PAST LIFE: MAKING THE MOST OF THE BIOARCHAEOLOGICAL ARCHIVE

Hollund, Hege (University of Stavanger)

The remains of ancient past life, plants, animals, and humans, often appear unrecognizable, brown, and fragmented, sometimes leaving just a stain or a microscopic trace in the soil. Why and how should we care for this type of material for future research?

In the study of past humans, few finds are more telling than human remains themselves. Bones and teeth have always provided important evidence for archaeologists, but have recently become increasingly more valuable with the advent of new methods such as ancient DNA and protein analyses. Such biomolecules tell the stories of individuals and populations through time. Unfortunately, the material is sensitive to decay and contamination which may compromise analyses. It is thus important to understand the complicated mechanisms responsible for the degradation, or preservation, of biological remains. These are complex materials entangled within the intricacies of the environment for hundreds or thousands of years. Furthermore, biomolecules are invisible to the naked eye. What factors determine the preservation of archaeological biological remains at various levels, macroscopic, microscopic, and molecular, in- and ex-situ?

To investigate this question, the Future Past project (2021-2025) carried out an excavation, and installed environmental monitoring in an urban medieval cemetery in Stavanger, Norway. The conditions of the freshly excavated remains are then compared to the skeletal remains already in the museum collections. The project combines traditional archaeology with environmental science and molecular biology, using state of the art methods to analyse both the material and environmental conditions.

This presentation will report the preliminary results of the project as well as provide a brief introduction into the background of the project, also discussing its conception within the institution, which has long standing traditions of interdisciplinary work and collaboration.

2 OLD BONES, NEW PROSPECTS: RESEARCH AND PRESERVATION OF IDENTIFIED SKELETONISED INDIVIDUALS FROM HISTORICAL ICELAND

Walser, Joe (National Museum of Iceland) - Ómarsdóttir-Sesseljudóttir, Freyja (National Museum of Iceland) - Konráðsdóttir, Hrönn (National Museum of Iceland)

In 1954 an excavation at the Bishopric of Skálholt, a site with over a thousand years of history, culture, and service to the local and greater community yielded a wide range of artefacts and human remains, including those of known identity. Among the individuals was the first bishop of Iceland, Páll Jónsson, who perished in AD 1211, and numerous other unknown and known-identity men, women, and children from the site. The known identity individuals were thereafter interred into wooden chests and placed within a crypt in the basement of the church. The National Museum of Iceland requested access to the remains for the purpose of conservation and research in 2020. The conditions in the crypt were poor for skeletal preservation, which can be clearly seen when comparing the images of the remains at the time they were excavated and the condition the remains are in today. Following our initial assessment, we have started a research and preservation collaboration with Skálholt and several scientific/academic institutions, aimed at investigating both historical and modern scientific questions relevant to Icelandic archaeology using modern technologies (e.g. ancient DNA, isotope analyses, AMS dating) and methods that were not available at the time of the excavation. It is uncertain what will become of the remains following this project, both practically and preservation wise, which may even be reburied. Thus, we intend to carefully document and digitally preserve these remains alongside our research objectives using photography, mould and cast making, and most importantly, 3D scanning. This presentation aims to discuss the archaeology of Skálholt, preservation of the named individuals, the 3D scanning work and osteological research, as well as set the stage for the upcoming archaeological science phase of the project.

3 DIFFERENT ROLES AND DIFFERENT PERSPECTIVES? VALUES AND PRACTICES OF USING LEGACY COLLECTIONS IN ESTONIA

Torv, Mari (Archaeology Department, Institute of History and Archaeology, University of Tartu)

The establishment of archaeological collections in mid-19th-century Estonia has laid the foundation for a rich heritage spanning over 150 years. These collections have played a crucial role in highlighting various aspects of past societies. In the past, collections were mainly used for non-destructive purposes like measurements and drawings of objects. However, with the advent of the 3rd scientific revolution, there has been a shift towards destructive sampling of legacy collections. Although the larger archaeological collections have set guidelines for their use, the challenges of destructive sampling have not been anticipated in depth.

Despite guidelines established by larger archaeological collections for their use, the challenges posed by destructive sampling were not thoroughly anticipated. The project “PaleoMIX: Nurturing Heritage Science with Novel Bioarchaeological Methods in the Eastern Baltics” has identified these challenges, emphasizing the need for a collaborative approach to adapting to evolving scientific practices and finding sustainable solutions for heritage use.

In this paper, I will delve into destructive sampling of ancient materials from legacy collections, specifically examining the roles and responsibilities of both researchers and collection holders. Using case studies from Estonia, I aim to explore the delicate balance between current research interests and the preservation of archaeological collections, ensuring their significance for future generations.

4 **NEW ASPECTS OF ANCIENT EGYPTIAN FLAX THAT WAS NAPPING FOR MORE THAN 150 YEARS IN A MUSEUM COLLECTION IN BERLIN**

Karg, Sabine (Free University of Berlin, Germany)

Flax seeds and capsules covering a wide chronological period (3000 BC-100 AD) are kept in the collection of the Botanical Museum at the Free University of Berlin. The desiccated preserved flax remains were collected at the end of the 19th century by Georg Schweinfurth, a German pioneer of archaeobotany and textile archaeology.

In order to determine whether ancient Egyptians had already selected and cultivated very specialized flax types according to their purpose for textile or oil production, respectively, we compared the finds from this Museum collection with nearly 3000 diverse genebank accessions kept at the Plant Gene Resources of Canada (PGRC). The main result was that fibre flax was most probably already cultivated during the the 3rd millennium BC, whereas in later periods an intermediate flax and/or oil type was in use. This example of the use of museum collections by archaeobotanists and genebank curators shows how our knowledge about ancient usage of plants can be expanded.

5 **UNVEILING PARCHMENT PRODUCTION PRACTICES FROM LARGE-SCALE ANALYSIS OF MALDI-TOF DATA**

Rodriguez Palomo, Ismael (University of Cambridge) - Viñas Carón, Laura (University of Copenhagen) - Nair, Bharath (University of Cambridge) - Fiddymnt, Sarah (University of Cambridge) - Collins, Matthew (University of Cambridge; University of Copenhagen)

Parchment is a secondary product derived mainly from sheep, goat and calf skin. It was the main writing material used in Europe in the Middle Ages. The animal skin was dehaired and soaked in an alkaline Ca(OH)₂ solution (lime), and then stretched. Each piece of manuscript is folded into a bifolium and several of these nested together comprise a quire. Quires are subsequently sewn into bindings, manuscripts or codices. Sometimes, bifolia were reused by cutting, turning and removing the text, forming a palimpsest, which would contain parchment from a variety of sources. Parchment was a limited and expensive resource that required high-level craftsmanship. In turn, the choice of the animals and the traces left in the final product by these technological practices can be analysed, unveiling differences in production techniques and the quality of the product between quires, manuscripts and collections. These can give us insights into husbandry practices, livestock economy, choices and supply chains and trade. Biocodicology tries precisely to study the biological information from parchment to address these questions. ZooMS has been used to identify the species from which parchment is derived by identifying certain species-specific collagen markers in MALDI-TOF. Several studies have analysed large collections of manuscripts to this end. In this presentation, I will describe other data analysis techniques that have been able to extract novel information from the same MALDI-TOF spectra that can be traced back to production practices, such as differences in the liming process, surface treatment, or how palimpsests are constructed from different sources. Specifically, the extent of deamidation of the peptides, which can be estimated from MALDI-TOF data, is related to the liming process. In a different type of analysis, quires and manuscripts can be clustered by their MALDI-TOF “peptidic profile” and novel markers identified.

6 **THE ULTIMATE PROXY DATA? THE SIGNIFICANT RESEARCH VALUE OF RADIOCARBON DATABASES**

Solheim, Steinar (Museum of Cultural History University of Oslo) - Loftsgarden, Kjetil (Museum of Cultural History University of Oslo)

To understand the development of pre-modern and present societies, we need to adopt a long-term perspective. This requires archaeological data that can be compared across time and space. One of few such datasets is radiocarbon dates, data that have an unprecedented potential for comparative research on topics such as paleodemography and land use intensification.

In this paper we present the largest collected database of radiocarbon dates from Norway, containing data from archaeological sites from the Mesolithic to the Medieval period. The database is generated over a period of five years

and is composed of over 14,000 dates from more than 2,000 archaeological sites from numerous excavations conducted by the Museum of Cultural History over several decades.

The range of sites containing radiocarbon dated samples, and the ever-increasing quantity, means that this data has a significant research value as a growing and sustainable source for knowledge production that can be reused when aggregated and made openly available. This database increases the availability and reusability of radiocarbon dates providing improved potential for increased understanding of the past through research and cultural heritage management.

Here we address:

- o How collation of radiocarbon data can provide new knowledge using proper methods.
- o How this radiocarbon database is integrated into both archaeological cultural heritage management and research.
- o How the database/data is used in dates as data-approaches.
- o How the data from the database is used to address different research questions and integrated into a range of scientific papers focusing on different chronological periods as well as comparing different regions.

7 **GREEN HERITAGE AND THE BUILT ENVIRONMENT: RECOGNIZING AND PROTECTING LOCAL DISTINCTIVENESS IN A MEDITERRANEAN URBAN SETTING**

Zaro, Gregory (University of Maine) - Blaće, Ante (University of Zadar) - Baraka Perica, Josipa (University of Zadar) - Jurković Pešić, Filipa (University of Zadar)

In the Mediterranean, many ancient and historic cities reflect rapid urban expansion into the modern era, often replacing what has traditionally been a mosaic of green spaces – that is, plough fields, orchards, vineyards, forests, and grasslands – with a more homogenized landcover of industrial, commercial, and residential spaces. Although largely unrecognized by local residents and visitors alike, legacies of this “green heritage,” including Roman centuriation, drystone walls and cairns, or surviving groves, may still be reflected in scattered field plots, unkept green spaces, and even within the complex arrangement of streets and alleyways around the city. Unfortunately, these reflections of past land use are also regularly ignored by historic preservation or conservation efforts, which tend to focus on historic urban nuclei and the array of architectural monuments they contain. In this paper, we explore the legacies of built heritage, or green heritage, within the 3,000-year-old city of Zadar along Croatia’s Adriatic coast. Utilizing a GIS software, our approach combines data from archaeology, historic aerial imagery, cadastral maps, and contemporary city plans to illustrate the ways in which ancient and historic patterns of land use continue to shape the city’s urban spatial organization today. Documentation and protection of these land use legacies within the contemporary city would serve as a valuable archive of information about Zadar’s millennial-scale past, while also helping to promote an often-overlooked aspect of its locally distinctive character.

8 **MEDIEVAL MYSTERIES: REDISCOVERING LOST KNOWLEDGE AND SKILLS FOR A SUSTAINABLE FUTURE**

Ebert, Bettina (Museum of Archaeology, University of Stavanger)

This paper argues the case for taking a closer look at our medieval built heritage, as there is significant potential for new knowledge hidden within historic stone walls. What can be learnt from medieval craftspeople to help preserve our architectural stone heritage in an uncertain future? Medieval northern European churches are at increased risk of damage due to climate change, and forgotten historic materials and techniques may provide the key to preserving this cultural heritage.

An interdisciplinary research team is currently undertaking pioneering research on the medieval use of wood tar as stone adhesive in cathedral construction and repair as part of the project Sticking Stones, funded by the Research Council of Norway. The technique of using wood tar to attach stone blocks appears to have been widespread in medieval northern Europe, with evidence currently recorded in Norway, Germany and the United Kingdom. Yet, this craft has been forgotten over the centuries despite being in clear view on numerous medieval stone churches.

Intangible heritage and embodied knowledge are key concepts in understanding the craft skills behind these wood tar repairs, in conjunction with comprehensive material characterization of historic samples. In relearning these long-forgotten practices, new adhesive formulations based on medieval recipes can be created and tested for future use. The rediscovery of wood tar as stone adhesive presents a novel solution for modern heritage preservation in the form of alternative sustainable conservation adhesives based on historic techniques.

9 THE STONES OF NIDAROS CATHEDRAL – REDISCOVERING MEDIEVAL STONE GLUE

Hauglid, Kjartan (Norsk institutt for kulturminneforskning (NIKU))

The Trondheim Cathedral Restoration Workshop's stone collection (lapidary) was established in 1869. It consists of building stones that initially belonged to Trondheim's cathedral or other medieval churches. Several examples of building stones have been glued together, and others contain visible bolts. Subject to confirmation by analysis, the glue is likely to be tar-based and is very durable, even in a cold and wet Norwegian climate. Previously, it was assumed that some of these stones originated from 19th century restoration work. However, modern investigations as part of the research project Sticking Stones, financed by the Research Council of Norway, show that some stones were already reworked with adhesives as part of the construction process in the Middle Ages.

The extensive stone collection of the Trondheim Cathedral's Restoration Workshop is a significant source of material that has been studied and explored to a minimal extent. Deeper investigations of the stone adhesive will improve our knowledge and understanding of building stone restoration. Exploring the medieval stones of the Trondheim Cathedral Restoration Workshop may, in the scope of the Sticking Stones project, lead to the rediscovery of an adhesive that can replace the synthetic polyester or epoxy resin used today for medieval stone building restoration.

10 HOW CAN WE ACTIVATE FORGOTTEN MONUMENTAL CHANNELS BUILT BY KING FREDERIK II IN NORTHERN ZEALAND, DENMARK?

Aarsleff, Esben (Museum Nordsjælland)

In AD 1572 King Frederik II of Denmark ordered the construction of two water channels that would lead the water from two inland lakes into the lake around his castle at Frederiksborg thereby securing a constant water level. The channels were 7–8 km long, small by international standards, but rather large by Danish standards. Since there are only small natural differences in elevation, the bottom levels of the channels could be precisely measured by water engineers of the time.

The channels are known under one name as “Frederik II's channel” or the “Swedish ditch. The latter refers to a local legend saying that Swedish prisoners of war dug the channels or, more likely, that Swedish prisoners of war cleansed the channels in the 18th century.

Today the channels are forgotten and only partially preserved. In 2024 the Museum of Northern Zealand, Denmark, carried out archaeological excavations of the channels to investigate their construction. Concurrent research on the historical archives shed further light on the channels from a written perspective. The combined effort has shown that the channels were part of a greater story in which Frederik II transformed parts of the local landscape to improve the royal castle and its surroundings. On a smaller scale we have increased our knowledge regarding the construction of the channels from the excavations, but how do we engage the new results and create a better understanding of them in the present landscape and among the public?

The paper will present the results from the 2024 campaign both in the field and the archives, as well as some insight into how we envisage the future preservation of the channels.

11 RETHINKING ARCHAEOLOGICAL CONTEXT THROUGH ANCIENT ART COLLECTIONS: THE SCULPTURAL FURNISHING OF THE SO-CALLED CASSIO'S VILLA IN TIVOLI

Santarelli, Chiara (Sapienza Università di Roma)

Museums exhibit numerous Roman sculptures which are valued as treasures and celebrated from their aesthetic appeal. However, some of these pieces have an unknown provenance and are often detached fragments; consequently, the potential to fully grasp their importance and fit them into their original context is limited. Nonetheless, close analysis of these elements affords us the opportunity to develop our understanding of their function in the Roman world. Rather than just pieces of decorative art, we ought to think of these objects as archaeologically vital. By establishing a connection between the objects and their archaeological context our knowledge of the past can be enriched. This can prove to be particularly helpful when the objects' original contexts are no longer accessible or have been obliterated with no further investigations being carried out.

This paper intends to examine a group of marble statues discovered in the so-called Cassio's Villa, near Tivoli, during the 1700s. Indeed, the Villa has not been the subject of further archaeological excavations, and today it lies in a state of abandonment. The only useful information to outline the history of the site comes precisely from the sculptural furnishings found in situ, which are now scattered across international museum collections including the Vatican Museums, the British Museum and The Royal Palace of Stockholm. The study of these sculptural furnishings provided valuable insights into architectural remains, helping define archaeological phases of the site, as well as formulating hypotheses about the building plan and identifying where the marble decorations were originally displayed throughout the Villa. Therefore, this study contributes to a sustainable approach in archaeology and sheds light on a site that has been neglected for too long.

12 THE BRONZE STATUE OF ST. PETER ON THE TOP OF THE TRAJAN COLUMN

Rinaldi, Federica (Parco archeologico del Colosseo) - Pujia, Angelica (Parco archeologico del Colosseo) - Rivaroli, Laura (freelance)

The statue of St. Peter on the apex of Trajan's Column in Rome, Italy was installed in the 16th century by Pope Sixtus V to replace the statue of the Roman emperor Trajan, which had already been lost several centuries before. The statue is a monumental bronze, standing at a height of 40 metres above ground level and exposed to the elements – and therefore difficult, if not impossible, to maintain. Thanks to a grant from the government of the country Romania, starting in summer 2024 it will be possible to install a scaffold and proceed with the restoration of the statue, curbing the phenomena of degradation. The entire restoration intervention will be conducted with the best methodology currently in use for the restoration of copper alloy (bronze) monuments exposed outdoors, and will be documented in all its phases through photographic, graphic and textual documentation. Starting with the visual analysis of the monument, it is possible to proceed with a restoration program aimed at improving the general preservation condition of all metal elements.

13 DOCUMENTATION AND ANALYSES OF 11TH-12TH CENTURY BRONZE AND BRASS DOORS

Mödlinger, Marianne (Universität Salzburg, Austria) - Utz, Judith (Universität Salzburg, Austria) - Martin, Fera (Novetus, Austria) - Ghiara, Giorgia (Politecnico Torino, Italy)

Around 30 copper alloy doors from the 11th and 12th centuries have survived to the present day, forming the only preserved assemblage of large medieval bronzes. Most of the doors are located in Italy. The doors were made either entirely of metal or with single metal plates attached to a wooden base. Some of these metal plates have inlays containing various materials, often depicting religious iconography (e.g. saints, Biblical events). Previous research on the art and cultural history of doors has not thoroughly investigated the production process and the interaction between the material and the iconography.

This presentation will discuss the first results of the three-year FWF-funded research project at IMAREAL (University of Salzburg). The doors have been fully documented with high resolution images and 3D scanning. They have also undergone non-destructive analysis (XRF) that determined their chemical composition, wood type, and time period of the support materials used on selected doors. This data reveals the materials and techniques used, as well as information about the craftsmen, artists, and patrons involved in the manufacturing process. Comprehensive material analyses conducted on all of the doors on site has answered numerous questions, for the first time, about historic door production and material selection.

14 HISTORICAL ARCHAEOLOGY IN COLLECTIONS: NAVIGATING CHALLENGES AND EMBRACING OPPORTUNITIES

Connor, Kimberley (Stanford University)

Legacy collections from modern sites, particularly those from the nineteenth and twentieth centuries, present unique challenges in the midst of the ‘curation crisis’. This paper discusses insights gleaned from two case studies: the Hyde Park Barracks in Sydney, Australia, and the Market Street Chinatown Archaeological Project collection from San Jose, USA. It focuses on food and dining at the two sites using glass containers and tablewares from the Market Street Chinatown (1866-1887) and multi-material analysis from the Female Immigration Depot at Hyde Park Barracks (1848-1887) including glass, ceramics, metal, botanical, and faunal remains primarily recovered from underfloor occupation deposits.

Both collections pose significant challenges due to their sheer scale, origins in salvage excavations, and choices made in curation since the 1980s. Despite these challenges, both collections serve as invaluable resources for archaeological research. They provide rich datasets for addressing fundamental as well as emerging research questions, while also facilitating meaningful engagement with active descendant communities. In an era of uncertainty surrounding heritage institutions and academic archaeology, this paper explores the opportunities that emerge from re-assessing historical collections. By harnessing the potential of collections from the recent past, researchers can not only advance scholarly understanding, but develop innovative teaching methods, and foster public engagement. These examples underscore the value of re-evaluating historical legacy collections for understanding the past and communicating the importance of archaeology in the present.

15 THE HISTORY OF THE CITY OF TREPOL, FOUND IN MUSEUM BOXES

Videiko, Mariia (Kyiv Borys Grinchenko University)

The ancient city of Trepol, Ukraine, is first mentioned in chronicles from the 11th century AD. In 2018, I began work on a project to get a complete picture of its medieval history within a few years. However, first the COVID-19 pandemic in 2020, and then in 2022 the ongoing Russian invasion of Ukraine, stopped the archaeological excavations indefi-

nately. This led to the idea of studying the collections of the regional museum. Working with inventory books, and then the items mentioned in them from the territory of the city, gave interesting results: about a thousand objects with a connection to modern streets and estates were discovered. These include building materials, ceramics, and metal objects, which cover the period from the 11th to the 17th century AD inclusive. It was possible to map the distribution of these finds across the territory of the ancient city at different time periods.

Brick finds belonged to a church and a castle built in the 16th century, the existence of which was previously known only from documents. Ceramic vessels testified to the continuous existence of the city – including finds from the 14th century, which were absent from the documentary record. Finds of numerous kiln tile fragments from the 17th century showed the wealth of the inhabitants of the fortified part of the city, which according to documents numbered up to a hundred houses. Findings of jewelry and ecclesiastical items showed that the townspeople were already wealthy in the 11th and 12th centuries. Bronze artifacts indicate the likely presence of people from Scandinavia in the city and its surrounding region in the 11th century. The study of museum collections has not only revealed separate pages from the history of Trepol, but also indicated possible directions for future archaeological excavations.

16 THE 99%: THE AMERICAS COLLECTION AT THE BRITISH MUSEUM

Zborover, Danny (British Museum)

Amassed over three centuries, the Americas collection at the British Museum comprises about 100,000 objects. Like with many such large museums around the world, less than 1% has ever been on display. While objects for exhibitions and loans are routinely drawn from the various storage facilities, more recently these transformed into dynamic loci where community members, curators, scholars, artists, students, and the public at large can directly engage with the collection. The opportunity to closely observe, manually handle, measure, photograph, and share unobstructed space with preselected objects makes each encounter meaningful, ranging from the analytical to the reflexive to the emotive, oftentimes within the same visit. In tandem, digital platforms are being developed to enhance the visibility and accessibility to the collection, most crucially aimed at under-represented groups such as Indigenous peoples and communities of origin. Along with a growing emphasis on provenance studies and collection histories, these in-person and virtual engagements with cultural belongings are critical for exposing past injustices and offer an alternative museological discourse to repatriation, where this still remains an unviable option. The resulting multivocality feeds directly into more nuanced documentation, exhibitions, and acquisitions, and charts new ways in which cultural heritage can be activated and made useful to diverse audiences.

17 STAYING WITH THE OBJECTS. UNEARTHING THE POTENTIAL OF MUSEUMS' COLLECTIONS

Cosic, Natalija (Shared Conservation Department, MuHO)

Since the turn of the century, an increasing theme in heritage studies has been the future of heritage and the reevaluation of assumptions about its preservation for forthcoming generations. Despite the critical importance of these debates, numerous challenges for the heritage in museums exist and persist in the present. Drawing upon Donna Haraway's conceptual framework of "Staying with Trouble" and "kin-making", in this paper I advocate for interdisciplinary collaboration in managing collections.

Discussions revolving around the curator crisis have highlighted the imperative for responsible archaeological research and the efficient management of the extensive findings in post-excavation phases. The results from prior studies I conducted on archaeological heritage in Serbian museums have unveiled a fundamental challenge stemming from the assumption that all disciplines involved in object processing share an identical ontological understanding of the physical remains from the past. Combined with an uncritical approach to collecting and acquisitions, the practice has led to overcrowded storage facilities and a lack of collection overview. This, in return, prevents the core idea of research, preservation, and meaningful usage. I have seen similar difficulties since relocating to Vestland in Norway, even though the issue is management in museums with various collections and levels of complexities (e.g. cultural history items or contemporary art objects). This is not a unique predicament, as both UNESCO and ICCROM have previously identified (2011) the global issue of inadequate collection accessibility and packed depots.

I intend to present a decision-making model in development that explores innovative solutions for dealing with overcrowded storage areas and processing collections in museums while considering their contextual significance. The model lies at the intersection of conservation, heritage, and museum studies, and it is grounded in interactive learning and scenario-based approaches. Rather than handing definitive answers, it empowers stakeholders and all participants to arrive at decisions collaboratively.

18 MORE THAN STONE. BUILDING AND VISUALISING OBJECT BIOGRAPHIES FOR THE WILLENDORF II COLLECTION AT THE NATURAL HISTORY MUSEUM VIENNA

Posch, Caroline (Naturhistorisches Museum Wien) - Winkler, Viola (Naturhistorisches Museum Wien) - Filzwieser, Roland (Vienna Institute for Archaeological Science (VIAS)) - Eichert, Stefan (Naturhistorisches Museum Wien) - Brodtmann, Nikola (Naturhistorisches Museum Wien) - Haider, Anna (Naturhistorisches Museum Wien) - Posch, Celestine (Naturhistorisches Museum Wien) - Richards, Nina (Austrian Centre for Digital Humanities and Cultural Heritage)

One of the most famous objects in the Natural History Museum Vienna (NHMW) is the figurine known as the "Venus of Willendorf". The object inspired countless scientific articles, books, and treatises, as well as art projects, commercials, and awareness campaigns addressing e.g. obesity, body positivity, or breast cancer. However, for everyday museum visitors, the object stands alone, and it proves difficult to link the figurine with its archaeologically equally significant site of origin, Willendorf II. In this regard, the Venus is one of the examples in which a famous museum object overshadows its original context, at the expense of the underlying complexity of the respective item as well as related artefacts.

To address these issues, the Venus of Willendorf and the site Willendorf II were selected as one of five case studies of the bITEM project (Beyond the Item - Biographies and Itineraries of Cultural Heritage Objects in Museums and beyond). The project aims to combine "object biographies" and "actor network theory" to digitally map object itineraries as networks in CIDOC CRM (International Committee on Documentation - Conceptual Reference Model), based on the framework of OpenAtlas (<https://openatlas.eu/>). This will be realised as holistically as possible, connecting actors, related material things, digitized images and archival texts, 3D models, timelines, story maps, events, and places from the beginning of an object's existence to the present. These itineraries will be visualised in a freely accessible web application based on the FAIR principles on the bITEM homepage after the conclusion of data collection (<https://bitem.at/about>).

Through bITEM, a look beyond items such as the Venus of Willendorf is provided for the scientific community and the broader public, visualising its complex object history, strands of research questions, and interpretations of the last 115 years, as well as the rich archaeological collection of the site Willendorf II.

19 ACTIVATING THE INACTIVE THROUGH NEW TECHNOLOGIES: GIVING THE HISTORIC PLASTER CASTS OF THE NATIONAL MUSEUM OF IRELAND A NEW LIFE

Bevivino, Michael Ann (The Discovery Programme; University College Dublin School of Art History and Cultural Policy) - Shaw, Robert (The Discovery Programme)

How do you revive a historic museum collection? How do you make a historic collection relevant to today – especially when that collection consists of large, unwieldy and fragile objects?

This paper will consider these questions by looking at the National Museum of Ireland (NMI)'s significant collection of historic plaster casts of European sculpture. The collection, originally the centrepiece of the Dublin museum, lay dormant and relatively unknown for a number of years until recent efforts to revive it through popular exhibitions in Japan and Dublin.

Two interlinked projects are currently seeking to further bring these important objects to academic and public attention by using an innovative technological approach that bridges the humanities and sciences. Recognised as potential 'snapshots' of the original monuments when the casts were taken (some almost 200 years ago), a number of casts and moulds have been recorded via the most up-to-date technologies, including laser scanning and photogrammetry. Using highly detailed 3D models of the original monuments, it has been possible to compare the casts to the originals on a sub-millimetre level. This study yielded some very interesting results, including a deeper understanding and appreciation of the work of the artisans who created the casts.

An integral part of the recent projects is the dissemination of their results to a wide audience, including the local community where some of the original monuments can be found. This was originally intended to be through an exhibition that was to take place 'in real life' in the local museum; however the COVID pandemic required a shift in approach, resulting in an online digital exhibition instead. This paper will conclude by looking at the benefits of bringing this collection online in an innovative and user-friendly manner which brings the historic plaster casts firmly into the 21st century.

20 PHOTARCH - AN IMAGE OF THE PAST

Lindskog, Daniel (PHOTARCH)

Whenever an artefact is discovered it's either put on display in a museum or, more likely, put in a box and stored in an archive. Whichever the case, a photograph is taken. Often with different equipment and with different lighting condi-

tions, resulting in differently looking images. What if we did things differently? What if we used the same method, not just in one museum or in one archive, but in all of them.

The PHOTARCH is a method that, when spread wide enough, will result in a cohesively looking database of all things past, where the image, along with its metadata is free from copyright, free to publish and free for all to use.

This presentation will look at a trial run where the project explores three archives in three museums and sets out to make new images of the objects in a uniform style. By making the images in a style that allows for easy comparison, the artefacts are seen in a new light and made available to the public at the same time. It adds a piece to the big picture that is an artwork of all works of art within archaeology.

This project shows what can be done with three collections, displaying them as a whole, while asking the question: what would an image of everything look like? It's a suggestion of a standard of documenting artefacts in the future but also re-documenting what we already have in our collections to make our archives more accessible.

21 THE FIRST OPEN ACCESS DIGITAL ARCHAEOLOGICAL COLLECTION OF A STATE MUSEUM IN TÜRKIYE: DIGITIZATION OF JULIOPOLIS AND BUILDING ITS HERITAGE

Dolmus, Muhammed (Koç University Vehbi Koç Ankara Studies Research Center (KU VEKAM); Human Behavioral Ecology and Archaeometry laboratory (IDEA lab)) - Büyükkarakaya, Ali (Human Behavioral Ecology and Archaeometry laboratory (IDEA lab); Hacettepe University, Department of Anthropology) - Sertalp, Evren (Human Behavioral Ecology and Archaeometry laboratory (IDEA lab); Hacettepe University, Faculty of Communication, Department of Radio, TV and Cinema)

The Ancient City of Juliopolis, on the sacred Pilgrim's Road on the border of Galatia and Bithynia in the historical lands of Anatolia has hosted historical wealth dating back centuries, showing traces of the Hellenistic, Roman and Byzantine Periods. Today, a significant part of the ancient city, located 122 km away from Ankara, is submerged under the waters of the Saryar Dam, which was built in the 1950s. The ancient city came to light again following the excavations carried out by the Museum of Anatolian Civilizations in 2009. Bringing together the Museum of Anatolian Civilizations, Hacettepe University and Koç University VEKAM, the Juliopolis Project started to create a Digital Archaeology Archive (DAA) in 2019. The collaboration sought to bring global visibility to the ancient city and overcome limitations in access to the artifacts and immovable

heritage unearthed in these comprehensive excavations. This project has essentially enabled the creation of a useful, contemporary database for the finds or cultural heritage, and an open-access digital archive for preserving digital files. A standard database was also created by digitizing all documentation, artifact images, tombs, and artifact cards in the museum. At the same time, this project established inter-disciplinary collaboration, including specialists in bioarchaeology, geoarchaeology, numismatics, dendrochronology and social anthropology, ensuring that Juliopolis City is effectively researched, complex information is simplified and that everything is publically available through open access. The digitized wealth of Juliopolis is the pioneer of open-access archaeological collections in Türkiye. This study aims to explain how the project and the Juliopolis DAA works towards making the ancient city visible as valuable cultural heritage beyond its "passive" position in the Museum.

22 THE SOPHISTICATION OF THE BENAHOARITAS OF LA PALMA, CANARY ISLANDS (C.II-XV AD) THROUGH A UNIQUE OBJECT (PHOTOGRAMMETRY AND MULTISPECTRAL IMAGING)

Fumero, Emilio (University of La Laguna) - Rodríguez-Caraballo, Selene (University of La Laguna) - Álvarez-Rodríguez, Nuria (Museo Arqueológico Benahorita (La Palma)) - Pais-Pais, Jorge (Museo Arqueológico Benahorita (La Palma))

The Canary Islands remained isolated from the time of their settlement around the start of the first millennium AD until the arrival of the first Europeans in the 14th century. As a result, we find cultural and material developments that, although based on the same cultural substratum, differ greatly over the more than a thousand years that these societies have existed on the islands. The island of La Palma is a clear example of this variation, being one of the islands that showed the greatest level of sophistication in various types of craft production: ceramics, lithics, bone and, of course, textiles. This textile production using animal materials is usually related to the funerary world.

This proposal focuses on the treatment given to a completely exceptional piece even for the archaeological record of this island. It is a portion of dragon tree (*Dracaena draco*) trunk covered with a total of five leather bands sewn together. This object is housed in the island's archaeological museum, and was provided by a private donation. The object and its elements were documented in as much detail as possible, including 3D modelling using photogrammetry, detailed photography of the piece and its various parts, and UV photography. Following this recording, samples were taken for radiocarbon dating and to determine the animal provenance of the hides using ZooMS.

In the absence of the results of these molecular analyses, the uniqueness of the piece and the detailed graphic documentation have made it possible to determine some aspects of the original production and subsequent conservation, in addition to preserving all the macroscopic information before compromising its integrity through sampling.

23 DIALOGUES BETWEEN ANCIENT WESTERN ASIA AND US. UNTOLD STORIES FROM ITALIAN COLLECTIONS AND ARCHIVES: THE DIWA PROJECT

Alaura, Silvia (CNR - Consiglio Nazionale delle Ricerche, Istituto di Scienze del Patrimonio Culturale, Roma) - Catagnoti, Amalia (Università degli Studi di Firenze) - Conti, Claudia (CNR, Istituto di Scienze del Patrimonio Culturale, Milano) - Damiano, Rossana (Università degli Studi di Torino) - de Martino, Stefano (Università degli Studi di Torino) - Devecchi, Elena (Università degli Studi di Torino) - Felli, Candida (Università degli Studi di Firenze) - Pedrazzi, Tatiana (CNR, Istituto di Scienze del Patrimonio Culturale, Milano) - Peyronel, Luca (Università degli Studi di Milano)

The project "Dialogues between ancient Western Asia and us. Untold stories from Italian collections and archives" (DiWA), recently financed by the Italian Ministry of University and Research (MUR) and Next Generation EU, is aimed at the study, enhancement and communication of the collections of Western Asian artefacts and related archives housed in two of the most important Italian museums: the Museo Archeologico Nazionale di Firenze (MAF) and the Museo di Antichità - Musei Reali di Torino (MAT).

DiWA is a transdisciplinary project involving historians, archaeologists, and philologists of ancient Western Asia, as well as experts in non-invasive diagnostics as applied to cultural heritage, virtual museums, public archaeology, and cultural heritage communication. The project uses cutting-edge technology (e.g. Raman Spectroscopy, X-Ray Fluorescence, infrared spectroscopy - ER-FTIR) to establish and implement an innovative model for managing artefacts such as cylinder seals and cuneiform tablets in museum collections. We adopt a holistic approach to the preservation and value-enhancement of cultural heritage according to some of the major aims of contemporary museums.

The goal of the DiWA project is to characterize the Western Asia collections housed in Florence and Turin as free spaces for dialogue between past and present, and between countries and cultures. It harnesses the full potential of cross-cultural heritage as a driver of sustainable innovation, realized through engagement with society and citizens, as well as through improved documentation and promotion. DiWA's innovative results will contribute to integration and societal cohesion by providing better, wider, and more equal access to Western Asian cultural heritage in Italy. Moreover, it will foster a pattern of cultural inclusion that enhances the integrative potential of cultural heritage in multi-cultural societies.

24 WHISPERS OF CARIBBEAN ISLES: INCLUSIVE NARRATIVES FOR REDISCOVERING MAA'S PRE-COLUMBIAN ARCHAEOLOGY COLLECTIONS

Lobo Guerrero Arenas, Jimena (University of Cambridge) - Antczak, Oliver (University of Cambridge)

The Whispers of Caribbean Isles project, conducted at the Museum of Archaeology and Anthropology (MAA), University of Cambridge, aimed to activate museum archaeology collections by engaging contemporary Caribbean communities through innovative methods. Focused on Trinidad and Tobago's archaeology collection at MAA, the project sought to deepen connections between existing collections and stakeholder communities locally and abroad. Two key working groups, one from diaspora communities in Cambridge and another in the Caribbean, collaborated in unpacking materials at MAA facilitated by a digital platform. This paper presents workshop results on reapproaching Indigenous pasts, fostering inclusive narratives of memory and identity, and developing a pilot digital platform for sustained community dialogue. Furthermore, it explores discussions ignited by the project on decolonizing practices and the nature of pre-Columbian Caribbean collections. Through its collaborative approaches, the Whispers of Caribbean Isles project endeavoured to amplify Caribbean voices, unveil untold narratives, and foster a more inclusive understanding of the region's rich cultural heritage. We aim to show how studies like this contribute to the broader discourse on community engagement in museum archaeology and underscore the importance of collaborative initiatives in promoting cultural inclusivity and representation.

25 THE PROVENANCE RELIABILITY INDEX: SPOTLIGHTING THE IMPACT OF OBJECT HISTORIES ON OUR UNDERSTANDINGS OF THE ANCIENT WORLD

Neill, Liz (Boston University)

Provenance: literally, from where a thing comes. At times considered secondary to the aesthetic value of an artwork or a secret to be hidden away in restricted files, particularly in museums outside of objects' countries of origin, object histories have become more widely discussed in recent decades. Major museums have hired staff to ensure their collections are up to date, particularly those with paintings of WWII-era provenance. Every museum object has its own history. The professional standard for ancient art is a pre-1970 history, in accordance with the 1970 UNESCO

Convention: a binary checkbox that glosses over earlier histories and can mask 20th- or 21st-century antiquities trafficking. Hundreds of years of the antiquities trade have left us with many intermediate shades of gray. The Provenance Reliability Index provides a basic framework to research and analyze these earlier object histories and a constructive way to interpret collections that do not meet the current standard. This fuzziness in the dataset is not a bug, but a feature: when we consider what types of geographical data we have, we can find more ways to analyze, preserve, and exhibit ancient art in the future while acknowledging the complex history (and present) of the field.

615 ARCHAEOLOGY OF ARCHAEOLOGY?

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: van Wijngaarden, Gert (University of Amsterdam) - Clare, Lee (Deutsches Archäologisches Institut, Istanbul) - Waagen, Jitte (University of Amsterdam)

Session format: Session with keynote presentation and discussion

Many excavators have to deal with the remains of older excavations at their site of research. Spoil heaps and old trenches, as well as archival documentation and photographs, all testify of the activities of former archaeologists. In this session, we will discuss the extent to which these remains can be used to inform us about the epistemology of archaeological research.

We will present the 'Archaeology of Archaeology' approach, which is being developed at the University of Amsterdam. This approach aims to understand better how the excavations at ancient Troy in Turkey have functioned as research contexts in which knowledge has been produced.

The current geography of a place such as ancient Troy in Turkey is determined at least as much by the archaeological activities over a period of more than 150 years as by ancient habitation. The remains that testify of the activities of previous excavators can be investigated archaeologically. For example, old trenches can be re-investigated to review documentation methods. Excavation can be done in old dumps to study collection practices. There are additional possibilities using innovative technologies.

By now, archaeology has a long history and can itself be investigated archaeologically. In this session we aim to discuss how the remains of older excavations can serve to shed light on the process of archaeology. In particular, on the basis of best practices, we hope to begin to formulate methodologies and guidelines to arrive at a diverse toolkit for this new field of archaeology of archaeology. The possibility to publish the session's papers will be considered.

ABSTRACTS

1 ARCHAEOLOGY OF ARCHAEOLOGY AT ANCIENT TROY: THE AMSTERDAM TROY PROJECT (2018-2022)

van Wijngaarden, Gert (University of Amsterdam)

Troy is one of the most well-known sites in archaeology. Systematic excavations have been conducted at the site in Turkey from the 1860's up to the present day. Because of the fame of Troy, these researches, led by enigmatic directors such as Heinrich Schliemann, Wilhelm Dörpfeld, Carl Blegen and Manfred Korfmann, can be considered exemplary for Mediterranean field archaeology as a whole. Therefore, Troy is an ideal site to study the development of archaeological field practice.

The many excavations have had a great impact on the topography of the site. The exposed archaeological remains are surrounded by extensive spoil heaps, and interspersed with caved-in trenches, exposed sections, walkways and such. Since 2018, we have been studying these remains archaeologically in the framework of the Amsterdam Troy Project. We made trenches in dumps from different excavation campaigns to determine what was not collected, in order to compare this with registered and published finds. We have re-excavated filled-in trenches to study archaeological features, and are comparing our findings with what was documented and published. The aim of these researches is to assess what the effects of excavation practices are on the knowledge produced about a site.

In this paper, we will present the backgrounds and methodology of our approach. In addition, we will show some of the first results of our research. The hope is that we can continue to develop the approach of archaeology of archaeology.

2 DUMPS AND DITCHES – PRISMS OF ARCHAEOLOGICAL PRACTICE AT KALAUREIA IN GREECE

Berg, Ingrid (Uppsala University)

In the summer of 1894, two philologists from Uppsala University conducted the first Swedish excavation in Greece. On the island of Kalauria (Poros), they worked together with a local workforce in the Sanctuary of Poseidon. In 1997, the Swedish Institute in Athens resumed the excavations which are still on-going.

Archaeological excavations leave traces behind and change the cultural landscape. In fact, it produces a heritage site that alters the perception of place and potential for land use. The dumps and ditches left behind at Kalauria not only have the potential of informing us about methodology and collecting, but are in themselves monuments of archaeological heritage and part of the history of the site. By analysing remains of archaeological practice as cultural features, I approach the history of archaeology as our professional heritage. Informed by perspectives from critical heritage studies, the dumps and ditches from 1894 reveals how archaeology functioned as a cultural and social practice in the late 19th century. The archaeology of classical archaeology thus becomes a history of class, race and power hidden among the ruins of antiquity.

3 THE ARCHAEOLOGY OF ARCHAEOLOGY AT TEL AKKO, ISRAEL

Killebrew, Ann E. (The Pennsylvania State University) - Skinner, Jane C. (The Pennsylvania State University)

In this paper, we present approaches and techniques to investigate, reconstruct, and publish the largely unpublished large-scale excavations at Tel Akko/Akka, a major second and first millennia BCE maritime center on the central Levantine coast, directed by Moshe Dothan from 1973–1989. As with all excavations, the research questions and methodologies are major factors in determining the outcome and production of knowledge. Understanding these components, especially of legacy excavations, as well as the methods and personality of the excavator ("excavating the excavator") are essential in our attempts to uncover the epistemology of the 20th century Tel Akko excavations. To provide insights into the production of knowledge of the original expedition, the renewed excavations at Tel Akko (2010–2019), co-directed by Ann E. Killebrew and Michal Artzy, utilized several approaches. These include digitally preserving and archiving the original field documentation and photos; organization/standardization of varied field recording systems and archaeological terminology by means of a Filemaker database; resurveying the visible archaeological remains via photogrammetry and Geographic Information Science; and re-excavating Dothan's trenches and excavating adjacent unexamined areas of Tel Akko. These previously unexposed units provide a rigorous stratigraphic control for the site and allow us to apply 21st century collection techniques that can be used to assess quality and compare with the Dothan archival material.

4 REDISCOVERING ROMAN MALTA. THE MELITE CIVITAS ROMANA PROJECT AT THE DOMVS ROMANA OF RABAT (MALTA)

Tanasi, Davide (University of South Florida) - Cardona, David (Heritage Malta) - Lowe, Benedict (University of North Alabama) - Brown, Robert (Intercontinental Archaeology) - Wilkinson, Andrew (Intercontinental Archaeology)

After Malta's inclusion to the Roman territories in 218 BCE the Islands go through a cultural transformation that is epitomized in the late Republican domus built in the main town of Melite (modern Rabat and Mdina). This house provides the most emblematic example of Romanitas in Malta and was likely connected with a Roman of high rank. Its remains were cleared in 1881 under the watchful eye of A.A. Caruana, with a major new impetus in excavation carried out by Sir T. Zammit between 1920 and 1925. The two, have left us with an expanse of exposed ruins with very little, or no, stratigraphy, and an even less clear understanding of the standing walls and structures. This is exacerbated by the fact that further trenches have been excavated beyond the present site limits, trenches which have since been lost and are thus completely misunderstood. Since 2019, the site has been at the center of the research project Melite Civitas Romana, which is reassessing all the evidence using modern technologies and conducting new archaeological excavations. Although the overall aim of the project is to investigate untouched remains, the first few years of the project are inevitably concentrated at understanding the structures resulting from the 1881 and 1920s excavations, locating the old trenches, and trying to tie old and new data together to help us comprehend part of the Roman town of Melite. This paper will outline the difficulties encountered in marrying the written data, past interpretations with what is present on site. It will also present new results in this respect, including the examination of baulks and stratigraphic sections from Zammit's time, and the discovery of new structures alongside new contexts which have, for the first time, offered a new perspective on the Roman and Late Roman history of Melite.

5 BUILDING ON ARCHAEOLOGY OF THE 1930S AND 1960S: REINVESTIGATING THE TOWN ABOVE THE SANCTUARY OF HERA, PERACHORA

Lupack, Susan (Macquarie University) - Skuse, Matthew (British School at Athens) - Kassimi, Panagiota (Ephoreia of Antiquities of the Corinthia) - Sobotkova, Adela (Aarhus University) - Ross, Shawn (Macquarie University) - Weissova, Barbora (Bilkent University)

The 8th–2nd century BCE Sanctuary of Hera at the tip of the Perachora Peninsula was initially excavated in the 1930s by Payne of the British School at Athens. Payne and then Dunbabin, who continued Payne's work, also investigated the town located above the sanctuary in an area called the Upper Plain. There they found evidence for what they interpreted as a 'substantial town' with its large structures (e.g., Dunbabin's House is 23x13 m) and extensive

waterworks. In the 1960s, Tomlinson reinitiated work there, excavating both within the sanctuary's temenos and in the Upper Plain. Tomlinson's estimation of the Upper Plain's settlement was radically different from his predecessors', characterising it as 'a scatter of houses'.

The Perachora Peninsula Archaeological Project is currently conducting intensive surface survey, legacy data verification, Lidar, and drone photogrammetry over this town. A necessary part of our work has been questioning Payne and Tomlinson's diametrically opposed interpretations and the likely motivations for their (perhaps) over- and underestimating the significance of the town. Researching the respective projects within the BSA archives and documenting the changes the structures have undergone since they were excavated have also been key for this project.

We were also intrigued to learn that Payne had used a certain area for pot-washing and ceramic analysis. We conducted total pick-ups in five squares and found that one produced an extremely high concentration of sherds – nearly 20,000 – most of which represented small cups and pouring vessels. This sample will give a quantitatively (by nearly 10x) clearer view of the sanctuary's pottery than has been previously available. It may also give a qualitatively clearer view, as previous analysis of the sanctuary's ceramics addressed selectively chosen assemblages. This collection thus provides an alternative view of the sanctuary's religious practices to those presented in the past.

6 ALL THE THINGS LEFT BEHIND – THE REMNANTS OF THE H. HAUPTMANN AND K. SCHMIDT EXCAVATIONS IN THE URFA-REGION, TÜRKIYE

Kinzel, Moritz (German Archaeological Institute Istanbul)

Each year when returning to our excavation house at the outskirts of Şanlıurfa, we are welcomed by the long history of our excavation house furniture and equipment; reaching as far back as to the 1960ies excavations by Hauptmann in the Keban Dam area. Since then, each year leftovers of the field seasons have added - layer by layer - to the dig house stratigraphy. For sure from time to time someone might clean out spaces and shelves to re-organise it, but there are always traces of the past left. Is an excavation house – archaeologically speaking - a midden, a storage, a knowledge container or a ritual place where we donate and deposit things to our ancestors? However, recently we had the chance to dig even deeper into the heritage of the earlier excavation days. In cooperation with the Şanlıurfa Museum we started to re-do the inventory of the find boxes from the Harald Hauptmann excavations along the Euphrates. Besides the registered, packed and boxed archaeological finds, we also came across a number of items that offer insights into the archaeology of archaeology and the things archaeologist leave behind. In other words, the future past is now. The contribution will present some of the “finds”, their context and what they may tell about us as archaeologists.

7 THE CONTRIBUTION OF STATE-OF-THE-ART TECHNOLOGY TO THE ARCHAEOLOGY OF ARCHAEOLOGY APPROACH, A CASE STUDY AT TROY

Lanjouw, Tijm (University of Amsterdam) - Walsh, Alicia (University of Amsterdam) - Waagen, Jitte (University of Amsterdam)

The Archaeology of Archaeology approach deals with archaeologically researching complex and long-excavated archaeological sites to understand better the strategy and motives of previous excavators and facilitate re-evaluation and re-interpretation of their results. On the one hand, this allows new perspectives on the archaeological narratives about the past, while on the other hand, this potentially helps the modern archaeologist to appreciate how social, ethical, political, and theoretical context can be a determinant of the archaeological process, and better explain narratives emerging from historical archaeological activity at a site. One of the methods to engage with archaeologically researching archaeology is to apply modern digital techniques. The archaeological laboratory of the site can be meticulously documented by scanners and drones equipped with a whole range of sensors, creating highly detailed 3D surface models of the site. These can be used to better understand the current archaeological topography of sites as they are now but are also suitable for creating an environment to study old documentation. In this presentation, a few preliminary results of such applications will be shared in relation to the work of the University of Amsterdam and the 4D Research Lab at the ancient site of Troy, Turkey in which we have re-examined the various stages of its excavation throughout the last one and a half centuries. One approach has been to digitize and geolocate old photographs of the site and the excavations back into a 3D environment, and subsequently use projection mapping and virtual modeling to match their contents on the current topography or recognize changes in the landscape that were not documented in excavation reports. This can lead to new insights as to the state of the site in various moments in the past and understand how archaeological actions in the past shaped its modern topography.

8 (RE)CONSTRUCTED POTS AT TROY: THE LOCAL POTTERY MENDERS FROM THE UNIVERSITY OF CINCINNATI EXPEDITION TO THE TROAD

Kramer, Jeffrey (University of Cincinnati)

Carl W. Blegen, Marion Rawson, and John L. Caskey published scores of whole or nearly whole vessels in the four double-volumes documenting their excavations at Troy from 1932-1938. Yet only a single paragraph in Troy I hints at how these vessels were mended – a small group of local workers were tasked from 1934 until the end of the expedition in 1938 to find joins between pottery sherds and then restore, as completely as possible, these whole or mostly whole vessels.

In this paper, I redress this omission by identifying these local workers via records from the Troy collection in the Archives and Special Collections of the Department of Classics at the University of Cincinnati. This collection includes extensive financial records for each season listing every expense, including costs of labor and even the supplies used in the mending process. Supplementing the financial records is information from Carl W. Blegen's Director's Notebooks and unpublished photographs of the excavation. The photographs in particular allow us to fully visualize the workers, even when the precise identification of a worker cannot be fully ascertained. Finally, we also can reconstruct the environment in which they worked.

As I demonstrate, the study of archival records – even at a site as thoroughly investigated as Troy – can reveal new information about both a site and those who worked there. Moreover, an analysis of the pottery menders emphasizes the nexus between the examination of such a crucial aspect of material culture – pottery – and those who unearthed and reconstructed it.

9 BUILDING ON BLEGEN: LEGACY DATA FROM MYCENAEAN ZYGOURIES

Hilker, Sarah (University of North Carolina at Chapel Hill)

Beginning in the 1910s, Carl Blegen excavated at a number of sites across Greece. The American School of Classical Studies at Athens/Corinth retains many of his excavation diaries as well as much of the preserved pottery from his early excavations in the Corinthia. Although Blegen published (1921, 1928) the results of his work at Korakou and Zygouries, a wealth of untapped information remains a century later in storerooms in Ancient Corinth.

The larger project, Zygouries: the “Potter's Shop” in Context, involves examining preserved but unpublished Late Helladic (Mycenaean) sherd material in conjunction with the field notebooks by Blegen, J. P. Harland, and J. Donald Young. The pottery under study comes from throughout the site, not just from the so-called Potter's Shop, which has been better studied (Blegen 1928, Shear 1986, Thomas 1992) on account of the preserved architecture and large number of associated mendable vessels. Ultimately, the goal is to develop and publish a more nuanced understanding of Zygouries' development into a Mycenaean settlement with palatial connections.

In this paper, I discuss the challenges of the project and my methodology for dealing with this legacy data. This includes correlating different trench naming systems, developing digital composite plans based on unpublished notebook and archival drawings, reconstructing stratigraphy where possible, reconciling preservation bias, and identifying meaningful data despite said preservation bias. While I focus on Blegen's work at Zygouries and my methodology for revisiting this particular legacy material, I will also briefly contextualize his approach at Zygouries within his other work, particularly at Korakou, where he excavated several years before Zygouries. Lastly, I touch upon the differences between the three excavators' notebooks, particularly as they relate to reconstructing the excavation progress, architecture, contexts, and stratigraphy.

10 ARCHAEOLOGY OF ARCHAEOLOGY: THE CASE OF GIACOMO BONI

van Kampen, Iefke (Museo dell'Agro Veientano) - Rathje, Annette (Emeritus Associate Professor University of Copenhagen)

Giacomo Boni (1859-1925) for many years excavated at the heart of ancient Rome, at the Forum and Palatine (1898-1915). His work has been subject of much attention, in the first place for the important results obtained and the many monuments brought to light, but also because of his methods and original ways of proceeding. In recent years (2021-2022) a huge exhibition has been dedicated to Giacomo Boni, l'Alba della modernità (the Dawn of Modern Age), attempting to make a new evaluation of the famous excavator, putting him into the context of his time. The preparation of the exhibition has been the pretext to elaborate a new museum display of the Antiquarium del Foro, but has left also traces inside the archaeological site: totems with historic photographs of the excavation days, meant to signal the sites involved in the temporary exhibition, are now probably meant to stay and help the visitor to connect what is left with the moment of its discovery. Our contribution aims at making a new evaluation of the state of the art and allows to compare the archaeology of archaeology of yet another important archaeological area besides Troy. Also in our case we are bound to study archival material and the very finds in order to reconstruct excavations, besides

the excavations of older excavations (e.g. Einar Gjerstad excavating again at the same sites of Boni's excavations). The authors in particular refer to their study of Boni's excavation at the Sepolcreto arcaico site.

11 **ARCHAEOLOGY OF AN ARCHIVE – OPPORTUNITIES AND CHALLENGES. THE THECLA BASILICA IN MERIAMLIK AS A CASE STUDY**

Krampe, Magdalena (Albert-Ludwigs-University Freiburg)

Research on Cilicia (Asia Minor), in particular Meriamlik and Korykos, is still largely based on the works of Samuel Guyer (1879–1950) and Ernst Herzfeld (1879–1948), who traveled through Cilicia in 1907 while carrying out several small-scale excavations. The results, however, were only published 23 years later in one volume. Findings of Guyer's previous journey through Cilicia in 1906, which include recordings of approximately 100 churches, are unpublished.

Notes, numerous photos and sketches of both expeditions, as well as the excavation records, are relevant sources for my dissertation, which raises questions both on research as well as on architectural history.

In a case study, I will demonstrate how archival materials can provide new insights not only in terms of research history, but also for archaeology in general. Although Guyer and Herzfeld documented the incorporation of an "Armenian" church into the 5th century Thecla Basilica in Meriamlik – once the largest church in Cilicia –, they did not question the later incorporation's structure and function, as their focus was clearly on the earlier monumental basilica. Based on references in sketchbooks, the actively used sacred space may have remained consistent: The "Armenian" church, although seemingly smaller on the first glance, might have encompassed the entire area of the former basilica. Archival material offers the sole opportunity for further insight, as it seems likely that later investigations on the 5th century basilica removed and thereby destroyed most remains of the "Armenian" church.

Consequently, my aim is not only to present the material itself, but also to demonstrate the extent to which archival materials enable new archaeological findings. Questions on specific limitations of such an approach are necessarily part of the discussion.

12 **APPROACHING THE ARCHAEOLOGY OF ARCHAEOLOGY AT GÖBEKLI TEPE, ŞANLIURFA, SOUTHEAST TÜRKIYE**

Clare, Lee (German Archaeological Institute, Istanbul Department)

Despite its comparatively short excavation history, the Early (Pre-Pottery) Neolithic site of Göbekli Tepe (Şanlıurfa, Southeast Türkiye) has become a focal point not only of academic concern but also of ever-increasing esoteric interest, including various conspiracy theories, since fieldwork began there in 1995. The current popularity of this World Heritage Site has emerged from the entanglement of these two key areas, also culminating in the formulation of such descriptive terms of the archaeological remains as the "World's First Temples" and the "Zero Point in Time". In this paper, we illuminate the processes leading to this development over the last three decades, emphasising the roles played by archaeologists and the media. Furthermore, we highlight the role of past excavation and find collection strategies in previous interpretations and the difficulties encountered when revising what has become a securely anchored paradigm relating to site formation and function of this enigmatic Early Holocene site.

616 **WHOSE HERITAGE? MIGRATION AND HERITAGE: PROBLEM OR OPPORTUNITY?**

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Viragos, Gabor (EAA Heritage Advisory Committee; Hungarian National Museum) - Demoul, Jean-Paul (EAA Community on Archaeological Legislation and Organisation; Institut Universitaire de France & Université de Paris)

Session format: Discussion session (with formal abstracts)

The movement of people has been part of European history from the earliest migration into Europe out of Africa millennia ago to the present. Taking the long-term view that archaeologists possess, we are all representatives of immigrant communities. And yet, today, migration is declared across Europe to be a 'problem' requiring 'solutions'. Such rhetoric feeds into and supports community division and fear of others who are different. While transphobia, homophobia, islamophobia and antisemitism grab the headlines within countries, there are also existing European populations also treated as 'outsiders' that nobody notices.

The attitude towards the various forms of migration within and from outside Europe is at root a cultural phenomenon – it is not natural but created. Heritage management has often argued that sites and archaeological cultures are important for local and regional identities. Does it thereby also share in the rejection of people with other origins and identities? This is equally true for long standing ("historical") national minorities in present-day countries and "new" migrants (even if the border has moved, not the persons). And what of the heritages of those who are entering Europe from other parts of the world? Is the idea of European heritage an exclusive one, or one that seeks to incorporate new

elements (and perhaps we can remember how much the heritage of individual communities is in itself borrowed from elsewhere, often the result of the colonisation of other parts of the globe)? Should we – as workers on heritage – be concerned with migration at all?

This session seeks contributions which address these and other related questions. The session consist of the presentation of formal papers and their wider discussion, also involving commentators drawn from the EAA Heritage Advisory Committee and Community on Archaeological Legislation and Organisation.

ABSTRACTS

1 **VARIATIONS FOR PEOPLE AND HERITAGE: INDIGENOUS AND IMMIGRANT - LOCAL AND IMPORTED**

Viragos, Gabor (Hungarian National Museum (Magyar Nemzeti Múzeum); EAA Heritage Advisory Committee)

Culture – and tangible heritage as a significant part of it – is enormously important for Europe, giving a solid base to its present functioning, human-social behaviour and future development. Europe as a whole, but also its nations and states, are closely reliant on cultural heritage and therefore also strongly committed to it. Because of historical reasons, the states of Europe were based for a long time on traditions, ethnicity and cultures. As migration became a very hot issue in Europe (both the incoming and the intra-European one), most of Europe, and particularly the urban zones, is now inhabited by a multi-ethnic and multi-cultural population. The conflicts arise mostly from the cultural shock caused by facing other cultures locally. People growing up or living in a culture different from the one their parents lived in or from the one the majority of the surrounding people live in, have a different sense of personal and collective belonging. Consequently, their relationship with the locally accessible cultural heritage is different. Because of the constant and growing need of the developed countries to replace the aging workforce with immigrants, the changes in state-borders in the 20th century and the various forms of mobility (education, Foreign Service, military or religious mission, tourism, etc.), the present societies, identities, built environment and historical basis of the European community are challenged. What are the various impacts of this situation on cultural artefacts, buildings, sites and landscapes, and what is the impact of this cultural heritage on the local non-native population or on the social groups otherwise not committed to this heritage? This interaction involves the questions of migration, racism, nationalism on the one, and archaeology, listed monuments and historical landscape on the other side. The objective is to encounter the possible major scenarios of this relationship.

2 **ARCHAEOLOGICAL HERITAGE MANAGEMENT AND LOCAL HISTORY - WHOSE PAST IS AT STAKE HERE?**

Fries, Jana (Niedersächsisches Landesamt für Denkmalpflege)

This paper is following the line of enquiry as to why and how archaeologists use narratives that claim or imply supposed population continuities since prehistoric times in their public relations work. Looking at the day-to-day work of heritage management, it is a popular reasoning to woo politicians, the local population or the media into supporting a preventive excavation, claiming that it yields potentially sensational results concerning the history of the respective municipality or the local landscape. In archaeological research, we also often refer to the importance of our local work especially for the people of the region or the next village. It is often implied that there have been continuities in the way of life or landscape use since prehistoric times. The assumption that the ancestors of today's population already lived there is also sometimes stated, sometimes implied, by non-archaeologists and experts alike.

In my paper I will address the question of the effects of such assumptions on our work. How do they affect people with roots outside the region, the country or the continent? What political narratives do they serve? What preconceptions of the general public do we reinforce when we emphasize these continuities? Why do we rely on continuities at all to emphasize the importance of our work? Do we consider the history of a site as less relevant to those whose ancestors did not live in the region? The paper is intended to raise questions and start a discussion rather than provide answers.

3 **CHALLENGING "SENSE OF SPACE/PLACE". MIGRATION, NEWCOMERS AND ADVOCACY FOR DE-HERITAGIZATION PROCESSES**

Calaon, Diego (Ca' Foscari University - Venice) - Monica, Calcagno (Ca' Foscari University - Venice) - Magnini, Luigi (Ca' Foscari University - Venice)

Today's migration trends are challenging for those working in heritage fields, such as archaeologists, architects, and policymakers who deal with landscapes and historic sites. Archaeology often focuses on how past human movements have created rich, interconnected cultures. These connections are central to our understanding of history and are celebrated as part of our cultural heritage.

Yet, when it comes to managing and preserving this heritage, there's a tendency to see modern migration as a problem. This perspective suggests that migrants might threaten cultural heritage, and over-emphasizes the need to protect a so-called "local identity" by integrating newcomers and educating them about this heritage. As a result, when archaeologists move from research to the role of preservation, they often end up supporting a narrow view of heritage that resists change, aiming to keep historic sites "pure" and unchanged, and potentially missing out on the natural evolution of cultural sites through new influences.

This approach can unintentionally fuel social tensions in our globally connected world. This paper questions whether the traditional method of preserving artefacts and sites just because they're old is still the right approach in today's world, which is facing challenges like overpopulation and climate change. As archaeologists we are celebrating people's movements, as Cultural Heritage managers we advocate "authenticity" as proxy to divide and segregates "identities".

We'll discuss alternative ways to consider heritage in multicultural and migratory settings by looking at examples from Venice and its surrounding lagoon. Considering Faro Convention principles, the goal is to find approaches that can ease social tensions by embracing the evolving nature of cultural heritage in these diverse communities.

617 FROM LOTS OF DATA TO BIG DATA: STRATEGIES FOR QUALITY, REUSABILITY, AND ACCESSIBILITY OF DATABASES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Schjerven, Noline (University of Gothenburg) - Dahlberg, Fredrik (University of Gothenburg) - Bilotti, Giacomo (Christian-Albrechts-Universität zu Kiel)

Session format: Regular session

In this session, we aim to explore the use of databases in managing the increasing volume of information produced in the field of archaeology. As we transition from dealing with "Lots of Data" to grappling with the ever more present concept of "Big Data" and the challenges that follows, one of the key challenges is the integration of legacy data with the continuous influx of new information. This task is not only about managing the volume of data, but also to ensure the quality, relevance, and accessibility of the data.

By building on the principles of FAIR – Findability, Accessibility, Interoperability and Reusability as described in Wilkinson et al. (2016), it ensures that data is not only accumulated but also effectively utilized and shared. Currently, the time and effort involved in understanding the semantics of various databases is overwhelming, however, the field of archaeology strives to adapt to new technologies by stepping into transdisciplinary collaborations.

Key questions

- What strategies can be employed to ensure the quality and relevance of data in databases?
- How can we effectively integrate new information with legacy data without compromising data integrity?
- What are the challenges in transitioning from traditional datasets to Big Data, and how can they be addressed?
- What setbacks have been encountered in the process of data management, and what lessons can be learned from them?
- How can the use of databases assist in shaping our field and the archaeological discourse?

We want to look into the principles of FAIR, and the different strategies for its implementation in databases. We welcome presentations from organizations and projects that are currently battling these issues. We want to hear about your innovative solutions, insights, and your setbacks. Our aim is to foster mutual learning and cultivate improved practices through sharing experiences.

ABSTRACTS

1 MODERN PATHWAYS TO MOBILITY NEW APPROACHES TO MOBILITY AND CONNECTIVITY IN ARCHAEOLOGY IN THE LIGHT OF BIG DATA

Schjerven, Noline (Department of Historical Studies, University of Gothenburg) - Dahlberg, Fredrik (Department of Historical Studies, University of Gothenburg)

This article explores contemporary perspectives on mobility and connectivity in archaeology, leveraging the transformative potential of ever more present Big Data and its use and role within the field of archaeology. Examining the evolving landscape shaped by technological advancements, the study delves into novel methodologies and analytical frameworks. The investigation builds upon the so called ongoing Third Science Revolution in archaeology, as elucidated by scholars like Kristiansen and Olsen, emphasizing the central role of Big Data in this potential paradigm shift. The paper presents a curated selection of case studies that showcase the intersection of archaeology with themes of mobility and connectivity, utilizing the potential concept of Big Data as a key analytical tool. Furthermore, the

article addresses implicit connotations associated with Big Data use, emphasizing the principles of FAIR and CAIR for context-specific applications. By offering fresh insights and perspectives, this article contributes to the ongoing discourse, paving the way for enhanced understanding and the potential application, development and use of word 'Big Data' in archaeological research on mobility and connectivity.

2 ESCAPING THE PAST: THE NEED TO UPLIFT DATA QUALITY AND STANDARDS IN ARCHAEOLOGY

D'Aprix, Michael (University College London)

Issues on 'Big Data' and 'Legacy Data' in archaeology are debated without recognizing where the discipline sits in terms of data production and what tools are used in that data production. Archaeology is deeply fragmented at every level – with methods, theories, philosophies, and standards varying at the highest level between countries down to the most granular level of individual archaeologists.

This results in an unmanageable variation in data production from different methods using different systems and tools to collect different types of data. To complicate the issue, many archaeological companies and organizations are desperately behind in adaptation of technologies that might improve data quality and promote modern data standards. This can be seen in the UK where the tendering process prevents meaningful funding into research and development that could uplift data quality and standards leaving companies to rely on methods 15-20 years out of date.

The first step in overcoming this hurdle is understanding the state of the discipline. The last large scale studies on the state of archaeology occurred over a decade ago, to simply determine how many archaeologists there were in Europe (Aitchison et al., 2014). Other technology-specific studies focused on tools like GIS but included troubling statistics, even at the time of research (De Roo et al., 2013).

The second step is using knowledge about the status of our discipline to move away from methods that continue to produce what should be 'Legacy Data'. Many archaeologists around the world still utilize tools from the early 2000s. AutoCAD, custom Access Databases, and paper recording dominate the methodological process despite better tools existing.

It is urgent that we understand the reality of archaeology and move beyond these out-of-date processes and stop adding data to an already unmanageable pile of 'Legacy Data'.

3 THE BIAD STANDARDS: RECOMMENDATIONS FOR ARCHAEOLOGICAL DATA PUBLICATION AND INSIGHTS FROM THE BIG INTERDISCIPLINARY ARCHAEOLOGICAL DATABASE

Reiter, Samantha (National Museum of Denmark) - Staniuk, Robert (University College London) - Kolar, Jan (University College London) - Agerkov Rose, Helene (University of Gothenburg) - Bulatovic, Jelena (University of Gothenburg) - Ryabogina, N. (University of Gothenburg) - Speciale, Claudia (University of Gothenburg; Catalan Institute of Human Paleoeology and Social Evolution (IPHES)) - Kristiansen, Kristian (University of Gothenburg) - Thomas, Mark (University College London) - Timpson, Adrian (University College London)

This paper presents a series of recommendations for the publication of archaeological data to facilitate efficient databasing. These recommendations were collated by data experts who mined thousands of publications for different types of archaeological data (funerary practices, AMS dating, stable isotopes, zooarchaeology, archaeobotany, aDNA, pathologies, etc.) during the construction of the Big Interdisciplinary Archaeological Database (BIAD). We also include data harmonisation vocabularies utilised for the integration of data from different recording systems. Starting from some case studies from published literature that we present, these recommendations initiate a move towards creating a unified and integrated framework for all types of archaeological data to ultimately sit within a single relational structure. We aim at creating a collaborative environment among the scholars collecting Big Data. Finally, we anticipate that use of the BIAD Standards will increase the visibility, usability and longevity of published data and also increase the citations of those publications from which said data is drawn.

4 GRAPPLING WITH BIG HERITAGE DATA: REFLECTIONS ON THE MODELLING OF HETEROGENEOUS HERITAGE INFORMATION FROM THE MAHSA AND MAEASAM PROJECTS

Lander, Faye (Origins-Centre, University of the Witwatersrand) - Project, Mapping Africa's Endangered Archaeological Sites and Monuments (MAEASaM) (McDonald Institute for Archaeological Research, University of Cambridge, UK) - Project, Mapping Archaeological Heritage of South Asia (MAHSA) (McDonald Institute for Archaeological Research, University of Cambridge, UK)

The Mapping Archaeological Heritage in South Asia and Mapping Africa's Endangered Archaeological Sites and Monuments projects work within different geographic regions of South Asia and Africa, dealing with large volumes of published (and unpublished) archaeological sites and monuments records. This paper explores the work and challenges of the two projects in digitising, modelling, re-interpreting, linking, and re-using non-digital archaeological data into

a structured and standardised digital format so that it may become findable, accessible, interoperable and reusable (FAIR). All these data follow the same or similar data standards and recording methodologies, and will be published in publicly accessible databases using the Arches platform.

Both projects, working with different partners, are compiling existing data through legacy records (archival records, published documents, reports, and surveys) as well as newly created data in the form of field documentation, remote sensing surveys, historical map analysis and automated site detection methods.

Retaining context while delivering standardised usable data is a key challenge, and the meanings of the original source and context are inevitably subject to re-interpretation during this process. Different heritage stakeholders, each bring their own expectations of data use, management, and accessibility, in addition to navigating the post-colonial spaces in which they operate. To ensure usability, use case scenarios have been identified and are being developed with project collaborators and database end-users. We explore some of the interventions we have used to grapple with the challenges we have encountered while dealing with heterogeneous archaeological big data.

5 (RE)CONNECTING SCATTERED FRAGMENTS. SETTING THE FOUNDATION FOR A DATA BASE COMBINING ROMAN STONE ARCHITECTURE AND ITS HISTORY OF STUDY

Rensinghoff, Berenike (Philipps-Universität Marburg) - Deicke, Aline (Philipps-Universität Marburg; Akademie der Wissenschaften und der Literatur Mainz) - Rösler, Katja (Römisch-Germanische Kommission)

Starting in 2023, the long term project “disiecta membra. Stone Architecture and Urbanism in Roman Germany” is scheduled to run for 24 years, gathering data on Roman stone architecture, the actors and the history of knowledge associated with its study. This big complex data set is intended to serve as a basis not only for qualitative research but aims to enable and encourage quantitative analysis and research via other computational approaches.

To ensure that the data is easy to evaluate by the scientific community, we use existing structures of proven data repositories. From them, we evaluate and incorporate various edition concepts, norm data, and thesauri in exchange with the multi-disciplinary network NFDI4Objects. Because of that the project is currently focusing on laying a solid foundation in the form of a flexible, open source data base built on a carefully conceptualized, expandable data model structuring the project domain and in exchange with the scientists using it. Thus, it is necessary to first create a conceptual data model by building on the CIDOC CRM and its compatible models as a foundational ontology.

The data is going to be recorded in a no code database and gradually published to iDAI.world, esp. iDAI.objects / Arachne, as well as to Propylaeum-VITAE. The database fulfills several requirements: it (a) is a project database, therefore it must record “field” data of archaeological objects, (b) links the object data with data on historical actors and their practices recorded from publications and in archives, hence crossing traditionally separate research data structures, and (c) is designed in such a way that data can be exported in various formats depending on the desired publication output, e.g., in long established data collections with already large data inventories, as RDF for integration into the semantic web, or even in print publications.

6 COMPUTATIONAL APPROACHES TO A SUSTAINABLE HERITAGE MANAGEMENT IN CENTRAL ASIA

Nebbia, Marco (Institute of Archaeology, University College London) - Jorayev, Gai (Institute of Archaeology, University College London) - Pang, Rui (Institute of Archaeology, University College London) - Voyakin, Dmitry (International Centre for Central Asian Studies, Uzbekistan) - Abdelrazek, Mahmoud (ARC Research Data Group, University College London) - Alvey, Bryan (Cultural Heritage Information Consultants) - Williams, Tim (Institute of Archaeology, University College London)

The Central Asian Archaeological Landscape (CAAL) project is building a geo-spatial inventory of archaeological resources for Central Asia. Funded by the Arcadia Fund, CAAL is developing a two-platform system that addresses the needs of the end users. The graph database Arches platform, developed by the Getty Conservation Institute, is being employed for its powerful semantic search engine and multi-lingual capabilities, while an object-based relational PostGIS database is implemented because of its analytical functionalities and interoperability with other software packages.

In this paper, we present the challenges of populating the database systems with data coming from 6 national inventories, several national and international research projects, digitised archival materials, digitally-born datasets (e.g., UAV outputs, satellite imagery), remote sensing mapping, and field survey data. This paper will discuss the solutions adopted in order to integrate the over 85,000 records, the challenges encountered in the mitigation across a spectrum of data sources, the solutions to overcome data inconsistency, variable gaps in information, and the multi-voicedness of different institutions and teams who are populating the database. We also present some applications of the data to cultural heritage risk assessment and archaeological research. The project adopts a FAIR approach to the data and here we will discuss the principles followed to develop a sustainable data system, which has already been adopted by two countries as their new digital national inventory. Co-design and use of the database are major aspects, and

we will present several other issues including ones for which we have not yet found solutions. We believe that a wider discussion with other projects in this session will be beneficial to all.

7 RE-WORKING OF THE NUMISMATIC DATABASE OF THE NIETULISKO MAŁE HOARD APPLYING INTERNATIONAL STANDARDS AND RTI DOCUMENTATION

Zajac, Barbara (National Museum in Krakow, Poland) - Ostrowski, Wojciech (Jagiellonian University, Institute of Archaeology, Poland; Warsaw University of Technology, Poland) - Bodzek, Jarosław (Jagiellonian University, Institute of Archaeology, Poland) - Sochacki, Grzegorz (Jagiellonian University, Institute of Archaeology, Poland) - Wilk, Łukasz (Warsaw University of Technology, Poland) - Zachar, Paulina (Warsaw University of Technology, Poland) - Modrzewski, Jakub (Warsaw University of Technology, Poland)

Databases are a solid foundation for modern numismatic research, widely used nowadays. During a recent project which applied big data methods and cloud processing to the digitalization and dissemination ca. 2,800 coins from the hoard from Nietulisko Małe, Ostrowiec County technical investigation need to focus not only providing new imagery and migrating the old databases but also on re-working the database to be created in accordance to international standards and FAIR principles.

The database was done with a view to adapting it to modern standards. It is one of the largest deposits discovered in Poland, which has not been properly published yet. For this work, that will be the basis for future research in numismatics, it was important to implement RTI (Reflectance Transformation Imaging) documentation for these coins - one of the best methods of coin archiving. It would facilitate numismatic research, especially with coins that are illegible or in a bad state of preservation.

RTI needs around 30 images, means that the final documentation will be the taking of over 180,000 images with different light positions. It was decided to build a solution using big data and cloud computing. This raises the question of archiving and sharing this type of data in accordance with FAIR, but is this justified when no one will probably ever be interested in it? The very use and sharing of RTI technology also raises some questions - it is relatively easy to share and display this type of imagery in a local database, but how to share this type of data within Linked Open Data - if there is no clear FAIR-compliant standard for its storage, and even less so for its display. The aim of the presentation is to answer the above questions.

8 LEGACY COINS: MAKING ROMAN COINS OF THE PAST COMPATIBLE WITH THE FUTURE

Welte, Micheline (Austrian Archaeological Institute) - Burkhart, Karl (Austrian Archaeological Institute) - Schwaiger, Helmut (Austrian Archaeological Institute)

For many years, the Austrian Archaeological Institute (OeAI) hosted an online Roman coin database known as dF-MRÖ; however, the database was not being realised to its full potential and a decision was made to update it in order to more closely adhere to modern data standards. Thus, OeAI.COIN was envisioned - a database to host the OeAI legacy coin collection in a modernized and interoperable format with Linked Open Data, which would allow for the standardized import of future coin collections, while adhering to the FAIR Principles of data management and employing links to specialist authority databases and ontologies, such as NOMISMA.

In the process of the coin database's transformation into OeAI.COIN, a variety of issues cropped up that involved difficulties in adapting the previous dataset to more modern standards. There was a lack of standardization of the data, low quality photos, redundant information, as well as ambiguous and non-standardized vocabulary to name just a few. In addition, the potential to include 3D data was not available. The OeAI will discuss its attempt at preparing its archaeological legacy collections for the future.

9 CHANGES IN HUMAN-PLANT INTERACTIONS IN CENTRAL ITALY OVER TIME: COLLECTION AND COMPARISON OF PUBLISHED AND UNPUBLISHED ARCHAEOBOTANICAL DATA

Moricca, Claudia (Department of Environmental Biology, Sapienza University of Rome) - Florenzano, Assunta (Department of Life Sciences, University of Modena and Reggio Emilia) - Mercuri, Anna (Department of Life Sciences, University of Modena and Reggio Emilia) - Sadori, Laura (Department of Environmental Biology, Sapienza University of Rome)

Recent advancements in the field of archaeobotany have significantly enhanced our understanding of the historical interactions between humans and plants in Italy. This includes insights into ancient diets, resource selection, introduction of allochthonous economic plants, and their ceremonial applications. Despite the diffusion of archaeobotanical research, accessing this information remains challenging due to its dispersion across various scientific papers and archaeological reports, with the latter being particularly difficult to obtain. Moreover, this data is typically restricted to isolated findings or specific sites, which complicates the assembly of a comprehensive historical perspective.

The establishment of the Botanical Record of Archaeobotany Italian Network (BRAIN) in 2015 marks a significant stride towards consolidating information about historical human-plant relations across Italy. This collaborative network and database compiles an extensive inventory of archaeological sites, detailing their specific locations, chronological context, culture, and the array of archaeobotanical research carried out, complete with bibliographic citations. This database is regularly enriched with the latest scholarly contributions.

Within the scope of the PNRR PE5 CHANGES Spoke 8 and CN5 NBFC Spoke 3 projects, this study introduces a georeferenced instrument designed to synthesize and compare data on plant macro-remains from archaeological and historical sites. This tool collates findings from both published sources within BRAIN and unpublished studies, standardizing the information and categorizing it chronologically. Currently focusing on central Italy, the initiative is set to expand and encompass the entire nation. By employing this newly formulated dataset, the process of reconstructing past dietary patterns and tracking the introduction of new species from the Neolithic period to the present becomes more feasible and direct. Consequently, this will enhance our ability to trace traditional plant uses in the past, including trade and importation showing origins and proliferation of archaeophytes and neophytes throughout the Italian Peninsula.

10 TRANSPARENT INTEGRATION AND REUSE OF LARGE ARCHAEOLOGICAL DATASETS: A CASE STUDY FROM NEOLITHIC AND BRONZE AGE SOUTHERN SCANDINAVIA

Bilotti, Giacomo (Kiel University)

The exponential growth of data accessibility presents archaeologists with an unprecedented resource. The amount of open databases and datasets, ranging from simple spreadsheets to complex architectural assemblages, significantly expands the horizons of archaeological research. However, numerous archaeological sites from commercial archaeology excavations are continuously flowing into regional and national databases. Despite their potential, these datasets often remain underutilised in scholarly research due to challenges related to data homogeneity and reusability.

This paper explores the potential and issues of this vast source of data for archaeologists, especially in terms of modelling. Here, I use Neolithic and Bronze Age societies in southern Sweden and Denmark as a case study, showing how diverse and large-scale datasets can be effectively combined, tackling common issues such as data uncertainty and the need for homogenisation. I argue for the necessity of a straightforward and transparent methodology to effectively integrate legacy data into our models (e.g. consistent use of regular expressions), enabling straightforward adaptation or replication by the academic community as new data emerges or old projects conclude.

The approach presented here is fully documented and accessible in a dedicated GitLab repository, written using R, a well-known and open-source programming language and software environment for statistical computing. While acknowledging the limitations inherent in these data sources, the paper also proposes potential solutions for their effective use and integration into archaeological research.

11 VISUALIZING ARCHAEOLOGICAL DATA - SMALL PROJECTS, BIG PROBLEMS

Molander, Paula (Rio Kulturlandskapet; Gothenburg University)

Utilizing digital tools for the visualization of archaeological information, notably through web-based interactive maps, is an effective strategy for engaging with the general public as well as professionals in the archaeological field. However, what challenges might arise when developing interactive web maps intended for public consumption?

Archaeological data can be labour-intensive to effectively manage and present visually. The process of extracting and compiling data, in large volumes, is often complicated, with the available data being highly diverse and often originating from a variety of sources. Furthermore, ensuring accessibility for the general public puts different demands on the format of visualization than if only created for professionals.

This paper discusses two instances where the objective was to present archaeological data to a general audience using interactive web maps. Open-source tools such as QGIS and Leaflet were employed in both cases, ensuring method reusability. The goal is to identify common challenges encountered by professionals when creating visual formats for large volumes of varied data, regardless of project size or ambitions, and to discuss potential opportunities and solutions for these issues.

12 IMPLEMENTING DATA MANAGEMENT STRATEGY BASED ON AGILE SCRUM METHODOLOGY WITHIN THE AL-ULA CULTURAL PROJECT (UCOP)

Leschallier de Lisle, Anne (ARCHAIOS) - Gourret, Gaël (ARCHAIOS) - Charbonnier, Julien (ARCHAIOS) - Kanhoush, Yasmin (ARCHAIOS; ARCHEORIENT UMR 5133)

Within the framework of the Al-Ula Cultural Oasis Project (UCOP) – carried out by Archaios, funded and steered by the French Agency for AIUla Development on behalf of the Royal Commission for AIUla – a large-scale comprehensive survey of over 4000 hectares of gardens has been conducted between 2019 and 2023, resulting in the

recording of over 16,000 archaeological structures. The purpose of the survey was understanding the evolution of Al-Ula oasis, located in the northern Hejaz region (Kingdom of Saudi Arabia).

As the survey progressed, the volume of data increased and the empirical knowledge of the structures developed, prompting us to migrate towards a more detailed recording and upgrading of the database. Gradually, a data management strategy was implemented within the project to address the many challenges of quality, relevance, and accessibility of data, which are at the core of the forthcoming analysis and diachronic understanding of the oasis.

Selected tools and methods of a well-known IT project management framework (Agile, SCRUM) were tested and adapted in an unprecedented way to support the UCOP's data management. The experience of data management for a project of such magnitude led us to carry out a retrospective on the setbacks encountered but also the successes achieved, by significantly improving the quality and relevance of the data. It forms a solid background of guidelines and new approaches to apply within archaeological projects.

This paper will examine how specific tools and techniques of Agile methodology can enhance data management, playing a major technical support role in research.

626 MERC FORUM. STANDING RUINED BUILDINGS IN LARGE CITIES: A BURDEN OR A RESOURCE FOR SOCIETY?

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Lorans, Elisabeth (University of Tours) - Citter, Carlo (University of Siena)

Session format: MERC forum

This forum, inspired by the location of the EAA conference in Rome, the Eternal City, seeks to confront the ways large European cities deal nowadays with important remains of ancient buildings preserved above ground level and analyse whether they are seen, both by the local authorities and by the local population, as a burden or on the contrary as a resource (with possible changes from one to the other point of view). By the term “ancient buildings”, we do not refer only to classical Antiquity but also to major medieval and post-medieval ruined architectural remains which are part of the contemporary townscape and may still frame it. The forum will be based on the presentation of three European case studies, selected by MERC committee, providing a diversity of situations and supporting a general discussion afterwards, in which all EAA members can participate. Case studies will be presented by three archaeologists:

- Riccardo Santangeli Valenzani (University of Rome3): Rome and its monuments: two centuries of history
- Çiğdem Özkan Aygün (Technical University of Istanbul) How to turn the historical structures into a resource. Who should benefit? What are the limits to adaptive reuse?
- Jeroen Bouwmeester (Dutch ministry of Education, Culture and Science-Cultural Heritage Agency), Crossing borders: urban archaeology in the 21st century.

ABSTRACTS

1 HOW TO TURN THE HISTORICAL STRUCTURES INTO A RESOURCE? WHO SHOULD BENEFIT AND WHAT ARE THE LIMITS TO ADAPTIVE REUSE?

Çiğdem Özkan Aygün (Technical University of Istanbul)

Istanbul is a time capsule with numerous protected and unprotected examples of a great range of building types belonging to the Byzantine and Ottoman civilizations.

Apart from well known structures like Topkapı Palace, Hagia Sophia, Süleymaniye Mosque and Blue Mosque, there are unique examples of vernacular architecture like the timber houses in the Süleymaniye and Zeyrek quarters. The protection and conservation of those sites is not clearly regulated. The shared responsibilities of national government (The Ministry of Culture and Tourism General Directorate of Cultural Assets and Museums, General Directorate of Pious Foundation) and local administrations together with the several state institutions makes the issue more complex and confusing. The overlaps and vacancies about the responsibilities of different institutions creates a risk for the protection of those structures. The perception of the local people about those more vulnerable structures, to see them as a burden or resource becomes the key issue for the future.

2 ROME AND ITS MONUMENTS: TWO CENTURIES OF HISTORY

Riccardo Santangeli Valenzani (University of Rome3)

Every historical period has considered the theme of the relationship between cities and their monumental heritage in the light of the prevailing ideological superstructure. My paper aims to analyze the transformation of this relationship in Rome, from the Unification of Italy to the present day: from the destructions carried out in the 19th century during

the works to adapt Rome to its new role as capital of the Kingdom, to the exaltation of Romanity in the Fascist era, with the consequent destruction of all those archaeological realities that were not propagandistically and ideologically usable by the Regime, up to the experience of Urban Archaeology in recent decades.

3 CROSSING BORDERS: URBAN ARCHAEOLOGY IN THE 21ST CENTURY

Jeroen Bouwmeester (Dutch ministry of Education, Culture and Science-Cultural Heritage Agency)

The position of archaeology, and urban archaeology in particular, has changed radically in recent decades. This is due to the changing place of heritage in society. The Malta Convention and the FARO Convention are the result. Archaeology is within society, or at least it should be and not a distant academic field. But how do you do that? Covering an underground wall with a sheet of glass and a sign next to it is not always enough. Archaeology, or rather the past, has to be experienced. Participation, and there are many ways of doing this, can be very empowering. Heritage can contribute to important social tasks. In my lecture, after a short introduction, I would like to take you on a voyage of discovery through a number of examples in the Netherlands and abroad.

627 MORE THAN FIRE: INVESTIGATING PYRE TECHNOLOGY IN EXPERIMENTAL AND ARCHAEOLOGICAL CREMATIONS FOR UNDERSTANDING THE BURNING CONDITIONS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Stamataki, Elisavet (Vrije Universiteit Brussel) - Fülöp, Kristóf (HUN-REN Research Centre for the Humanities, Institute of Archaeology) - Magno, Giovanni (Morgagni Museum of Human Anatomy - University Museums Centre CAM, University of Padua)

Session format: Regular session

Cremation was the dominant funerary rite in many regions on the European continent from the Late Bronze Age to the Roman period (ca. 1300 BCE-300 AD). As a result, cremated human remains are commonly found in archaeological contexts. The role and the use of fire in funerary archaeology have mostly been linked to the ability of fire to transform the human body into burnt bones and ashes. Beyond its practical purposes, fire in the mortuary context has also been seen as a symbolic means of elaborating or extending the ritual process, enabling a new kind of interaction between the living participants in cremation and the deceased. However, due to the destructive nature of fire and the lack of written sources from the Bronze and Iron Ages, it is extremely difficult to investigate how cremation was performed in past societies. Assessing the variability in cremation conditions over time and space is crucial for understanding the various attitudes of ancient communities towards death and the different methods for managing and treating the deceased. Therefore, it is necessary to turn to other types of evidence to further investigate the burning conditions (e.g., ignition, temperature, fuel, duration, pyre structure, and size, pyre goods, body position, location of the pyre in the environment, extinguishing methods, seasonality, etc.), such as experimental archaeology, archaeological sciences, macroscopic analysis, and ethnographic information.

This session aims to bridge the gap between macroscopic and scientific analysis of burnt human remains and experimental archaeology for understanding pyre technology as well as body and pyre management in ancient societies in which cremation was the main funerary practice. In this session, we welcome presentations from experimental archaeology on pyrotechnology, archaeological sciences, macroscopic analysis, anthracology, and new approach techniques on cremated bones from all chronological periods and without geographical limitation.

ABSTRACTS

1 TRANSFORMING BODIES: THE SIGNIFICANCE OF PYRE TECHNOLOGIES IN THE TRANSFORMATION OF THE HUMAN BODY BASED ON THREE OPEN-AIR CREMATION EXPERIMENTS

Fülöp, Kristóf (HUN-REN Research Centre for the Humanities Institute of Archaeology, Hungary) - Chatzikonstantinou, Ioannis (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Chronaki, Sotiria (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Gucsi, László (HUN-REN Research Centre for the Humanities Institute of Archaeology, Hungary) - Triantaphyllou, Sevasti (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece)

With the appearance of cremation, a significant change took place in the chaîne opératoire of funerals as fire became the central element of the ritual. The use of fire reflects a new perception of the self and the afterlife, giving rise to different body management and treatments before, during, and after cremation.

In our presentation, we focus on the middle phase of this transformation process utilizing experimental methods to gain a better understanding of burning characteristics. Based on three open-air cremation experiments conducted in 2017-2018 (ÚNKP project, Hungary) and 2023 (TEFRA project, Crete), we investigate how pyre technology directly or indirectly influences burning conditions. Among the many factors, the location and weather, the size and structure of the pyre, the ignition technique, the temperature, and the extinguishing method are involved in the analysis. All these technological elements essentially determine the transformation of the human body resulting in charred and calcined bones. Therefore, understanding their characteristics and often invisible interconnections is crucial for the complex analysis of archaeological cremated bones and the reconstruction of former pyre technologies.

2 EXPERIMENTAL CREMATION AS A RECONSTRUCTION OF ANCIENT VENETI RITUALS

Magno, Giovanni (Morgagni Museum of Human Anatomy - University of Padua) - Stamataki, Elisavet (Vrije Universiteit Brussel)

Five open-air experimental pyres were made to reconstruct the funerary cremation rites of Ancient Veneti population, correlating the results with historical, archaeological, paleobotanical and anthropological data from known Bronze and Iron Age contexts in the Veneto region (Italy). Temperature variation and effects of fire on bones and soft tissue were carefully monitored during the cremation process. Furthermore, it has been addressed the various ways of fire extinguishing, including the potential use of wine during the conclusive phases of the cremation, as per ancient funerary customs.

Preliminary analysis on the correlation between burning process and extinguishing damage, bone colors and structural alterations were made through using Photometric Scanner Imaging (PSI), and Fourier Transform Infrared (FTIR) spectroscopy. First results showed some differences in the crystalline state attained, reflected by significant differences in color evaluated by the reflectance measurements using the Photometric Scanner, which could have been correlated to different extinguishing procedures.

A new complete analysis on the bones with modern state-of-the-art analytical techniques are planned to shed a new light on how cremation rituals were performed and how these differences may affect the structural and chemical composition of bones combining FTIR and PSI methods with carbon and oxygen isotope analysis.

3 EXPLORING PYROTECHNOLOGICAL DYNAMICS: INSIGHTS FROM EXPERIMENTAL AND ZOOARCHAEOLOGICAL ANALYSIS OF BURNT SKELETAL REMAINS

Chronaki, Sotiria (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Chatzikonstantinou, Ioannis (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Kadi, Domniki (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Triantaphyllou, Sevasti (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece)

Experimental pyres can contribute in several ways to the reconstruction and interpretation of past human activities involving combustion processes. Identifying thermal alterations in burnt bones derived from experiments can provide valuable insights into the differential use of fire associated with human and animal remains in funerary, ritual, and domestic contexts. In the current presentation, the diverse burning conditions of skeletal remains will be examined under the premise of zooarchaeology. Burnt faunal remains from the earliest sanctuary in northern Greece (Poseidi, Chalcidice), where the use of fire for ritual and non-ritual purposes is attested, were compared macroscopically with burnt bones from various experiments in Greece. The comparison of experimental and zooarchaeological data can enrich our knowledge of pyrotechnics and its dynamics in skeletal manipulation. This research contributes to the broader discussion of the effects of fire on bones, considering factors such as fire intensity and temperature, duration of burning events, proximity of the body to the fire, and the state of decomposition of the burned remains (dry, fleshed, or semi-fleshed) at the time of burning.

4 THE AEGEAN SPARKS: INTERDISCIPLINARY EXPLORATION OF FIRE USE IN EXPERIMENTAL AND PREHISTORIC ARCHAEOLOGICAL CONTEXTS CONTAINING SKELETAL REMAINS

Chatzikonstantinou, Ioannis (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Chronaki, Sotiria (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Fülöp, Kristóf (HUN-REN Research Centre for the Humanities Institute of Archaeology, Hungary) - Kadi, Domniki (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Stamataki, Elisavet (Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, Belgium) - Papathanasiou, Vasso (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Kiriati, Evangelia (Fitch Laboratory, British School at Athens, Greece) - Snoeck, Christophe (Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, Belgium) - Triantaphyllou, Sevasti (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece)

The use of fire in the treatment and conceptualization of the deceased is a complex and diverse social process comprising multiple intellectual pathways. Fire can transform a detectable individual into a set of scattered material remains, while negotiating and defining personhoods, identities, relationships, and funerary beliefs. Critical interpretation of the diverse use of fire in human bones is provided by the systematic macroscopic study of burnt human bones from prehistoric Aegean bone assemblages, the application of innovative infrared and isotopic analyses, and the parallel comparison with new experimental data. This talk presents some of the first results of the complex macroscopic, analytical, and interdisciplinary study of thermal alterations from different sites dating from the Mesolithic (9500-9000 BP) to the Early Iron Age (8th c BCE) carried out in the framework of the TEFRA project. The archaeological data are compared with modern experiments taken place in Greece in order to gain more information about the burning conditions in the prehistoric Aegean.

5 CREMATION IN THE FUNERAL RITE OF THE ANDRONOVO CULTURE: EVIDENCE AND EXPERIMENT (BASED OF THE BRONZE AGE LISAKOVSK SITE, KAZAKHSTAN)

Usmanova, Emma (Buketov Karaganda State University, Margulan Archaeological Institute, Kazakhstan Kazakhstan;)

Cremation was presented in the rituals of the steppe Eurasian cultures of the Bronze Age. There were several stages: preparing the deceased for burning; combustion process; collection of cremated bones; disposition of cremated remains. About 180 burials were opened at the Lisakovsk burial site. Of these 40% contain cremated bones. In the Andronovo burials of the middle 2nd millennium BC the fourth stage of the cremation was recorded as bones placed at the bottom of the grave. As known cases when the cremated human bones mixed with cremated animal bones. The size of the cremated burial corresponded to the size of the inhumated burial. Apparently, the dead body was exposed to fire for a long time. Cremated bones look like fragments measuring 2-3 cm. How did the cremation of the dead body take place in the conditions of the steppe landscape, where wood resources were limited? To understand the cremation process, an experiment was conducted on burning a pig corpse. Combustible materials known to the Andronovo inhabitants were used in the experiment. These were dry dung fuel, branches, felt. A corpse wrapped in felt creates a "candle" effect when burned, providing a long process to destroy. The experiment demonstrated that the slow burning of corpse inside a felt cocoon contributes to the destruction of bones and flesh. The approximate combustion temperature was about 300 degrees. The pig corpse, wrapped in felt, was laid on branches, covered with dry dung fuel and set on fire. The burning process until the flesh was destroyed about 14 hours. The burnt fragments bones were destroyed into cremated fragments up to 3 cm size. The result of the experiment indicates the existence of a similar method of cremation of the deceased in the funeral rite of the Andronovo society.

6 THE EFFECTS OF FUNERARY PRACTICE AND THE BURNING SCENARIO ON SCIENTIFIC INTERPRETATIONS OF BURNED BONE

Monetti, Lisa (Drew University)

Heat-induced changes to bone include alterations to the morphology, colour, and chemistry of skeletal elements. The propagation of fractures on the surface of bone is often observed but an exact cause is not definitively understood. This presentation will investigate the fracture pattern known as patina wherein many small fractures propagate on the surface of burned bone, lacking the energy to break the bone into smaller fragments, but still leaving it noticeably changed, nevertheless. These multidirectional intersecting fractures will be considered not just as a heat-induced change, but rather as the result of interconnections of funerary practice, pyre technology, decomposition of the corpse, and the actions of the living prior to and during the cremation funeral. This presentation will argue that practice, memory, and decompositional changes influence how the skeleton is burned and how we interpret it, in this case using patina as an example.

Experimental archaeology allows for a more holistic investigation into the ways practice, identity, and institutional influence may have affected the ultimate appearance of cremated bone fragments. This presentation will also highlight the need for our ideas of experimental cremation to expand into the interdisciplinary space, taking into account a broad definition of the funeral, considering the timeline of decomposition, and experimenting with materials beyond bone and tissue.

7 TWO CREMATION EXPERIMENTS IN OLD UPPSALA, SWEDEN. OSTEOLOGICAL OBSERVATIONS AND REFLECTIONS ON SOOTINESS, SPATIAL DISTRIBUTION AND FRAGMENTATION

Prata, Sofia (Stiftelsen Societas Archaeologica Upsaliensis) - Sjöling, Emma (Stiftelsen Societas Archaeologica Upsaliensis)

Even though cremation graves are frequently excavated in Sweden, the pyre site is rarely identified. However, in the last decades, several Late Iron Age graves containing clear traces of pyre sites have been excavated, leading to more knowledge but also new questions, some of which could be tested experimentally. We have had the opportunity to participate in two cremation experiments where different animals, food and artefact replicas were cremated. In this paper we are focusing on the osteological part of the experiments. The primary purpose was to investigate the result of direct human influence versus natural processes related to cremation and burial practices. Within this, a variety of relevant issues can be accommodated. In the experiments we focused on the following questions: What affects whether the bones become sooty or non-sooty after the cremation? How does the collapse of the pyre construction affect the spatial distribution of the bones? How does the cremation process affect the fragmentation of the bones? The results and their implications on the archaeological interpretations will be presented together with other observations made during the experiments. The overall aim of this presentations is to convey how the cremation experiments and the study of pyre sites have progressed our understanding of cremation and burial practices.

8 MANAGING FIRE AND BONES: OSTEOARCHAEOLOGICAL EVIDENCE FROM EARLY IRON AGE CENTRAL MACEDONIA, GREECE

Papathanasiou, Vasso (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Triantaphyllou, Sevasti (Department of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Lioutas, Asterios (Ministry of Culture, Greece) - Misailidou-Despotidou, Vasiliki (Ministry of Culture, Greece)

The exposure of the body to fire causes various chemical and structural changes such as discoloration, warping, shrinkage and fracturing of the bones. The examination of these alterations can offer valuable insights into the technology and conditions of cremation process (e.g. temperature, duration, pre-combustion state of bones). Cremation as a means of treating the dead body has a long history in the region of Macedonia, Greece, during prehistoric and protohistoric times. Evidence so far, indicates that cremation appears as early as the Late Neolithic and continued to be applied during the Bronze Age. The practice of cremation becomes more intense during the Iron Age and there is an increase in the number of cemeteries with deposits of burnt human remains; however only a few osteological studies have been carried out so far. The aim of this paper is to present some preliminary results of the ongoing osteological study of cremated bones from two cemeteries, Polichni and Nea Philadelphia, in central Macedonia. Both cemeteries have yielded a significant number of secondary cremation deposits dating back to the Early Iron Age (11th-8th c. BCE). One of the main axes of this research is a thorough macroscopic examination of the thermal alterations of cremated human remains, with a view to understanding the burning conditions and the manipulation of the deceased through fire. These data will be correlated with specific variables, including the biological sex and age of the individuals, as well as the type of cremation deposits (single versus double burials). In addition, the integration of archaeological evidence will further contribute to elucidate social and cultural aspects of this multi-layered practice.

9 BIOLOGICAL AND CULTURAL INSIGHTS FROM CREMATION PRACTICES: A MULTIDISCIPLINARY APPROACH AT EL TORREJÓN DE GÁTOVA

Alapont, Llorenç (Universitat de València) - Burriel, Josep Maria (Museu Arqueològic de Moncada) - Ruiz, Juan José (Fundación Antonia Clavel) - Martí Bonmatí, Luís (Instituto de Investigación Sanitaria La Fe Valencia) - Ginés Cárdenas, Sonia (Instituto de Investigación Sanitaria La Fe Valencia) - Penadés Blasco, Ana (Instituto de Investigación Sanitaria La Fe Valencia) - Gallelo, Gianni (Universitat de València) - Fababuj, Francisco (Independent researcher) - Sabater, Ana (Independent researcher) - Granel, Paula (Independent researcher)

The site of El Torrejón de Gátova, spanning from the 6th century BCE to the 1st century BCE, holds significant archaeological importance in the ancient Edetania territory of the eastern Iberian Peninsula. This location, strategically situated, witnessed colonial contact and exchange during the mid-6th century BCE, as indicated by the presence of sumptuous objects and the construction of extravagant elite funerary enclosures housing cremations. These collective tombs, unparalleled in Iberian culture, suggest a potential paradigm shift in the society's cremation funerary

practices. The ongoing excavation process of one such enclosure has revealed a chamber containing eight cremations, alongside various burnt objects like silver libation vessels, buckles, fibulae, and jewellery items.

This multidisciplinary study employs methods enabling comprehensive analysis of the cremation practice, yielding essential biological data and insights into the cultural significance of accompanying objects. In contrast to inhumations, interpreting cremated remains relies heavily on fragmentary evidence and contextual analysis. This research, focusing on eight Iron Age urns from El Torrejón de Gátova, combines archaeological techniques with bioanthropology, computed tomography, archaeobotany, zooarchaeology, and X-Ray Fluorescence analyses. Through CT scans and micro-excavation, the study reveals distinct depositional pathways for bones and offerings within the urns, shedding light on cremation processes and funerary practices. Multi-element geochemistry and bioarchaeological analyses provide further insights into the Iron Age environment, cremation rituals, bone gathering practices, and final funerary deposition patterns. This comprehensive approach enhances our understanding of burial rites and societal dynamics in ancient Iberian Peninsula.

10 FIRE AND STONE: A UNIQUE CREMATION MEGALITHIC TOMB IN IBERIA

Becerra Fuelle, Paula (University of Granada) - Aranda Jiménez, Gonzalo (University of Granada) - Díaz-Zorita Bonilla, Marta (University of Tübingen) - Vilchez Suárez, Miriam (University of Granada) - Robles Carrasco, Sonia (University of Granada) - Sánchez Romero, Margarita (University of Granada)

Iberian megalithic funerary rituals are characterized by multi-depositional events creating complex palimpsests. This is the case of southeastern Iberia, one of the classical Iberian megalithic regions. Archaeological fieldwork undertaken in 2023 at Los Milanes site (Abla, Almería), revealed a necropolis composed of at least 18 tholoi or tombs with circular chambers covered by false vaults. The excavation of Tomb 8 showed an unknown funerary ritual that consisted of thousands of cremated bone remains. The bone assemblage, currently under analysis, is made of highly fragmented human remains with clear thermal alteration. The macroscopic characteristics of the human bones showed all types of coloration ranging from brownish to chalky white and a wide range of heat induced fractures including patina and warping. The cremated bones belong to different anatomical regions including even small bones, such as sesamoid bones, feet phalanges or carpal bones from at least a minimum number of 16 individuals. The absence of ash and charcoal associated to the cremated bones suggests that the funerary chamber was not where the pyre was located. Currently, the pre-burning conditions and heat induced features are being explored through a set of bioarchaeological analyses, which allow us to interpret the original position of the corpses and/or skeletons in the pyres and to reconstruct the paleodemographic profile of this population. Other additional techniques such as SEM or FTIR would also be applied to understand the cremation process.

The analysis of this assemblage from Los Milanes throughout bioarchaeological methods is key to understand the complexity and the wide variety of funerary practices that were taken place at megalithic monuments.

11 SPECTROSCOPIC AND ISOTOPIC STUDY OF INTENSITY OF FIRING OF CREMATED HUMAN REMAINS FROM ROMAN BURIALS FROM HADRIAN'S WALL, UK

Mays, Simon (Historic England) - Schulting, Rick (University of Oxford) - Pouncett, John (University of Oxford) - Snoeck, Christophe (Vrije Universiteit Brussel) - Wilmott, Tony (Historic England)

Study of cremation burials from a two-phase, 2nd-3rd century AD Roman cemetery serving a fort and associated civilian settlement at Birdoswald, Hadrian's Wall, indicated greater frequency of structural nails as finds in later phase burials. This may relate to greater use of scrap wood as fuel in pyres in later burials. In order to test the hypothesis that this apparent alteration in fueling resulted in differences in firing intensity of the human remains, seven parameters relating to conditions of firing were analysed: $\delta^{13}\text{C}$, $\delta^{18}\text{O}$, infra-red splitting factor (IRSF), type A+B carbonate: type B carbonate ratio (C/C), hydroxyl: phosphate ratio (OH/P), type B carbonate: phosphate index (BPI), and cyanamide: phosphate ratio (CN/P). IRSF, C/C, OH/P, BPI and CN/P were collected using FTIR in absorbance mode; $\delta^{13}\text{C}$, $\delta^{18}\text{O}$ using isotope ratio mass spectrometry. Bone fragments from a total of 30 burials were analysed. Multivariate statistical analyses of the results indicate a statistically significant difference between phases. The pattern of differences suggest that it was later phase burials that may have been subjected to less intense firing. These results are discussed in the light of the above-mentioned evidence for changes in fueling of pyres, and in the light of palaeo-environmental evidence for depletion of woodlands in the region of Hadrian's Wall in the Roman period.

12 UNVEILING THE FIERY PAST: INSIGHTS INTO THE CREMATION PRACTICES AT GALLO-ROMAN TIENEN USING CARBON AND OXYGEN ISOTOPE ANALYSIS AND FTIR-ATR

Frère, Anneminne (Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium; Brussels Research Centre on Innovation in Learning and Diversity, Vrije Universiteit Brussel, Brussels, Belgium) - Stamataki, Elisavet (Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium) - Legrand, Emma M. (Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium) - Martens, Marleen (Flanders Heritage Agency, Havenlaan 88/5, 1000 Brussels, Belgium) - De Mulder, Guy (Department of Archaeology, Ghent University, Sint-Pietersnieuwstraat 35, 9000 Ghent, Belgium) - De Backer, Free (Brussels Research Centre on Innovation in Learning and Diversity, Vrije Universiteit Brussel, Brussels, Belgium) - Snoeck, Christophe (Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium)

During the Roman Period (ca. 52 BCE - 406 AD), cremation was the main funerary practice in the Belgian region, characterised by an increase in the number of cremation burials. This is illustrated by the findings in Tienen, where the largest Gallo-Roman cemetery of the Low Countries was discovered with >1400 cremation deposits. These findings were already analysed for strontium isotopes and concentrations to investigate population dynamics. However, information on the way cremation was performed is lacking, despite the site's potential for unique insights due to the large amount of cremated remains, the coexistence of diverse types of cremation deposits, the quantity of grave goods and the different chronological phases of use.

The aim of this study is to use state-of-the-art analytical techniques such as Fourier Transform Infrared Spectroscopy in Attenuated Total Reflectance mode (FTIR-ATR) and carbon and oxygen isotope analyses to gain more insights into the pyre technology and body treatment at the Gallo-Roman cemetery of Tienen (1-4th c.AD). Furthermore, the existence of variations in cremation conditions across the different chronological phases, deposit types, and the amount and/or type of grave goods were also investigated. For this reason, a total of 146 fully calcined diaphyses of long bones were analysed. Initial results indicate a high degree of homogeneity in burning conditions at the cemetery of Tienen, confirming the assumption that there was little socio-economic variety at the vicus of Tienen during the Roman period. Finally, the infrared and isotopic data of Tienen were compared with the data of five neighbouring Gallo-Roman cemeteries to enhance the understanding of the way cremation was performed in Belgium during the Roman period.

13 JOURNEY THROUGH AGES: TRACKING STRONTIUM SHIFTS ACROSS ADULT LIFE STAGES

Waltenberger, Lukas (University of Vienna; Austrian Academy of Sciences) - Fritzl, Michaela (Austrian Academy of Sciences) - Skerjanz, Hannah (Austrian Academy of Sciences) - Verdianu, Domnika (Austrian Academy of Sciences) - Rebay-Salisbury, Katharina (University of Vienna; Austrian Academy of Sciences)

Strontium isotopes are commonly used to study mobility in archaeological case studies and are linked to strontium ratios in different geological zones. Specifically, strontium ratios reflect the origin of food sources of single individuals. Especially for cremated remains with their limits, reconstructing people's osteobiographies, strontium provides valuable additional information on mobility during the life course in prehistory. We combined strontium isotope analysis with state-of-the-art age-at-death estimation of Late Bronze Age cremated remains originated from the Traisen-valley in Austria. Using tooth cementum analysis, we could significantly improve the age-at-death estimation as root fragments could be regularly recovered from cremated remains, but a morphological age-at-death estimation is imprecise due to a lack of diagnostic elements. Especially individuals over 40 years are usually underrepresented in urn fields. By assigning adult individuals to age groups based on TCA results, we analyze differences in the trends of strontium intake over their lifetimes and highlight the underrepresented group of late mature and senile individuals in the Late Bronze Age.

14 EXPLORING ELEMENTAL DYNAMICS IN CREMATED BONE: A GEOCHEMICAL EXPLORATION USING EXPERIMENTAL ARCHAEOLOGY

Vegh, Emese (AMGC, Vrije Universiteit Brussel) - Kaskes, Pim (Laboratoire G-Time, Université Libre de Bruxelles) - Boonants, Tom (AMGC, Vrije Universiteit Brussel) - Goderis, Steven (AMGC, Vrije Universiteit Brussel) - Snoeck, Christophe (AMGC, Vrije Universiteit Brussel)

The crystal structure of cremated bones recovered from archaeological sites is thought to be chemically stable after burial. Yet, understanding the persistence of elemental composition post-cremation and burial remains incomplete, potentially involving exchanges with the environment and leaching of endogenous trace elements. A *Bos taurus* femur was sectioned and burnt at controlled temperatures (250-700°C) and subsequently subjected to a simulated burial solution (comprising K, Mg, Al, Sr, Ba, Zn, Cl, Na at 10 ppm and Fe, Zr, Si, Ce, S, Mn at 1 ppm). The research aims to replicate potential post-burning elemental introduction processes using experimental archaeology. Major and trace element concentrations pre- and post-burning and pre- and post-doping were determined using micro-X-ray fluo-

rescence (μ XRF) high-resolution element mapping and linescans (25 or 200 μ m resolution from the inner trabecular surface towards the outer bone cortex), as well as bulk inductively coupled plasma mass spectrometry (ICP-MS). These measurements were repeated following standard pretreatments procedures typically applied in preparation of the analysis of cremated bones for ^{14}C dating and isotopic studies. Elemental mobility was simulated with a diffusion-advection model. Preliminary results indicate stability in major elements (Ca and P) in bone. Bone burnt up to 600°C displays uptake in Al, Mn, Zn, Sr, and Ba, not observed at 700°C. Conversely, Mg and Cl show an inverted pattern, while K and S demonstrate a tendency to leach out of bone. Thus, cremated bones not reaching calcination lack chemical stability, showing uptake and leaching of specific elements.

629 LIVING THROUGH CRISIS: URBAN HOUSEHOLD ARCHAEOLOGIES IN THE MEDIEVAL WORLD

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Jervis, Ben (University of Leicester) - Haase, Kirstine (Museum Odense) - Radohs, Luisa (Albert-Ludwigs-Universität Freiburg) - Morton, Benjamin (University of Leicester)

Session format: Regular session

The household offers a scale of analysis on persistence and change appropriate to understanding the variability of lived experiences in the medieval world. It offers a contrast to studies of towns and cities at the scale of the settlement, which are necessarily prone to degrees of generalisation and abstraction. Households are sites of consumption, social production, economic activity and care, which provide a window into the social relations constitutive of urban life. Urban households are heterogeneous, with varying economic bases, levels of wealth and demographic composition. As such, their study allows for the development of a nuanced understanding of how urban communities lived through the crises and turbulence of the Middle Ages, and, by extension, the complexity and diversity of urban lived experiences.

The aim of this session is to develop a comparative, household-scale approach to urban life in the medieval World (broadly conceived as the period c500-1600). Specifically, we wish to explore issues such as:

How do experiences of urbanity vary within and between households?

How did households experience and act on moments of crisis or change?

How do households contribute to the sustenance of the wider fabric of medieval urbanism?

How do the actions of households shape wider neighbourhoods, communities, and settlements, and how are they shaped by their wider social relations?

Contributions which explore a range of evidence including, but not limited to, material culture, buildings, environmental remains and historical sources are welcome, and contributions which explore households in an explicitly comparative sense are particularly encouraged. The session is a collaboration between 2 research projects; ENDURE: Urban Life in a Time of Crisis (which explores urban lifeways in later medieval England) and Consequences of Crisis (which explores the consequences of crisis on towns in later medieval Scandinavia).

ABSTRACTS

1 INTRODUCTION: HOUSEHOLDS AND CRISIS IN MEDIEVAL TOWNS

Jervis, Ben (School of Archaeology & Ancient History, University of Leicester)

In setting the scene for this session, this contribution will briefly define the term household in relation to the medieval urban contexts and explore some ideas of how urban communities, particularly in England, lived through, anticipated and dealt with moments of crisis.

Households can take a range of measures to anticipate, and seek to prevent, crisis. These may range from growing food to ensure sustenance to digging channels or raising ground levels to prevent flooding. These anticipatory actions can be understood as resilience building at the domestic scale, providing insights into the kinds of potential crises which households perceived, and what elements of their lives they sought to protect. Such actions can have wider consequences, representing trade-offs between different priorities and being potential sources of dispute and tension between neighbours or communities. Furthermore, some crises may not have been anticipated, or have been worsened by measures to prevent other kinds of event.

This paper introduces the session through an exploration of the anticipatory action taken by households in medieval English small towns, based on a national survey of excavation data from these settlements. It will explore the kinds of anticipatory actions taken by households, examine how this action varies contextually and considers its consequences for the persistence of urban lifeways through the turbulent period of the later 14th and early 15th centuries.

2 THE BUILT ENVIRONMENT AND ITS ROLE IN SHAPING HOUSEHOLDS AND COMMUNITIES IN LATE MEDIEVAL ENGLISH TOWNS

Morton, Benjamin (Cardiff University; University of Leicester)

Traditionally, studies examining the houses of ordinary medieval households have focused on understanding forms and methods of construction and how buildings reflect the social standing and wealth of their inhabitants. This approach that sees historic buildings as simply illustrative of past economic and social conditions has been challenged in studies adopting a social constructivist perspective, such as those inspired by structuralism (see, for example, Austin and Thomas 1990) and post-structuralism (see, for example, Johnson 2010, Giles 2007 and Mileson 2015). Those who have adopted this theoretical perspective have primarily focused on rural households and communities, as well as high-status and public buildings in towns.

This paper explores how the houses of ordinary town dwellers in small towns shaped household and community experiences, social practices and identity in late medieval urban communities. A series of case studies of individual towns across England will examine how variations in house size, layout and positioning within plots shaped social practices and identities within these urban communities. The built environment of these towns will not simply be seen as an adjunct to their economic and social history but as an essential factor in accounting for changes on a household and community scale. This study uses evidence derived from standing buildings, topography and archaeological excavations.

The following questions are examined:

- How did the built environment change in response to the economic and social conditions of the late medieval period in the case study towns?
- What was the extent to which earlier medieval material and social conditions within the towns shaped these changes?
- What was the effect of these changes in the built environment on social practices and identities within households and communities?

3 INDUSTRIALISED HORTICULTURE & FOOD SECURITY: ADAPTING URBAN GARDEN SPACE FUNCTIONALITIES THROUGH CRISIS IN MEDIEVAL ENGLAND

Evetts, Kate (University of Leicester)

Studying households illuminates aspects of economic activity, production, consumption, social interaction, and individual pursuits of urban life. Gardens, defined here as urban open spaces within housing plots, play into all of these aspects, being places of utility and beauty no matter the scale. However, garden spaces and features are often not considered in depth within urban archaeology as open spaces are typically under-theorised compared to the built elements of urban landscapes. Yet, gardens must have been important spaces for medieval people, whether for industrial, dietetic, or recreational use, as they ultimately take away space from houses within plots. Therefore, urban garden spaces can reveal aspects of varied experiences of urbanity that have previously been overlooked.

This paper investigates townspeople's responses to the various political, agricultural, and health crises of the medieval period (c.1200-1600 CE), with particular focus on those of the fourteenth century. This is achieved through an assessment of archaeobotanical, cartographic, architectural, and artefactual data from the case study town of Huntingdon, Cambridgeshire, UK. Evidence for changing land use, including agricultural practices, industrial activity, and abandonment, is critically appraised to illuminate the decisions and performances of urban life made by inhabitants and landowners at the time of crisis. Ultimately, this paper highlights the potential of assessing evidence of change within urban garden spaces in informing on the endurance of town communities in the wake of the famine, war, and disease of fourteenth century England.

4 PERIPHERAL URBAN HOUSEHOLDS IN THE MEDIEVAL CITY OF CAHOKIA, NORTH AMERICA

Baltus, Melissa (University of Toledo) - Baires, Sarah (Eastern Connecticut State University)

Households offer a unique window into individualized patterns of social relations as they shape communities through daily practice. Our research focuses on neighborhood communities located on the physical periphery of North America's largest Medieval City, Cahokia (1050 - 1400 CE), located in the Mississippi River floodplain dubbed the American Bottom. We investigate domestic households and related community buildings and spaces to understand how persons located on the margins participated in place-making during the critical moments of city emergence and reorganization. The research presented is derived from two seasons of field work at Cahokia using non-invasive geophysical survey methods and targeted excavation of domestic features to understand how communities, at the domestic level, chose to participate in the process of city creation and/or dissolution. We compare size, style, and organization of houses over time to describe neighborhood dynamics and timing (founding, reorganization, dissolution). We also compare access to key materials and evidence for participation in practices that are central to Cahokian structuring principles and ideologies to determine how connected peripheral communities were to the core of the

city. Our data are preliminary and speak to the dynamics of social change on the edges of a densely populated urban environment, as well as to the contributions of peripheral neighborhoods to the success or decline of a city.

5 LIVING IN STRALSUND'S QUARTIER 17- COMPARATIVE STUDIES OF HOUSEHOLDS IN A LATE MEDIEVAL QUARTER OF A NORTH GERMAN TRADING TOWN

Radohs, Luisa (University of Freiburg)

During the reconstruction of the area Quartier 17 in the Hanseatic town of Stralsund (northeastern Germany), extensive rescue excavations were carried out in 2007-2008 and 2010-2011. The archaeological investigation of an almost complete urban quarter with 30 plots provides deep insights into the genesis and development of a central residential area of the medieval trading town.

For the paper, selected plots of Quartier 17 were analysed comparatively for the 13th and 14th centuries according to a uniform scheme that includes the find material, the spatial organisation of the plots, building types, layouts and materials, the plot size and its positioning within the overall urban topography. The approach enables a classification of the parcels through material culture and thus an archaeological description of the variance and diversity of households in this urban neighbourhood. It opens up for analyses of lifestyle, occupation, consumption and, through the diachronic perspective, the temporal development of individual plots in a central quarter of medieval Stralsund.

6 ACTIVITIES, FUNCTIONS AND INNER STRUCTURES OF HOMESTEADS AT THE EARLY MEDIAEVAL STRONGHOLD POHANSKO (CZECH REPUBLIC)

Příšáková, Michaela (Department of Archaeology and Museology, Faculty of Arts, Masaryk University, Czech Republic) - Adameková, Katarína (Institute of Archaeology, Czech Academy of Sciences, Czech Republic) - Dresler, Petr (Department of Archaeology and Museology, Faculty of Arts, Masaryk University, Czech Republic)

The Early Mediaeval stronghold Pohansko (9th – 10th century), one of the Great Moravian centres, has a very specific inner structure consisting of at least 20 homesteads out of which 8 have been archaeologically excavated. Most of them are more or less of rectangular shape, however they vary in size, function and layout. When examining Early Mediaeval strongholds in the Central Europe, the built-up area within them seems to be without firmly set urban planning rules. The urban plan of the stronghold at Pohansko indicates that this may not have always been the case.

The homestead consists of sunken-floored houses of various functions, features built on the original surface, possibly of timber construction, hearths and in some cases graves and preserved parts of palisade trenches. Some of them were associated with crafts such as specialized blacksmithing or non-ferrous metal production, non-specialized home textile production, as well as carpentry, cooperage and pottery manufacture. In addition, the number of finds of agricultural tools and large osteological assemblages also implies an agricultural and breeding function.

Here, we will compare the excavated evidence with the results of geophysical and geochemical prospections to describe similarities and differences between homesteads, considering their function and spatial distribution on the site. We will describe their internal structure, together with open spaces, waste management inside the homestead and spatial distribution of the finds and we will address the issue of homestead recognition.

7 HOUSES AND POTTERY. A RECENTLY EXCAVATED HOUSE OF MADĪNA BALAGHĪ (BALAGUER, CATALONIA, SPAIN)

Alcolea, Guillem (Universitat Autònoma de Barcelona) - Granell, Helena (Universitat Autònoma de Barcelona) - Padilla, Andrea (Universitat Autònoma de Barcelona)

The archaeological site of Pla d'Almatà (Balaguer, Lleida, NE of Spain) is the deserted city of Madīna Balaghī, located in the so-called Upper Frontier of Al-Andalus. Its 27 hectares are delimited by a wall to the west and east and by River Segre cliffs to the east and south of it. Islamic occupation of Balaguer can be traced back to the beginnings of the 8th century and continued until the start of the 12th century. The settlement fell under the rule of count Ermengol VI of Urgell in 1105, after a long siege, that resulted in the expulsion of muslim population. The city was not reoccupied and, therefore, it became an exceptional archeological site. Between 2004 and 2009 four houses were excavated and since 2023 the excavation of another house is being carried out. This paper presents the architectural study and the ceramics recovered from this house. The aim is to identify the function of each part of the house through the study of the distribution of the ceramics and fireplaces. Finally, the presence of a stratigraphic layer of carbons and ashes with burnt ceramics under the tiles of a collapsed roof constitute an evidence of a fire at the moment of abandonment.

631 "A DAY WITHOUT POTTERY IS A DAY WASTED" - POTTERY TECHNOLOGY AND MANUFACTURE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Hall, Derek (Independent Researcher) - Witte, Frauke (Museum Sønderjylland) - Brorsson, Torbjorn (KKS-Kontoret for Keramiska Studier) - Roeser, Christian (LVR-LandesMuseum Bonn)

Session format: Regular session

The creation of fired clay pottery vessels was a vital and widespread process across medieval and post-medieval Europe and many different distinctive styles were produced. This session aims to discuss and consider the various methods of pottery production that were in use. It will look into how the different types of kiln in use come into being. Is it possible to identify external influences and if so, where are they coming from. It can be argued that it was Roman influence that introduced technology such as the use of updraught kilns in the firing process. But in those parts of Northern Europe where there was little, or no such influence are we looking at a much later development with an unknown place of origin.

Did the making of specific wares like stoneware spread from a single production centre or was it invented individually across Europe? Is it possible to identify the transfer of techniques, for example the transfer of tin-glaze technology from the Mediterranean to the Netherlands, England and southern Germany, and understand the causes of that process? Are similar things happening elsewhere in Europe? In Northern Europe it would appear that the wheel-throwing of pottery was introduced in the 12th Century primarily by German potters who brought that technique with them. Is it possible to identify when local potters adopted that technique and if so where in particular.

The organisers would welcome papers that highlight ceramic craft, transfer of technology and innovation from both a macro and micro perspective from across medieval and post-medieval Europe. The main point of interest for this session is whether it was the movement of people or the transfer of ideas and technology that changed pottery production practices throughout Europe.

ABSTRACTS

1 POTTERY FROM THE CASTLE OF CASERTAVECCHIA: A FIRST ANALYSIS

Napolitano, Salvatore (Università degli Studi della Campania) - Sordillo, Valerio (Università degli studi della Campania "Luigi Vanvitelli") - Ianniello, Veronica (Università degli Studi della Campania Luigi Vanvitelli)

The castle of Casertavecchia, a fortress located on the north-eastern edge of the current town, stands out on a crag of Mount Tifata which overlooks the Terra di Lavoro plain (Caserta) from the north.

Over the last century the castle has been the subject of numerous restoration interventions, first of all an intervention in 1972 by the Civil Protection of the municipality of Caserta. During these non-archaeological operations, a significant number of artefacts linked to the life of the fortified complex were found, including iron elements such as nails and clasps, fragments of molded tuff and a significant quantity of ceramic fragments.

Two bases of protomajolica bowls stand out for their conservation, a class widely attested in the Mediterranean and southern Italy. The decoration, very common in the contexts of Campania in general, is represented by a brown spiral on the bottom of the bowl.

Another class of pottery present is the painted glazed one. Particularly noteworthy is a base decorated with a concentric circle motif that is very common in Campania contexts.

The discovery of these two classes of ceramics, albeit not in a stratigraphic sense, allowed us to include the castle of Casertavecchia in the distribution network of these artefacts in the late medieval contexts of Campania.

Together with these sporadic finds, the contribution offers a preliminary analysis of the first clay finds that emerged during the archaeological research launched in 2021 by the University of Campania "Luigi Vanvitelli", focusing on common ceramics without coating.

This contribution presents itself as a first examination of the consumption of ceramics in the castle, especially with regard to the stratigraphic contexts relating to the final phases of the monument, the latter to be placed in the years between the end of the 15th and the beginning of the 16th century.

2 'WHERE HAVE ALL THE KILNS GONE?' POTTERY MANUFACTURE IN MEDIEVAL SCOTLAND

Hall, Derek (Independent Consultant)

Since its Renaissance in the 1990's due to the availability of targeted research funding the study of Scotland's medieval pottery industry has allowed us to understand what was being made for daily use across the country. However, we are still in the situation where we only have five excavated production sites at Stenhouse, Falkirk Council, Colstoun,

East Lothian, Rattray, Aberdeenshire, Throsk, Stirlingshire and Roslin in Midlothian. Ranging in date from the late 12th through to the 17th/18th centuries all these sites have largely been found by chance. It seems clear from the extensive excavation work that has now been carried out in Scotland's medieval burghs that pottery manufacture was not taking place within their confines largely due to fire risk and/or availability of space. This paper will use the excavated sites to consider what we currently know about the kiln types in use, firing methods, clay exploitation and the pottery workshops. Consideration will then be given as to how to track down more production sites and seek the funding required for that fieldwork. A short overview of apparent external influences on Scottish pottery design and manufacture will also be given.

3 NO ROMANS – NO POTTERY CIVILIZATION!?

Witte, Frauke (Museum of Southern Jutland, Denmark)

The influence of the Roman Empire can only be seen marginally in Scandinavia, and not at all in the styles or types of local medieval ceramics. The first wheel thrown pottery from Denmark dates to 725-760 AD. But it was not until the 12th century AD that the fast-turning potter's wheel came into general use. Around 1200 the evolution from black fired pots to red fired glazed jugs began. The oldest medieval kiln so far from Denmark is C14-dated to 1020-1160 AD. Vertical and horizontal kiln types are both found in the following centuries.

In the early 15th century, the High Medieval tradition of pottery making in the Danish region disappears and a completely new type of pottery emerges with a new firing technique and new vessel shapes, techniques and decorations. This 'younger redware' is probably modelled on Dutch pottery. In the Netherlands, it first appears in the early 14th century, while production did not spread to Denmark until just over a century later. As yet, no pottery kilns have been found that can be linked to this new production in the 15th century. However, production did not take place in the same place as the production of the high medieval glazed jugs, nor did it take place in the same way. It is reasonable to imagine that the production of ceramics moved to the cities, where we have the first kiln finds, although they are a good 100 years younger.

The significant technical and formal difference between High Medieval and Late Medieval domestic pottery in Denmark suggests that there is no continuity between the two productions. Immigrant potters may have played a decisive role here.

4 THE ORIGINS OF FAIENCE PRODUCTION IN ALSACE : JEAN-HENRI WACHENFELD'S WORKSHOP IN STRASBOURG IN 1720

Arnold, Elise (Archéologie Alsace) - Minot, Florent (Archéologie Alsace) - Wendling, Jean-Michel (independent researcher)

Excavations carried out in 2020 at the 1, rue de la Question in Strasbourg (France), unearthed the poorly preserved remains of a potter's kiln from the modern era. Thanks to archival documents, this kiln - and the few production failures that were found on site - could be attributed with certainty to the potter Johann Heinrich Wachenfeld. Wachenfeld came to Strasbourg in 1719 from Bavaria. Back there, he worked for a short period of time in the city of Ansbach as a painter and faience maker. His goal in Strasbourg was to set up a faience factory whose production techniques were unknown in Alsace at the time. Shortly afterwards, he joined forces with Charles-François Hannong, to whom he seems to have passed on the techniques that would later make Hannong's Strasbourg faience works such a success.

Thus, the unfinished ceramics discovered during the excavations (a jug and a few fragments of biscuit plates) represent the very first attempts at producing faience in Alsace. The particular type of jug, produced in the purest Nuremberg faience style of the early 18th century, leaves little doubt as to the identity of its maker, identified by the archives as Johann Heinrich Wachenfeld. The documents also enable us to retrace the requests made to the city of Strasbourg by the potter to set up his workshop. They also detail the various attempts to build the kiln, the technology of which was clearly still poorly mastered.

Field discoveries combined with archival documents have enabled us to demonstrate, quite exceptionally, that the techniques for producing faience vessels arrived in Alsace from southern Germany, thanks to the knowledge and movement of a single man.

5 TECHNOLOGY AND DISTRIBUTION OF POST-MEDIEVAL CERAMICS FROM THE BAY OF CÁDIZ (SPAIN)

Ruiz-Gil, José-Antonio (Universidad de Cádiz)

Starting in the 13th century, a set of port structures of a military, fishing and commercial nature were consolidated in the Bay of Cádiz. From this moment on, the Islamic ceramics produced locally were complemented by other productions that came, mainly from Valencia in Spain. From the end of the 15th century the Bay of Cádiz will supplement the hegemonic role of Seville. From the ceramic point of view, it is observed in the productions of Seville, Liguria and

Tuscany, and to a lesser extent the Rhineland stoneware from Flanders, all of which are registered in the distribution centre of Cádiz. During the 17th century, Cádiz became the head of American trade, where we found Spanish ceramics, mainly from Seville, that imitated Italian ones and even Chinese porcelains. During the 80 years of peninsular unity, majolica from Lisbon and ceramics from Estremoz were very common. From Cádiz, both Ligurian or Montelupo majolicas and marbled and sgraffito no tin majolicas from Pisa are traded. Without forgetting the decorations in cobalt blue on tin white of the Nederland. During the 18th century, the Islamic tradition of glazing was clearly replaced by porcelain ceramics that imitated Chinese tableware. This ceramic was imitated in Seville during the 19th century. The complement this time will come from stoneware bottles made in Germany. At a Micro level, the data from the Cádiz distribution centre speak of the movement of people through commerce, not so much the transfer of ideas and technology. Not so at a macro level, since these ceramics always have production-supplying centres that do speak to us about innovation and technological transfer, such as that produced in Italy and taken to Seville or to Flanders. And from here to Lisbon. Or in medieval times from Malaga to Valencia.

6 PATRIX – MATRIX – TILE. A “FRAGMENTARY” INSIGHT INTO TRADE CONNECTIONS AND ROUTES

Wegner, Martina (Archaeological Heritage Office of Saxony)

From 2004 to 2006, excavations were carried out in the suburb of Leipzig, Saxony, prior to the construction of the “Wilhelm-Leuschner-Platz” S-Bahn station. A number of waste pits from several potteries from the 16th/17th century were uncovered. In addition to ceramic vessels, they also contained several thousand fragments of stove ceramics. These include not only relief tiles, but also their ceramic positive and negative moulds, some of outstanding quality. Many of the tile motifs, which are based on contemporary woodcuts, are known both regionally and supra-regionally. The finds from Leipzig were 3D-scanned at the Archaeological Heritage Office of Saxony. The highly detailed 3D models were used for image documentation and also for comparison with finds from other sites that had the same images. The initial question was along which route the motifs spread, i.e. which pottery was the one that created the motif and which took it over, and which of the products – positive or negative moulds or tiles – were sold. For this purpose moulds from other pottery waste were also 3D-scanned. As a result, the 3D models confirm an elaborate multi-part production process for stove tiles using primary and secondary moulds. However, the lack of objects suitable for 3D scanning and comparison limits reliable information on the trade route of the pottery products. Nevertheless, the examples shown are intended to draw attention to the importance of a differentiated and precise view when analysing relief stove ceramics. The widespread motifs not only provide us with insights into past zeitgeist, trends and fashions, but in the best case even reflect individual trade relationships. Another unanswered question is whether the products were traded via the potters themselves or via middlemen. In any case, the potteries of the important trade fair city of Leipzig must have played an important supra-regional role.

7 THE EMERGENCE AND ESTABLISHMENT OF A MEDIEVAL POTTERY PRODUCTION IN SCANDINAVIA

Bronsson, Torbjörn (Ceramic Studies) - Johansson, Erik (Department of Archaeology and Ancient History, Lund University)

Northern Europe has often been considered an outpost and it was an area where innovation came later than the rest of the Western world. In Scandinavia and Finland, it started around 4500 BC. making vessels from clay and this craft has usually been considered a home craft.

South of the Baltic Sea, the ceramic craft was already in the Viking age mainly a professional craft, but despite this, the Nordics chose to still make the vessels based on the same methods as they did during the Neolithic. Only at the end of the 12th century are there the first indications that the pottery craft changed, and the first traces are of wheel thrown pottery, glazes and pottery kilns. Why did this happen at this time and why not earlier?

Different studies of thin section and ICP-MA/ES have showed that it is possible to identify where and when a professional pottery production started in different parts of Scandinavia.

We will also present a case study based on pXRF analysis of 400 diagnostic sherds of redware and greyware from the period 1150-1350 found in Lund, Sweden. Using chemical analysis in combination with traditional ceramic analysis and rim form analysis, we want to discuss the emergence and establishment of the glazed redware production in Scania. The questions we want to address are: When was the Scanian production established? From where came the influence or competence? What did the organization of the Scanian pottery craft look like?

8 CLAY AND CHANGE: CHARACTERIZATION OF CERAMIC PRODUCTION IN MEDIEVAL AND MODERN TIMES IN FARO DE LIMANES, ASTURIAS, SPAIN

Piñera, Francisco (Universidad Nacional de Educación a Distancia UNED. Departamento de Prehistoria y Arqueología. Programa "Severo Ochoa" de Ayudas Predoctorales del Principado de Asturias)

Faro de Limanes, Principado de Asturias, Spain is one of the most important pottery centers in the northwest of the Iberian Peninsula for medieval and modern times, with activity from the 11th century to the present. In medieval times, only black wares were produced, which responded, above all, to forms related to the preparation and storage of food. In modern times, tin-lead glazed, white lead glazed wares and honey-glazed wares productions are added, dedicated to food consumption. These pieces appear in large quantities and in a multitude of archaeological contexts, reaching a notable dispersion throughout the northern Iberian Peninsula

Our proposal entails the multidisciplinary study of Faro de Limanes and its ceramic productions, combining traditional archaeological and ceramic analyses with archaeometric techniques and Digital Humanities. Ceramics from Faro de Limanes have been examined in numerous archaeological contexts with well-defined chronologies, including pieces from the production center itself. For the first time, a chrono-typological approach is presented alongside a technological characterization based on archaeometric analyses for its entire ceramic repertoire from the 11th century to the 18th century.

Analyzing this long-operational production center provides a unique opportunity to observe diverse technological changes and evolutions in production methods reflected in its pieces. Adaptations in the ceramics of Faro de Limanes mirror the dynamics of the societies that created and utilized them, capturing the nuances of their developments and transformations over time.

9 LATE MEDIEVAL POTTERY FROM BENEVENTO CONTEXTS

Cammarota, Claudio (Università della Campania "Luigi Vanvitelli")

The present paper focuses on a survey of late medieval tableware pottery from excavations conducted in the Benevento town and the surrounding area, dating back to the first fifteen years of the 2000s. The study was conducted by the team of medieval archaeologists from the Department of Humanities and Cultural Heritage (DiLBeC) of the University of Campania, who have been conducting research in Benevento for some time with the aim of reconstructing the material history and identifying the transformations of the city during the Middle Ages. The data obtained from the macroscopic analysis made it possible to identify the main characteristics of the finds, most of which may have been produced locally. Of particular interest are the productions covered with tin and lead-based vitreous coatings. The study of the ceramics, in addition to providing chronological references useful for dating the archaeological layers, has allowed us to understand social, economic and cultural aspects of the communities to which they belonged.

10 EVOLUTION OF POTTERY PRODUCTION IN MEDIEVAL FLANDERS: TRACING CULTURAL INFLUENCES AND TECHNOLOGY TRANSFERS (8TH-14TH CENTURY)

De Groot, Koen (Flanders Heritage Agency)

Excavations and studies in the last decade have revealed a lot of new data and insights into local and regional pottery production and consumption between the 8th and 14th centuries in Flanders. There is a clear technical shift from the Carolingian period onwards in both fabrics and forms that is clearly part of a broader cultural evolution. Broader general trends as well as direct influence play a role in this. For example, there is some indication that itinerant potters were active. The acculturation of international trends is also clearly observable in subsequent centuries and can recently be demonstrated in newly discovered production sites.

Influence and technological transfers in Flanders occurred from various surrounding European regions, both south and east, from northern France, the central Meuse valley to the Rhine region. Some of these technological transfers formed the starting point for important innovations in local productions that continue to have a significant impact until many centuries later. The lecture aims to give an overview of the broad outlines and important turning points between the 8th and 14th centuries, highlighting the many new data from recent research.

11 EIGHTEENTH CENTURY TILES FOUND AT SAINT-JEAN-DU-DÉSERT, MARSEILLE, FRANCE

Abel, Véronique (INRAP - National Institute for Preventive Archaeological Research)

Monograph study about me hundreds of tiles from the same archaeological context in the Marseille region. Beside an eclectic iconography, this group attests hitherto unknown technical innovations. Thanks to this archaeological excavation a new kind of production, until now unknown for this period and not recorded in the texts, has come to light.

The half pan carré tiles with painted decoration reveal a technical ability which is not completely obscured by the fact that these are "second rate" objects. Even if the simple hand-painted floral or geometric designs do not attest great painterly talent, their number and variety are indications of a well-established production. Later due to a lack of qualified craftsmen, or the means to pay them, the manufacturers moved towards mechanical systems for the more complex decorations. The impression of hand painted decoration is maintained either by chance or intent. This discovery would point to an hypothetical although possible transfer of technology between faience craftsmen and those of other trades.

12 POTTERY OF WESTERN ORIGIN AND THEIR INFLUENCE IN CENTRAL TRANS-DANUBIA (HUNGARY) IN THE LATE MIDDLE AGES

Kovács, Bianka (HUN-REN Research Centre for the Humanities)

Based on archaeological finds and written sources, a significant amount of western pottery arrived in the western half of the Carpathian Basin in the Late Middle Ages, which also had an impact on local pottery. Primarily we can count on the arrival of two major groups: graphitic ceramics and tableware. In my paper, I would like to present my latest results about these western originated groups of ceramics and their effect on the local production in Central Transdanubia.

Graphite ware was a common pottery type used in the western Danube Region during the Middle Ages, and this was also used in large quantities in the medieval Kingdom of Hungary. This pottery was mainly imported from the Austrian provinces, but researchers count also some local production. Furthermore, the strong influence of these imported goods on local, non-graphitic pottery is evident. The western forms were imitated by local potters in the 14th-16th century from local clays, which burns to yellow or red. These ceramics were partially made in Central Transdanubia, around the Vértes and Gerecse mountains. Several excavated pottery kilns and traces of workshops are known in this area. Tableware also shows that local potters imitated products from abroad, especially cups, which made it possible to lower classes to imitate the higher classes.

Based on the types and forms of pottery products, the western part of the Kingdom of Hungary, including Central Transdanubia, was connected to the western, Austrian-Moravian areas in the Late Middle Ages. From the look at the transport, the Danube played a central, mediating role in the trade of the studied region, and perhaps also played a role in technology transfer. Western pottery arrived on the river and on other trade routes had a powerful effect on local potters.

13 ANALYZING THE FIRING PROCESS IN LEAD GLAZES FROM THE 14TH TO THE 17TH CENTURIES FROM BARCELONA, CATALONIA

Peix Visiedo, Judith (University of Barcelona; GRACPE (Research Group on Archaeology of Complex Societies and Processes of Social Change); IAUB (Institute of Archaeology of the University of Barcelona)) - Coso Álvarez, Júlia (University of Barcelona; GRACPE (Research Group on Archaeology of Complex Societies and Processes of Social Change); IAUB (Institute of Archaeology of the University of Barcelona)) - Buxeda i Garrigós, Jaume (University of Barcelona; GRACPE (Research Group on Archaeology of Complex Societies and Processes of Social Change); IAUB (Institute of Archaeology of the University of Barcelona)) - Madrid i Fernández, Marisol (University of Barcelona; GRACPE (Research Group on Archaeology of Complex Societies and Processes of Social Change); IAUB (Institute of Archaeology of the University of Barcelona))

This study aims to analyse reactions occurring during the firing process of glazed ceramics from the modern period (14th-17th centuries) produced in Barcelona, Catalonia. The glazing process was expected to involve a double-firing procedure, which consisted of the application of the glaze on the ceramic body after the first firing phase, in a biscuit ceramic. This practice aimed to mitigate problems such as bubbling, particularly in calcareous ceramics, caused by the release of carbon dioxide during the biscuit firing, as well as other difficulties related to shrinkage and porosities.

By examining some samples from Barcelona using a Scanning Electron Microscope (SEM-BS-EDS), the development of a significant interaction layer at the interphase, between the clay body and the glaze, can be identified. This layer is characterised by the growth of newly formed feldspar and lead crystals, which could be attributed to a single firing process. It is known that the arrival of ceramics from other regions (Valencia or Italy) influenced the shapes and decorations of Barcelona's ceramics. Potter's treatise recovered in those countries specified the use of a double firing, a practice corroborated by the SEM study.

However, a slow cooling during the second firing may also have eased the development of crystalline phases. To explore this further, some samples from Barcelona showing no interphase interaction have undergone refiring using three different cooling rates (100 °C, 45 °C and 10 °C per hour). The specimens have been observed using SEM to focus on several features including glaze thickness, chemical diffusion of elements between the clay and the glaze, and changes in crystal presence within the interphase. This analysis aimed to determine if the cooling rate could have influenced the development of these reactions and potters from Barcelona might have adopted the double firing process influenced by potter from Valencia or Italy.

14 POTTERY PRODUCTION AND TECHNOLOGICAL CHANGE IN THE KINGDOM OF SEVILLE (15TH-18TH CENTURIES): AN ARCHAEOMETRIC APPROACH

Coso Alvarez, Júlia (Universitat de Barcelona; GRACPE (Research Group on Archaeology of Complex Societies and Processes of Social Change); IAUB (Institute of Archaeology of the University of Barcelona)) - Buxeda i Garrigós, Jaume (Universitat de Barcelona; GRACPE (Research Group on Archaeology of Complex Societies and Processes of Social Change); IAUB (Institute of Archaeology of the University of Barcelona)) - Madrid i Fernández, Marisol (Universitat de Barcelona; GRACPE (Research Group on Archaeology of Complex Societies and Processes of Social Change); IAUB (Institute of Archaeology of the University of Barcelona))

This study presents the first archaeometric characterization of pottery production from the Kingdom of Seville, focusing on previously understudied regions outside its capital, an area often forgotten. Through the integration of archaeological and archaeometric data, we illuminate a complex landscape of pottery workshops located in the current provinces of Cádiz and Huelva, in the southern Spain.

In this study, four workshops have been characterized using a combination of complementary techniques: X-ray fluorescence (XRF) for chemical characterization, X-ray diffraction (XRD) for mineral characterization, and scanning electron microscope (SEM-EDX) for microstructural studies. The results have enabled us to identify part of the ceramic production from the Kingdom of Seville and their techniques of manufacture.

Our research reveals distinct production patterns according to the chronology of the workshops, and verifies that the production of the Kingdom would not be completely assimilated to that of its capital.

In this sense, this study has provided a better understanding of this complicated scenario and underscores the need for further investigation into other areas and chronologies to provide a comprehensive view of ceramic productions in this territory.

15 THE POTTER OR THERE AND BACK AGAIN - MIGRATION OF RHENISH POTTERS AS A DRIVING FACTOR IN TECHNOLOGY TRANSFER

Röser, Christian (LVR-LandesMuseum Bonn)

For a series of ceramic phenomena, it can be stated that these did not only occur once at a production site, but that they became part of craft traditions and spread across regions and beyond. But whether these products were imitations made by local craftsmen following the paragons of circulating wares or whether the ideas and the knowledge spread to new places through the mobility of individuals can hardly be answered a priori solely on the basis of the preserved objects.

However, archival sources from the Early Modern Period document the personal migration of potters of the Rhenish tradition in many cases and can be correlated with the changing production ranges at their respective places of residence. Despite all remaining uncertainties, this provides valid evidence for the influence of migration on the transfer of technology and ideas in the pottery industry. In conjunction with socio-cultural push and pull factors, these sources unveil a perspective on the economic constraints and the realities of potters' lives that has which has hardly been considered so far. Furthermore, this allows to outline a reference model to explain the process of technology transfer and to facilitate a reliable assignment of the craft tradition on the basis of specific features, be it related to the findings of archaeological sites (especially the kiln construction) or to the objects.

632 MULTISCALAR METHODS FOR STUDYING ANCIENT LANDSCAPE DEVELOPMENTS AND SETTLEMENT DYNAMICS IN THE CLASSICAL WORLD BETWEEN ARCHAEOLOGY AND HERITAGE MANAGEMENT

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Ippoliti, Mattia (Sapienza Università di Roma) - Casarotto, Anita (University of Groningen; Koninklijk Nederlands Instituut Rome) - Zamora, Mar (Universidad Autónoma de Madrid)

Session format: Regular session

This session invites papers aimed at reconstructing changing urban/rural landscapes and settlement patterns of the ancient Mediterranean. The focus is on layered contexts tackled from a multiscalar, diachronic perspective in archaeology or cultural heritage management. We especially welcome contributions that deal with territorial reconstruction and evolution based on field survey data using GIS spatial analysis and remote sensing for land use, population and socio-economic mapping and modeling. Also important to this session are the ways of integrating data and analyses into today's society as cultural heritage.

The palimpsest concept is used to define the urban or rural landscape, and explain its complex layered structure. The Mediterranean is one of the most archaeological data-dense landscapes, which allows for comparative studies of

multiscalar interactions between regions, cities, settlement patterns, buildings and objects. Based on mapped legacy and new data, various methodological approaches are applied to reconstruct the temporal and spatial evolution of the landscape and its historical narratives. Landscapes are both contexts and systems of contexts. This allows for analysis at different scales to reconstruct and narrate stories, but also changing landscapes in modern spatial planning. The session theme will be the methods of mapping and analyzing old and new data in stratified landscapes to produce 1. scientific research that investigates, at different scales, the urban and rural landscapes of the ancient Classical World and 2. heritage maps for policy makers that support territorial monitoring of cultural resources in sustainable spatial planning. Particular attention will be given to the relationship between the heritage stories of places and monuments and their historical, archaeological, topographical, social, cultural, ecological and natural contexts.

To sum up, this session is for papers dealing with:

- the use of territorial analysis for socio-economic reconstructions
- the ways of integrating ancient changing landscapes into today's society, as cultural heritage.

ABSTRACTS

1 LANDSCAPE STRATIGRAPHY AND MULTISCALAR ANALYSIS. THE COUNTRYSIDE OF ROME AND ANCIENT LATIUM

Ippoliti, Mattia (Sapienza Università di Roma)

Landscape is both a layered reality and a container of stratigraphies that can therefore be analyzed both as a context and as a system of contexts. In order to be able to identify, analyze, and understand the processes that have characterized the history of ancient landscapes, it is therefore necessary to apply a multiscalar approach that allows reconstructing and narrating histories and microhistories. Such an approach requires the consideration of all the different sources of information and all the available data; to do so, it is necessary to develop techniques for the management and critical analysis of legacy data that allow their integration with current databases. By analyzing with continuous changes of scale from both a synchronic and diachronic perspective all the available data, it is possible to break down and recompose the stratigraphy of the landscape, which is in turn composed of the stratigraphies of all the places and monuments it contains. This stratigraphic and multiscalar perspective will be applied to the analysis of the countryside of Rome and ancient Latium. The contexts of this territory will be the case study to test the possibility of using spatial analysis to reconstruct historical, demographic and cultural phenomena. Thus, a possible diachronic reading of the occupation, organization and exploitation of the ancient countryside will be proposed through the analysis of the rural settlements that populated it between antiquity and the early Middle Ages.

2 VISUAL PERCEPTION OF CHANGING LANDSCAPES OF THE ROMAN WORLD

Zamora, Mar (Universidad Autónoma de Madrid)

Historical and archaeological landscapes evolve creating new landscapes always in change, since landscape is dynamic. Our image of those landscapes also changes.

In this paper we think about the visual perception of roman cities of Hispania (and their monuments) throughout the years, changed landscapes from the ancient world to the present days that produce a rich array of realities from different points of view:

- Cities considered as visual references in the surrounding landscape (mostly analysed using GIS), since the city was one of the axes of territorial structure in the ancient roman world.
- Visual perception of archaeological remains on the field, including drawings and paintings.
- Representation of roman cities in historical cartography.
- Image of archaeological landscape in literature (novels and travel books).
- As Heritage landscapes.

In summary, considering that architecture is one of the most lasting archaeological remains of the ancient world, we would like to approach the visual impact of these buildings and cities in the surrounding landscape, the images of these landscapes given by travellers, cartographers, or writers, among others. Some case study will be considered.

3 **CHANGING LATIUM: AN EXPERIMENTAL ASSESSMENT OF LEGACY AND SURVEY DATA FOR AN ARCHAEOLOGICAL HISTORY OF CHANGING LANDSCAPES AND HERITAGE MANAGEMENT**

Della Seta, Tommaso (Rijksuniversiteit Groningen/University of Groningen; Sapienza Università di Roma) - De Palis, Paolo (Sapienza Università di Roma)

“Progetto Lazio Antico” (www.lazioantico.it) is a collaboration between Sapienza University (Rome) and the Regione Lazio. The project aims at reconstructing the archaeological history of ancient Latium from the left bank of the Tiber to the southern limits of the modern region, from the Late Bronze Age to Late Antiquity. Project members collect information and archaeological data from a range of available sources to create a database with a clear taxonomy allowing different sources of information to communicate. The project is closely connected with the international Rome Hinterland Project that aims at making data from archaeological surveys comparable (see comparativesurvey-archaeology.org/consortium/).

In our paper we will comment on the development of legacy data concerning rural settlement patterns and their archaeological history in Latium Vetus and Adiectum, arguing that a new step is needed to assess the reliability of the data, in two intersected ways: a site falsification assessment, to evaluate the reliability of each topographical datum point, and to verify site data coming from the older topographical surveys; and a pattern falsification assessment, to evaluate the amount and quality of information each territory holds, taking into account the quality of the sources and the distribution of the available data. This procedure will help to assess a robust delineation of rural development over time.

To illustrate our approach we employ a case study in which we have carried out a pattern falsification assessment (Satricum) and one which has been tested for site falsification issues (Upper Latina Valley).

4 **THE EVOLUTION OF LANDSCAPE AND SETTLEMENT TRANSFORMATIONS IN THE 18TH MUNICIPIUM OF ROME'S SUBURBIUM: A WEIGHTED AVERAGE ANALYSIS**

Peloso, Elisa (Sapienza Università di Roma) - Fabbri, Sara (Perugia Università)

The aim of this paper is to reconstruct the evolution of the landscape in the 18th Municipium of the Suburbium of Rome between the 8th century B.C. and the 7th century A.D.

This will be based on the analysis of a detailed and extensive documentary dossier of the surveys carried out between 1993 and 2003 as part of the project ‘Archaeology of the Suburbium of Rome’ by the Department of Classical Archaeology of the University of Rome ‘La Sapienza’, under the scientific direction of Andrea Carandini.

The method of weighted averaging was chosen for analysing the pottery in order to estimate in a statistically reliable way the amount of pottery in each of the topographic units over a given period, taking into account the approximate or exact date of each of the fragments collected.

The method used produces graphs that make it possible to understand the evolution of the settlement in the XVIII Municipium, based on the distribution of wares in the area by chronological phases, through the processing of data on a GIS platform.

The comparison between the graphs produced with weighted averages and those related to the evolution of the landscape allows for the examination, for example, of settlement changes linked to main historical events, visible in the evolution of the topographical units, as reflected in the changes in the attestation curves of the main ceramic classes. It is possible to determine whether periods of peak development in the number of TUs are associated with periods of particular dynamism in production and trade, or whether periods of decline in the number of TUs are associated with a decline in the quantity of products.

5 **AN ARCHAEOGEOGRAPHICAL APPROACH OF THE TERRITORY OF GROSSETO (ITALY). THE PARCEDES PROJECT**

Grosso, Simone (Université Paris 1 Pantheon Sorbonne; SDAVO)

The territory surrounding the city of Grosseto (Tuscany, Italy), occupied since the prehistory, can be divided into two distinct zones: to the west, an alluvial and originally marshy plan, dedicated to the cereal cultivation; to the east, a hilly area dedicated to pasture and transhumance. Thanks to a project on agrarian landscapes, PARCEDES, funded by the French “Agence Nationale de Recherche”, we have worked on these areas to understand the history of these two different rural landscapes and their anthropisation. Specifically, one of the aims of this project, is to reconstruct the evolutions of these two different realities from an archaeogeographical point of view thanks a diachronic and multi-scalar approach and to compare them from the point of view of the agrarian morphology, legal possession, agricultural exploitation in a longue durée chronological perspective (from the late roman period to the 20 th century). To reconstruct the palimpsest of these territories and their changes, the creation of a carte compilée or archaeogeographical map in a WebGis space which gathers within it archaeological, geological, geographical, and historical data has been neces-

sary. The georeferencing and vectorisation of the 19 th -century cadastre, combined with the study of the real estate registry and the comparison with ancient sources and archaeological data, allowed to gain a precise spatial outlook of the land ownership and to identify its main transformations between the Late Antiquity (Papacy and nobility) and the modern age (local church, nobility, and privates). On the other hand, both the visual and the automatic analysis of the cadastral forms of land parcels and micro-toponyms made it possible to obtain more informations on the relationship between legal land tenure and the paleo environmental characteristics of the place, especially about the processes of land reclamation in the lowlands.

6 **SOCIAL STATUS AND IMPERIAL ALLEGIANCE: URBAN TRANSFORMATION IN SOUTHERN ETRURIA UNDER AUGUSTUS**

Cattaneo, Matteo (Sapienza Università di Roma)

While the development of urban networks and the expansion of towns are often regarded as defining Roman culture, specifying precisely what constituted a city in antiquity and determining its “Roman” characteristics remains challenging. Nonetheless, from the late Republican period onward, a common suite of public buildings, clearly influenced by Rome, was constructed in most of the cities of Roman Italy—temples, theatres, amphitheatres, baths, and basilicas reshaped these urban landscapes. Combining different sources of evidence, including archaeological excavations, non-invasive surveys, and inscriptions, the evolution of these urban spaces can be observed, shedding light on social organisation and the development of Roman identity within these communities. This transformative process, varying in its precise timing and expression, reached its peak in the early decades of the first century AD.

Drawing on an ongoing PhD project at Sapienza Università di Roma, this paper focuses on three cities in southern Etruria: Falerii, Lucus Feroniae, and Veii. Despite their diverse origins, these cities each experienced significant changes to their urban form and fabric during the Augustan era. Rather than centrally directed by the emperor, the archaeological and epigraphical evidence suggests that the primary drivers behind these changes were members of the local elites and the emerging Augustan aristocracy. For instance, the Nonii Asprenates at Falerii, the Volusii Saturnini at Lucus Feroniae, and the Herenni Picentes at Veii played pivotal roles in these developments with the objective of advancing their social status and reaffirming their loyalty to the new regime. The analysis of the buildings and of the interactions with each other within the urban landscape allows the definition of settlement patterns for each of these cities and displays their complex and multi-layered structure. Moreover, it provides further studies on interactions between cities on regional scale.

7 **THE ARCHAEOLOGICAL MAP OF THE UPPER TAMMARO VALLEY BETWEEN ARCHAEOLOGY AND HERITAGE MANAGEMENT**

Cerbone, Oriana (Univeristy of Salerno)

The rural landscape taken into account in this paper is the upper valley of the Tammara river (Benevento, Campania region, South Italy) from the IV BC to the VI century AD. This territorial context is a rural area that has recently received attention from Italian and European development plans as it is at risk of environmental, social and economic marginalization.

This territory is characterized by several human occupations, remains of ancient roads connected to the Via Appia, and transhumance routes, some of them still in use today.

The study of the landscape and its transformations is carried out through the tools of historical-archaeological research, in order to be able to formulate reconstructive hypotheses on the development and territorial occupation in ancient times.

The knowledge of the ancient heritage is necessary in order to be able to implement strategies to safeguard the cultural heritage of marginal areas and to promote new forms of valorisation capable of supporting projects for rural development. The working methodology involved the creation and implementation of an archaeological territorial information system based on the correct positioning and analysis of the information collected. The territorial system was developed using a QGis web-oriented architecture, which manages cartographic and descriptive data-sets. Its basic logic is from detail to general and conversely. The elements collected are helping to define a new archaeological map through which to elaborate various themes on a chronological-typological basis.

The results of this study can be used for planning the development of the territory, implementing policies for the protection of cultural heritage, and supporting the various stakeholders in shared decisions and informed policies. The archaeological map therefore becomes a Decision Support System (DSS) and a territorial governance tool.

8 MAPPING ANCIENT LILYBAEUM. INTEGRATING DIFFERENT SPATIAL LEVELS AND DIACHRONIC PERSPECTIVES IN A 2D WEBGIS

Güngör, Aylin (University of Hamburg) - Seifert, Martina (University of Hamburg) - Griffo, Maria Grazia (Parco Archeologico di Lilibeo-Marsala) - LoBrutto, Mauro (University of Palermo) - Mandruzzato, Antonella (University of Palermo) - Occhipinti, Anna (Parco Archeologico di Lilibeo-Marsala) - Schwenn, Fabian (University of Hamburg) - Thiele-O'Sullivan, Nils (University of Hamburg)

The DFG-funded project "Lilybaeum. Principles of Urban Development" is a collaborative project between the University of Hamburg, the University of Palermo and the Archaeological Park of Marsala, Sicily. Since 2017, the team from both universities work on the archaeological map of ancient Lilibeo/Lilybaeum. A topographic map of all the known archaeological areas in a WebGIS is still a desideratum up to the present date.

The research focuses on the ancient city plan in different time phases, using new survey data as well as mapped legacy data to reconstruct the city's development over time and space and its historical narratives. The archaeological map unites all archaeological sites and remains with georeferenced data in one map for the first time, allowing not only the identification of different urban functional areas and respective buildings in the different phases, but also allows reviewing the research narrative of a differentiable cityscape. The remote sensing methods used make it possible to reconstruct changes of the urban settlement. This helps to define the urban landscape and explain its complex layers. The long process of data collection and analysis will serve the future qualitative description of Lilybaeum within the supra-regional network of Sicilian cities.

Questions of space and time are essential when creating an archaeological map. One of the main problems is the visualisation of relatively chronological data as well as complex multidimensional areas. The project has developed several strategies and solutions that will be discussed in the context of digital strategies. In particular, integration and presentation in geographic information systems through the combination of 2D and 3D methods offers solutions for complex multidimensional structures in areas such as necropolises. In addition, "the codified survey" has been developed as a new standardised method which meets the needs of practice by providing a systematic approach to address finds.

9 EXPLORING THE STRATIFIED LANDSCAPE OF WESTERN MEGARIS: THE ETHNOARCHAEOLOGICAL EXPLORATION OF AN ANCIENT GREEK CHORA

Farinetti, Emeri (RomaTreUniversity) - Anelli, Dario (University of Pavia)

The Western Megaris Archaeological Landscape Project (WeMALP) aims to reconstruct the long-term landscape history of Western Megaris, Greece. The research examines the rural land use over time, investigates the relationships between Megara and the countryside, and sheds light on the historical significance of the natural bridge connecting Attica and Corinthia. To achieve these goals, we conduct intensive systematic artifact surface surveys, architectural surveys, low-altitude drone photogrammetry, and remote sensing, all integrated into a digitally oriented workflow. Field data are critically interlaced with existing legacy data within a dynamic GIS environment.

This paper seeks to illustrate our multiscale approach. Along with settlement history, by studying the responses that the terrain offers to the research on landscape evolution over time, we can analyse, for instance, mobility systems that served as the physical link corresponding to cultural relationships between the ancient city, their harbours, and surrounding communities, traversing cultivated fields and mountainous landscapes.

We also explore changes in land use patterns over time. In particular, our ethnoarchaeological approach focuses on the material traces of recent human activities, including rural vernacular architecture associated with long-lasting wine production in the area. They are a valuable testimony to the territorial organization in ownership of individual family groups, which often replicates that of the classical period, as well as the original use as vineyards of areas employed otherwise today.

By using these small rural structures as vehicle of communication, deeply rooted in local culture and intertwined with familial and historical significance, we engage in community activities aimed at exploring the awareness of local communities of their rural heritage, understanding their perceptions of the landscape, as well as their cultural connections with neighbouring communities. In this way, we engage with the landscape of collective memory that has shaped, and continues to influence, the identity of every rural society.

637 UNVEILING EURASIA'S PREHISTORIC TECHNIQUES THROUGH USE-WEAR ANALYSIS: A CROSS-CULTURAL EXPLORATION

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Chen, Hong (School of Art and Archaeology, Zhejiang University of China) - Li, Weiya (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art; University of Science and Technology of China) - Mickaël, Baillet (School of Art and Archaeology, Zhejiang University of China; Faculty of Archaeology, Leiden University) - Xue, Liping (School of Art and Archaeology, Zhejiang University of China)

Session format: Regular session

Prehistoric techniques reflect the daily lives, economic activities, and social structures of ancient communities. This proposal aims to explore the significant role of use-wear analysis in understanding prehistoric techniques in the Eurasian context. Use-wear analysis, a pivotal tool in archaeological research, has the potential to uncover valuable insights into the technological advancements and cultural practices of early Eurasian societies. Despite its application in archaeology, there remains a noticeable gap in communication among researchers from the East and West.

This session will provide a platform for researchers, especially traceologists, presenting the progression of tool-making practices and technological innovations across different regions of Eurasia during prehistoric times. We also welcome studies that demonstrate the developments in use-wear analysis techniques, including experimental archaeology, microscopy, and other cutting-edge methodologies, and their application in deciphering the functional and symbolic aspects of prehistoric tools. By bringing together a diverse group of scholars from various fields of archaeology and related disciplines, our goal is to encourage interdisciplinary collaboration and facilitate the exchange of knowledge and methodologies for interpreting the use-wear patterns on prehistoric artifacts across Eurasia.

ABSTRACTS

1 THE SURVIVAL OF THE PERISHABLE. UP GROUND STONE TOOLS INFORM ABOUT IDENTIFICATION AND CHARACTERIZATION OF BEHAVIORALLY RELEVANT PLANT TRANSFORMATIVE POTENTIAL

Longo, Laura (Ca' Foscari University of Venice) - Cagnato, Clarissa (Ca' Foscari University of Venice) - Veronese, Mauro (University of Padua) - Sorrentino, Giusi (Ca' Foscari University of Venice) - Parisatto, Matteo (Ca' Foscari University of Venice) - Birarda, Giovanni (Elettra Sincrotrone Trieste (Basovizza, Italy)) - Vaccari, Lisa (Elettra Sincrotrone Trieste (Basovizza, Italy)) - Longo, Elena (Elettra Sincrotrone Trieste (Basovizza, Italy)) - Marcomini, Antonio (Ca' Foscari University of Venice) - Badetti, Elena (Ca' Foscari University of Venice)

Material culture production, namely artefacts, represents the tangible expression of human activities, and it is regarded as a powerful archive and a rich repository providing evidences for complex conceptual knowledge since it responds to cultural and environmental constraints over time. However, only durable artifacts are surviving the millennial scale, and stone tools are less susceptible to destruction than biogenic remains; therefore, they typically offer the best evidence of the humans' ability to survive in a variety of habitats. The present work is reasoning about non-flaked industry – ground stones tools (GST) – used to mechanically transform plants. Yet, data about GST intentional use for plant processing, either to obtain calorific food or for other economical purposes, are scattered and even more rare are the residues of plants still adhering to the utilized areas. The broad range of different part of plants processed by modern humans is informative of their transformative capacity to convert a wide range of biotic resources even beyond dietary purposes. Through test cases we present the analytical strategy: imaging which included different resolution microscopes – optical, in both reflected and transmitted light, polarized; Confocal and SEM (operated in FEG and thermionic modality) and microCTscan with the aid of synchrotron light, and chemoprofiling of the residues by applying non-invasive spectroscopic techniques like microFTIR (with the aid of synchrotron light) and RAMAN. We will also call for raising awareness on the criticalities underpinning the mining of micro and nanoscale data and also the great potential of disclosing the role of ground stone tools as bioarchives, intelligently used by Homo sapiens to exploit the resources of the relevant environment.

The presented study is based on GSTs used by early waves of Homo sapiens during the MIS 3 (60-25 ka) colonization across the Eurasian steppe.

2 ABOUT DESIGN, USE, AND HAFTING OF CHÂTELPERRONIAN POINTS AND KNIVES. A COMBINATION OF USE-WEAR, RESIDUES, MORPHO-FUNCTIONAL ANALYSIS AND EXPERIMENTAL APPROACH

BAILLET, Mickael (School of Art and Archaeology, Zhejiang University, China; Faculty of Archaeology, Leiden University, The Netherlands) - **Aleo, Alessandro** (Faculty of Mechanical Engineering, Delft University of Technology, The Netherlands)

At the far west of Eurasia, during the so-called Middle to Upper Palaeolithic transition, several techno-complexes potentially made by Neanderthals or Homo Sapiens, such as Châtelperronian, Jerzmanowician, Uluzzian, Neronian, were dominated by lithic points. Preliminary studies have demonstrated that these tools were used both as projectile points and knives for butchery, with projectile points being hafted, while the knives were probably hand-held. However, the data are still too scarce to state the differences in tool design between both tool types. The question of tools and hafting designing of hunting weapons and butchery knives could be crucial to better distinguish between the specificity of both Neandertal and H. Sapiens techno-complexes during this pivotal period.

We therefore approached this question by way of a traceological, residue, and morpho-functional analysis, but also experimental archaeology, applied to two Châtelperronian lithic assemblages from Morín Cave (Cantabria, Spain) and Canaule II (Dordogne, France). Our results show that projectile points, identified through impact fractures, are mostly manufactured on regular blanks with reduced thickness and straight profile. Micro-polishes and residues on the proximal and backed portion of the points demonstrate that they were sometimes hafted with adhesives. Knives, identified through macro-scarring and micro-polish, are often manufactured on irregular blanks with uneven thickness. They always exhibit a retouched back facilitating prehension. Rarely, some knives are made on regular blanks and display hafting polish on the proximal part, but also possible impact fracture on the distal part, suggesting that they were used alternatively as knives and projectiles.

These data tend to demonstrate a specialization in the selection, use, and hafting of projectile points and, on the contrary, a certain degree of variability in the selection, use, and prehension of butchery knives. Thus, the concept of Châtelperronian backed blades, besides being ambivalent, appears to be quite flexible.

3 DECONSTRUCTING LITHICS: INTEGRATING TECHNOLOGICAL, DESIGN AND FUNCTIONAL APPROACHES TO THE LITHIC INDUSTRIES FROM YAHUAI CAVE, GUANGXI PROVINCE, SOUTH CHINA

Chen, Hong (School of Art and Archaeology, Zhejiang University) - **Li, Yao** (School of Art and Archaeology, Zhejiang University) - **Xie, Guangmao** (Guangxi Institute of Cultural Relics Protection and Archaeology)

The Cobble-tool industry, Hoabinhian techno-complex and lithic miniaturization were three cultural phenomena which merged together in Lingnan region from the upper Paleolithic to late Neolithic. Many scholars had carried out both technological and typological analysis of these lithic industries, and succeeded in identifying technological trends between different sites. However, not enough attention has been paid to lithic design, utilization and equipment manage.

In this paper, we combined microwear analysis and techno-functional method to investigate the design and utilization strategies of stone tools unearthed from the Yuhai Cave in Guangxi Province, which dates back to 45–4ka. The lithic assemblage composed of cobble tools, sausage slices and miniaturized lithics shows a kind of rough style from typological perspective. However, after analyzing, we found some forms were intentional chosen or designed and the lithics were efficiently used, as shown below:

1) Prehistorical human take advantage of the natural morphology of the stone tools. They always chose some flakes with a sharp edge at one side and a blunt facet at opposite side to form suitable transformative and prehensive module. 2) Prehistoric humans permutated and combined techno-functional modules flexibly to produce predetermined but not standardized tools, although the retouch is partial and minimal. 3) Lithics were efficiently utilized. Various kinds of processed materials were involved, which suggests that lithics could apply to a variety of subsistence activities.

The techno-economic system of prehistoric humans at Yuhai Cave seems to be a good balance between minimal technical investment and high efficiency and planning. This behavior follows the principle of least effort, and reflects the cultural adaptation at this pivotal period.

4 THE USE-WEAR ANALYSIS OF DOLOMITE MICROBLADE AT SHUIDONGGOU LOCALITY 12

Zeng, Chenru (Wuhan University) - **Gao, Xing** (Institute of Vertebrate Paleontology and Paleoanthropology; University of Chinese Academy of Sciences)

Shuidonggou locality 12(SDG12) is a Late Paleolithic site characterized by microblade technology. Dolomite is the primary lithic raw material at the site, and functional studies of dolomite microblades can help us understand the be-

havior of ancient humans and explore functions of the site. Experimental archaeology and use-wear analysis are the main methods used in this paper for functional studies. To compare microscopic use-wear, experiments were conducted on dolomite microblade pressing, heat treatment (250°C-350°C), and bone handle inlay to obtain dolomite microblade specimens. Thirty groups of dolomite flakes (n=17) and microblades (n=52) were thus divided for tool-use experiments and micro-use-wear observation. Dolomite microblades unearthed from SDG12(n=296) were then observed and compared with the results of experiments and corresponding observations. It was indicated that ancient humans in Shuidonggou may have skillfully produced and used microblades in daily activities such as meat-cutting and wood/bone tool manufacturing between 10500 and 10200 cal BP. Combined with analytical results of lithic technology, zooarchaeology, fire use and paleo-environment reconstruction, this paper provides new evidence on the gradual decrease in human's mobility and shift to a sedentary life.

5 ASSESSING THE APPLICATION OF DIGITAL 3D MICROSCOPE FOR FUNCTIONAL ANALYSIS ON SHELL TOOLS: A COMPLEMENTARY APPROACH

Tumung, Laxmi (Instituto Internacional de Investigaciones Prehistóricas de Cantabria. (Universidad de Cantabria, Gobierno de Cantabria, Grupo Santander), Universidad de Cantabria. Edificio Interfacultativo, Avda. Los Castros 52, 39005, Santander, Spain; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona educacional 4, Campus Sescelades URV (Edif. W3), 43007 Tarragona, Spain) - **Chaniotaki, Evangelia** (Sezione di Scienze Preistoriche e Antropologiche, Dipartimento di Studi Umanistici, Università degli Studi di Ferrara, C.so Ercole I d'Este, 32 - 44121 Ferrara, Italy) - **Ollé, Andreu** (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona educacional 4, Campus Sescelades URV (Edif. W3), 43007 Tarragona, Spain; Dept. Història i historia de l'Art, Universitat Rovira i Virgili. Fac. de Lletres, Avinguda Catalunya 35, 43002 Tarragona, Spain)

Functional analysis (combining wear and residue analyses) has become a potent approach to understanding past human activities. For decades, this field has developed its methods and techniques to better interpret the function of ancient artifacts but still requires some more advancement to improve the reliability and repeatability of the analysis, especially for shell tools. In the past decades, researchers have shown the importance of Optical Microscopy and Scanning Electron Microscopy to investigate the functionality of the tool. Recently, 3D Digital Microscopy has become common among traceologists to analyze (stone, bone, and shell tools) surfaces for functional analysis. Here, we propose to examine for the first time the advantages and disadvantages of 3D Digital Microscopy, focusing mainly on the fully automatized Hirox KH-8700 model. The results obtained from the analysis of the experimental shell tools (both non-retouched and retouched) show that digital microscopes have significant benefits for analyzing wear and residue traces. It offers high magnifications compared to OM and allows quick 3D modeling and profiling of the surfaces. Automatic stacking and stitching combined with a wide range of magnifications are powerful for describing the distribution and organization of traces. Also, the possibility to connect different light sources allows the highlighting of different types of features on different raw materials. Our results confirm the effectiveness of this technique for the qualitative description of use-wear and residues, both as a stand-alone microscope and as a complement to OM and SEM. This leads us to propose its systematic incorporation into shell use-wear studies and to explore its suitability for quantitative assessments.

6 TRACING MIDDLE BRONZE AGE DAGGER BIOGRAPHIES IN MAINLAND GREECE, CRETE, AND CYPRUS

Tripodi, Paolo (Ludwig-Maximilians-Universität München (LMU))

In recent years, traceology has emerged as a potent methodology for uncovering the intricate meanings of human artefacts used for various tasks by prehistoric communities, representing significant progress in archaeological research. Nevertheless, discernible disparities endure among some geographical contexts adopting this methodology, noticeable between Northern, Continental, and Eastern European countries. Specifically, in the eastern Mediterranean, the predominant approach to artefact analysis continues to be grounded in typo-chronological methods. Daggers have consistently captivated both archaeologists and museum enthusiasts worldwide, emerging as intriguing and multifaceted artefacts. These dual-purpose objects, serving as both tools and weapons, boast a rich historical record spanning an important part of human civilisation. Despite ongoing discussions regarding the precise roles and significance of daggers in prehistoric communities, their enigmatic nature continues to attract and spark curiosity among academics. Traceology applied to daggers of the Middle Bronze Age may indeed answer some of the questions raised about the functionality of these objects.

This paper endeavours to address these differences by “bridging the gaps” and presenting preliminary findings from my PhD, which focuses on Middle Bronze Age metal daggers from funerary contexts in mainland Greece, Crete, and Cyprus, via the lens of use-wear analysis. This study aims to provide compelling insights into the biographies and potential functions of these artefacts within prehistoric communities in the Aegean and Eastern Mediterranean during

the Middle Bronze Age by combining macroscopic and microscopic examinations, as well as integrating results from experimental archaeology with existing literature.

7 EXPERIMENTAL ARCHAEOLOGY AND USE-WEAR ANALYSIS BASED ON THE TORTOISE SHELLS FROM TAIJISI SITE

Lu, Yongming (Zhejiang University)

Tortoise shell, as a type of oracle bones, was an important instrument in the divination rituals of the Shang and Zhou dynasties. However, for a long time, the study of inscriptions on the oracle bones has been greatly developed, while the study of the bones themselves is relatively lacking, especially a series of preparations taken to make tortoise shells suitable for the divination. According to literature research, tortoise shells usually need to undergo specific processing procedures before the divination, including drilling, chiseling, burning and other key steps. However, there is a lack of verification and research on these specific processing procedures. This project aims to reconstruct the processing procedures by drilling, chiseling and burning modern tortoise shells in the simulation experiments. Meanwhile, combining with the use-wear analysis, to compare the traces on the experimental specimens with those on archaeological specimens excavated from the Taijisi Site, in order to deduce the tools, methods and sequence of the tortoise shells' processing. This would provide some help for further discussion of divination techniques in early Chinese societies and the culture, conceptual, political interaction and social organization structure revealed behind the divination techniques.

8 AN EXPERIMENTAL INVESTIGATION OF THE GROUND STONE KNIVES AND SICKLES IN SOUTH CHINA DURING THE LATE NEOLITHIC AND BRONZE AGE

Xue, Liping (School of Art and Archaeology, Zhejiang University, Hangzhou, China) - Chen, Hong (School of Art and Archaeology, Zhejiang University, Hangzhou, China) - Chen, Minghui (Zhejiang Provincial Institute of Cultural Relics and Archaeology, Hangzhou, China)

Ground stone knives and sickles were important implements in the Lower Yangtze River Region during the Late Neolithic and Bronze Age. Previous studies had suggested that harvesting gramineous plants such as rice was probably one of their functions, but there is very few empirical evidence of whether these tools were used and how. In this study, a set of replicative experiments were carried out to examine their effectiveness as harvesting tools and use-wear analysis was adopted to determine the multi-stage formation process of the use-wear traces on tool's surface. The results showed that the knives and sickles were efficient for rice harvesting when used in proper working motions. The use-wear patterns generated by rice harvesting are dominated by bright domed polish linked in reticulated patches often accompanied by fine striations. The distribution of the polish and its morphological characteristics are influenced by working motion, use intensity, and the nature of the stone raw material in varying degrees. The results of our study provide significant reference data and images for deciphering the functions of stone knives and sickles in archaeological records, which are crucial for investigating the development of rice farming agriculture in the Lower Yangtze River Region during the Late Neolithic and Bronze Age.

9 A PRELIMINARY TECHNO-FUNCTIONAL ANALYSIS OF LIANGZHU CULTURE DRILLS FROM ZHONGJIACUN SITE IN SOUTH CHINA

Guo, Yunhao (Zhejiang University)

Given the continued emphasis on the rich and magnificent material culture characteristic of the Liangzhu period, other objects that occupied a secondary place within the Liangzhu culture technical system, such as the most of chipped-stone tools were made of chert, remain understudied in technological and functional terms. We have approached this problem by conducting a techno-functional analysis of the chipped-stone tools from the Zhongjiacun site, which are mainly composed of flakes, with drills being the main tool type. Our results suggest that among different types of tools, the drills and the some flakes show clear patterns of design and use. The former was functionally specialized for drilling activities on mineral material, likely for making holes in perforated ground-stone tools (probably the perforated ground-stone tools and jade, emblematic tools of the Liangzhu culture); the latter were probably expedient tools dedicated to scraping hard organic material (probably within secondary activities). There is a scarcity of analyses of the use-wear and design of the rare chipped stone tools from some of the Liangzhu culture workshop sites specializing in the manufacture of perforated ground stone tools. Therefore, the study of chipped stone tools from the Zhongjiacun site is important for discussing the organization of the different lithic production systems of the Liangzhu culture, as well as the function of different sites in the Liangzhu area.

10 FROM LIGHT TO DARK: TRACEOLOGICAL INVESTIGATION TO UNDERSTAND THE NEOLITHIC OCCUPATION AT MORA CAVORSO

Petrinelli Pannocchia, Cristiana (University of Pisa) - Vassanelli, Alice (Department of Civilizations and Forms of Knowledge, University of Pisa) - Lunardi, Anna (independent researcher) - Rolfo, Mario (Department of History, Humanities and Society, University of Rome "Tor Vergata")

The Mora Cavorso Cave is situated in the karst complex of the Upper Aniene River Valley, on the slopes of the Simbruini Mountains (Western Latium, Central Italy). The cave comprises two main chambers and an impervious conduit that leads into a series of internal rooms and ravines. The investigations revealed a complex stratigraphy from the Upper Paleolithic to the Bronze Age.

A discontinuous level pertaining to the Neolithic period was discovered in the deposit, which includes funerary depositions in its innermost part dated to the 6th millennium B.C. (Rolfo et al., 2009, 2010; Silvestri et al., 2020).

This communication presents the traceological investigation of Neolithic lithic tools and personal ornament assemblages collected in the cave, to reconstruct their technology and functional properties. The objective is to understand the behavioural patterns of the site during the Neolithic period, also through the spatial analysis of the acquired data.

The data indicates differences in the techno-typological composition of the tools and ornaments, as well as in their use, showing variations in the utilization of the cave between the early and late Neolithic.

11 THE ZHANGJIASHAN SITE AS A WORKSHOP FOR MAKING KNAPPED STONE TOOLS FOR JADE PRODUCTION: AN USE-WEAR PERSPECTIVE

Ning, Yuxin (Zhejiang University)

The Zhangjiashan Site, situated within the ancient city of Liangzhu, is primarily distinguished by the prevalence of flint knapping tools, with stone drills accounting for a large proportion. Use-wear analysis is an effective method for determining the function of stone tools. By comparing archaeological artifacts with experimental ones and observing them under low and high magnifications, researchers can glean insights into the technological organization and even the social distribution of the site. Use-wear analysis of the flint knapping tools at the Zhangjiashan Site reveals their primary use in crafting jade tools, with stone drills specifically employed for drilling holes in jade artifacts. A comprehensive study of the types and functions of stone tools indicates that the Zhangjiashan Site functioned as a workshop for knapping stone tools for jade production. In contrast to neighboring workshop sites where finished and semi-finished jade artifacts alongside a limited number of knapping stones have been discovered, the Zhangjiashan Site is unique in its exclusive focus on knapping stone tool production, devoid of any jade items. This reflects a division of jade productive specialization, demonstrating the high level of specialization in handicraft industries within the ancient city of Liangzhu. This exemplifies the refinement of the jade crafting industrial system, bearing significant socio-economic implications, and also provides an important reference for the study of specialization in handicraft industries during the Neolithic period.

638 SYMBOLISM AND SOCIETY DURING THE LATE PREHISTORY OF WESTERN EUROPE: MEGALITHS AND HYPOGEA AS CASE STUDIES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Cicilloni, Riccardo (University of Cagliari, Italy) - Spanedda, Liliana (Universidad de Granada, Spain) - Rodríguez Rellán, Carlos (Universidad de Granada, Spain)

Session format: Regular session

During the Late Prehistory of Western Europe, two distinct types of graves seem to have emerged nearly simultaneously: megalithic burials, which were notably more common, and rock-cut tombs. These sepulchers are widespread across most Central and Western European countries, with particular prevalence in the Iberian Peninsula, France, the Italian Peninsula, and Mediterranean islands like the Balearic Islands, Sardinia, and Sicily.

Despite considerable debate, the relationship between these two phenomena, namely the hypogean (rock-cut) and the megalithic (epigeous) burials, remains poorly understood. Both forms of funerary expression carry rich symbolic elements. These encompass aspects such as the placement of the deceased and their grave-goods; their structural attributes and the presence of diverse artistic representations inside them; their geographical positioning and their associations with both the surrounding landscape and other sites and monuments; and most importantly, the interplay between megaliths and hypogea.

An integrated examination of these phenomena offers the potential to enhance our comprehension of the prehistoric societies that constructed and utilized megalithic burials and rock-cut tombs. Therefore, we aim to investigate the features of these monuments that may relate to the realms of symbolism and culture, serving as a means to approach

the attributes and level of social complexity within the human groups responsible for their construction. We welcome both archaeological case studies and ethnographic approaches as they offer valuable opportunities for further analysis of these phenomena.

ABSTRACTS

1 ALL TOO HUMAN: ANTHROPOMORPHIC REPRESENTATIONS IN THE GALICIAN MEGALITHIC TOMBS

Valcarce, Ramón (University of Santiago de Compostela; CISPAC) - Ramírez, Fernando (University of Vigo)

Stone-made human figurines, usually very schematic, are found in several Galician passage graves dating back to the earlier 4th millennium BCE. They occur in front of the access to the corridor and may number in the dozens. In the last decades, research has reported a growing number of megaliths, too, where one or more uprights (in at least one case a capstone too) are roughly shaped in such a way that they resemble a human outline. Moreover, the slabs that make up the chamber and corridor of passage-graves have been decorated by painting and carving. That decoration consists of abstract motifs (wavy lines, chevrons, and geometric patterns), while figurative designs and, namely, human images are very rare. The latter are a more usual feature among the painted passage-graves located further south, in the Portuguese region of Beira. We shall examine the context and implications of the occurrence of those anthropomorphic representations.

2 ANÁLISIS DE LOS OBJETOS DE ADORNO PERSONAL DE ÉPOCA CAMPANIFORME HALLADOS EN CONTEXTOS FUNERARIOS DE ANDALUCÍA (ESPAÑA) Y CERDEÑA (ITALIA)

Pau, Claudia (Universidad de Granada)

En este trabajo se estudian los objetos de adorno personal hallados en importantes contextos funerarios de Andalucía (necrópolis megalíticas de Los Millares, Santa Fe de Mondújar y del río Gor) y de Cerdeña (hipogeo de Padru Jossu (Sanluri) y sepultura hipogeo-megalítica de Bingia e' Monti (Gonnostramatza).

Se ha realizado un estudio tipológico de los artefactos. Sono stati analizzati morfologicamente e morfometricamente, prendendo in considerazione alcuni parametri fondamentali come le perforazioni, la lunghezza, la larghezza e la sezione. Gli artefatti sono stati disegnati, fotografati e scannerizzati, raccolti in gruppi e questi, a sua volta, divisi in sottogruppi, tipi e sottotipi.

Se han individuado las materias primas. Los objetos en materia dura animal se han examinado macro y microscópicamente y se han realizado comparaciones con colecciones privadas y públicas de hueso de varias especies de animales. La nomenclatura de los artefactos en material malacológico se ha homogenizado con la base de datos CLEMAN. Sobre el material pétreo se han empleado técnicas no destructivas que han permitido distinguir con criterios diagnósticos las diferentes materias primas gracias a observaciones colorimétricas y microscópicas, completadas con análisis XRF, PIXE-PIGE, RAMAN y SEM. Se ha realizado un análisis traceológico detallado de los artefactos con lupa binocular, microscopio óptico y el SEM (microscopio electrónico de barrido) para identificar las huellas tecnológicas y de uso, acompañados de pruebas experimentales. Se ha propuesto el posible significado de los objetos de adorno, realizando estudios etnográficos.

Objetivo principal del presente trabajo es individuar similitudes y diferencias entre los objetos encontrados en las diferentes tipologías de estructuras funerarias y en las dos áreas geográfica. Además, partiendo desde el estudio de estos importantes artefactos de ajuar, obtener mayores informaciones sobre el ritual funerario en particular y sobre el fenómeno Campaniforme, más en general.

3 ROCK-CUT TOMBS, DOLMENS, CAVES AND THOLOI WITHIN THE PORTUGUESE ESTREMADURA: REVISITING ERMEGEIRA AND OTHER TOMBS IN THE TORRES VEDRAS REGION

van Calker, Daniel (UNIARQ - Centro de Arqueologia da Universidade de Lisboa) - Silva, Inês Sofia (Faculdade de Letras da Universidade de Lisboa) - Silva, Ana Maria (CIAS - Centro de Investigação em Antropologia e Saúde; UNIARQ - Centro de Arqueologia da Universidade de Lisboa; CEF - Centre for Functional Ecology) - Sousa, Ana Catarina (UNIARQ - Centro de Arqueologia da Universidade de Lisboa)

Portuguese Estremadura holds a diverse array of tombs from the 4th and 3rd millennia BCE. Initially, natural caves served as collective burial spaces, dating back to the early 4th millennium. From the second quarter of the 4th millennium onwards, dolmens and rock-cut tombs start being built and utilized. The 3rd millennium saw the emergence of tholoi alongside continued use of existing burial structures. Despite efforts at chronological phasing (Boaventura,

2011), the interconnection of various megalithic traditions in the landscape remains unclear due to old excavations and limited radiocarbon dating.

An in-depth overview of the Torres Vedras municipality highlights the polymorphic character of Neolithic and Chalcolithic funerary structures within the broader scope of Megalithism, understood as complex set of magical-religious practices (Gonçalves, 2003). The dolmen-type structures are currently absent from the region, but rock-cut tombs are abundant. Notwithstanding old excavations, the authors are developing new approaches for this area: fieldwork and absolute dating. In Torres Vedras, rock-cut tombs exhibit diverse solutions regarding architecture and chronology. A noteworthy site features the contiguous construction of an artificial cave and a tholos, in the Cabeço da Arruda necropolis – possibly augmented by a nearby orthostatic monument.

This presentation focuses on new data related to the Ermegeira hypogaeum, discovered accidentally in 1939, with a summary excavation led by Manuel Heleno, Director of the Ethnological Museum. Due to the fragmentary nature of the findings, the two gold earrings recovered, typologically classified as “basket shaped ornaments” (Comendador & Armbruster, 2019), are nearly the only known element from this tomb. This discussion will cover a comprehensive review of the monument, exploring votive goods, anthropological remains, and the first radiocarbon dates. Challenging the prevailing patterns for rock-cut tombs in the region, the data suggests a single occupation phase in the second half of the 3rd millennium BCE.

4 FEELS LIKE HOME? ARCHITECTURAL SYMBOLISM IN THE DOMUS DE JANAS OF SARDINIA (ITALY)

Lilley, Kirsty (University of Edinburgh) - Robin, Guillaume (University of Edinburgh)

The domus de janas tombs of pre-Nuragic (c. 4400-2300 BC) Sardinia represent one of the most elaborate iterations of rock-cut burial monuments in the prehistoric Mediterranean. Around 3600 tombs are known across the island, where they occur in cemeteries and in isolation, and are, predominantly, akin to those of later prehistoric Europe. However, a significant minority (c. 490) deviate from this pattern, and are embellished with a range of architectural, representational, and abstract art. The tombs' symbolic ornamentation is unique for this period in the Mediterranean, and therefore offers key insights into pre-Nuragic socio-cultural environments.

The motifs present within the tombs have a long history of study, and scholars have proposed interpretations ranging from religious or cultic significance to representational/realistic depictions. However, a subset of the symbols employed is often overlooked, and has only rarely been discussed: the architectural art – including ‘sagging’ roofs and beams, pillars and pilasters, false doors, and arguably bull’s horns (bucrania) – which earned the domus de janas or ‘houses of the fairies’ their local name. In some cases, the tombs recreate entire structural interiors, yet are carved underground in stone.

But why was it important for pre-Nuragic communities to reference architecture in their burial monuments? What was the symbolic significance of buildings, and what types of structures were they? This paper presents updated distributions and diversities of ‘house-like’ tombs, and compares it with data from selected contemporary settlements, including the newly-excavated sites of Punta Ferulusu (Bonorva) and Monte Mannu (Ossi), and wider contexts. In doing so, it explores possible social and cultural motivations for architectural elaboration, and the relationship between above- and below-ground structures.

5 ENCLOSURES AND STONE CIRCLES OF PREHISTORIC SARDINIA IN RELATION TO THE MEGALITHIC TOMBS AND FUNERARY HYPOGEA

Marcialis, Paolo (Universidad de Granada) - de Martini, Maria Giovanna (Freelance)

Sardinia is well known to scholars for the high diffusion of megalithic sites in prehistory: menhirs, dolmen tombs, funerary circles have been the subject of important studies in recent decades. Less known, however, are the stone circles and enclosures with probable uses linked to worship or funerary rituals, widespread throughout the island. For over a decade, the writers have been carrying out research aimed at cataloging and studying these megalithic constructions. This contribution presents a series of enclosures and stone circles which, due to their characteristics and their proximity to areas of dolmenic, hypogean necropolises or with the presence of menhirs and menhir statues, could have been used for particular rituals linked to depositions in the period Neolithic and Eneolithic. These are works that do not contain remains of tombs or mounds within them, which have variable dimensions and shapes and whose delimitation is made up of stone blocks of a predominantly globular shape, sometimes with the presence of cupels or other intentional signs. Since the unpublished sites have not been the subject of archaeological excavation investigations, the analysis is mainly based on the study of comparisons in extra-insular areas, the construction characteristics, the position of the sites and the presence of elements of a cultic nature.

6 A LOOK AT THE MORPHOTYOLOGY OF COPPER AGE BETILES IN IBERIA. ON THE LOS MILLARES ASSEMBLAGES

Dorado-Alejos, Alberto (Lab. of Archaeometry, Department of Prehistory and Archaeology, University of Granada) - Quero Díaz, Ada (Lab. of Archaeometry, Department of Prehistory and Archaeology, University of Granada) - Núñez Caravaca, Helena Adriana (Lab. of Archaeometry, Department of Prehistory and Archaeology, University of Granada) - Pérez l'Huillier, Daniel (Lab. of Archaeometry, Department of Prehistory and Archaeology, University of Granada) - Maldonado Ruiz, Alexis (University of Santiago de Compostela | Visiting Research Fellow, Leiden University.) - Castillo Gallego, Francisco Javier (Department of Prehistory and Archaeology, University of Granada) - Pinillos de la Granja, Paula (Department of Prehistory and Archaeology, University of Granada) - Basso Rial, Ricardo (University Institute of Research in Archaeology and Heritage, University of Alicante | Visiting Research Fellow Department of Prehistory and Archaeology, University of Granada) - García Martínez, Victoria (Department of Prehistory and Archaeology, University of Granada) - Cámara Serrano, Juan Antonio (Department of Prehistory and Archaeology, University of Granada)

Anthropomorphic figures called “betilos” present a large distribution in Iberia, but variations in shape and decoration can be traced depending on the different societies that produce them. In any case, their presence in necropolis areas allows us to relate these artefacts to specific funerary and symbolic practices, which must have constituted a certain ‘Iberian norm’ as they were found in different areas. In this way, their production was probably linked to common beliefs that we can try to decipher by studying their production processes, taking into account that both concrete shapes and specific raw material could be intrinsically linked to the territories in which they were produced and, usually, used. The aim of the present study is the morphometric characterisation -based on the analysis of their shapes and sizes- of these symbolic items in order to identify the formal patterns that define the “betilos” in their large area of distribution in Southern Iberia during the Copper Age. For this aim items from Los Millares necropolis -which is the main focus of this study as it includes some analytical data-, Hidalgo Dolmen, Palacio Megalithic Complex, Dolmen de Dombate, Mina de Parxubeira and A Cova da Moura are analysed. It's supposed that formal features of these items can provide a chance for the identification of large cultural groups that could constitute the areas of influence of relevant sites such as Valencina de la Concepción, Los Millares or Zambujal, for example. The results allow us to point out, for the moment, the existence of three large groupings that help to decipher differential technical knowledge but with shared symbolic patterns, as shown by the use of these “betilos” at the entrance of the corridors. The proposed morphotypological approach is intended to be a useful tool for the identification, recording and interpretation of new “betilos”.

7 THE COASTAL MEGALITH SITE OF PIETRA TARA, PALERMO. THE CULT SYSTEM OF THE UPPER ZONE. FIRST ANALYSIS OF THE ACROPOLIS

Mercadante, Francesca (Studio GeoArchPa Palermo) - Cabrero Correo, Carolina (Department of Prehistory and Archaeology, University of Granada)

The coastal megalith site of Pietra Tara is located on the northernmost side of western Sicily, on Monte Gallo, Palermo, in front of the Tyrrhenian Sea. It appears to be the only known site in Sicily with megalithic/cyclopean constructions, still intact, with landslide carbonate blocks, adapted to menhirs. To facilitate the study, the area was indicated in two portions: Lower Zone, from the coastline up to 60 meters above sea level, and Upper Zone, from 60 meters above sea level, up to under the cliff of Monte. The funerary architecture is widespread and connected with the structures of the entire site, mainly with the intramural dolmen hypogea. Starting from the altitude mt. 50 above sea level the slope becomes steep (30-40% slope), has some hilltops, with accumulation of stone material along the steep slopes. In July 2023, a lidar drone flight was carried out over the entire area, which highlighted a small acropolis in the Upper Zone with megalithic constructions, with partially ruined megaliths and mounds. The acropolis has architectural spatial characteristics different from the underlying Zone B, it has a polygonal closure made up of cyclopean blocks, with double-faced walls, with a first ovoid shed environment leaning against the ZA.1 megalith. Furthermore, at higher altitudes there are two pseudo-rectangular rooms cutting into a thick wall. In the first instance it could be argued that we are in the presence of a secluded area, whose architectural system, formed by the two megaliths, (ZA.2 and ZA.3) appears as the entrance to a cult/funerary place with the presence of mounds, in which the Megalith ZA.2 takes on the condition of an “anthropomorphic Monolith”, as a reference to the female Goddess, while the second ZA.3, behind it, acts as a funerary hypogeum. The cult/funerary system is flanked by terraces with shed structures

643 THE EXPERIENCE OF STONE II: SCULPTING COMPARATIVE PHENOMENOLOGIES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Smith, Christina (Durham University) - D'Alisera, Alexander (Boston College)

Session format: Regular session

The Experience of Stone hits Rome! Building upon the success of last year's all-day panel, this session offers explorations into the phenomenology of stone sculpture and monuments, stone artefacts, stone buildings, and natural landscapes of stone. In the words of Maurice Merleau-Ponty, 'The body is our general medium for having a world.' Centred on EAA 2024's theme 'persisting with change', this session explores how stone constructs (and is mediated by) a viewer's sensorial experience. Phenomenology offers a way for thinking about the affective presence of stone, stone monuments, and natural stonescapes, and proves particularly important for periods and places where the textual record is scant.

We invite scholars of all time periods, geographies, and disciplines—but especially archaeologists, historians, and art historians working from the prehistoric to medieval periods—to contribute papers exploring comparative phenomenologies of stone. Papers that examine geographically or temporally cross-border case-studies are particularly welcome. Possible subjects include, but are not limited to: comparative stonescapes; reuse of hewn or sculptured stone; epigraphy through changing viewership; sculpting memory; textual references to the experience of stone; stone and empire; agentive stone; the application of viewsheds in spatial analysis; a theology of stone; multi-media stone monuments; and, landscape archaeology. As with last year's panel, this session aims to offer a forum through which history, archaeology, and other disciplines may continue to develop further scholarly discourse and collaboration.

ABSTRACTS

1 PERSISTENCE OR CHANGE? THE USE OF STONE IN THE ROOFING SYSTEMS OF ROMANESQUE CHURCHES OF NORTHERN ITALY (11TH-12TH CENTURIES)

Passuello, Angelo (Marie Skłodowska-Curie Postdoctoral Fellow - University of Cyprus (Archaeological Research Unit))

Some structural systems assumed a fundamental importance in the formulation of the architectural language of sacred space in the Middle Ages. Chief among them was the emergence of varied roofing solutions that decisively conditioned the internal spatiality and also assumed a key role in shaping the external form of ecclesiastical buildings, since the entire design would be affected by the shape that the roof was meant to have.

This paper will present the first results of the Cataloguing Medieval Roofs (CaMeRoofs) project, funded by the European Commission under the Marie Skłodowska-Curie Actions, which I am carrying out at the Archaeological Research Unit of the University of Cyprus.

According to a common view, Romanesque architecture drew inspiration from the great Roman basilicas by making stone roofs and giving up the wooden ceilings of early Christian origin. The experience of stone, therefore, would be quintessential for the development of the spatial concept typical of Romanesque churches. Nevertheless, was this truly the case?

This paper, in line with the conference's main theme, “Persisting with Change”, will consider some examples of Northern Italian churches (regions of Veneto, Lombardy, Piedmont, Emilia Romagna) with a view to examining more closely whether it was really the use of stone vaults that acted as a catalyst for change in Romanesque design and construction.

In order to broach this and related questions, the project in question employs an archaeological (and not just an architectural-historical) approach to the study of medieval roofing systems. The aim is to attempt an interpretation of the structural relationship between the churches' roofing and the load-bearing walls, highlighting any discontinuities and design or phase changes (stratigraphic analysis), to identify restorations and modifications, and analyze in detail the construction technologies applied to the stone vaulting.

2 PEARLY STARS, CELESTIAL REFLECTIONS, AND PENDENT VERSE: THE FOUNTAIN OF THE LIONS IN THE GARDEN OF BLISS

Cottignoli, Emilia (Stanford University)

This study explores the stone architecture of the Fountain of the Lions in the Garden of Bliss and its phenomenological, material flux from solid stone to running water. Converging as a center of liquidity, the basin at the center of the fountain becomes a glittering eye in this liquid waterscape as the highest point in reflection of the sky, mirroring the clouds, sun, and moon in its vessel, ingathering the distant sky in the form of reflection. Characterized by the slippage

of the word *ein*, meaning both eye and fountain, the eye takes everything in, holding the clouds, trees, water, and sunlight in its reflections, creating the all-seeing illusion of omniscience and surveillance. Water gurgles, bubbles, and runs, interceding in four rivers like the divine rivers of Paradise, made of water, milk, wine, and honey, that join at the fountain, collect in its basin, and fall from the lips of lions in a strand of watery pearls. Inscribed into the basin itself and throughout the Alhambra, the verses of Ibn Zamrak evoke how water droplets fall like a string of pearls, catching the sunlight in each orb, becoming luminous, shooting stars that complete their arc from lion to floor, where they are extinguished. The poet becomes the stringer of pearls, linking together dewdrops of brilliance through verse, immortalized in the renewal of water that cycles through the fountain and persists in the stone. Strung pearls of words and water resonate with lanterns pendent from golden chains, evoking the Byzantine hanging lamps and polycandelon of the fifth and sixth centuries that informed the iconography of heavenly cities. Baptism through illumination becomes present in the nocturnal space of these church skies, where the lantern glitters like a star, washing the visitor clean in divine light.

3 A PHENOMENOLOGY OF CONSTRUCTION PROCESSES IN ROMAN NORTH AFRICA

Peers, Max (Brown University)

In this paper, I argue that a phenomenological approach is necessary to understand the impact of construction projects on the inhabitants of Roman cities in North Africa. I draw from the rich archaeological material of urban centers in Roman Tunisia, as well as my own experience carving stone as a research practice and hobby.

Roman Tunisia was an important center of building activity in the Roman Imperial Period, and I draw my case studies from sites such as Utica, Uthina, and Thuburbo Majus. I examine the phenomenological differences in the experience of builders and passersby between traditional stone masonry and the addition of new techniques to the architectural repertoire of the Roman period, such as concrete and brick construction.

Scholars have traced the ancient construction process in detail – from work at quarries and tile factories to workshops and construction sites – both in terms of materials and people involved. I build on this scholarship to focus on the sensorial stimuli of urban construction sites and how these would have changed with known architectural developments. A construction site for a brick-faced concrete building would have had a different acoustic profile than one produced by the work of stone masons. The addition of smoking lime kilns for producing mortar would likewise have created new sensorial effects, something surely noticed by the neighbors and passersby to these construction sites.

Augustus claims to have found Rome a city made of brick and left it made of marble. Scholars have devoted attention to the phenomenological differences between finished architectural products in the Roman period, but construction work itself would have been near constant. I argue that a phenomenological analysis of Roman building techniques is necessary to understand how the processes of construction would have shaped the social fabric of cities in Roman North Africa.

4 FROM ST PAUL'S TO SANTA PUDENZIANA: THE AFFECTIVE PRESENCE OF SCULPTURE IN-THE-ROUND, AD 600-1100

Smith, Christina (Durham University)

The Insular world was anything but insular. Ecclesiastical men and women travelled far and wide, taking with them ideas, sketches, books, artefacts, and people. From the Venerable Bede we learn that Benedict Biscop (d. 690), abbot and founder of Wearmouth-Jarrow, made five journeys to Rome alone. Not only were Biscop's continental connections instrumental in furnishing the Northumbrian joint monastery with one of the finest libraries in early medieval Europe, but they also shaped the sculptural landscape and layout of St Peter's and St Paul's.

This paper is interested in the affective presence of free-standing sculpture when it is found within or in proximity to a built environs. This contrasts with monuments in landscape settings, many of which are in isolated settings. By using a series of case-studies from Britain and Italy, this paper compares and contrasts the form and function of early medieval stone sculptures in a built environment—whether that be a building of stone or a structure in wood; a manorial church or a large monastic complex. The themes of approach and access (or lack thereof) are examined with an aim to unpacking different engagement(s) with the sculptures. In all, the paper shows that while many Insular sculptures undoubtedly took inspiration from Christianity's Roman heartland, a class of early medieval Britain's sculptures in-the-round were innovative and unlike their continental counterparts.

5 FLYING VISITS TO THE WORLD OF STONE: ANGELS, DEMONS AND CELESTIAL AIRDROPS ON PICTISH AND IRISH EARLY MEDIEVAL STONE SCULPTURE

King, Michael (Independent)

In early medieval times, stone would have been regarded as the hardest material on earth, a substance that epitomised God's work of Creation, and was found suitable for the carving of timeless images that reflected the progress

of human salvation in the world, beneath the realms of airborne celestial beings. In early medieval Insular art, angels of the air are depicted on stone monuments, on metalwork and in manuscripts, as heavenly worshippers, protectors, messengers and guides, sent to expedite and glorify God's intervention in earthly human affairs. Demonic beings also appear in many forms, particularly on the north sides of stone monuments, facing the northerly source of evil forces as described in Insular early medieval writings. This paper will consider and compare the roles of angelic and demonic visitors to the world, plucked from the air in the imagination of sculptors and 'captured' in stone on Pictish carved monuments and Irish high crosses. In addition, carved depictions of hitherto unidentified winged objects, air-lifted prophets and hell-bound demons will be examined and placed in context, drawing on textual descriptions and pictorial images from both Insular and Continental sources. The emergent themes of the glorification of Christ, the angelic protection, sustenance and guidance of the faithful, and the binding in stone of demonic beings who threaten them, will be explored in conclusion.

6 NEW PHENOMENOLOGICAL APPROACHES TO UNDERGROUND STONESCAPES IN EARLY MEDIEVAL BRITAIN AND IRELAND

D'Alisera, Alexander (Boston College)

Caves dot the landscapes and seascapes of Britain and Ireland. Containing vast corpora of archaeological material from the prehistoric to the medieval, the two islands' undergrounds have granted scholars extraordinary insight into daily premodern life. While natural caves often take precedence in these studies, a number of artificially constructed caves, as well as natural caves with significant human augmentations, also exist across both Britain and Ireland. Taking one British and one Irish site as its shared basis, this paper explores the early medieval curation of artificial and augmented caves through the lens of comparative phenomenology. The British site of focus is an artificial cave in Derbyshire, known as Anchor Cave, and the paper's Irish site is a natural cave with a constructed entrance in County Roscommon, known as the Cave of Crúachain. Both sites bespeak a particular early medieval interest in constructing the space of the underground beyond its natural boundaries. By studying hewn stone with natural stone, this paper seeks to explore the multifaceted ways in which ordinary premodern people altered their landscapes to curate a sense of the underground in both Britain and Ireland's early medieval periods.

7 VIEWING AND CREATING THE PAST IN VIKING AGE STONE SCULPTURE

Stoner, Heidi (Canterbury Christ Church University)

The notion of complex cultural connections that develop and change can be seen in the manner in which sculpted material is presented and considered in the wider Insular world, particularly that of the so-called Viking age. This paper will examine individual sites where the evidence that demonstrates there are multiple phases of sculpture and complex patronage patterns further arguing that the maintenance of sites over the long Viking age demonstrates a conscious continuity and integration rather than a subsequent replacement of networks in place. The case studies selected will consciously not be arranged by national region but posit various scales of approaches to the study of sculptural materials. This study will examine the use of both iconography and inscriptions as ways of establishing cross cultural links that go beyond style. I will examine close links in small regional collections, to connections that form across maritime routeways, to links that might be established by larger church networks that cover the whole region, and beyond the Insular world.

8 THE SEIKILOS STELE: TELLING A STORY WITHOUT CONTEXT

Alliata, Victoria (Independent Researcher)

"There is life in a stone. Any stone that sits in a field or lies on a beach takes on the memory of that place. You can feel that stones have witnessed so many things." Andy Goldsworthy

Now, archaeologists usually do not rely on feelings only. For the study and interpretation of archaeological finds the context is a crucial tessera of the mosaic. This makes it particularly challenging to place an object that has been rediscovered serving as a flowerpot pedestal in a private 19th century household: the so called Seilikos Stele.

This marble stele bears an inscription, an epitaph in ancient Greek, and is perhaps best known for the rare presence of ancient musical notation. Of course, this exceptional find has been discussed by epigraphists and musicologists with a particular focus on the inscription, the notation and its musical interpretation.

However, there has never been an attempt to better understand the stele as part of an environment, its heuristic value, its potential topography and topology, its phenomenological "power". This is true, whether we try to imagine its display in a potential ancient context, or we consider the present experience of visitors of the National Museum of Denmark in Copenhagen, where it is displayed today.

Using the tools provided by different disciplines – mainly history and archaeology – this paper aims to analyse the Seikilos Stele through different theoretical and practical approaches, trying to tell a story through its textual and material dimensions.

9 FROM SILENT BEDROCK TO STONES OF MEANING

Johnson, Andrew (Manx National Heritage)

Ever since the Isle of Man – an island in the Irish Sea – emerged from the Ice Age, its rocks have served as a source of tools, mineral wealth, building material, and as an enduring medium for the making of monuments.

On one hand, rock quarried and eroded from its crags and coastlines has provided boulders and slabs suitable for building prehistoric megalithic tombs, but on the other, sheer geological age has resulted in a raw material that is difficult to work for more intricate purposes.

It is the latter which particularly intrigues, because in spite of this, a sizeable corpus of medieval sculpture has survived to this day as witness to a tradition of memorialisation that lasted several centuries, developing from small, cross-incised grave-markers and ending with intricately carved monuments standing over two metres high. In so doing, these stones have become unique documents of an era for which the Isle of Man is otherwise poorly provided.

These cross-slabs have long been the subject of considerable scholarship, focussing mostly on studies of art styles and inscriptions. Current research is however showing that these memorials performed significant roles as landscape monuments, as well as contributing towards place-making and the formation of centres for newly-created parishes in the twelfth century.

Furthermore, their enduring resilience attracted new uses, experiences and reactions beyond those for which they were originally intended: in a series of case studies they can now be understood as landmarks, as pilgrimage sites and as market crosses, as building stone, and latterly as objects of antiquarian study. Public interest has grown apace, and for well over a century there has been a drive to rescue them from their use as building stone and to gather and display them at parish churches, where they continue to engender considerable community interest.

10 TOUCHSTONE? EXPERIENCING 3D PRINTS OF EARLY MEDIEVAL CARVED MONUMENTS

Kasten, Megan (University of Glasgow)

The vast majority of scholarship about 3d printing in archaeology has primarily revolved around its potential for producing educational handling collections or to facilitate access to museum collections for the visually impaired. The ability to 3D print offers a tactile means of bringing early medieval carved stone to anyone: those with or without access to the original, whether researchers or the general public, though often through an inauthentic tactile medium and at a much smaller scale than the original. But does the physical experience of the 3D print affect our perception of the real thing?

This paper compares the author's experience of early medieval sculpture through three lenses – through the performance of photogrammetric data capture and processing of a stone monument as a digital 'slow looking' method, analysis of the resulting 3D model via a 2D computer screen and a range of computer software to remove its real-life appearance (i.e. remove colour), and tactile interaction with the same 3D model printed in resin. These multi-media experiences of stone monuments will be reflected upon to identify how 3D prints can be best used in different educational settings: alongside the real monument, while viewing the digital model, or as an assemblage of 3d prints in a handling collection.

644 MOBILITY AND TERRITORIALITY IN PRE-ROMAN ITALY: ROUTES, OBJECTS, IDEAS

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Di Fazio, Massimiliano (Università di Pavia) - Stek, Tesse (University of Groningen; KNIR) - Tabolli, Jacopo (Università per Stranieri, Siena) - Riva, Corinna (University College London)

Session format: Regular session

Pre-Roman Italy (i.e. the various communities that populated the Italian peninsula before the Roman conquest) constitutes a fascinating but also contentious field of study. The consistent degree of heterogeneity of ancient Italy often leads to an analytical approach that considers the various peoples/cultures separately (the 'handbook' approach, so to speak), and not as part of a strongly interconnected and dynamic world. One of the possible ways to overcome this ethno-regional approach is to highlight characteristics that enable a transcultural approach, so as to emphasize what connects these communities beyond their differences. As several influential recent studies (e.g. Isayev 2017) have pointed out, one of the most striking features of ancient Italy is its internal mobility. Paradoxically or not, this feature developed alongside the creation of territorially expressed cultural communities as visible in the material culture from the late Bronze age to the Hellenistic period.

This panel aims to take this theme of mobility and territoriality further in three interrelated sections: routes of mobility, movement of ideas, movement of objects. This approach enables us to better appreciate the changeable character and intensity of movement and exchange in ancient Italy. The panel seeks to generate new ideas on the societal circumstances stimulating this dynamism, as well as on the mechanisms of mobility and exchange on the ground. Departing from that basis, the panel aims to investigate the interaction of this enhanced mobility with the development of cultural biographies, socio-political structures as well as cultural and socio-economic networks, and their territorial expressions. Ultimately, we consider the products of these punctuated interactions between people, objects and ideas, and its legacy at the dawn of Roman imperialism.

ABSTRACTS

1 SETTLING THE APENNINES IN THE BRONZE AGE. NEW DATA FROM THE TAPPINO VALLEY AREA

Palazzini, Flavia (Sapienza - Università di Roma; KNIR) - de Neef, Wieke (University of Bamberg) - Stek, Tesse (University of Groningen; KNIR)

Research on mobility and connectivity in protohistoric southern Italy has predominantly focused on coastal communities and their integration into the Late Bronze Age Mediterranean economic and cultural networks (XIV-XII century BC). These routes of commerce and cultural exchange not only spurred technological innovation (e.g. the use of potter's wheel) but also served as catalysts for the emergence of social and economic complexity among indigenous populations. In contrast, coeval inland communities across the Apennines have traditionally been considered rather isolated and secluded due to their exclusion from the Mediterranean-wide exchange networks. However, archaeological evidence suggests that these groups developed alternative, internal connections. Facilitated by mountain routes, these networks established a functional economic organization and cultural dynamism, but its traces are still few and far between.

Recent non-invasive field investigations in the mountainous area surrounding the Tappino River Valley (modern Molise, southern Italy) – including pedestrian surveys, geophysics, and drone imagery – resulted in the discovery of several pre-Samnite sites, ranging in chronology from the Middle Bronze Age (XVIII-XIV century BC) to the VII/VI century BC. The examination of these sites, particularly in a region where previous data were limited, provided a starting point for delving into aspects such as location preference, settlement patterning and the special characteristics and functioning of these sites. Moreover, the analysis of pottery production aided in tracing interactions with neighbouring Apennine communities (notably in Campania, Abruzzo, and Marche), which furthered our understanding of the role of cultural exchange in shaping the region's history.

This paper adopts a multi-scalar approach, moving from individual sites to broader areas and trying to identify similarities that may serve as evidence for connections. We will present the new discoveries and discuss their contribution to our understanding of Bronze Age communities that settled the Apennines before historical times.

2 THE RISE OF EARLY ROME. NETWORKS AND DOMINATION IN CENTRAL ITALY (1050-500 BC)

Fulminante, Francesca (Bristol University; Oxford University; University Roma Tre)

The trajectory of Rome from a small village in Latium vetus to an emerging power in Italy during the first Millennium BC and finally an overarching Empire over the all known world until the collapse by end of the 4th century AD is very well known and often appears almost inevitable and unstoppable. But Why Rome?

By analysing transportation networks in Etruria and Latium (central Italy, 1000-500 BC), my recent book, on which this paper is based, reveals with a grounded and solid quantitative background the favoring factors to the emergence and dominance of this city within these regional networks, which is at the origin of our Western civilization.

Applying traditional Social Network Centrality Measures, existing and tailored-made Efficiency Indexes and Network Science modelling to terrestrial and fluvial transportation systems in central Italy, the book and the paper show how a larger and probably more powerful region, but with an heterarchical regional organization, such as Etruria, in the end was won and dominated by a smaller, but more dynamic and hierarchical Latium vetus.

Further development of this work shows how the terrestrial and the fluvial routes are actually complementary and how their interaction changes through time according different socio-political and economic conditions.

3 **STAPLE RESOURCES MOBILIZATION AND EXCHANGE AT THE URBAN TRANSITION IN CENTRAL ITALY (8TH-6TH C. BCE). THE ISOTOPIC EVIDENCE FROM GABII**

Motta, Laura (University of Michigan)

Resource mobilization plays a crucial role in the transition to urbanized political systems. However, the lack of direct evidence for the movement of crops and livestock has hindered our understanding of urban-rural economic integration, territoriality, and the regional dimension of staple exchange among the closely interacting, autonomous polities of Central Italy during the Iron Age and Archaic period.

Recent excavations at Gabii have yielded an unprecedented amount of archaeobotanical and zooarchaeological remains dating from the 8th to the end of the 6th century BCE. These new datasets are uniquely positioned to provide a material perspective on resource management in these emerging urban centers. A multi-isotope approach, combining strontium, oxygen, carbon, and nitrogen stable isotope analysis of the animal bones and crop remains, has revealed important insights into animal management and farming practices. The integrated isotope analysis has allowed us to discriminate between locally grown and imported staple resources, making it possible to track directly the otherwise invisible choices that were made around herd mobility, pastoral strategies, and crop movement.

The data from Gabii show a persistence of household-level staple economies characterized by diverse animal husbandry and cultivation strategies throughout the period. Animals were raised in the hinterland without evidence of vertical mobility or horizontal transhumance. Most of the staple crops were cultivated in the volcanic soils near the settlement, suggesting that the rural production and the carrying capacity of the immediate hinterlands were sufficient to meet the needs of the population. It remains to be determined to what extent farming and husbandry practices may have been also socio-politically constrained by the territorial reach of the settlement.

4 **THE PROJECT FAMILIES, GENDER, MOBILITY AND INTERCULTURALISM IN THE ETRUSCO-ITALIC NECROPOLIS: CASE STUDIES FROM CAMPANIA AND VENETO. SOME PRELIMINARY CONSIDERATIONS**

Gambacurta, Giovanna (Ca' Foscari University Venice) - Pellegrino, Carmine (Università degli Studi di Salerno) - Cuozzo, Mariassunta (Università degli Studi del Molise)

The paper deals with the research project FaGeMI presented in the context of PRIN 2022.

The research theoretical issues are related to the definition of gender, ethnicity, identity, mobility, intercultural dialectics and hybridization through the analysis of groups of burials belonging to some pre-Roman necropolises in Campania and Veneto in crucial stages of their development (9th-7th century BC).

Routes of mobility, movement of ideas and movement of objects will be examined between these two different areas of ancient Italy.

The archaeological side of the question is controversial, having been the subject of a new debate ever since the late Nineties. From an archaeological point of view, the crux is whether material culture, in some cases, can be a vehicle of ethno-social meanings, and whether these meanings can be understood by archaeological methods, in the absence of other kinds of evidence.

This objective will be pursued on the basis of a shared theoretical platform, with a special focus on mobility and interculturalism, by applying an interdisciplinary protocol of analysis.

Furthermore this project intends to apply some types of scientific analyses such as DNA and strontium analyses to selected groups of burials in order to acquire elements for investigating parental links and mobility that have been suggested from rituals and materials.

For these kinds of analyses, priority will be given to those burials in which the ritual or the material culture suggests an origin from a different cultural environment of any kind. Nevertheless, tests will be carried out also on funerary groups that appear to be more homogeneous, with the aim of identifying also cases that might be "invisible" from the perspective of material culture.

5 **AN INVISIBLE RIVER IN A LANDSCAPE OF VISIBLE MOBILITY: THE RIVER CLANIS**

Tabolli, Jacopo (Università per Stranieri di Siena)

This paper aims at discussing mobility in central Italy during the first millennium BCE while looking at a pre-Roman landmark that despite its disappearance still constitutes a living frontier in central Italy: the River Clanis. According to the ancient Latin sources the Clanis was navigable and originated from the foothills of Chianti; it descended towards the south, before joining the River Paglia, then reaching the Tiber. Along the Clanis, the Etruscan city-states of Orvieto, Chiusi, Cortona and Arezzo were founded in the Iron Age, thus representing the most important waterway of ancient Central Italy, after the Tiber. The narrative account by Tacitus (Ann, I, 76-79) on the floods that affected Rome in 13CE and the consequent plan of inverting its course towards the Arno has remained an open matter of de-

bate. Despite the various theories, it is generally accepted that in the Medieval period the entire Valdichiana – whose toponym derives directly from Clanis – turned into a system of swamps and lakes and constituted the main target for conflicts between the Granducato di Toscana and the Papal State. Despite the landfill promoted by the Lorena family and the agricultural exploitation of the valley, characterized by major contemporary connectivity infrastructures, the land division because of the ancient river is still alive in local perception.

This paper aims at positioning the Clanis for the first time on archaeological maps of Central Italy and to define whether its course could have determined borders and interconnections between the early city states and cultural groups from the Tyrrhenian to the Adriatic sea, considering that the geo-political understanding of this area is still unclear when compared to other parts of central Italy. This will be achieved by moving beyond the various narratives in literature and by considering how regionalism have influenced cultural biographies.

6 **MOBILE MYTHS IN PRE-ROMAN ITALY**

Wright, Parrish (University of South Carolina)

The integration of Greek mythology and heroes in the foundation stories of cities and cultural groups throughout pre-Roman Italy goes beyond "Hellenization. This phenomenon allows us to examine the interconnectedness of cultures and the movement of ideas throughout the peninsula. I argue that the widespread adoption of Greek myths was motivated partially by the desire to establish alliances based on kinship diplomacy, where political and economic partnerships were forged through perceived genealogical connections rooted in mythical narratives (Jones 1999). This approach has been applied fruitfully to Asia Minor (Patterson 2010) and Rome (Prag 2010, Russo 2012), not yet for pre-Roman Italy.

Changes in these relationships appear both textually and archaeologically; for example, Strabo and Cato claim that the Samnites are descended from Spartans through their local deity, Sabus (Strabo 5.4.12, Cato FRH F9, F50), which illustrates how mythical ancestry was leveraged to strengthen military cooperation and mutual interests with the Spartan colony, Taras. In Apulia, sources claim Diomedes as a founder of the Daunians, and dedications found on nearby Adriatic islands inscribed to Diomedes, indicate his role as a mediator. Others connect Diomedes to the enigmatic Daunian stele – providing a Greek story to explain a local practice.

Previous studies have focused on individual ethnic groups (i.e. Samnites, Bruttians, see Maiuro 2014, Bradley & Farnley 2017, Dench 1995), but considering this practice across Italy provides a new way to understand nascent cultural identities through the movement of ancient gods and heroes, such as Heracles, Homeric heroes, Dionysus, etc. Stories traveled across cultural boundaries in various ways: human mobility, storytelling, depictions on temples, reenacted through rituals, votive offerings, or iconography on coins. Mythical connections could facilitate other interactions, including traditional military alliances, hiring mercenaries, facilitating trade, loans, and even interpersonal connections based on a shared understanding of myth and history.

7 **FOLLOW THE WOLF. THE VER SACRUM TRADITION AND THE MOBILITY IN PRE-ROMAN ITALY**

Di Fazio, Massimiliano (University of Pavia)

When we speak of mobility in pre-Roman Italy, there is a myth that comes to the fore: that of the ver sacrum, the tradition according to which a part of a community, in times of famine and distress, had to abandon its home and seek its fortune elsewhere, creating another community, under the guidance of a 'totemic' animal. It has long been debated whether these traditions that we know from literary sources are merely stereotypical accounts that are part of the narrative modes through which ancient ethnography has tried to describe the cultures of ancient Italy, or whether some aspects of these traditions may have a historical background.

My contribution aims first and foremost to reflect on the literary tradition, on the possibilities of recognising historical and archaeological indications of a historicity of the ver sacrum, but also on the use (and sometimes abuse) of the ver sacrum in modern historiography.

Furthermore, the aim is to frame the ver sacrum within a series of issues:

- the historical context, in which the movement of groups was anything but exceptional;
- the factors (economic, social, even climatic) that could determine these movements;
- the outcome of the movements, as an occasion for conflict but also for encounters between different communities, with all that this entails in terms of interaction between cultures and thus of mutual influence, which sometimes ends up undermining our 'ethnic' schemes.

8 ENCLOSING PASTORALISM: PASTORAL MOBILITY AS A SOCIAL CONNECTOR IN PRE-ROMAN CENTRAL ITALY

Cohen, Sheira (Intercollegiate Center for Classical Studies in Rome)

The shepherds and their flocks are ever-present in our image of pre-Roman Italy, but these figures only appear in general terms in the scholarly literature. The lack of clear archaeological evidence and minimal textual references means that pastoral mobility remains an under-discussed and under-theorized phenomenon in studies of Rome and western central Italy more broadly. As a result, pastoral mobility is not integrated into broader discussions of urbanization and community formation. Notions of territoriality and territorial control are instead rooted in sedentary agricultural systems. Rarely are the social or economic implications of seasonal pastoral mobility considered.

Rather than search 'for' the pastoralist, this paper will draw on worldwide ethnographic and historical analogies to explore pastoralism and pastoral mobility as a social connective practice. Pastoralism is more than just an economic behavior; it is a socially-embedded phenomenon. As a social connector between individuals and families, it can support social reproduction through time and social cohesion across space. Comparative examples range from the practice of "stock friendship" in East African cattle herding communities to the socially-embedded trade systems used to form "vertical archipelagos" in pre-Columbian Andean societies. These diverse examples serve to break down subsistence-based binaries between mobile and sedentary ways of life and inspire new ways of looking at old evidence.

This paper will reveal how pastoralism and pastoral mobility are implicated in mechanisms of social cohesion across different scales from the individual to the state. The constant small-scale, stochastic mobilities that characterized Italy's economy would have acted as a central mechanism for connecting diffuse communities across the landscape.

9 CROSSROADS OF ANTIQUITY: INVESTIGATING THE IMPACT OF ROMAN INFRASTRUCTURE ON PRE-ROMAN TRADE IN THE PELIGNA VALLEY

Merola, Antonio (DIRUM, Università di Bari, Italy)

The conventional interpretation of pre-Roman connectivity, often illustrated by the preserved routes "fossilized" by Roman roads, has traditionally depicted these pathways as mediums connecting various cultural facies across the peninsula. However, this model is biased by the knowledge gap between the Roman roads and the pre-Roman (Italic) routes, the former being a proper network of infrastructures and the latter a less structured path (at least in their materiality). Although the Roman phenomenon has trans-regional implications (up to the trans-Mediterranean ones), a re-examination of pre-Roman connectivity is essential, employing new theoretical frameworks to contextualize technological, economic, social, and historical phenomena. (the order is not random).

The goal of this presentation is to analyse the impact of Roman infrastructures within a non-colonized landscape. The case study is the impact of the Roman infrastructures of the Peligna Valley (Abruzzo, Italy), compared to the pre-Roman routes of trade. Reconstructions of the routes will be presented with attention to the material culture in the research area and the possible investigation of the contacts between the different Italian areas. The results of the several spatial analysis suggest an extremely heterogeneous ancient landscape, where each area developed an unique settlement and road system, that it can be read as the different results of the same event: the Roman conquer. Are we perhaps facing various Romanizations happening in the same time and in the same area?

10 FROM THE MOUNTAINS TO SEA AND BACK: TOWARDS A MORE NUANCED UNDERSTANDING OF BURIAL PRACTICES IN SOUTHERN LATIUM

Revello Lami, Martina (Leiden University) - Marazzi, Elena (Università di Pavia) - Di Fazio, Massimiliano (Università di Pavia)

This work seeks to contribute to the debate about the interconnectedness of the pre-Roman world by examining the interplay between mobility, burial practices, and funerary goods traditionally ascribed to the so-called Volscians, an ancient Italic group mentioned in literary sources as fierce adversaries of Rome. Focusing on the recently unearthed necropolis in Pofi, Southern Latium, our research aims to shed light on the nuanced connections between material culture, social structures, and territorial expressions.

The material culture commonly attributed to this group, found both in the hinterland of Lazio and close to the Tyrrhenian coast, presents an intriguing case study. The necropoleis excavated in Frosinone, Pofi and Satricum reveal an incredibly rich funerary record, which offers an unprecedented opportunity to explore the complexities of burial practices of southern Latium in the Archaic and post-Archaic age, emphasizing both similarities and differences across diverse geographical locations, and thus giving an opportunity to reflect on the ethnic labels traditionally used in this area.

Our investigation employs a multidisciplinary approach, integrating survey and excavation data to morpho-typological and materials sciences analyses to gain insights into the cultural biographies of Southern Latium. By exploring the

mobility of objects, people, and ideas within these pre-Roman communities, we aim to disentangle the simplistic correlation between materiality and ethnicity. The outcomes will contribute to a more nuanced understanding of ancient Italy's internal mobility, fostering dialogue on societal patterns, mechanisms of exchange, and the legacy of these interactions on the eve of Roman imperialism.

Through this contribution, we seek to enrich the discourse on transcultural approaches to pre-Roman Italy, emphasizing the need to go beyond the 'handbook' approach and recognize the interconnected and dynamic nature of the ancient Italic world, fostering also discussions on the multifaceted relationships between mobility, material culture, and the societal landscape of pre-Roman Italy.

11 MOBILITY BETWEEN THE LATIAL HINTERLAND AND THE COASTAL AREAS AT THE DAWN OF THE ROMAN EXPANSION: THE CASE OF SATRICUM

Gnade, Marijke (Royal Netherlands Institute in Rome; University of Amsterdam)

The discovery in the 1980s of systematically laid out burial grounds within the boundaries of the urban settlement of pre-Roman Satricum and their subsequent attribution to the Volscians - the historical conquerors of ancient Satricum around circa 500 BC - led to a fundamental debate on the validity of ethno-historical interpretations of material culture. Subsequent discoveries of corresponding graves with identical grave assemblages in the hinterland of Latium (Frosinone, Pofi) provided welcome confirmation of the ethno-cultural interpretation of the material remains in Satricum. Whether the attribution to the specific population group of the Volscians is correct, and whether we should take the sources at their word, is actually not so relevant in this story.

As such, the discoveries constitute silent testimonies of a highly mobilised pre-Roman society in which exchange of material culture and settling in other habitats were common. Material testimonies from earlier times point to similar processes between coast and hinterland albeit less explicitly. Socio-economic considerations in subsequent periods of political instability will have contributed to increased mobility with the inclusion of home-based subsistence economies. During this process, relations with the homeland remained intact as witnessed by the constant exchange of objects between coast and hinterland and vice versa.

In my talk, I will reflect on the dynamics of interaction between the various pre-Roman groups which, in the case of Satricum, had its unmistakable repercussions on the post-archaic settlement resulting in a greatly altered society and subsistence economy.

12 ORANGE IS THE NEW BLACK. FROM HELLENISTIC TO ROMAN FINE WARE IN SOUTHERN ITALY

De Mitri, Carlo (Università del Molise)

The black-gloss ware constitutes the almost exclusive fine tableware used in Italy until the 3rd century BC. Between the 2nd and 1st centuries BC, there is a change in Fine Ware tradition, characterized by the shift from Black to Orange/Red Glazed. Alongside this, there is a notable spread of Mouldmade Ware and the establishment of workshops producing new ceramic classes of Aegean-Oriental tradition in Italy and the western Mediterranean. Through the analysis of case studies, this phenomenon is examined, stemming from the mobility of artisans and the circulation of technical and craft knowledge, facilitated by the geo-political conditions that developed in the late Hellenistic period. The in-depth analysis focuses on two case studies: the Ionian-Adriatic region, paradigmatic for understanding the arrival of new Aegean-Oriental products and the start of new ceramic productions, and the Samnite area, linked to the Tyrrhenian and Apulo-Lucanian sides, to verify the change that took place.

646 EXPLORING TRAUMATIC INJURIES LEADING TO DISABILITY IN THE PRE-ANTIBIOTIC ERA: A MULTIDISCIPLINARY APPROACH

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Micarelli, Ileana (McDonald Institute for Archaeological Research, University of Cambridge, UK) - McKenzie, Catriona (Department of Archaeology, College of Humanities, University of Exeter, Exeter, UK) - Matczak, Magdalena (Institute of Archaeology, Nicolaus Copernicus University, PL; Faculty of History, Adam Mickiewicz University, PL) - Casagrande, Giulia (Department of Classics, Sapienza University of Rome, IT)

Session format: Regular session

This session will examine how individuals and past populations dealt with significant traumatic injuries which resulted in disability in the pre-antibiotic era. The session aims to explore different methodological approaches to help us contextualise traumatic injuries and their ongoing impact on both individuals and communities. We are particularly interested in i) how individuals adapted to their injuries, ii) likely healthcare support from the wider community, iii) material culture that may have assisted with daily tasks post-injury, e.g., protheses and tools, and iv) possible changes in diet following injury. Drawing upon a wide range of evidence, this session will move beyond a detailed description

of traumatic injuries to understand the longer-term impact of the resulting disability on an individual across their life course. We hope to include archaeologists working with documentary evidence, material culture, and biomolecular analyses. Submissions can cover any period and geographical region. We also want to include new approaches to identifying and contextualising traumatic injuries. Theoretical presentations to initiate constructive and creative discussion among researchers working on trauma, disability and care are also welcome.

ABSTRACTS

1 INTRODUCTION TO THE SESSION #646: EXPLORING TRAUMATIC INJURIES LEADING TO DISABILITY IN THE PRE-ANTIBIOTIC ERA: A MULTIDISCIPLINARY APPROACH

Micarelli, Ileana (McDonald Institute for Archaeological Research, University of Cambridge) - McKenzie, Catriona (Department of Archaeology, College of Humanities, University of Exeter, Exeter, UK) - Matczak, Magdalena (Institute of Archaeology, Nicolaus Copernicus University, PL) - Casagrande, Giulia (Department of Classics, Sapienza University of Rome, IT)

We can identify the presence of trauma in skeletal remains. However, we still do not know how past individuals and communities coped with significant injuries in pre-antibiotic times. To further this research, a multidisciplinary approach is needed. A bioarchaeological investigation can explore how individuals adapted to their conditions after injury. But, we can also consider care, medical treatments, and/or herbal remedies that may have been used in the aftermath of injury. We can incorporate analysis of archaeological artefacts (including prosthetics) and documentary sources to reveal deep narratives.

This session aims to move forward the study of trauma in the past. A contextualisation of trauma, and its ongoing impact on both individuals and communities, helps us to better understand the lived experience of people with significant injuries. We are particularly interested in (1) how individuals survived open trauma in the pre-antibiotic era, (2) how traumatic injuries impacted an individual's life, and (3) how material culture may have been used to aid resultant disabilities.

This introduction will outline the order in which papers are presented, and establish a focus group among researchers from various disciplines. The ultimate aim is to discuss why the topic of trauma and disability is important, and how it may contribute to a more comprehensive understanding of the everyday lives of people and their communities in the past.

2 TRAUMATIC EVIDENCE AND DISABILITIES IN AN EXCEPTIONAL POPULATION OF THE SW MEDITERRANEAN CHALCOLITHIC: CAMINO DEL MOLINO (MURCIA, SPAIN)

Haber, María (Dpto. Preh., Arq., H. Antigua, H. Medieval y CCyTT Historiograficas. Univ.Murcia) - Díaz, Sonia (University of Valladolid (Spain))

The analysis of evidence of trauma in skeletal remains offers a very important point of view when reconstructing the ways of life of past populations and the interaction of the community with its physical and socio-cultural environment. Forensic anthropology has helped to discern the interpretation of casuistry and the correct identification of ante, peri or postmortem injuries, the type of weapon or the type of violence used. Camino del Molino (Murcia, SE Spain) (2971-2251 years cal. BC, 2sigma) is an exceptional archaeological site due to the number of buried bodies, 1,348 individuals of which 167 were recovered in anatomical articulation. Of the CMOL sample analysed in detail, 26.3% showed cranial trauma and 44.3% post-cranial trauma, which suggests that the prevalence of injuries is very high, as is the prolonged survival of the individuals. This scenario highlights the care in Prehistory, and the combination of archaeological, isotopic, palaeodemographic, palaeopathological and osteometric analyses of a population such as this one allows us to approach the relationship between people in a Chalcolithic context over a long period of time.

3 FROM ONE TRAUMA TO ANOTHER: THE UNIQUE CASE OF VICTIM 2 FROM POMPEII - INSULA DEI CASTI AMANTI

Amoretti, Valeria (Pompeii Archaeological Park) - Sparice, Domenico (Pompeii Archaeological Park; Osservatorio Vesuviano - Istituto Nazionale di Geofisica e Vulcanologia) - Zuchtriegel, Gabriel (Pompeii Archaeological Park)

The site of Pompeii, situated to the south-east of Mount Vesuvius (Naples, Campania, Italy), is known worldwide for having been devastated and entombed during the 79 CE eruption. This event facilitated the preservation of a living city, frozen in time forever, enabling archaeologists to ascertain its final moments. The site is presently the focus of numerous archaeological activities, primarily directed towards conserving the structures susceptible to the lateral pressure of the volcanic material.

In a recent excavation in the so-called 'Insula dei Casti Amanti,' in the central part of the city, a room has been unearthed, revealing the skeletal remains of two individuals. Their traumatic pattern provides insights for reconstructing

the triggering mechanism of the building collapse which possibly resulted from seismic solicitations during the eruption. This implies that their death might not be linked to the effects of volcanic phenomena (accumulation of pumice lapilli or arrival of pyroclastic currents) but rather to the syn-eruptive seismicity.

Both individuals exhibit a high number of peri-mortem fractures. However, the male individual referred to as "Victim n.2" displays an intriguing pattern of healing trauma. Victim number 2 had healed trauma at the rib level and a double fracture with substantial eburnation at both wrists, suggesting that he had survived one or more previous traumas for an extended period. This contribution aims to shed light on the palaeopathological scenario of the residents of Pompeii before the catastrophic eruption and how this might have affected their reactions during the seismic and volcanic event in 79 CE.

4 UNVEILING LIFE'S STRUGGLES: A MULTIDISCIPLINARY APPROACH TO EXPLORE TRAUMA IN THE LONGOBARD PERIOD

Panella, Sofia (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAREA) Centre, Sapienza University of Rome, Rome, Italy) - Bernardini, Sara (Department of Cultural Heritage, University of Bologna, Bologna, Italy; Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAREA) Centre, Sapienza University of Rome, Rome, Italy; Aix Marseille Univ, CNRS, Minist Culture, LAMPEA, Aix-en-Provence, France) - Zeppilli, Carlotta (Department of Life and Environmental Sciences, University of Cagliari, Cagliari, Italy) - Maurizi, Antonio (Department of Biotechnological and Applied Clinical Sciences, University of L'Aquila, L'Aquila, Italy) - Tafuri, Mary Anne (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAREA) Centre, Sapienza University of Rome, Rome, Italy) - Micarelli, Ileana (McDonald Institute for Archaeological Research, University of Cambridge, Cambridge, United Kingdom)

This talk aims to introduce a ground-breaking approach to investigate in-life dietary changes in skeletal collections presenting healed traumas. In bioarchaeology, there are no methodologies for determining when a trauma has occurred throughout an individual's lifespan. Recently, high resolution sampling of dental tissues for multi-isotope analysis has been increasingly used to investigate short term dietary variations for life-history reconstructions. The analysis of sequential primary and secondary dentin in adult individuals helps to cover a longer time interval in the life-span, from childhood to early adulthood/death according to the teeth analysed. It has been observed that variations in the isotopic signals may also reflect stress events. This raises the question of whether it is possible to detect the stress signal of trauma by imagining a possible change in diet due to the period of recovery. This presentation explores potential dietary changes associated with traumatic events, unrecognisable from the traditional bone analysis, by using a multi-isotope analysis of primary and - when present - secondary dentine of adult individuals. This pilot study is applied to three individuals from the Longobard period showing traumatic injuries. There is an older male skeleton from the necropolis of Povegliano Veronese (VR, northern Italy, end of the 6th - beginning of the 8th C CE), an older male from Selvicciola (VT, central Italy, end of the 4th - beginning of the 8th C CE) and a mature adult male from Castel Trosino (AP, central Italy, 6th - 8th C CE). The choice of these individuals is motivated by the palaeopathological presence of a completely healed trauma, and the availability of complementary isotopic, archaeological and osteological data. The results will show the potential and limit of isotopic analysis on paleopathological case studies, and promote future research by multidisciplinary approach helping shed light in unveiling past lives struggles.

5 DISABILITY OF AN ADULT MALE WITH AMPUTATION OF A LOWER LIMB FROM MEDIEVAL CULMEN, POLAND

Matczak, Magdalena (Institute of Archaeology, Nicolaus Copernicus University in Torun; Faculty of History, Adam Mickiewicz University in Poznan) - Kozłowski, Tomasz (Institute of Archaeology, Nicolaus Copernicus University in Torun) - Chudziak, Wojciech (Institute of Archaeology, Nicolaus Copernicus University in Torun)

The Early Mediaeval (10th-13th century) settlement complex, which was named Culmen in Latin, consisted of a stronghold with the remains of a stone basilica and a cemetery with up to 1,500 graves - one of the largest in Central Europe at that time. In total, 661 skeletons from 653 burials (some of them being multiple burials) were selected for the analysis of disability and diseases in Culmen. The analysis determined eight skeletons that display pathological lesions indicating disability such as amputation, Pott's disease, leprosy, paralysis, osteomyelitis, and multiple myeloma. An amputation, which was identified in the skeleton of a male 40-50 years old at death from grave 41/00, could have a long-term impact on that individual's life. As a result of amputation, the distal parts of the left tibia and fibula were shorter by about 7 cm than the corresponding bones in the right lower limb. Proliferation and remodelling (healing) processes in the tibia and fibula suggest that the male survived amputation and lived with this condition. His other ailments included degenerative joint disease, anaemia and an antemortem fracture of the crown of the upper right medial incisor. The male was the only one individual disabled in the consequence of a specific human activity such as a surgery, punishment or fighting, and the remaining seven ones were disabled due to development of disease. In his advanced age, the male could have considerable problems with sustaining his life as a consequence of amputation and

walking difficulties. It is possible that someone had to support him to satisfy his economic needs. The male was buried in grave with W-E orientation and traces of frame. However, his body was set in atypical manner on the right side in a strongly huddled position, which indicates his other treatment after death than others.

6 **BROKEN BONES AND REMEDIES: A BIOARCHAEOLOGICAL ASSESSMENT OF TRAUMA AND MEDICINE IN MEDIEVAL ICELAND**

Haraldsson, Haraldur (University of Iceland) - Walsler III, Joe (National Museum of Iceland)

Traumatic injuries can alter the way a person utilizes their body, and severe injuries can lead to various forms of different types of bodies. Bodies changed by such events are often viewed as disabled, but myriad circumstances can facilitate debilitating situations or life courses. Humans are creatures that are known to be highly adaptable to their surroundings. Furthermore, they are also quite efficient at adapting to changes in their own bodies, often utilizing their surroundings or parts of it in the process. For this presentation, we will discuss differing types of fractures in the skeletal records from medieval Iceland, including those occurring through accidents, interpersonal violence, and those that may have received treatment versus those that may have not. Additionally, we will discuss the possibility of disabling conditions arising from exposure to volatile gases originating from volcanic activity, since such geothermal activity has been quite common in Iceland's history.

The skeletal trauma record has been bioarchaeologically understudied in Iceland and thus this presentation will provide an overview of medieval trauma cases whilst considering how case studies were analysed in the past and what we can achieve today by applying new methods and technology. We will specifically consider technological applications such as radiography, 3D and CT scanning and theoretical frameworks, such as the use of fictive osteobiographic narrative. Moreover, we will discuss the usage of medicine in historical Iceland and what may have been used in place of antibiotics.

7 **RECLAIMING AGENCY: UNVEILING THE LIVED EXPERIENCE OF DISABILITY IN RURAL TRANSYLVANIA**

Heron, Megan (Florida Atlantic University) - Bethard, Jonathan (University of South Florida) - Nyárádi, Zsolt (Haáz Rezső Múzeum)

Disabled individuals have historically been omitted from the archaeological record, appearing only as liminal figures who retain minimal agency and association. When they do appear, these individuals are misrepresented in an emotional context of despitiness, dread, and despair. Due to this, archaeological analysis overlooks a significant demographic, resulting in an incomplete understanding of the past. Efforts to remedy this omission of the disabled experience require us to examine how bioarchaeologists approach the subject of disability, as well as the theoretical shortcomings associated with integrating the heterogeneity of abilities into analysis.

In this presentation, we display one method for reinserting disabled individuals into the historical record. This analysis exhibits a microhistorical bioarchaeology of caregiving behaviors employed for Burial 150, a disabled adult male excavated from the Bögöz archaeological site (1100-1700) in Mugeni, Romania. Care-giving behaviors are complex and multi-faceted human behaviors that offer rich information into the traditions and values of the society in which care is occurring. Analyzing the lived experience of caring for a traumatically dislocated hip in early modern Transylvania offers as an example for how bioarchaeologists can include disabled individuals as active historical agents worthy of analysis- that the lived disabled experience offers unique insights into archaeological societies that, otherwise, would go unobserved.

8 **THE POWER OF PHYSICAL LIMITATIONS: FOUNDING THE CLASSIC COPAN DYNASTY**

Buikstra, Jane (Arizona State University) - Bell, Ellen (California State University Stanislaus) - Wolf, Katherine (University of West Florida) - Traxler, Loa (University of New Mexico)

This paper develops an osteobiographic narrative within a deeply contextualized study of K'inich Yax K'uk' Mo' who played a central role in the founding of the Maya Copan dynasty during the Early Classic Period (250-600 CE). K'inich Yax K'uk' Mo' survived severe blunt force trauma to the chest, left shoulder, right forearm, and skull, which left him with permanent physical limitations. Information drawn from archaeology, bioarchaeology, and epigraphy is combined with plausible inferences drawn from knowledge of traditional medicinal plants and treatments by the skilled Maya bonesetters to surmise the degree to which he required both short and long-term care.

Over 150 years of archaeological study has characterized Copan was the capital of a Maya state that flourished under the 16 named rulers of the Classic period dynasty (426-822 CE) established by K'inich Yax K'uk' Mo', a foreigner who took power, likely under authority emanating from the central Mexican capital of Teotihuacan. The levels of the Copan Acropolis that date to the time of the dynastic founding include a Central Mexican style talud-tablero building nicknamed "Hunal" that appears to have been the royal residence of K'inich Yax K'uk' Mo' during his life and remodeled as

a shrine containing his tomb upon his death. Objects buried with him point to his royal status, wealth, and foreign ties as he was interred wearing regalia associated with both Maya rulers and Teotihuacan warriors. Our narrative considers his personal history in light of his traumatic injuries, available treatments, and his permanent disability in his role as powerful dynastic founder.

647 **TRAJECTORIES OF AI IN ARCHAEOLOGICAL HERITAGE: GEOGRAPHIES, INNOVATIONS, FUTURE-MAKING, AND (IN)JUSTICES**

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Bonacchi, Chiara (University of Edinburgh) - Marras, Anna Maria (Università di Torino) - Rey da Silva, Arturo (University of Edinburgh)

Session format: Regular session

This session aims to discuss applications of Artificial Intelligence (AI) in archaeological heritage research and practice. In the last few years, these applications have increased in number and kind. To name just a few of several possible examples, they have included work to identify looted artefacts, detect unknown heritage sites, decipher ancient languages, facilitate access to heritage, understand visitor experiences at heritage sites, and interpret collections through the recent developments of generative AI. Intergovernmental organisations such as the European Union or UNESCO are starting to define specific regulations and common ethical approaches for AI use in all aspects of life. However, the potential and challenges posed by AI for archaeological heritage research, management and interpretation are yet to be conceptualised and understood fully.

We invite papers that present and discuss past, present, and future (potential) applications of AI within archaeological heritage. Contributions will focus on either or both: (1) methodological innovations and challenges, and (2) the ethical implications of Artificial Intelligence for people and the planet. We welcome reflections on applications of AI within different geo-political contexts, internationally, and within different societal or community contexts (communities of place, interest, practice, etc.).

Our session hopes to provide an arena for debating answers to four questions:

(1) How has the use of AI changed over the past few years, and what futures could AI help to build in the field of archaeological heritage?

(2) What research and practice-based agendas are impacted by and impact the development of AI?

(3) What ethical 'emergencies' should be foregrounded?

(4) What epistemic injustices may derive from the use of AI in archaeological heritage? Through what theoretical lenses can we explore them?

By fostering dialogue on these critical issues, we hope to create a dynamic environment to collectively advance our understanding of AI's role in archaeological heritage.

ABSTRACTS

1 **UNRAVELING THE ROLE OF LARGE LANGUAGE MODELS IN ARCHAEOLOGICAL HERITAGE: APPLICATIONS, CHALLENGES, AND ETHICAL IMPLICATIONS**

Marras, Anna Maria (University of Turin)

This presentation explores the burgeoning role of Large Language Models (LLMs) within the domain of archaeological heritage research and practice. In recent years, the advent of LLMs, such as GPT (Generative Pre-trained Transformer) models, has revolutionized the landscape of natural language processing and textual analysis. From the interpretation of ancient texts to the documentation of cultural heritage, LLMs offer unprecedented opportunities for advancing archaeological knowledge and understanding.

The presentation will offer insights into the diverse applications of LLMs in archaeological heritage, showcasing examples of how these models have been utilized to automate translation tasks, analyze textual datasets, and generate descriptive narratives about archaeological sites and artifacts. Additionally, it will delve into the methodological innovations and challenges associated with integrating LLMs into archaeological research workflows, including issues related to data bias, model interpretability, and reproducibility.

The presentation will address the ethical considerations and dilemmas inherent in the use of LLMs in archaeological heritage, including concerns related to cultural appropriation, intellectual property rights, and the representation of marginalized communities. It will underscore the importance of adopting ethical guidelines and best practices for the responsible deployment of LLMs in archaeological research, ensuring transparency, equity, and respect for diverse cultural perspectives.

2 STORIES TO BE TOLD: PRESERVING EXCAVATION NARRATIVES IN AI/ML DATASETS DOCUMENTATION

Osti, Giulia (University College Dublin)

Web scraping, the act of obtaining data from web resources, is critical to artificial intelligence/machine learning (AI/ML), enabling the creation of comprehensive training sets for model development and refinement. While it can be a powerful tool for collecting big data at scale, it often operates at a superficial level, focusing primarily on the visible content of web pages. This leads to a disconnect from the context of their collection, making the captured data vulnerable to exploitation and misuse. Emerging fields such as critical data studies are beginning to address these issues from a variety of perspectives, and have only recently begun to attract the attention of disciplines concerned with digital cultural heritage, including archaeology.

This contribution proposes an original reverse engineering approach taking as a case study the online photographic archive of the Museo Egizio in Turin, which documents the work of the Italian archaeological missions in Egypt around 1800. The approximately 2,800 photographs and their metadata – which are released in the public domain – have been scraped, explored and re-arranged with Python to fit an AI/ML typical reuse scenario. The presentation stands out for its emphasis on the challenges of preserving contextual information, particularly the narratives of the excavation campaigns that form the backbone of the photographic archive. Drawing on the principles of Collections as Data, this approach uses the 'datasheet' format to document digital heritage datasets, to advance the dialogue on their use by paving the way for the integration of an archaeological documentation perspective.

3 AI'S ROLE IN MANAGING MARINE CULTURAL HERITAGE: CHALLENGES, POTENTIALS, AND ETHICAL CONSIDERATIONS

Rey da Silva, Arturo (University of Edinburgh)

The exponential proliferation of artificial intelligence (AI) across diverse spheres of human behaviour has engendered unforeseeable opportunities globally, spanning scientific endeavours, education, industrial practices, economic dynamics, and mechanisms of global governance. At the same time, deliberations within UNESCO and the broader international community have gravitated towards the formulation of a normative framework addressing the ethical dimensions of AI. The fields of culture preservation and heritage studies have emerged as domains potentially influenced by the advancement of AI technologies. While potential applications have already been explored in terms of identification of archaeological sites, monitoring degradation, or enhancing public awareness, less attention has been devoted to the preservation, governance, and heritage-making processes. Using the case of the marine cultural heritage, increasingly impacted by economic and natural factors such as marine industries, climate change, or coastal urban development, this paper will explore the ethics, challenges, and potentials that AI might bring to its effective management and preservation. The paper will also discuss AI's potential contribution to developing inclusive and participative policies that can improve heritage definitions, public engagement, and its overall governance.

4 GENERATIVE AI FOR HERITAGE INSTITUTIONS: A CASE STUDY OF HISTORIC ENGLAND'S "HAZEL"

Bonacchi, Chiara (University of Edinburgh) - Witte, Jessica (University of Edinburgh)

Despite the increasing number of use cases for generative AI tools in archaeological heritage, researchers have yet to comprehensively examine the potential impacts of these tools in contexts across the sector. This paper contributes to these emerging discussions by presenting a case study of our development of HAZEL, a pilot generative AI tool designed to assist with the writing and communication of heritage guidance literature. Designed collaboratively by University of Edinburgh researchers and Historic England (HE) staff,* HAZEL aids authors in crafting guidance literature while also providing content summaries for diverse audiences. Through a textual analysis of the HE guidance corpus before and after applying HAZEL, we discuss the affordances and constraints of generative AI tools for the writing and communication of best practices in historic environment settings. Additionally, we consider how generative AI could shape knowledge exchange in heritage more broadly and, in turn, authorised heritage discourse (AHD). As such, we argue, critically examining the impact of generative AI on heritage guidance is a crucial prerequisite for ethically implementing these tools at a larger scale.

*HAZEL is a collaborative project involving Dr Jessica Witte (Research Fellow), Dr Chiara Bonacchi (PI), Dr Edmund Lee (Co-PI) and Dr Lisa Brausem (Co-PI).

648 WORKERS OF THE PAST UNITE! LABOUR STUDIES TODAY: A REFLECTION ON THE POTENTIALITIES AND LIMITS OF THE APPROACH

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Tomei, Francesca (IMT School for Advanced Studies Lucca) - Vicenzutto, David (University of Padova) - Halbertsma, Diederik (University of Liverpool) - Politopoulos, Aris (Leiden University)

Session format: Regular session

Studies on labour and energetics are rapidly growing in popularity as a quantitative approach to understanding socio-economics aspects of ancient communities that are not visible in the archaeological record. This popularity is mostly due to its multi-scalar applicability: from a family to a community effort, from the chaîne opératoire of the artefacts to buildings and cities construction and the manipulation of landscapes, energetics can help in shedding light on processes and people in different research scales.

The scholarly literature, however, is still not set on a comprehensive and shared methodology for this approach. Frequently, researchers have been building up their own theoretical framework and methodology, also because the energetic estimates are highly dependent on single case studies and focus on different perspectives (e.g., the natural resources, the landscape, the demography, etc).

Moreover, critics often highlight that the energetic approach produces estimates rather than absolutes and there is always a plethora of variables in the resulting models. Nevertheless, the growing body of labour cost studies demonstrates that - besides its multiscalarity - this approach can help answer important questions arisen in modern archaeological scholarship, like the visibility of social groups that do not appear using traditional research methods or the relationship between labourers, production and the people who control production.

This session aims to bring together contributions which define the state-of-the-art, the potentiality and the limits of this approach, in order to increase the body of knowledge of labour cost studies and investigate new ways forward. Papers should bring a particular focus on their multiscalarity - from individuals to communities, from production processes to landscape transformations, and so on - and the implications of these studies on the historical and social interpretation of past societies. Case studies from prehistory to medieval times from any geographical area are welcome.

ABSTRACTS

1 HOW DOES LABOUR IMPACT THE POPULATION? THE RELEVANCE OF EARTHWORKS IN THE BRONZE AGE FORTIFIED SETTLEMENTS OF NORTHERN ITALY

Vicenzutto, David (Università degli Studi di Padova)

Labour studies aim to measure how impactful any type of work can be on a population, its resources, and the environment. The use of a quantitative approach, capable of measuring the energy effort and/or the labour rate, allows us to establish the magnitude of the impact that a specific labour has on society. However, to gain a deeper understanding of the repercussions of a particular production process, it would be advisable to quantify the elements constituting the context upon which the labour impacts: as mentioned before, population, resources, and environment.

This paper aligns with this research path, seeking to highlight the impact of labour by quantifying the population and thus the workforce available. To illustrate this methodological approach and its potential in the socio-economic reconstruction of communities, several case studies related to fortified settlements of the Bronze Age in Northern Italy will be used. These case studies analysed allow the comparison of population, in terms of the number of individuals, with the energy effort required for the earthworks (ramparts, ditches and channels). The impact of these earthworks on both the entire community and individual households within a settlement will be considered.

2 FROM HOUSEHOLD TO COMMUNITY: THE ENERGETICS OF THE CONSTRUCTION OF AMBITIOUS BUILDINGS IN EARLY MYCENAEAN GREECE

de Raaff, Yannick (Gothenburg University)

The early Mycenaean period on the Greek mainland (ca. 1800-1400 BCE) is witness to the emergence of architectural complexes that exceed previously known domestic structures in terms of size, quality of construction, and labour investment, through which they represent a substantial change to the built environment. I argue that the mobilization, manipulation, and centralization of labour in construction projects played an important role in the transformation of kin-based and relatively undifferentiated Middle Bronze Age societies to the asymmetrical and centralized social formations of the early Mycenaean period.

In this paper, architectural energetics is used to chart the changes in the labour required for the increasingly large structures of the early Mycenaean period. It will be explored at which stage house construction exceeded the capacity of the household, and thus when larger social units would have been required. Central to my discussion are two early elite residences, Mansion I and II of the Menelaion in Laconia. They are key buildings for our understanding of architectural and social developments in the early Mycenaean period. This rubble-built Korridor Haus has been considered a major step in the monumentalisation of the built environment and has at various occasions be considered a proto-palace. Architectural energetics forms a useful method to bypass traditional categorisations of architecture as elite and non-elite residence because it can be tested whether such larger edifices had 'extra-domestic' demands in terms of labor required for their construction - were they constructed by individual households or by communal entities of local scale?

3 PUBLIC WORKS AND COMMUNITY AT THE DAWN OF THE POLIS. THE TEMPLE OF APOLLO IN GORTINA OF CRETE

Bonetto, Jacopo (University of Padova) - Frizzera, Jacopo (University of Padova)

Beginning in 2001, the University of Padua and the Italian Archaeological School of Athens started a research project concerning the sanctuary of Apollo Pythios in the city of Gortina, Crete. Stratigraphic excavation and survey activities since 2013 have focused on the area of the Temple of Apollo, which was unearthed in the late 19th century.

Research at the time recovered a substantial number of legal inscriptions from the Archaic period and led to dating the building between the 7th and 6th centuries B.C. in relation to the concluding stages of the polis formation process.

Work in recent years has investigated stratigraphic deposits not documented to date, which allow a precise dating of the building to the mid-7th century B.C., and has completed a three-dimensional digital survey of every stone element of the massive building, reconstructed as an open-air enclosure measuring 19.8 x 17.6 m.

The survey made possible a detailed analysis of the dimensions of the whole and individual parts, in order to study the structure from the individual block to its entirety.

The data collected, coupled with the knowledge of the territory and the supply basins of the stone material, made it possible to make very precise calculations of the quantities of raw material used, the labor energy lavished for its procurement, and the community's energy effort for the construction of the building.

Through such quantitative assessments it is possible to address the complex issue of the demographic, social and economic structure of Greek communities in the crucial period of formation of complex urban societies.

4 REFLECTIONS ON THE VALUE OF ENERGETICS TO UNDERSTAND RAPID URBANISATION AND LABOUR LOGISTICS IN CLASSICAL GREECE

Fitzjohn, Matthew (University of Liverpool)

Our research explores labour in the Classical city and the value of energetics to unpack the logistics of construction, artisanal labour, as well as the finances of production. Our focus is on Olynthos, a city in northern Greece, that is known from the Demosthenic corpus with a rich history of excavation by David Moore Robinson and a team from Johns Hopkins University, as well as the more recent project (2014-2019), co-sponsored by the BSA and the Greek Archaeological Service, with the Universities of Michigan and Liverpool. Olynthos is an exceptionally good case study for exploring how new, planned housing was constructed in terms of both the planning and financing of the construction work as well as the practicalities and processes by which (and by whom) the building was undertaken. Our research is beginning to reveal the complexity of the construction process across the city, which involved a massive project of brick-making, timber felling, and plastering. This presentation will explore the economic and financial implications of this huge urban growth spurt. We evaluate the use of architectural energetics to explore the costs of constructing a single house and using this data consider the economic and social implications of the construction of all the houses on the north hill of the city. The calculations indicate the logistical complexity and cost associated with building the residential district of a city and indicates that households did not build their own houses, though they might have contributed casual labour. The research contributes to our comprehension of house construction and wider scholarly discussions of specialisation in Classical Greek towns and cities.

5 PAINTING UNDER THE SHADOW OF A PALACE: THE CASE OF THE HOUSE OF THE FRESCOES AT KNOSSOS, CRETE

Georgiopolou, Vasiliki (Leiden University)

Aegean prehistoric paintings have sparked a great interest among archaeologists, art historians and art enthusiasts ever since their discovery. Decorating the walls, mostly, of known palatial buildings, such as Mycenae, Knossos and Tiryns, the naturalistic scenes of humans, animals and plants, in combination with intricate schematic motifs, had

been thought of as evidence of both the delicate taste and the propagandistic efforts of the palatial elite. However, was this how the paintings were perceived by their creators themselves? Viewing the plastered paintings as a mere propagandistic tool deprives them of their material agency, and treats them as ready-made art pieces, and not as human creations. Research on the technology and the energetics of their creation could shed light to these neglected aspects of prehistoric paintings and to the painters themselves.

This paper will attempt to investigate these queries through the study of the decorations of the 'House of the Frescoes', a building situated at the northwest part of the archaeological site of Knossos, in Crete. The 'House of the Frescoes' is a fitting example to investigate the social dynamics between painters, commissioners, common people, and the elite in Prehistoric Crete, due to its proximity to the knossian palatial structure. Initially regarded as the property of an elite that antagonized the palatial elites, the 'House of the Frescoes', was named after the pile of painted plaster found in one of each main rooms. The study of the chaîne opératoire of the paintings will reveal how many people were involved in their manufacture, as well as the needed level of specialization. Finally, by attempting to investigate the building with a bottom-up approach and by posing the painters in the epicenter, new possible interpretations for its function will be reached.

6 A LEATHER TANNING CRAFT IN MEDIEVAL AND POST-MEDIEVAL BRNO, CZECH REPUBLIC

Pribylková, Michala (Archaia Brno, z.ú.; MUNI - Department of Archaeology and Museology) - Ostrý, Ctibor (Brno City Museum) - Antal, Róbert (Institute of Archaeology of the Czech Academy of Sciences)

The paper presents multidisciplinary research in leather tanning craft in medieval and post-medieval Brno, which synthesizes results of the archaeological rescue excavations and historical study of the social-topography of leather craft in Brno.

The main focus is on two tannery complexes excavated in Brno on Koliště Street and Křenová Street. At these sites, a large number of archaeological finds, consisting of wooden structures of production facilities, watercourse modifications serving the needs of the tannery, and tannery waste of organic origin has been preserved.

Firstly, the paper evaluates the result of the excavations, including waste analysis. Afterwards, it presents hypotheses regarding the hypothetical layout of the tannery complex, the influence of the tanning craft on the workers, and the influence of leather tanning activities on its immediate surroundings.

Attention will also be paid to inner structures and relations within tannery guild and trade and their manifestations in settlement strategy of this particular population in Brno. The report will also include a model example of product and raw material logistics within the city of Brno.

7 ENTREPRENEURING WOMEN: LABOUR AND THE LABOUR FORCE OF TEXTILE MANUFACTURE IN CLASSICAL GREECE

Foxhall, Lin (University of Liverpool)

This paper argues that 1) women of all political statuses (free, freed and enslaved) working in domestic settings were predominantly responsible for the manufacture of the textiles and clothing traded and sold commercially for consumer use in classical Greek cities, including luxury products; 2) that specialist textile 'workshops' as physical spaces are very rare, and 3) that consequently the contribution of women's labour to the economies of classical Greek communities has been dramatically underestimated as a result.

Classicists and ancient historians have argued largely on the basis of references to craftspeople in Plato and Aristotle, that in classical Athens numerous male weavers were responsible for producing high-end luxury textiles for the market in workshop settings, while women wove basic, utilitarian textiles in domestic settings for everyday home use. This paradigm is deeply flawed: there is virtually no evidence for textile workshops in any classical Greek city; instead the evidence points to domestic production in household settings by women.

Archaeological, visual and textual for cloth production read 'against the grain' shows the pre-eminent roles of women working in households. Most textile tools appear in residential settings, generally in storage contexts. Although some archaeologists have argued for the presence of 'weaving rooms' in domestic houses in most cases numbers of loom weights found are insufficient to operate a loom, let alone a 'workshop'. Experimental research data published by the Center for Textile research, Copenhagen can be deployed to quantify estimated levels of person-hours needed to supply a city with textiles of all kinds.

The findings of this paper challenge understandings of textile manufacture that remain current, expand our knowledge of women's key, and still undervalued, roles in acquiring household wealth, and highlight the complexity of labour 'specialisation' in classical Greek economies.

8 THE ORGANISATION OF LABOUR IN THE CERAMIC WORKSHOPS OF THE CHORA OF METAPONTO

Tomei, Francesca (University of Liverpool)

The energetic approach quantifies the labour-time cost of human activities and provides a tool to investigate the organisation of labour in building and other production processes. In this study, energetics explores the organisation and seasonality of labour in ceramic production in the rural countryside of Metaponto during the 2nd- 1st centuries BC through the examination of the archaeological data - namely, the structures of the workshops and the ceramic products - of two sites, Sant'Angelo Vecchio and Pantanello 'Tile Works'. Energetics are supported by experimental archaeology and ethnographic data and will help to understand and compare the scale and modes of production of the two workshops and the amount of labour force necessary to carry out some tasks of the productive chain, such as raw material collection, transportation, clay preparation, vessel shaping, and kiln firing. In an ancient rural context, where the economy was based on agriculture, labour was conditioned by the agricultural calendar and most likely labour in craftmaking was seasonal too. Therefore, this study will investigate also the seasonal nature of labour in pottery making according to the agricultural activities, highlighting the interconnectedness of all productive activities in the region, where sites and tasks are intricately linked, fostering a flexible and seasonal labour system in both ancient and modern Mediterranean societies.

650 DISAPPEARED AND FORGOTTEN: NAZI CONCENTRATION SUB-CAMPS, FORCED LABOUR CAMPS, AND OTHER TYPES OF CAMPS AS NEGLECTED ARCHAEOLOGICAL AND HERITAGE SITES

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Vareka, Pavel (University of West Bohemia) - Carr, Gilly (University of Cambridge) - Theune, Claudia (University of Vienna) - Konczewski, Paweł (Wrocław University of Environmental and Life Sciences)

Session format: Regular session

Recent archaeological research focused on concentration and other types of Nazi camps have demonstrated that archaeological approaches and methods not only complement fragmentary historical (written and oral) sources, but also open up new questions connected with the materiality of European dark heritage and totalitarian pasts. The main concentration camps, whose names have become symbols of Nazi atrocities, were supplemented by hundreds of sub-camps, many of which have been forgotten and their exact locations unknown. However, it was the ubiquitous sub-camps, as well as forced labour, and other types of smaller camps, that formed the Nazi "campscape" which was entangled with war infrastructure and logistics. Hundreds of thousands of prisoners and forced labourers who were housed in these locations worked in appalling conditions in war production facilities. Unlike the main concentration camps and Holocaust extermination centres, historical memory formation has often ignored the material remains of smaller camps in the post-war period. Due to the vast number of these sites, most of them lack any kind of memorialization and heritage protection. Additionally, places where mass violence and crimes against humanity took place currently face development and construction activities that erase archaeological evidence of this kind at an alarming rate.

We invite contributors to explore the tangible dark heritage of Nazi concentration sub-camps, forced labour, and other types of neglected sites such as Arbeitserziehungslager, Jugendschutzlager, Polizeihäftlager, Sammellager für Juden or Zigeuner Anhaltelager.

ABSTRACTS

1 TOPOGRAPHY OF MASS EXTERMINATION - INTELLIGENZAKTION, T-4 AND INTERNMENT CAMPS

Kobialka, Dawid (Uniwersytet Łódzki) - González-Ruibal, Alfredo (Heritage Studies of the Spanish National Research Council) - Kostyrko, Mikołaj (Independent researcher) - Czarnik, Michał (Institute of Archaeology, University of Rzeszów) - Wysocka, Joanna (Department of Anthropology Hirsfeld Institute of Immunology and Experimental Therapy, Polish Academy of Sciences) - Kowalczyk, Zuzanna (Faculty of Archaeology, Adam Mickiewicz University in Poznań) - Torlop, Piotr (Independent researcher) - Martínez Barrio, Candela (Independent researcher) - Rennwanz, Joanna (Institute of Archaeology and Ethnology, Polish Academy of Sciences)

The first months of the Second World War in Gdańsk Pomerania, Poland, had a unique historical significance. They were associated with the mass extermination of the local Polish elite, the mentally ill, and representatives of the small Pomeranian Jewish community. The Germans planned these actions before 1 September 1939, and then carried them out systematically. These actions had code names: Intelligenzaktion and T-4. Currently, there are about 400 known

crime scenes from 1939 in Gdańsk Pomerania, and their scale is estimated at approximately 30,000-35,000 human lives. In most cases, the Poles were taken to places of detention - detention centres, prisons, and other buildings used as internment camps. The next stop for imprisoned Poles was usually a mass grave. The material traces of these events and the social memory of them are the subject of a multidisciplinary scientific project entitled "An Archaeology of the Pomeranian Crime of 1939". It examines the broadly understood topography of the mass extermination of 1939 in Gdańsk Pomerania. Internment camps are an important point on the research map and an essential element in understanding the events of 1939. In our presentation, we will focus on the example of Chojnice and its surroundings, where several internment camps operated in the autumn of 1939 - execution sites and mass graves were always nearby.

Acknowledgements

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2 THE FORCED LABOUR CAMPS IN KIRCHBICHL (TYROL) AS PART OF THE UTILISATION OF AUSTRIAN HYDROPOWER FOR THE GERMAN WAR INDUSTRY

Hinterndorfer, Peter (Universität Wien)

In the context of the national socialists' program to ensure the energy supply for the German (armaments) industry, several hydropower plants were built in Austria after its incorporation into the German Reich in March 1938. In Kirchbichl (Tyrol) a run-of-river unit was erected by forced labourers from two consecutive camps, one of which was established directly adjacent to the construction site. Completely demolished in the early 1960s and with no preserved above-ground structures, this former camp was integrated into commemorative discourses only after its archaeological investigation during extension works of the power plant, still operated by a local energy supplier. The excavations carried out in 2014 and 2015 brought up a broad spectrum of materiality from different spheres of activity connected to the operation of the camp and construction site, but also post-war alterations and continued uses.

Using the example of Kirchbichl (Tyrol), this paper aims to discuss the role of forced labour in the enlargement of the electricity industry, how infrastructural remains of the camps can be affected by the expansion and conversion of associated power plants and how the respective companies concerned deal with historical-archaeological investigations into specific parts of their heritage.

3 THE INTERNATIONAL HOLOCAUST REMEMBRANCE ALLIANCE CHARTER FOR SAFEGUARDING SITES: ITS APPLICATION TO NAZI SUBCAMPS EXPLORED

Carr, Gilly (University of Cambridge)

In November 2023, at the Zagreb plenary meeting under the Croatian chairmanship, the International Holocaust Remembrance Alliance adopted the IHRA Charter for Safeguarding Sites. This heritage charter for sites of the Holocaust, genocide of the Roma and other victims of Nazism and collaborators of the Nazis was launched in Brussels in January 2024 as part of the European Commission's marking of Holocaust Memorial Day. The charter has been the result of five years of work by a 14-member team of delegates to the IHRA, chaired and project-managed by the author.

In this paper I explore the application of the new heritage charter to sub-camps, asking whether it offers sufficient protection - and is sufficiently pragmatic - in its approach to sites in the 21st century. Has the time come to accept the loss of many sub-camps or should we, as archaeologists, be activists for every single one? If we accept loss in the face of threats of the 21st century such as war and climate change, what language can we use to make this acceptable?

4 COMPLEX GEOPHYSICAL SURVEY OF THE ROMA INTERNMENT CAMP IN LETY FROM 1942-1943 (CZECH REPUBLIC)

Vágner, Michal (MUNI - Ústav archeologie a muzeologie) - Vařeka, Pavel (University of West Bohemia)

Former Czechoslovakia occupied by Hitler's Germany in 1939-1945 was included in the Nazi plans for the extermination of the Romani and Sinti in Europe. In 1942, all Czech "Gypsies" were interned in camps one of which was established in Lety (South Bohemian Region). In the 1970s, a large-scale industrial pig-farm was built on the very same site of the former camp. Heated public discussion concerning the embarrassing situation in Lety erupted shortly after the Velvet Revolution in 1989 and continued until 2017 when the state finally bought out the pig-farm and a memorial began to be planned here. Archaeology played a key role in locating the camp. In the first phase of the research several geophysical surveys were carried out. The complex survey of the whole site, the results of which are presented in this paper, was carried out in three phases, the last of which was completed after the demolition of the pig-farm in early 2024. The survey combined two methods: ground-penetrating radar and magnetometry. Geophysical measuring revealed nearly complete plan of the camp, located foundations of most buildings, indicated other structures as well as components outside the fenced area such as the headquarters of the guards' unit. This information proved instrumental in planning subsequent archaeological excavations of a sample of the camp area that also tested the accuracy

and information potential of the geophysical methods. The whole camp area located by the archaeological research is currently incorporated into a new memorial of the Roma and Sinti Holocaust which is currently being built in Lety

5 **HIDDEN TOTALITARIAN HERITAGE: NAZI CONCENTRATION SUB-CAMPS, PRISONER OF WAR CAMPS AND LABOUR CAMPS IN THE LOWER SILESIAN FORESTS (POLAND)**

Konczewski, Paweł (Wrocław University of Environmental and Life Science, Department of Anthropology) - Biel, Radosław (Wrocław University of Environmental and Life Science, Department of Anthropology) - Biernacka, Katarzyna (Wrocław University of Environmental and Life Science, Department of Anthropology) - Kwiatkowska, Barbara (Wrocław University of Environmental and Life Science, Department of Anthropology) - Szczurowski, Jacek (Wrocław University of Environmental and Life Science, Department of Anthropology) - Bernacka, Natalia (Wrocław University of Environmental and Life Science, Department of Anthropology) - Gałdyn, Natalia (Wrocław University of Environmental and Life Science, Department of Anthropology) - Sady-Bugajska, Agata (Independent researcher) - Orlicki, Łukasz (Independent researcher)

In 1944, faced by Allied bombing raids in western Germany, the invasion of Normandy and the progress of the Red Army on the eastern front, the Third Reich was forced to reorganise its military economy and logistics. These actions included translocating several dozens of industrial plants into the Lower Silesian Forest mesoregion, where the factories and military bases were expanded. This research focuses on the material remnants of this Nazi camp-economic-military complex as part of a wider landscape of national-socialist repressions. Using archaeological and bioarchaeological methods, the team of the multidisciplinary Polish-Czech project entitled "Bioarchaeology and Landscape Archaeology of the Nationalist-Socialist Repressions: Central-Eastern European Perspective," launched in 2023, ran numerical analyses of terrain models and inventoried, among others, the remains of various camps near villages: Karczmarka, Trzebień, Czyżówek, and in Ruszów. A review of historical sources and botanical analyses of camp flora were also carried out. Trench excavations allowed for a more detailed understanding of camp architecture and provided items used while the camps were operating. It was also possible to gain information on the graves of victims of Nazi repressions and local memory on the "campscapes" in the Lower Silesian Forests mesoregion.

Our research provides crucial input into understanding the mechanisms of Nazi repressions and their multiple ramifications: social, cultural, and ecological. As the trauma of the Second World War is still lingering, this work has a particularly strong social resonance as it discovers and presents the neglected material heritage of the dark past of the 20th century.

Acknowledgements

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6 **THE CAMP AND THE CITY. KL PLASZOW'S HERITAGE IN CONTEMPORARY KRAKOW'S LANDSCAPE**

Karski, Kamil (KL Plaszow Museum)

The German Nazi KL Plaszow, Krakow was established in October 1942. Until January 1944, it was operated as a forced labour camp (ZAL Plaszow) and initially was intended for Jews from the Krakow Ghetto. Soon after the mid-1943 also Jews from the liquidated ghettos and camps in General Government were put in the camp, as well as Poles and Romani families. From mid-1944, it functioned as a transit camp for Slovakian and Hungarian Jews and a temporal place of isolation for Poles arrested in response to the Warsaw Uprising. It is estimated that about 30–35 thousand people were imprisoned in 1943–1945 in ZAL/KL Plaszow, while 6 thousand of people were killed on-site.

Among the peculiarities of the Plaszow camp was its proximity to Krakow. This made it possible to apply prisoners' forced labor in the camp's workshops served for local economy, but also in the numerous sub-camps, work sites, and factories behind the barbed wire of main camp. Over time, the network of KL Plaszow's spatial relationships grew to include sites throughout the Krakow district and further.

With the advance to the new memorial and museum, archaeological research was carried out on the present-day memorial site. Non-invasive and invasive archaeological methods for mapping the 'campscape' were adopted. The next stage of research is studying KL Plaszow's 'spatiality' at different levels. This includes not only the topography of the camp itself but also its sub-camps (almost invisible in the contemporary landscape), human movements/transports/deportations as well as interpretation of artifacts found during previous research. This allows us to consider KL Plaszow's heritage on different scales and meanings.

7 **"VIRTUAL" ARCHAEOLOGY - A VISIT TO THE CONCENTRATION CAMP IN NOVÁ ROLE**

Hlavenka, Pavel (University of West Bohemia, Pilsen) - Vařeka, Pavel (University of West Bohemia, Pilsen)

"Virtual" archaeology, using archival aerial photographs, brings to life in a 3D world places that are inaccessible to conventional archaeology (flooded river areas, denuded spaces, etc.). It reconstructs the world in a way that almost

resembles the time of its reality and allows people to feel the power of the quote "if we do not know the past, we are condemned to repeat it..

The history of the twentieth century is linked to a series of social and military changes. These events are linked by the existence of camps, which have restricted personal freedoms in various ways. Their mission is to eliminate the opposition, making them an unfortunate symbol of the times.

For the University of West Bohemia in Pilsen, this issue is crucial because it believes that preserving history and examining it leads to its non-repetition in the future. Using a progressive method, we make use of archival aerial photographs that capture objects directly from the functional period or shortly after their demise. Thanks to stereophotogrammetric evaluation, we obtain information about their spatial form, which we transform into virtual reality.

We believe that our efforts present the problem to contemporary and future generations who have forgotten the horrors that humans were able to inflict on themselves. Visiting the concentration camps promoted by the media brings different emotions than knowing that there was a similar camp on the hill behind our house.

This presentation has chosen as such a "nearby place" the location north above the town of Nová Role in northwestern Bohemia, where a Nazi concentration camp was established during World War II. The site is inaccessible to the public because it has been covered by a landfill. The project digs it up virtually, transforms it into 3D and presents it in a simple way.

8 **THE WARSAW GHETTO AS A PLACE OF PERSECUTION AND EXTREMATION OF JEWS IN THE LIGHT OF ARCHAEOLOGICAL RESEARCH IN 2021-2022**

Konik, Jacek (Pultusk Academy of Humanities - Vistula University; Museum of Independence in Warsaw)

As a result of the destruction of the war only few remains of the former Warsaw Ghetto have survived. Of what has survived, the most impressive are the few fragments of the former ghetto wall, which in the collective memory perpetuate the image of the ghetto mainly as a place of isolation for Jews before they were deported to extermination camps.

Admittedly, stories about the persecution and extermination of ghetto residents have been documented in historical sources, testimonies of witnesses, but until recently these stories were not supported by material artifacts. That has changed in the past few years thanks to archaeological excavations conducted on the former ghetto site. In my paper I will focus on the research in 2021 - 2022, which I personally directed.

The research examined the remains of the basements of the now defunct buildings on Wałowa Street in Warsaw and at the intersection of Miła Street and Stanisława Dubois Street, in the vicinity of the so-called Anielewicz Bunker - the place of death of the commander of the Jewish Combat Organization. In the course of the research, many artifacts testifying to the Jewish identity of the residents of the buildings were found. The context in which they were found are testimony to the dramatic circumstances of their abandonment and the persecution that afflicted their owners.

In the excavated basements, traces of a bunker were also found, an underground hiding place from the extermination activities of the Nazis. The entire context of the discovery of the remains of the bunker and hideout allows us to hypothesize that it is part of a large complex of underground hiding places known as the Anielewicz bunker. The discovered remains are a shocking material testimony of the struggle to save life in the face of merciless extermination.

9 **ARCHAEOLOGY OF THE HOLÝŠOV (HOLLEISCHEN) CAMP COMPLEX. CONTRIBUTION TO THE STUDY OF THE INTERCONNECTION OF NAZI CAMPSCAPE AND WAR PRODUCTION**

Vareka, Pavel (University of West Bohemia) - Netolický, Petr (University of West Bohemia) - Varekova, Zdenka (University of West Bohemia) - Vagner, Michal (Masaryk University)

The research on the entanglement of the Nazi "campscape" and war production in Bohemia has focused on a small town of Holýšov (Holleischen). Situated 25 km SW from Pilsen it became part of the Third Reich after the annexation of Czechoslovak borderland (Sudetenland) to Nazi Germany. In the beginning of the war, a large ammunition plant was built here that demanded ever-increasing labour force. Gradually, a total of 7 camps were established in Holýšov that housed both forced and prison labourers who were deployed in mass ammunition manufacturing for Luftwaffe. The variety of camps provides a representative sample of the use of forced and slave labour for Nazi war production in occupied Czechoslovakia (Flossenbürg concentration sub-camp, POW camps and forced labour camps). With the use of historical aerial photographs, remote sensing, surface and building archaeology survey the location, plan and structure of individual camps sites have been determined as well as remains of the ammunition factory preserved in forested area. Trial excavations tested different components of the studied complex. Comparative analysis and interpretation of material evidence, archival research and the testimonies of prisoners shed light on the spatial, functional structure and the system of operation that made use of unfree labourers, as well as the living conditions of forced workers and inmates. The heritage protection of these sites, the current state of memorials and the contemporary utilization of the camp areas has been also examined.

THE SONDERLAGER OF STALAG X B SANDBOSTEL - ARCHAEOLOGICAL RESEARCH IN AN EXTERNAL PART OF A PRISONER-OF-WAR CAMP

Luick, Lorenz (University of Hamburg) - Eckert, Lukas (University of Hamburg) - Ehresmann, Andreas (Sandbostel Camp Memorial) - Hesse, Stefan (Office for Archaeology of the District of Rotenburg (Wümme)) - Schumann, Robert (University of Hamburg)

Part of the Stalag X B Sandbostel camp complex in northern Germany was the so-called Sonderlager (special camp). This Sonderlager, approx. 2 km away from the main camp, was part of the camp's internal disciplinary system, in which prisoners who had violated the camp by-laws were transferred to more severe confinement and hard labour in the bog. Towards the end of the war, the Sonderlager also served as a provisional typhus lazarette. In contrast to the history of the main camp, which is being researched both historically and archaeologically and is firmly anchored in regional commemoration work through a memorial site, the Sonderlager has largely been forgotten. Only a former inmate testimonies and a sparse collection of archival documents attest to the existence of the Sonderlager, the exact location of which was no longer known. In recent years, the Sonderlager has become the focus of archaeological research. In addition to the exact localization and reconstruction of the structure of the Sonderlager using geophysical methods, a metal-detector-survey and a small excavation campaign were carried out. The latter in particular yielded a great deal of evidence from the last phase of operation of the camp. It was also possible to prove that it was burnt down after liberation by the British army. The archaeological research has thus succeeded in gaining new insights into the history of the special camp as well as contributing to heritage management and, building on the results, to the memorial's commemorative work outside the fences of the main camp of Stalag X B Sandbostel.

653 INFECTIOUS DISEASE AND HYGIENE IN THE NEOLITHIC AND BRONZE AGE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Civilyte, Agne (Lithuanian institute of history) - Spyrou, Maria (Institute for Archaeological Sciences, University of Tübingen; Max Planck Institute for Evolutionary Anthropology, Leipzig)

Session format: Regular session

Understanding the interlinked histories of humans and infectious disease promises a more comprehensive view of our past. The investigation of infectious diseases in archaeological contexts has gained increasing interest given the numerous open questions with regard to the aetiological agents of past pandemics and the potential influence of human subsistence and sociocultural changes (such as the Neolithic and Bronze Age transitions) on population health. Throughout human history, a number of epidemics and pandemics have been historically recorded or are hypothesized to have occurred, however, a deep understanding of the influence of infectious disease on human societies prior to the availability of textual records is still lacking. In this session, we aim to use a multi-faceted approach that enhances our overall understanding of pathogen presence, diversity and evolution, as well as human responses to infectious disease during prehistory, with special focus on the Neolithic and Bronze Age periods. To create a platform for discussing the interactions between humans and pathogens from a biosocial perspective, we welcome contributions from researchers specialized in paleopathology, bioarcheology, history, and genomics. Specifically, this session will focus on:

1. The identification of infectious diseases in the Neolithic and Bronze Age using a variety of methodological approaches;
2. The determination of drivers of disease emergence and transmission, such as living circumstances, dietary habits, food preparation methods, waste disposal practices, etc.;
3. The exploration of evidence of hygienic treatment and prevention of disease in prehistoric communities;
4. The impact of infectious diseases on the demographic and social development of Neolithic and Bronze Age societies; and
5. The characterization of long-term evolutionary history of pathogens and their association to modern-day diversity, especially for infectious diseases that continue to pose a threat to public health today.

Submission deadline 8th of February 2024.

ABSTRACTS

1 INFECTIOUS DISEASES AND THE SKELETON: NEW APPROACHES TO ANALYSING BONE PHENOTYPES ON THE EXAMPLE OF NEOLITHIC POPULATIONS

Fuchs, Katharina (Kiel University, Germany) - Petiti, Emmanuele (Kiel University, Germany) - Görner, Irina (Hessen Kassel Heritage)

In studying human responses to infectious diseases in the past, paleopathologists are confronted with low specificity of bone symptoms regarding their causative agents and complex, often not fully understood pathophysiology of non-specific skeletal phenotypes.

In this presentation we show how a new data recording protocol for porous cranial lesions enables to (i) analyse the distribution and spectrum of stress- and inflammation-induced phenotypes, (ii) examine their complex pathophysiological pathways, (iii) test for co-occurrences, and (iv) interpret the results within an etiological model by considering the interplay of individual, social, and environmental factors. We focus on three Neolithic populations from Northern and Middle Germany that are of different skeletal preservation and with socioeconomic backgrounds (Sorsum, Ostorf-Tannenwerder, Altendorf; 3200-2900 BCE).

Our results on the disease profiles, which are based on the examination of the respiratory system and the ectocranial and endocranial regions, show high variation both within and between populations. This indicates differences in human responses to inflammatory and physiological stressors, such as pathogens, but also nutrition, hygiene, and housing conditions. For instance, the farmer population of Sorsum more often survived a high inflammatory burden, which may as well be interpreted as a sign of resilience.

We hereby advocate a more standardised, in-depth and interdisciplinary investigation of pathological phenotypes and promote the current discourse on the critical diagnosis and evaluation of established palaeopathological markers (e.g. cribra orbitalia as a symptom of anemia). Taken together, this will ultimately provide a more solid foundation, including for interdisciplinary approaches such as ancient DNA research (pathogens, immune genes), to better understand the interplay of infectious diseases and human evolution in prehistory and beyond.

2 FREQUENCY OF INFECTIOUS AND METABOLIC DISEASES ON OSTEO-DENTAL REMAINS IN NEOLITHIC, COPPER AGE AND BRONZE AGE CONTEXTS IN NORTHERN ITALY

Mateyka, Taylor (University of Bologna) - Capecchi, Elisabetta (University of Bologna) - Cecconi, Viola (Servizio di Bioarcheologia, Museo delle Civiltà, Roma) - Cavazzuti, Claudio (University of Bologna)

The study of infectious and metabolic diseases in ancient populations offers a unique window into the health challenges faced by past civilizations and provides insights into the epidemiological dynamics of human communities over time. The aim of this presentation is to discuss the occurrence and frequency of infectious and metabolic diseases observed in osteological and dental remains spanning various contexts within the Po Plain area, encompassing the period from the Neolithic to the Bronze Age. During the Middle Neolithic, characterized in this region by the Square Mouth Pottery culture, instances of pathological conditions have been identified at archaeological sites such as Parma-Via Guidorossi and Arene Candide cave, revealing individuals affected by tuberculosis among other health indicators including hypoplasia, dental calculus, cribra orbitalia and porotic hyperostosis. At the Neolithic-Copper Age transition, we observe a rising prevalence of dental cavities and calculus among the population, but the lower number of funerary contexts has offered up fewer instances of pathologies. The occurrence of tuberculosis, meningitis, and non-specific lung infections becomes more evident during the Bronze Age, particularly at sites like Olmo di Nogara; additionally, dental conditions persist in the skeletal record. However, the Bronze Age introduces a challenge in the form of cremated remains, complicating the paleopathological analysis due to the removal of pathological traces and lesions through the act of incineration, as seen at Casinalbo and in other similar contexts of the Terramare culture. Nevertheless, leveraging demographic approaches enables us to reconstruct the mortality profiles across age classes and identify episodes of selective mortality potentially related to epidemic episodes. Through the analysis of archaeological and osteological evidence we will establish the prevalence and impact of infectious diseases on these ancient populations over a span of several millennia, as well as reconstruct the health profiles of ancient individuals.

3 OCCURRENCE OF HUMAN SKELETAL REMAINS ON LATE BRONZE AGE SETTLEMENTS FROM SW POLAND

Haluszko, Agata (Institute of Archaeology, Maria Curie-Skłodowska University, Lublin, Poland; Archeolodzy.org Foundation, Świdnica, Poland) - Kanz, Fabian (Center for Forensic Medicine, Medical University of Vienna, Vienna, Austria) - Tangl, Stefan (Karl Donath Laboratory for Hard Tissue and Biomaterial Research, University Clinic of Dentistry, Medical University of Vienna, Vienna, Austria; Austrian Cluster for Tissue Regeneration, Vienna, Austria) - Dobsak, Toni (Karl Donath Laboratory for Hard Tissue and Biomaterial Research, University Clinic of Dentistry, Medical University of Vienna, Vienna, Austria; Austrian Cluster for Tissue Regeneration, Vienna, Austria) - Neumann, Gunnar (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Haak, Wolfgang (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Zółkowski, Grzegorz (Faculty of Mechanical Engineering, Wrocław University of Science and Technology, Wrocław, Poland) - Guziński, Maciej (Department of General and Interventional Radiology and Neuroradiology, Wrocław Medical University, Wrocław, Poland)

The funeral rite of the Lusatian Urnfield culture (LUC) in southwestern Poland was dominated by cremation. Inhumed remains are exceptional even in cemeteries and are mainly found in areas occupied by populations associated with the Upper Silesian-Lesser Poland group of the LUC. Interestingly enough, there are contemporaneous though rare occurrences of human remains within settlements. From this perspective, it seems intriguing to examine these contexts and explore the reasons for placing human corpses or their parts in them.

Finds of human remains in settlements are usually interpreted as the result of conflicts, violence and warfare, manifestations of exceptionalism/exclusion, cults and sacrifices or the disposal of corpses. The interpretation depends on the archaeological, taphonomic and palaeopathological data, but is impeded by the fact that most diseases do not leave any specific lesions on the bones, especially short-term lethal infectious diseases.

Here, we present preliminary research data on human skeletal remains from different contexts at four Late Bronze Age settlements. At one site, the disarticulated remains of approximately nine individuals were found in a ditch surrounding the settlement. At another, bones of two individuals mixed with animal remains were found in a garbage pit. At the remaining two sites, isolated skulls of single individuals were discovered in separate features. Anthropological and tomographic analyzes were carried out as part of the MOUND project (no. 2023/48/C/HS3/00020, financed by the National Science Centre, Poland). To identify bioerosion, eight bone and teeth samples were subjected to detailed histological and taphonomic examination. The aims of these analyses were to exclude possible secondary deposition of single bones and skeletons, to find traces of deposition in a humid environment favouring the growth of bacteria and fungi, as well as to capture other taphonomic processes.

4 A VIRAL PERSPECTIVE ON HUMAN PREHISTORY: THE NEOLITHIZATION AND LATE BRONZE AGE COLLAPSE OF HEPATITIS B VIRUS

Kocher, Arthur (Max Planck Institute for Evolutionary Anthropology; Max Planck Institute of Geoanthropology) - Krause, Johannes (Max Planck Institute for Evolutionary Anthropology) - Kühnert, Denise (Max Planck Institute of Geoanthropology; Robert Koch Institute)

Hepatitis B virus (HBV) is today a major threat to global health, causing hundreds of millions of infections around the world. This virus doesn't leave specific marks on skeletal remains, but archaeogenetic evidence has shown that it has been infecting humans for more than 10,000 years and that its current geographical distribution and genetic diversity have been shaped by human migrations and population dynamics across that period. Reciprocally, the evolutionary history of HBV, which is mostly transmitted through mother-to-child and sexual transmission, can provide insights into the (pre)history of its human hosts. I will present the results of a published study in which we reconstructed and analysed large numbers of ancient HBV genomes. Our results unveiled patterns of past viral diversity reflecting known human migrations and demographic events such as those which have been concurrent to the Neolithization process in Europe, but also unexpected findings such as the almost complete collapse of HBV diversity around the end of the 2nd millennium BCE. The latter suggests continental-wide transformation of epidemiological dynamics during that time, for reasons that remain to be explained.

5 ARCHAEOGENETIC STUDIES OF TWO ANCIENT BRUCELLOSIS CASES

Neumann, Gunnar (Max Planck Institute for Evolutionary Anthropology, Leipzig) - Spyrou, Maria (Eberhard Karls Universität Tübingen; Max Planck Institute for Evolutionary Anthropology, Leipzig) - Keller, Marcel (University of Basel; University of Tartu) - Klochko, Viktor (National University of Kyiv-Mohyla Academy) - Koško, Aleksander (Adam Mickiewicz University Poznań) - Šlaus, Mario (Croatian Academy of Sciences and Art, Zagreb) - Włodarczak, Piotr (Instytut Archeologii i Ethnologii PAN, Krakow) - Żurkiewicz, Danuta (Adam Mickiewicz University Poznań) - Haak, Wolfgang (Max Planck Institute for Evolutionary Anthropology, Leipzig) - Krause, Johannes (Max Planck Institute for Evolutionary Anthropology, Leipzig)

Brucellosis stands out as one of the most prevalent food-borne zoonotic diseases worldwide, caused by different *Brucella* species. These bacteria exhibit moderate host specificity and are capable of infecting an array of both wild and domesticated animals such as sheep, goat, and cattle. Occasionally, transmission to humans occurs via infected animal products, inhalation of aerosols, or direct contact with the infected animals themselves. In archaeological contexts, diagnosing brucellosis has often relied on specific lesions on bones, however genetic evidence from the past is still scarce.

Here, we present two ancient brucellosis cases uncovered through archaeogenetic analyses in two rather uncommon specimens. Firstly, we identified the cattle-specific *Brucella abortus* as the causative agent for the formation of a calcified nodule which was found in a kurgan burial at the site of Prydnistrynske in modern-day Ukraine. The individual of this burial is associated with the Early Bronze Age Yamnaya culture and was radiocarbon-dated to c. 4,800 yBP. Further, we detected traces of DNA of the goat and sheep-specific *B. melitensis* within the ossified pleura of a medieval burial from Bosnia and Herzegovina.

Benefiting from the excellent preservation of bacterial DNA and minimal environmental contamination in these specimens, we successfully reconstructed high coverage genomes. Based on its phylogenetic placement, the identified ancient *B. abortus* strain groups with one of the earliest diverging *B. abortus* lineages currently circulating. Moreover, employing Bayesian molecular dating, we estimated the divergence time of *B. abortus* from the closely related species of *B. melitensis* to approximately 10,500 yBP, which coincides with the onset of animal domestication in the Fertile Crescent. While shedding light on the evolutionary history of *B. abortus* and *B. melitensis*, this study also emphasizes the potential of calcified tissues as invaluable archaeological sources for investigating ancient pathogens.

6 THE ANTISEPTIC AND ANTIPHLOGISTIC PROPERTIES OF MEDICINAL PLANTS USED SINCE PREHISTORY

Kramer, Axel (Institute for Hygiene and Environment Medicine, University of Greifswald) - Civilyte, Agne (Lithuanian institute of history)

The World Health Organization resolved in 1989 that traditional herbal medicine is of great importance for the health of individuals and communities. They developed guidelines for the evaluation of medicinal plants in 1991.

During archaeological excavation seeds and pollen of medicinal plants are regularly recovered. In addition historical archaeology and folklore can be used to develop methodologies as their application in prehistoric archaeology on the medicinal.

The constant modern search for more effective and/or additional botanical antibiotics in the wide field of geographical biodiversity may make the field incredibly technical and also obscure a slower prehistoric development of ever more effective therapies.

From a medical perspective the most important aspects of practice with respect to public health are focus on community hygiene, the following issues are of particular interest: Disposal of personal and common waste water and garbage, ventilation within human dwellings, practices of personal as well as oral and dental hygiene. To achieve some of these infrastructure solutions people have been using the healing effects of plants and their preparations for thousands of years in various cultures and for a variety of reasons. This is of current importance, because plants used in antiquity can be the starting point for targeted research today.

From the wealth of plants used in prehistory, their use in modern medicine and health care will be analyzed with the special focus on lavender distillate as an example.

654 CENTERING THE OBJECT: BETWEEN PRODUCTION AND CONSUMPTION IN CERAMIC STUDIES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Knappett, Carl (University of Toronto) - Paralovo, Elena (Charles University, Prague) - Rosell Garrido, Patricia (Independent researcher; University of Alicante) - Tsuvaltsidis, Aude (Sorbonne Université; Charles University, Prague) - Langohr, Charlotte (F.R.S.-FNRS/UCLouvain)

Session format: Regular session

Ceramic studies have seen very significant progress on two fronts: in analyses of production, on the one hand, with sophisticated archaeometric studies of fabrics and technology; and on the other, in use and consumption, with detailed attention to context and use traces. However, it is unclear where these advances leave the topic of style. It is not as if we can dispense with style; as a method, stylistic analysis can hardly be avoided. We prefer here to position it more productively, given the key work it does in foregrounding the artefact itself as interface between producer and consumer. It obliges us to think not only of how the producer sought to communicate an intended use to a consumer through design, but also of how the consumer interpreted design through use. Our view of style is one that takes account of vessel morphology, surface features and functional affordances in centering the object as a mediator between producers and users. In this way we seek to build a ceramic methodology, adaptable to various traditions, that can holistically incorporate insights concerning both production and consumption practices. Furthermore, by viewing these practices as substantially economic in nature, we also aim to shed light on both structural and agentive dimensions of the ancient craft economy. Specifically, we are interested in interpretations that reckon with the diversity of economic action, particularly the sexual division of labour and the role of marginalised groups in workshop production and household economy. We invite submissions from various scholarly traditions in later prehistory (e.g. Bronze and Iron Ages) and from across the Mediterranean, that present methods for ceramic analysis that expressly seek to balance considerations on both production and consumption practices through object-centred approaches. We particularly welcome papers that aim to articulate perspectives from archaeology, art history and anthropology.

ABSTRACTS

1 STAYING IN-BETWEEN: CERAMIC PERSPECTIVES ON STYLE BASED ON THE STUDY OF MINOAN POTTERY

Mathioudaki, Iro (Associate Researcher Aegis Research Group)

Pottery is one of the most reliable categories of prehistoric material culture. It is both a result of and an active component in the formation of social and cultural relations. It is often seen in duality, as part of the market trend and commodity networks of its producers, or as part of the symbolic and social actions of its consumers. While production is closely related to the economic perspective, and consumption to the social perspective, they are complementary. Style has a profound impact on both. Stylistic standardisation and variability should be studied systematically by quantifying the stylistic attributes of a substantial number of samples. Standards should be used to assess variability and similarity in order to investigate the meaning of the tendency to conform to certain styles. By assessing the quantitative, functional and stylistic parameters of pottery, we gain important clues to the social and cultural dynamics of ceramics. In this paper we use specific case studies from Knossos and Sissi to build on the social perspective of ceramics, positioning them as mediators between users and producers. The methodology involves a re-evaluation of Neopalatial pottery styles towards a patterning of data on typologies with emphasis on intended function, performance characteristics of vessels, proposed object hierarchies and the potentially emblematic character of specific vessels.

2 POSITIONING POTTERY BETWEEN PRODUCER AND CONSUMER AT THE LATE BRONZE AGE WORKSHOP OF PETSAS HOUSE, MYCENAE, GREECE

Shelton, Kim (University of California Berkeley) - Kvapil, Lynne (Butler University)

This paper considers the dynamic relationships between consumers served by the Petsas House workshop and the occupants of the house who rubbed elbows with powerful elites but also ran a pottery workshop that provided implements supporting the needs of varying groups of consumers. Petsas House in the 14th c BCE was positioned between the emergent state that would become the palace at Mycenae and the residents of the surrounding village. Upstairs the inhabitants enjoyed the trappings of the cosmopolitan elites; downstairs was the busy ceramic workshop. By the 13th c, the house had been destroyed in an earthquake and conflagration, and it was never rebuilt.

From the masses of broken pots found in the ruins of the house, first excavated in the early 1950s with renewed excavations beginning in 2000, it appears that the Petsas House workshop produced finely finished vessels adorned with intricate and innovative designs alongside roughly finished undecorated table wares. With an approach that combines

cognitive archaeology and advanced statistical methods, we examine the perception of morphology by contrasting the process of vessel construction with the pot's outward appearance. By deconstructing the building process, we can see pots as potters might have – the sum of related and component parts formed by various hands and completed with a series of technical gestures. This view stands in opposition to the consumer's understanding of the vessel as an object that, in its completed state, was imbued with meaning related to intended or desired use. The pots themselves reveal myriad choices on the part of the potters (highly skilled potters, apprentices, unskilled laborers) who also understood to varying degrees the wants and needs of consumers. The result moves us closer to understanding the operations of the Petsas House workshop within the complex socio-economic world of Late Bronze Age Greece.

3 CERAMIC MEDIA, CHANGE AND ACTIVITY (RE)ARRANGEMENTS: INVESTIGATING SERVING AND CONSUMPTION VESSELS FROM EARLY HELLADIC SETTLEMENTS

Kapsali, Polina (University of Cambridge)

Studies examining changes in ceramic morphology frequently focus on questions about the agency of the producers and users of the respective ceramics. Such questions direct research to the attribution of morphological transformations to shifts in crafting techniques and/or to shifting networks of exchange. This paper, adopting a relational approach, proposes instead that the examination of morphological changes in ceramics entails an exploration of the rearrangement(s) such changes helped to support in specific fields of activity (involving shifts in forms of interpersonal attention, sensorimotor routines and cross-media contiguities). This topic is here explored through ceramics linked with the serving and consumption of food and drinks from settlements in southern and central mainland Greece from the second half of the third millennium BCE. Changes in certain morphological features of these ceramics, such as around the mouth and grips, are explored alongside changes that concern the increasing popularity of ceramic patterned surfaces. It is proposed that ceramics should be primarily examined as media embedded in fields of activity, with reference to which production should also be understood.

4 A VIEW FROM THE TALL GRASS: THE PLACE OF REED DECORATION IN THE LM IA CERAMIC REPERTOIRE IN CRETE

Oddo, Emilia (Tulane University)

At the intersection between production and consumption, ceramic style is one of the most important tools to investigate ancient societies. Stylistic changes or innovations are often linked to broad societal (and technological) developments and have become chronological landmarks. Determining what prompts these changes and the mechanisms that originate them (whether/how they are triggered by the producer or influenced by the consumer) remains challenging. Stylistic analysis can contribute expanding our understanding of the role style played in the community that consumed it.

With the aim to ultimately explore these topics, this paper proposes an analysis of the Minoan reed style, a staple of Neopalatial, and in particular Late Minoan (LM) IA, ceramic production. Considered a chronological marker, reed decorated sherds are routinely employed to distinguish LM IA from earlier assemblages. At a closer look, however, reed decoration appears to have been more than a shift in fashion, in turn affording us the opportunity to delve into the meaning of style itself. Two main factors set this style apart from other Neopalatial decorative styles. First, at the production level, the reed style seems to be following specific decorative rules: a selected shape repertoire, and potentially a fabric preference. Second, from the consumption perspective, reed-decorated pots are not geographically broadly circulated, being chiefly located in central Crete, particularly in the north-central region. Within this region, moreover, contextual data may indicate ritual associations for vessels with reed decoration.

Whether ritual or else, reed decoration represents a specific stylistic choice with a relatively limited chronological and functional span. What regulated this type of production and what does it teach us about style and society?

5 LATE CYPRIOT 'BATHTUBS': A CASE STUDY FROM ERIMI-PITHARKA

Recht, Laerke (University of Graz) - Yamasaki, Mari (PCMA, University of Warsaw) - Clark, Brigid (University of Haifa) - Zeman-Wisniewska, Katarzyna (Cardinal Stefan Wyszyński University, Warsaw)

So-called 'bathtubs', deep oval basins with almost vertical walls and typically with a hole near the base, termed so based on their resemblance to the modern shape, are commonly found in Late Cypriot settlement, including at the site of Erimi-Pitharka in the Kouris Valley in south-central Cyprus. In Cyprus, these objects have been found at many significant sites dating between the 13th and 12th centuries BCE, such as Enkomi, Hala Sultan Tekke, Pyla-Kokkinokremos, Maa-Palaeokastro, Palaepaphos, Kalavassos-Ayios Dhimitrios, Alassa and Erimi-Pitharka. Their use is still not well-understood: more recent interpretations suggest a purpose related to industrial processing, specifically textiles, cooking facilities, or an unspecified cultic function. Here, we make a first attempt at analysing their design (also in comparison with the similar vessels from elsewhere in the Eastern Mediterranean, sometimes known as larnakes) in order to understand function and their impact on the organisation of manufacture. This paper uses examples of these

'bathtubs' from the Late Bronze Age (LC IIC - LC IIIA, c. 1300-1150 BCE) site of Erimi-Pitharka as a starting point. Erimi-Pitharka is a regional settlement with a focus on agricultural production and storage, and with a ceramic record that is dominated by coarse and plain ware vessels. Among these are several examples of bathtubs and pithoi embedded into the bedrock or as part of permanent and semi-permanent installations. The aim is to present a preliminary assessment of the typology, chronology, distribution and function of Late Cypriot 'bathtubs', investigating, on the one hand, their role in production and manufacture, including their relationship to other large vessels such as basins and pithoi; on the other hand, exploring the possible symbolic connection to water and water management within the ritual-practical activities at Erimi-Pitharka and other Late Cypriot settlements.

6 CERAMIC STYLISTIC DIVERSITY IN EARLY GREECE: EXCLUSIVE STYLE(S) AND RITUAL CONTAINERS

Vlachou, Vicky (Aristotle University of Thessaloniki)

Pottery was meant for everyday use, and thus related to all spheres of human activity: domestic, ritual and cultic, funerary. Despite the wide range of shapes, the individual vessel forms remained relatively constant overtime. Potters and painters adapted their products for specific and practical uses that were maintained over time, although continuously evolving to reach the optimum practical shape as perceived by their users. Technical achievements and innovations distinguish regional pottery styles; exclusive pots related to conspicuous consumption, and/or everyday pots serving ritual activities may vary considerably across the EIA Aegean thus revealing complementary and contrasting tastes of the regional clientele.

In this short paper stylistic diversity is approached through the lens of regional pottery production in EIA. Pottery assemblages from selected areas shall serve this approach: large skyphoid kraters of the late 8th century BC from Oropos and Euboea, relief pithoi from the Cyclades of the early 7th century BC and dinner sets with figure decoration of the late 8th/early 7th centuries BC from Laconia. All three cases represent concurrent and specialised pottery productions, appreciated by specific communities, yet demonstrating small impact on other concurrent regional pottery productions. Their exclusive or not character, the technological innovations they introduced and their distinctive style seem to have aimed to their exclusivity, on the part of both producers and consumers in each area.

7 MASS-PRODUCED OR MASS-APPEAL? CORINTHIAN POTTERY PRODUCTION IN THE ARCHAIC PERIOD

Bertram, Haley (University of Cincinnati)

Corinth's aptitude for ceramic production and export in the Archaic period is well-known, but the factors which enabled its long-term success are not well-understood. The standing stylistic narrative hails an artistic peak in the 7th century, followed by a decline toward mass production in the 6th century. This framework overlooks the fact that most ceramics Corinth produced and exported throughout the Archaic period were not standout pieces, but vessels carrying variations on common motifs and decorative schema.

This paper undertakes a close study of Corinthian vessels exported overseas to assess the range of factors that guided Corinth's successful ceramic production and exchange. I compare vessels recovered from the Corinthian colony of Syracuse with those recovered from the colony of Marseille to investigate how different colonial consumers impacted the development of Corinthian pottery: I assess the vessel forms and decorations favored in each colony, and consider how these align with the changes Corinth made in production over time. I argue that the success of the Corinthian ceramic industry was thanks to the wide range of shapes, scales, and generic decoration it produced, which allowed it to be easily and selectively adapted into the cultural framework of any colonial dynamic. This broad appeal was a cornerstone of the Corinthian industry from the 7th century onward, and spurred an array of Corinthianizing wares from western Greek, Etruscan, and local producers, feeding into its broad market and appeal.

By shifting the analytical focus from style to multiple factors of consumption and production, this study demonstrates that we can gain new insight into the various ways potters – Corinthian and others – developed production in response to market demand, and better understand how the broadening contact and exchange in the Archaic period impacted the choices of potters across time and place.

8 FROM RAW CLAY, BACK TO EARTH: TECHNIQUES, FUNCTIONS AND CONSUMPTIONS OF EARLY IRON AGE POTTERY AT INCORONATA

Willborn, Chantal (Rennes 2 University) - Malingre, Léa (Rennes 2 University) - Mandić, Josipa (Aix-Marseille University, Centre Camille Jullian; UMR 6566 CReAAH)

This paper will focus on the locally produced and imported ceramics of the 8th and 7th centuries BC, found at the Oenotrian site of Incoronata (Basilicata, Southern Italy), that welcomed people from the Aegean at the beginning of the 7th century BC. This encounter has left us important archaeological evidence of greco-indigenous interplay, and

among all, the one that concerns the craft area for ceramic productions shared by artisans of both communities. The mixed community phase of the site thus becomes an ideal laboratory for the comprehension of the consumption of both imported and locally crafted ceramics: the indigenous (coarse, impasto and matt-painted ware) and Greek type pottery (gray ware, subgeometric and painted fine ware, coarse ware, and transport vessels) that finds its inspiration among the imported ones.

The paper aims to "center" these vessels as interfaces between different groups (artisans and customers) and communities (foreign and indigenous), as well as as objects that embody a variety of information about these human interactions. By illustrating precise Greek and indigenous pottery case studies from Incoronata and by adopting a cross-cutting technological, morphological, and contextual analysis approach, this paper intends:

(1) to present different phases of ceramic production (from the extraction of clay to the firing of vases) in order to enhance the understanding of craft and technical know-how transmission phenomena in the Iron Age Mediterranean and

(2) to discuss the exploitability of these potteries' properties (shapes, styles, raw material) through the transition from their original purpose (craftsmen's design) to their final destination (customers' perception and consumption), and thus to stress other than the primary functions of the vessels, such as e.g. building material or ceremonial objects, within the greco-indigenous intercommunity ritual sphere at the dawn of the Greek colonization in this region.

9 REVISITING THE POLYCHROME PAINTED POTTERY OF EARLY BRONZE AGE MESOPOTAMIA

Lewis, Michael (Universidade de Coimbra) - Del Bravo, Francesco (Freie Universität Berlin)

The 3rd millennium BCE in north-central Mesopotamia is characterized by the appearance of regionalized, heavily decorated pottery vessels. Polychrome Painted Pottery, often referred to as Scarlet Ware after its distinctive plum-red paint is one of the most characteristic of these regionalized traditions.

Excavated assemblages of Scarlet Ware are largely restricted to central Iraq and western Iran and are typically recovered from specific archaeological settings; funerary contexts and feasting deposits. Despite prior investigation being largely style-orientated and focused on the painted motifs of these vessels, limited archaeometric investigations have demonstrated highly regionalized clay recipes, signifying local production. Indeed, whilst the painted decoration of these vessels follows a specific set of overarching rules, there appears a wide degree of regional variation in the outcome of the designs, indicative of highly individualized choices by the potters.

This presentation will revisit data from Mesopotamian excavations to provide an overview of the Scarlet Ware and highlight the assemblage from ongoing excavations at Kani Shaie, Iraqi-Kurdistan. Here, Scarlet Ware recovered from several contexts include a funerary deposit, as well as a unique feasting deposit enables reconsideration of the regional social milieu.

Our aim is to fully integrate discussion of Scarlet Ware. We will explore stylistic aspects of the vessels, alongside the chaîne opératoire. We will also investigate ideas of household versus specialized production, alongside consumption and depositional practices of these vessels and integrate the findings with contextual, and socio-communal practices. We propose that these vessels allow to reconstruct material culture's role in countering, as much as adapting to shifting social balances during a pivotal period of Mesopotamian cultural realignment. Through this, we believe we will find ourselves at that "interface between style and social structure" (to paraphrase Goody), where material culture conveys, reassigns and, at times, restores community's roles and balances.

10 MATERIAL SEMIOTICS AND FEMALE FIGURINES: CRAFTING POLITICAL ECONOMIES IN THE SOUTHERN LEVANT

Hunziker-Rodewald, Regine (University of Strasbourg) - Aioanei, Andrei (University of Strasbourg)

In the 9th and 8th centuries BCE, the Jordan Valley witnessed the production of a specific group of female clay figurines, embodying the confluence of socio-political and craft economies. Drawing from archaeological findings across sites such as Amman, Tall as-Sa'idiyyah, and Tel Rehov, our paper focuses on how these figurines reflect societal evolution and intricate settlement dynamics. Through a detailed analysis of their morphology, applied crafting techniques, and archaeological context, we uncover their embeddedness in the socio-economic and political tapestries of the era. We argue that their design and dissemination represent deliberate actions by the ancient craft economy to underscore and perpetuate prevalent social and gendered norms. The figurines under review serve as vital intermediaries among economic actors, shaping the political and ideological aspirations concerning collapse and survival. Our research underscores the importance of the figurines, positioning them as critical links between the material and immaterial aspects of socio-economic interactions.

657 TEACHING AND LEARNING ARCHAEOLOGY WITH DIGITAL TOOLS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Waagen, Jitte (University of Amsterdam) - Masriera Esquerra, Clara (Universitat Autònoma de Barcelona) - Feuser, Stefan (University of Bonn) - Wollentz, Gustav (Nordic Centre of Heritage Learning and Creativity AB) - Mickleburgh, Hayley (University of Amsterdam)

Session format: Regular session

In this session we focus on archaeology, education (from pre-school to universities) and digital methods for teaching. As the past is an abstract concept, teaching and learning about the past can be challenging. Various perspectives on the past, as opposed to presenting it as straightforward reconstruction as a result of a set of facts, events, characters and dates, must be stimulated by providing tools that cater for critical evaluation. Such tools should allow for inquiry, problem solving and debating enigmas considering didactic principles, such as that of the 'hands on, minds on, hearts on' perspective. This requires activating methodologies for teaching and learning, for which digital technologies such as Virtual Reality (VR) are often suitable.

Local initiatives on digital methods used for research and teaching in higher education have emerged in several European locations, incorporating cutting-edge 3D and VR technologies. Despite this, there has been a lack of cohesion and cross-linking of knowledge and experiences between these initiatives, meaning that synergistic opportunities are not explored, and local initiatives are unable to make a greater impact.

In this session, we would like to invite papers on theoretical, technical and practical initiatives developed around the idea of teaching, learning and researching the past using digital tools (i.e. VR), and of exploring the relationship between digital/hybrid and analogue pedagogy in archaeological education.

ABSTRACTS

1 EVALUATING VIRTUAL REALITY AS A LEARNING ENVIRONMENT

Waagen, Jitte (University of Amsterdam)

Virtual Reality as a learning environment has seen various experiments in the field of archaeological education. Whereas the advantage of allowing access to remote sites, reconstructed worlds, or inaccessible places appears obvious, there are also prospections of increased learning outcomes. These are then expected from an increased spatial awareness, the stimulation of an active learning attitude, a more comprehensive structuring of learning materials, and so on and so forth. Although in general the often qualitative and small-scale evaluations are on average positive, more systematic evaluations are rare. In the context of the Virtual Past Places project at the University of Amsterdam, executed by the 4D Research Lab, a systematic evaluation programme has been developed and executed for tailor-made Virtual Reality environments for different courses in Humanities disciplines. In total, six environments were created for teaching in Archaeology, Ancient Studies and Art History, around which questionnaires, tests with control groups and focus group discussions have been organized. The aim has been to generate a solid empirical basis for such claims, and to advance good practice for embedding Virtual Reality as learning environments in Humanities education, and Archeology specifically. In this presentation, the tentative outcomes of the Virtual Past Places project will be shared and discussed.

2 UNDERSTANDING ANCIENT WORLDS - THE USE OF VIRTUAL REALITY IN UNIVERSITY TEACHING

Lang, Matthias (BCDH, University of Bonn) - Kluge, Philippe (BCDH, University of Bonn) - Feist, Sabine (Department for Christian Archaeology, University of Bonn) - Feuser, Stefan (Department for Classical Archaeology, University of Bonn)

Excursions to museums and archaeological sites have always been an indispensable didactic tool in archaeology. They allow students to see and understand spaces and objects in their materiality, actual shape and size. Although photographs, plans and maps allow this information to be recorded, they only ever represent a two-dimensional derivative of the three-dimensional shape of the objects or a site. For beginners in particular, these abstractions of material entities are often very difficult to understand, as they presuppose a basic experience of how the material world relates to the two-dimensional derivatives. The opportunity to take part in excursions during your studies is of course usually limited to a few places and students with particularly low financial resources are sometimes at a massive disadvantage compared to more privileged fellow students.

To address this problem, the BCDH and the archaeology departments at the university of Bonn have developed a VR learning platform, which makes archaeological teaching content available in virtual and immersive environments. The virtual twins of the locations offer unimagined possibilities for experimenting and interacting with the spaces

and objects. In addition, current research projects can be anchored in teaching much more easily in this way, as the digital 3D documentation, which is often generic today, can be transferred to this virtual learning environment with comparatively little effort.

So far, five different learning scenarios have been implemented and evaluated in the context of classes in various archaeological sub-disciplines. In addition to the technical background, our contribution will discuss our experiences to date with the use of VR learning scenarios within the. We would also like to encourage and discuss the exchange of existing learning environments and 3D models for teaching.

3 SERIOUS GAMES AND CULTURAL HERITAGE. VIRTUAL REALITY (VR) AND HEAD MOUNTED DISPLAYS (HMD) IN THE MUSEUMISATION OF ROCA DEL BOUS

Roda Gilabert, Xavier (Departament de Prehistòria. Universitat Autònoma de Barcelona; CASEs - Culture, Archaeology, and Socio-Ecological Dynamics group. Departament d'Humanitats. Universitat Pompeu Fabra) - Martínez-Moreno, Jorge (Departament de Prehistòria. Universitat Autònoma de Barcelona) - González Marcén, Paloma (Departament de Prehistòria. Universitat Autònoma de Barcelona) - Mora Torcal, Rafael (Departament de Prehistòria. Universitat Autònoma de Barcelona)

The use of new audio-visual media such as Virtual Reality (VR) and Head Mounted Displays (HMD) is an opportunity to promote the transfer of knowledge about the historical and cultural landscape. The use of these technologies in the dissemination of content related to archaeological sites allows the generation of content suitable for a wide range of users, from researchers to students, and for both scientific and recreational tourism.

This presentation will give an overview of the "Roca dels Bous Inmers" project, a public-private collaboration between the Departament de Prehistòria of the Universitat Autònoma de Barcelona and the digital heritage company DIGIT Enginyeria de Sistemes Audiovisuals S.L. The project is funded by the Spanish Government's State Plan for Scientific, Technical and Innovation Research. This partnership guarantees the transversality of the project and aims to generate new models of integrated heritage management.

The aim is to develop a set of actions (challenges) based on the concept of serious games (hyper-realistic video games) for head-mounted displays. The proposal is based on archaeological data collected during 25 years of work at the Middle Palaeolithic site of Roca del Bous (south-eastern Pyrenees, Spain).

Its development is based on the design of contents that allow the activation of the educational, cultural and tourist proposal and the dissemination of the results of the research project. This proposal renews and extends the content of the current visit model, which has been active since 2010.

Its development will allow not only tangible products (virtual world to visit), but also intangible benefits, such as a stronger link between archaeological heritage and the construction of identities and cultural memories. Finally, it also aims to foster sustainable and inclusive models of cultural tourism and geotourism in rural areas.

4 DIG, STUDY-GAME, REPEAT. AN ARCHAEOLOGICAL SIMULATOR AS A TEACHING TOOL FOR THE DEVELOPMENT OF METHODOLOGICAL SKILLS

Venco, Veronica (University of Sassari) - Magnini, Luigi (Ca' Foscary University Venice) - Milanese, Marco (University of Sassari)

Since the 70s-80s, when archaeology began to look to technology as an aid to research, analysis, interpretation and conservation of archaeological heritage and sites, the theme and potential of virtual three-dimensionality has grown in interest within the scientific community. In recent decades, with the relentless rush of technological progress and the increasing need for remote working, digital has become an integral part of work and research methodologies. In this panorama, educational contexts such as schools (at all levels of education) and museum institutions, have evolved towards a new learning model through various approaches characterised by edutainment. This form of teaching is based on the intersection between education and entertainment also through the use of games (not only digital) and gamification or game-based learning techniques and models. With these considerations in mind, this contribution introduces the project for the development of a digital application capable of simulating an archaeological excavation in most of its characteristics, starting from the removal of layers and their archaeological documentation, to finish with the analysis of the finds. Conceived as a didactic tool for university courses of Methods and Techniques for Archaeological Excavation, the initial development involved the collection of three-dimensional data from two case studies: the first from an Iron Age structure from the Bostel di Rotzo (Vicenza, Italy) and the second from two Late Middle Ages burials from the site of Sant'Antioco di Bisarcio (Sassari, Italy). Through the Game Design Document, two application models were theoretically devised with the same graphic content, but addressed to two different audiences. The first, aimed at university students, envisages the implementation of game elements within it, enabling constant and gradual learning while maintaining a high level of competition with peers. The second is instead aimed at professionals, as an archaeological investigation tool, making the excavation activities virtually repeatable.

5 LOOK CLOSER: UNCOVERING THE AFFORDANCES OF 3D DATA IN LEARNING AND COMMUNICATION

Pantos, Alexis (Museum of Cultural History University of Oslo) - Sztal, Alexandra (Muzeum Narodowe w Lublinie) - Andreassen, Ingvild (Museum of Cultural History University of Oslo) - van Riel, Sjoerd (Museum of Cultural History University of Oslo) - Cyran, Marta (Muzeum Narodowe w Lublinie) - Kimball, Justin (Museum of Cultural History University of Oslo)

Heritage institutions of all sizes have been steadily growing their collection of 3D documentation of heritage objects. Increasingly these data are being made available to both researchers and the public through online repositories. However, as many organizations discovered when publishing their 2D image collections, availability does not necessarily equate to accessibility. While digital literacy, and familiarity with 3D data, is much more commonplace among current generations than ever before, the complexity of these data, range of modes of presentation and multitude of potential use can act as hinderance without additional levels of mediation.

The presentation will draw from recent experiences, including the Heritage Accessible project - an EEA funded partnership between at the Museum of Cultural History in Oslo Norway and the National Museum in Lublin, Poland, as well as the ongoing UI3D project at the Museum of Cultural History. It will argue that 3D data can be an effective means of broadening access of heritage data to communities with otherwise limited access to cultural resources, but that presentation and contextualization are key for ensuring effective learning outcomes and engagement. We will also argue that at their heart many of the challenges faced by the effective use of 3D data are familiar to conventional education and dissemination. We will describe our attempts to mediate some of the current technological barriers of the medium - such as variations in quality, limitations in technology and differences in legislation on the use of digital media in classrooms. We will provide examples of how we have attempted to frame 3D content as a resource that should be embedded within learning activities, focusing on a 'look closer' and creative or playful 'make it your own' ethos. Finally, we will reflect on the wider challenges working across communities with diverse learning needs and access to technology.

6 OLD IDEAS AND NEW WAYS TO RECREATE HISTORY. LITHUANIAN EDUCATION EXPERIENCES

Zilinskaite, Agne (Vilnius University; Association of Lithuanian Archaeology) - Puzariene, Kristina (Centre for Local Land Cognition and Research) - Briedis, Paulius (School of Robotics)

It is acknowledged that integrating archaeological knowledge into teaching programmes significantly improves educational outcomes, broadens students understanding of the past and increases appreciation of archaeological heritage. Therefore, this paper explores the possibilities of integrating archaeological topics into the general curricula of Lithuanian education with the aim to disclose how the virtual space can stimulate interest in heritage sites and how a non-standard way of looking often allows us to discover what narratives or traditional research methods cannot.

Even though the integration of Lithuania's archaeological heritage to education has been advancing over the past decades, there is still no deep tradition of using it for school education purposes. The application of new technologies is often hampered not only by the technological factor: (a) the age and motivation of the pupils (archaeology topics are taught up to grade 8, while IT - in later grades); (b) 30% of the topics freely chosen by the teacher who often limited competence in archaeology or technology; (c) traditional and passive methods are used to present archaeological heritage more often.

The case study of international Erasmus+ 2021-2023 project "ReCreate History through 3D, Game Design and Virtual Reality" will be presented. It aimed to raise the interest of upper grade students (age 15-19) in cultural heritage and develop their creativity by presenting archaeological objects through modern technologies. It was based on the integrative approach where exploring of archaeological heritage is combined with Storytelling and innovative technologies (creation of 3D models using photogrammetry and mini game development with Unreal Engine software). One of the main objectives were to develop and validate the methodological concept of recreating history through these technologies consisting of lesson materials and teacher's guidelines. An intellectual outfit results based on the project developers', teachers' and students' feedback will be analysed as well.

7 DIGGING FOR GAMING. A GAME BASED APPROACH TO THE DAILY LIFE OF ARCHEOLOGICAL RESEARCH

Caloi, Luca (University of Sassari) - Magnini, Luigi (Ca' Foscari University Venice) - Milanese, Marco (University of Sassari)

Gamification is a practice that has brought the attention of the public, the media, and the experts to a set of applications and services based on the principles of play. The world of gaming has always been interlaced with the real one, to the point of becoming an integral part of it. Education itself has made the concept of edutainment widespread and recognized for its ability to generate engagement.

Research and projects related to gamification have multiplied in recent years to promote the teaching of customs and traditions, to increase people's interest in cultural heritage, and to contribute to the creation of new ways of preservation and valorization.

Among this massive production of games and experience it is evident the absence of a product primarily focused on showing and telling the professional archaeological research's reality. For that reason, the purpose of this research project is to create a serious game that conveys the procedures of archaeological fieldwork and the promotion of cultural heritage to the public.

The aim is to create a product with high scientific connotations, which would allow the public to better understand the role of archaeologists in contemporary society. This purpose will be attended by a narrative mechanics approach, in which the users will experience the problematic aspects and the everyday challenges of the archaeological work directly through the gameplay loop. The game also intends to increase awareness of cultural heritage, enabling the users to discover and learn about artifacts and historical contexts that would not be otherwise accessible to the public through collectible information cards.

8 EYE-TRACKING IN ARCHAEOLOGICAL EDUCATION: HOW RESEARCH ON THE VISUAL PERCEPTION OF ARCHAEOLOGICAL REMAINS MAY ENHANCE ARCHAEOLOGICAL TEACHING

Michalik, Tomasz (University of Warsaw) - Zielińska, Dobrochna (University of Warsaw)

In their famous book "Inattention blindness", Arien Mack and Irvin Rock claimed that even if something is completely visible, we may fail to notice it if it is unexpected. However, "looking without seeing", a phenomenon described by Mack and Rock, is only the tip of the iceberg. Many other challenges may arise from the unconscious nature of most visual processes, resulting in limited control over analytical procedures.

Considering the complex nature of vision and its fundamental role in archaeological analyses, in our study we investigated how archaeological studies influence the perception of medieval Nubian paintings. During the study, we tasked students enrolled in the 'Iconography for Archaeologists' course conducted at the University of Warsaw, Poland with analysing four medieval Nubian paintings from the Faras Gallery at the National Museum in Warsaw, both before and after completing the course. Their performance was recorded with eye-tracker (a tool enabling the tracing of patterns of visual attention). We were interested in observing the actual changes in students' visual behaviour in contrast to the verbal knowledge measured usually during the exams.

The study showed an increase in visual sensitivity after the course, especially concerning the clothes, the attributes, and the context of figures depicted in paintings. Moreover, it provided us with insights into the and challenges in the analysis of paintings, serving as a starting point for discussions on enhancing future courses and developing ways to measure the practical effects of archaeological education.

9 OPEN INVESTIGA.EDU - ARCHAEOLOGY REACHES RURAL SCHOOLS WITH DIGITAL MEDIA

Masriera-Esquerria, Clara (Universitat Autònoma de Barcelona) - Bonet-Peláez, Anna (Universitat Autònoma de Barcelona) - González-Marcén, Paloma (Universitat Autònoma de Barcelona) - Pinto-Font, Laura (Universitat Autònoma de Barcelona)

Autonomous University of Barcelona (UAB) has a network of archaeological sites, parks and museums where develops research and teaching (Campus d'Arqueologia i Paleontologia de la UAB). Most of these sites are in rural areas studied by researchers and students from urban areas. To link the territory and the knowledge, we developed the innovative educational program called Investiga.edu that aims to bring the high educational archaeological research to pre-school, primary and secondary school of rural areas around or close archaeological sites.

After having implemented the program for four years, since 2020-2021 school course, with financial support of public administration, there has been an increasing demand from more rural schools. This has led to design an open investiga.edu program, where we are publishing online educational files, providing all the necessary guidelines and resources. These guides are based on the same methodological pillars as all Investiga.edu projects: they propose the investigation of a specific archaeological site following the phases of the scientific method based on activities and challenges that work with real archaeological data and replicate some of the disciplines and techniques of archaeology.

On the other hand, the program also attaches great importance to the visibility of the UAB research teams and their contact with students; for this reason, the educational files incorporate audiovisual capsules starring researchers from different disciplines and research groups.

Currently "Open Investiga.edu" has published two educational guidelines: one on the La Cova de Montanissell site, located at the archaeological site of Coll de Nargó, and another focused on the Cova del Sardo, located in the Aiguestortes National Park and Estany de Sant Maurici.

10 ONLAAH MOOC: ONLINE EDUCATION IN AFRICAN ARCHAEOLOGY AND HERITAGE

Fonseca, Sofia (Teiduma, Consultancy on Heritage and Culture; German Archaeological Institute; ICArEHB, Algarve University)

The rapid advancement in digital technologies has provided unprecedented opportunities for the democratization of education in specialized fields such as archaeology and heritage. The Online Learning on African Archaeology and Heritage (ONLAAH) and its Coursera MOOC on Archaeology and Heritage of Africa, represents a concerted effort to leverage digital platforms to make heritage education accessible, engaging, and effective for a global audience. Developed by the German Archaeological Institute (DAI) in collaboration with several partner institutions and a team of 30 experts in archaeology, anthropology, digital technologies, and heritage studies, ONLAAH aims to bridge the gap between academic knowledge and public interest in African archaeology and heritage.

This presentation will outline the design and implementation of the ONLAAH MOOC, highlighting its curriculum that combines theoretical knowledge with practical case studies, including archaeological projects and community engagement. We will also discuss the challenges encountered during the MOOC's development and delivery.

With over 1000 students enrolled and counting and featuring a special partnership with the Museum of West Africa (MOWAA) in Nigeria for the "Unearth: Discovering Archaeology Together" Community Engagement Project, the ONLAAH MOOC, which launched in May 2023, exemplifies the potential of online learning to transform heritage education into a more inclusive, comprehensive, and engaging experience. By sharing our experiences and insights, we aim to contribute to the broader discourse on digital education in the fields of archaeology and heritage and encourage the development of similar initiatives that can advance our field of research.

11 ARCHAEOLOGICAL EDUCATION THROUGH DIGITAL TOOLS: CHALLENGES, OPPORTUNITIES AND CRITICISMS

Pyrgaki, Marie (1 Dr. Pyrgaki Marie Université Paris I, Panthéon-Sorbonne; 2 Cons. Prof. Hellenic Open University)

This paper explores the integration of digital technologies and approaches that have emerged as valuable resources for enhancing archaeological education. It examines the benefits and challenges of using digital tools and the theoretical frameworks, technical innovations, and practical implementations that bridge the gap between digital and analogue pedagogy.

It focuses on the case study of the Greek Neolithic period where digital technologies are being utilized to improve knowledge dissemination, engage students, and facilitate a comprehensive understanding of the subject matter. This study investigates the specific challenges faced by archaeological education initiatives in understanding and disseminating knowledge about the Greek Neolithic and proposes recommendations for improvement. But the archaeological education initiatives focused on this era often suffer from a lack of cohesion and coordination. This paper highlights the lack of cohesion and cross-linking of knowledge and experiences between different initiatives and the fragmentation that hampers the exploration of synergistic opportunities and limits the potential impact of local initiatives.

In this paper we will explain that while digital tools offer exciting possibilities for archaeological education, thoughtful implementation, critical evaluation, and a balance between tradition and innovation are crucial.

12 NOT JUST ANOTHER BRICK IN THE 3D WALL: BRINGING ACCESSIBLE 3D SCANNING METHODOLOGIES AND DATA MANAGEMENT INTO THE ARCHAEOLOGY CLASSROOM

Montfrooij, Max (Leiden University) - Revello Lami, Martina (Leiden University)

Over the last decades, digital tools for capturing, modelling and visualizing 3D data or virtual assets, have become a well-established practice at all stages of archaeological research, from documentation to public outreach. Increasingly popular amid scholars, museum professionals and field archaeologists, 3D technology has now proven a powerful means for preserving and displaying archaeological heritage sites and collections.

While reliance on virtual assets within archaeological research is growing exponentially, the utilization of sophisticated tools - such as laser scanning and photogrammetric recording methods - is typically confined to specialists operating high-end and costly equipment. Consequently, students face restricted opportunities to engage in 3D asset creation processes and are not familiar with essential guidelines for data management and storage, as well as issues concerning accessibility, quality standards, authenticity and responsible use of 3D virtual assets.

This paper advocates in favor of the incorporation of more affordable and accessible mobile LiDaR laser scanning technology to bridge this gap in our teaching practices. We will share the outcomes of a pilot project conducted at the Faculty of Archaeology of Leiden University, which utilized the LiDAR laser scanner integrated in the latest iPhone 15 Pro. We aimed to develop an accessible 3D scanning workflow that enabled students in a Material Studies seminar to effectively record and visualize archaeological objects. Our findings reveal a strong positive response and increased student interest not only in the scanned objects but in the applied tools. The project also illustrates how hands-on experimentation with user-friendly tools significantly enhances the understanding of relevant technologies, and fos-

ters comprehension of the aforementioned issues affecting 3D asset creation and management. Finally, we explore potential future strategies to more firmly incorporate 3D scanning methods in the archaeological teaching toolkit, drawing on our project's findings, didactical research and developments in the field of 3D creation.

13 MARE CYPRIUM: MULTIMEDIA APPLICATIONS FOR CYPRIOT MARITIME CULTURAL HERITAGE

Secci, Massimiliano (University of Cyprus) - Demesticha, Stella (University of Cyprus) - Katsouri, Irene (University of Cyprus)

Funded by the Honor Frost Foundation (HFF), the Mare Cyprium Project is an attempt to utilise digital archaeology to enhance public outreach. By integrating archaeological data from various ongoing and completed projects into a series of digital multimedia applications (DMAs), a team of the Maritime Archaeological Research Laboratory (MARELab), University of Cyprus (UCY) developed applications that targeted a diversified public. The case studies include artefacts, shipwrecks, harbours, and traditional boats, while the DMAs include 3D and 2D animations, an interactive 3D glossary of shipbuilding terms, a 3D collection of traditional boats. With this project we wanted to explore if an exercise in digital public outreach could successfully combine a high-level archaeological expertise with a functional digital knowledge and achieve to convey knowledge about various aspects of maritime cultural heritage, such as ship iconography and shipbuilding, the importance of stratigraphy, and the threats of looting and disturbance. This paper will critically discuss the general project idea and rationale, the challenges in materializing DMAs concepts and scenarios, and the results, including considerations on the insights derived from the external evaluation.

661 ON FIRE! ANCIENT PYROTECHNOLOGIES IN PRODUCTIVE AND RITUAL EASTERN MEDITERRANEAN AND NEAR EASTERN CONTEXTS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Laneri, Nicola (University of Catania) - Baldi, Johnny (CNRS) - Mendola, Alice (Università di Roma 'La Sapienza')

Session format: Regular session

Fire is a natural element that is the product of an oxidation reaction at high temperatures. With fire hominids started to interface as part of the exploitation of a seasonal natural resource and since then has become a quintessential part of human life. Moreover, the interaction between man and fire is sensorial: heat and light become elements linked to the life of man, who at the end of the Middle and Upper Palaeolithic endowed himself with a technology that guarantees the possibility of transforming elements, primarily food. Fire therefore acquires hybrid characteristics: extremely functional to life, it becomes a cultural element, created by man to satisfy the needs of lighting, heat, defence, cooking, production. Far from a purely physical and natural conceptualization, fire is an agency that intervenes and participates in the construction of the cultural world, a prerogative of the human species alone. The creation of the fire-artifact places its conceptualization within a cultural field, which arises from the creative intent of man in his social context to which he belongs. The monopoly acquired on planet Earth thanks to the long process of domestication of fire results in the creation of pyro-centric cultures capable of synthesizing foods and raw materials for the construction of objects. Indeed, with fire and by the means of fire, the species homo has become properly and metaphorically faber, not only as a creator, but also by developing ever new ways of processing raw foodstuffs, not only by cooking it, but above all by transforming it and producing new aliments.

It is within these premises that the session aims at investigating the use of fire for both productive and ritual purposes in a wide geographical area (i.e., the Eastern Mediterranean and the Near East) from prehistoric times until the first millennium BCE.

ABSTRACTS**1 WHO BY FIRE? HOW THE POTTER BUILT THE KILN AND HOW THE KILN BUILT THE POTTER**

Padovani, Claire (Paris 1 Panthéon Sorbonne)

This paper proposes a phenomenological approach to the artisanal use of fire in Southwest Asia from the late Neolithic period to the early Bronze Age. The emergence of the first kilns for pottery firing occurs in the latter half of the 7th millennium BCE and stands for a significant technological innovation in agropastoral societies at the end of the Neolithic era. Kilns become keystones in the transformation of the ceramic industry by the end of the 3rd millennium BCE. It is commonly acknowledged that kilns, among all firing structures, allow for reaching higher temperatures and achieving a uniform firing atmosphere suitable for limestone clay fabric. However, the pottery firing is a total sensory experience and the choice of the firing structure cannot be solely understood as a functional necessity. The mastery of fire is a lengthy, challenging, and hazardous learning process that varies depending on the firing structures chosen

by the potter. While the potter acts on the fire during the firing process, interviews with present-day potters reveal that the fire remains a feared master. Each firing structure involves a proper expertise, in other words, a technical know-how that may result in the specialisation of the firing operator within the social group. Drawing from archaeological and ethnological data, the aim is to grasp the significance of the firing experience in ancient societies and to make its transformative impact visible and explicit in its entirety. This includes the potter's action on the fire based on the chosen firing structure and the sociocultural aspect of the act of firing impacting both the firing operator and the social group.

2 FEELING THE FIRE. A PERCEPTIVE APPROACH TO THE TECHNO-ORGANISATIONAL COMPLEXITY OF THE POTTER'S WORKSHOPS IN THE EARLY MESOPOTAMIAN STATES

Baldi, Johnny (CNRS UMR 5133 Archéorient)

In the 4th and 3rd millennium BCE Mesopotamia, during the emergence of the early states and empires, ceramic workshops evolved substantially, becoming in some cases actual proto-factories. This was a far from linear process, based on new labour organisational patterns implying major technical innovations in firing structures and methods. In particular, various types of kilns, operating on the basis of different technological principles, are sometimes documented within the same workshops, without their use being in any way attributable to distinct groups of craftspeople or specific ceramic productions. The use of such different facilities and procedures to obtain products with totally similar features by potters who shared not only the same work spaces but also the same technical traditions and operational sequences raises relevant questions concerning cognitive, anthropological and firing cycle adaptations. How could these specialists learn to master different techniques without apparently needing long periods of adjustment or experimentation? What were the material difficulties that arose with the development of new firing procedures and how were they overcome? To address these issues, fieldwork data collected on North- and South-Mesopotamian workshops as part of the international FACT_WORK project were tested through an experimental and sensory approach. The aim is to understand the degree of complexity, distance or proximity of different firing techniques not only from the present-day archaeologist's etic perspective, but also through the past craftspeople's emic perception. The proxy employed for this purpose is the reconstruction of the visual, acoustic or tactile categories that guided their empirical knowledge of materials and privileged technical solutions. On the other hand, a sensory analysis allows for a better understanding of the cognitive steps underlying the evolution of the physical relations entertained by potters with fire as a "co-worker" and, consequently, some major changes in the labour organisation when the early states were appearing.

3 THE OVERLOOKED PYROTECHNOLOGY: A CONSIDERATION OF THE BITUMEN FINDS FROM THE OLD BABYLONIAN MESOPOTAMIAN SITE OF TELL MUHAMMAD

Hinks, Megan (University of Cambridge) - Laneri, Nicola (University of Catania)

The significance of bitumen as a pyrotechnology has often been overshadowed by its more well-known siblings, ceramics and metallurgy. Why is this the case? Like clay and metal ore, bitumen was extracted in its raw form from the earth, processed, combined with other components, and heated before being utilised. Like metal it had transmutative properties that allowed for it to be melted down and reformed. Like clay used for pottery or bricks, it was combined with temper which altered its nature as desired for function. Fundamentally, through fire, bitumen is transformed into a substance that had a wide range of uses.

This overview demonstrates how we can investigate bitumen from a similar perspective as ceramics or metals when it comes to systems of production. Namely, an examination of the bitumen chaîne opératoire using archaeometric techniques, use-analyses, and relationship to other materials. This latter aspect reflects on how other materials form not only an example for our approach to bitumen production studies, but an important part of the discussion.

This paper thus serves as an introduction to the archaeometric methods by which we can examine bitumen as a pyrotechnology that was widespread and multi-functional, with particular consideration of the preliminary bitumen finds from the Old Babylonian site of Tell Muhammad. Attention will be given to the context and use of bitumen at the site, highlighting questions that intended scientific analyses will seek to answer. In doing so, it sets the stage for a forthcoming wider project on bitumen production in southern Mesopotamia and takes steps towards a more rigorous methodological approach to this important but often overlooked substance.

4 FIRE FOR WATER: THE USE OF FIRE ASSOCIATED WITH WATER FACILITIES IN MESOPOTAMIA DURING THE OLD BABYLONIAN PERIOD

Laneri, Nicola (University of Catania)

The use of fire can have multiple purposes among which there was the impermeabilization of vessels, clay pipes for collecting water as well as toilets and other purposes associated with water management. In Ancient Mesopotamia,

fire was also used for disinfecting sewer during the hot summer seasons for protection from diseases. In fact, according to Mesopotamian textual sources, sewers were a source of diseases associated with minor deities and magical rituals (especially nearby gates) were enacted to protect the citizens from being sick.

This contribution will thus present a brief overview of the use of fire associated with water facilities in ancient Mesopotamia and especially during the Old Babylonian Period. In particular, I will use the Old Babylonian site of Tell Muhammad as an example for determining the important role played by fire in association with water through the data emerged during the recent excavations of the Baghdad Urban Archaeological Project.

5 EXPLORING POTTERY FIRING DYNAMICS: INTEGRATING ARCHAEO-METRIC ANALYSES AND EXPERIMENTAL ARCHAEOLOGY

Solard, Baptiste (Archaeometry Research Group, Eberhard Karls University of Tübingen) - Amicone, Silvia (Archaeometry Research Group, Eberhard Karls University of Tübingen; Institute of Archaeology, University College London)

The study of ceramic pyrotechnology is central to understand a wide range of cultural and social behaviours associated to pottery production.

Archaeometric analyses have been crucial amongst the different approaches used to reconstruct ancient ceramic pyrotechnology. Although these studies employ a variety of methods to reconstruct the firing process with a particular focus on the estimation of maximum firing temperatures of ceramics, the full complexity of firing dynamics is often not taken into consideration.

Another major focus of pyrotechnological studies is ancient combustion features, the study of which has enormous potential to gain better insights into a variety of other aspects regarding the firing procedures. However, pyrotechnological installations are rarely targeted for systematic and multi-disciplinary investigations that include both scientific analysis and experimental archaeology.

This paper aims to address pottery firing from a diverse perspective that merges archaeometric analyses and experimental archaeology to the study of both pottery and pyrotechnological installations. To demonstrate the potential of this approach, we combined scientific analyses including ceramic petrography, X-ray powder diffraction (XRPD), fourier-transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). These analyses were carried out on both archaeological materials from various archaeological contexts in the Near East and experimental reproductions. The latter were produced in experiments run in the laboratory as well as in the field using different types of pyrotechnological installations. The experiments were accompanied with a detailed program of firing temperature monitoring and integrated observations on atmospheric conditions, soaking time, and duration.

This integrated approach merging archaeometry and experimental archaeology enabled us to collect results useful to discuss the limits and advantages of various scientific analyses. Overall, our work demonstrated the potential of a dedicated methodological framework for studying pottery firing from a technological and social point of view that can be applied to various chronological and cultural contexts.

6 FIRE IN THE HEARTLAND OF CITIES: ILLUMINATING MESOPOTAMIAN NIGHTS

Earley-Spadoni, Tiffany (University of Central Florida)

In the pre-modern world, fire played a crucial role in extending activities beyond daylight hours. However, there has been relatively little scholarly engagement with the anthropology of the night, particularly to understand how the use of fire impacted life after sunset. This presentation explores the cultural perceptions of night, a time when fire became a purifying and protective force that safeguarded ancient peoples from both supernatural enemies and invaders at the city gates.

To comprehend cultural perceptions of night, it is crucial to frame it as a social construct. For instance, Mesopotamian imaginaries such as the night realm of Irkalla both reflected and influenced how individuals related to their world. Examination of this ideational landscape reveals a land characterized by liminality and social inversion. Meanwhile, cuneiform texts from the early first millennium BCE, like the Maqlû "burning" series, indicate an increased connection with supernatural forces at night. The darkest night, during the new moon, became a time for confronting and vanquishing adversaries, including ghosts, demons, and witches, utilizing flames to perform apotropaic rituals. People also employed fire to ward off existential threats through the deployment of fire beacon signaling and night watchers armed with torches. Thus, individuals recognized opportunities to express agency, with fire at their side, over a host of threats lurking in the darkness.

7 BURNING ARSLANTEPE. HEATING, COOKING, FEASTING, AND MUCH MORE DURING THE LATE CHALCOLITHIC PERIOD

Balossi Restelli, Francesca (Sapienza University of Rome)

In Anatolian prehistoric settlements, as probably in the majority of archaeological contexts of Western Asia, all domestic structures are characterized by the presence of a fire, or hearth. This was used daily for purposes that include heating and food preparation, but fire was used in many different occasions and contexts, frequently in relation to craft activities, and in waste and land management. Not all these uses are frequently visible, but another category of fire which is less rare than what one might think is attested in contexts that allow to imagine non-secular events, as ceremonies or rituals.

The paper shall take into consideration domestic and public contexts, in-door and out-door spaces, the traces left by fires, their shapes and sizes, and where possible the types of fuel, to analyse different uses of fire during the Late Chalcolithic (4200-3200 BCE) at the Eastern Anatolian site of Arslantepe (periods VIII-VIA), with the aim of identifying and comparing pyrotechnological behaviours and practices.

8 DETECTING FIRE-AGENCY AND HYBRIDIZATION: A VIEW FROM THE LATE BRONZE AND EARLY IRON AGE SOUTHERN CAUCASUS SETTLEMENT OF TAVA TEPE

Mendola, Alice (La Sapienza University of Rome) - Caggiani, Maria (University of Catania) - Barone, Germana (University of Catania) - Mazzoleni, Paolo (University of Catania)

The transformation of fire from a natural element to a cultural component has granted humankind a privileged condition above the planet Earth, establishing a relationship of co-dependence with the flames. The centrality of fire at productive, aggregational, and ritual levels highlights the demiurgic character of fire, capable of acquiring an agency and assuming an artifact essence. Archaeologically, it specifically becomes an invisible artifact, leaving ambiguous traces macroscopically similar for all its cultural uses. Detecting fire-agency means to render unambiguous the uncertain archaeological dataset of the traces of fire among productive, social-aggregative, and symbolic spheres.

The case study of the Late Bronze Age and Early Iron Age settlement of Tava Tepe, located on the right bank of Kura River in Southern Caucasus, offers the possibility to observe the three above mentioned aspects. In this framework, fire surely represents an instrument for metallurgical technology and a participant in symbolic belief within the so called shrines of the Southern Caucasus, sanctuaries that show the coexistence of production and sacrificial destruction of artifacts, making fire central in these processes. In terms of chronology and material culture, Tava Tepe seems to fit well into this description as it presents the coexistence of markers of production, food preparation and ritual features such as votive depositions affected by flames.

Archaeological examination and results of the main analytical techniques (XRD, FT-IR, Raman, SEM-EDS) experienced on pottery and metallurgical waste of production results of fire action, or presence as vitrified architectures and ash layers from Tava Tepe will be cross-referenced to convert the evidences of scientific analysis into cultural interpretation. Temperatures exposition range, esteemed by means of mineralogical, chemical and micromorphological analysis, will be addressed to identify fire agency and architectures within a context of mingling transformative, social, and symbolic elements in which fire takes on characteristics of hybridization.

9 THE USE OF FIRE IN THE FUNERARY PRACTICES OF THE SOUTHERN CAUCASUS DURING THE PROTOHISTORY

Poulmarc'h, Modwene (Université de Lyon, Archéorient (UMR 5133 CNRS/Université Lyon 2), Maison de l'Orient et de la Méditerranée Jean Pouilloux, Lyon, France)

In the Southern Caucasus, the funerary practices have been diversified since the Neolithic, and the inhumation was largely predominant until the end of the Bronze Age. The oldest case of cremation was discovered at the Neolithic site of Aruchlo in Georgia, but no other cases are known from the entire region until the Iron Age. During the Early Bronze Age, and particularly in the second half of the 4th millennium, fire played an important role in funerary practices, not to reduce a body to ashes but as part of the funerary ritual. During this period, in north-western Azerbaijan, there is a particular group of kurgans, all of which have collective burial sites, the common feature to all these kurgans is that a fire was lit in the funerary chamber at the time of its abandonment. Over the last two decades, excavations of these kurgans have enabled us to better understand, in particular, the depositional processes, the buried population and the use of fire. The aim of this paper is to present all these elements and to discuss the place of fire in funerary practices in the South Caucasus

10 INK INSCRIPTIONS AT BAZEH HUR - A PRELIMINARY REPORT

Cereti, Carlo (Sapienza; UCI) - Labbaf-Khaniki, Meysam (University of Tehran)

The paper will briefly present details about the discovery of a relevant number of Ink inscriptions at the Fire Temple of Bazeh Hur. These inscriptions, discovered in several Field seasons led by Prof. Meysam Labbaf-Khaniki are written in cursive Middle Persian script by several different hands and were likely the work of pilgrim and devotees active in and around the Fire Temple.

Research about the Bazeh Hur complex and Fire Temples is of utmost importance, since it is likely to be one of the most important Zoroastrian Shrines in Khorasan and in the entire eastern half of the Sasanian Empire. Its architecture, inscriptions, ritual chambers provide unique information on the cult of Fire in Late Antiquity and the Early Middle Ages.

According to evidence provided by the ink inscriptions, this temple was certainly active in late Sasanian and early Islamic centuries. Moreover, archaeological data show that the temple was built or enlarged in the early Sasanian period in an area where earlier Parthian buildings stood.

Sasanian Fire Temples and complexes are the most important cultic architectures known to this date to have survived from Pre-Islamic times and Bazeh Hur is certainly one of the most important ones yet to have been discovered.

664 ARCHAEOLOGICAL HERITAGE MANAGEMENT: PROCESSES AND MODELS FOR COMPARISON

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: JIMENEZ AVILA, Javier (Junta de Extremadura, Spain) - Taloni, Maria (Consiglio Nazionale della Ricerca, Italy) - Vlachaki, Anna (Acropolis Museum, Athens, Greece)

Session format: Regular session

In recent decades, the debate on the different models of managing cultural heritage, and in particular archaeological heritage, has increasingly broadened, also because management is no longer, or not only, based on centralised state governance, but is open to so-called collaborative approaches. Such approaches demonstrate the need to also integrate communities and private individuals in management and enhancement processes, either through special forms of partnership or by signing conventions, agreements or memoranda of understanding, or by changing the structure and organisation of state governance (archaeological museums, local authorities for the protection of archaeological heritage, etc.).

The aim of the session is, therefore, to compare the different ways of managing archaeological cultural heritage in different national and regional realities, also in the light of recent and future organisational reforms of central government structures to which the management and conservation of archaeological cultural heritage was delegated in the past.

The comparison between different national and local realities should highlight, not only on a theoretical level, but also through the presentation of concrete case studies, the strengths and weaknesses of the various approaches and create an interdisciplinary and international debate that unites the scientific community of archaeologists.

The identification of good practices applicable to common problems in different contexts or the need for context-specific solutions should lead to the creation of shared knowledge and management models that are more and more necessary in an increasingly interconnected world of cultural heritage management and enhancement.

Papers for this session may include, but are not limited to:

- Description and discussion of different processes and models for archaeological heritage management both at national and more local levels.
- Impact of different processes and models on the management of archaeological heritage.
- Future challenges and opportunities in the management of archaeological heritage.

ABSTRACTS

1 COMMON DIFFICULTIES AND DIFFERENT CONTEXTS: COMPARING ARCHAEOLOGICAL HERITAGE MANAGEMENT IN TWO WORLD HERITAGE SITES IN SPAIN

Corpas, Nekbet (Universidad Complutense de Madrid)

Drawing on two World Heritage sites in Spain, this communication addresses weaknesses and opportunities in managing archaeological heritage. It particularly focuses on participation of multiple stakeholders. Based on interviews and text sources, this communication explores the solutions given to these issues and associated weakness as well

as proposes ways forward in archaeological heritage management. The experience of Las Médulas, a World Heritage landscape resulting from Roman mining activities and in the heart of a modern ex-mining area, show a case study in a rural area affected by a process of depopulation. The current management system in this cultural landscape is based on the existence of different governmental tiers (local/regional) and also a foundation made up of the main governmental stakeholders. This management system has not catered for the needs of local populations inhabiting this landscape. In fact, the management of the site has exacerbated social tension. A different case is that of Alcalá de Henares, a World Heritage city. As a historic urban landscape, this site counts on a civic council as an advisory entity for municipal government to promote cooperation. Yet, it has not been a space for problem-solving in management. Both sites show limitations regarding how to engage populations in decision-making for archaeological heritage and disputes as to how to allocate land uses and distribute associated benefits and drawbacks. Yet, this communication considers different options to deal with these challenges. More specifically, it reflects upon the necessity to introduce strategies to address these disputes collaboratively when there are different concerns of stakeholders in archaeological heritage management.

2 **STACKING HERITAGE: NEW APPROACHES TO THE CULTURAL MANAGEMENT SERVICES AT IPHES (INSTITUT CATALÀ DE PALEOECOLOGIA HUMANA I EVOLUCIÓ SOCIAL)**

Hernando-Folch, Laura (IPHES) - Brià-Casarramona, Judit (IPHES)

Archaeologists and paleontologists have the responsibility to safeguard the specimens and artifacts discovered during excavations, ensuring proper care as materials are unearthed and collections grow. This document outlines the IPHES collection service and its working mechanisms, including ongoing considerations for potential improvements. Emphasis is placed on the critical necessity of implementing and adapting new technologies to effectively cater to the requirements of both research programs and investigators. The collection service is divided into two rooms. Room 1 houses the experimental Lithotech and Technotech, along with the archaeo-paleontological collection containing items such as bones, lithics, coals, coprolites, ceramics, and plant pseudomorphs spanning from the Pliocene (3 million years ago) to the Bronze Age (10,000 BC). Room 2 is designated as a temporary warehouse for materials from new campaigns and it fulfills additional functions, including serving as a storage space for samples requiring consolidation and restoration by the Conservation Unit. The service is presently undergoing a set of infrastructure modifications. Firstly, substantial bookshelves have been acquired to accommodate oversized materials currently lacking space in Room 1, situated in inadequate areas. Secondly, a modernization initiative for collection services commenced this year with the introduction of a Lithotech, along with its associated database named LithIPHES, and a forthcoming comprehensive relational database known as ARSYS DB (Archaeological System Database). Because traditional collections in museums and other institutions adhere to a methodology established by private collections two centuries ago, significant adjustments need to be suggested and implemented. Analog technologies, once effective for organizing small individual collections in the past, are now wholly ineffective in contemporary organizational settings. Even more sophisticated programs, like Microsoft Excel, prove impractical for handling extensive collections. At IPHES, these innovative methods have already been implemented with favorable outcomes, allowing researchers and institutions to benefit from well-organized materials and information.

3 **A GLIMPSE OF ITALY: THE MANAGEMENT OF ARCHAEOLOGICAL HERITAGE BETWEEN NEW REFORMS AND OLD PROBLEMS**

Taloni, Maria (National Research Council of Italy - Institute of Heritage Science) - Leopardi, Laura (Interdepartmental Research Centre "DigiLab" - Sapienza University of Rome) - Malatesta, Saverio (Interdepartmental Research Centre "DigiLab" - Sapienza University of Rome)

The Italian archaeological heritage is unique not only in term of quality and quantity, but also for his complex system of management that is the results of his history. The most obvious peculiarity is the mixture of state, church and local authority ownership and management: this compartmentalisation has led to numerous difficulties in identifying the respective competences and responsibilities, all too often resulting in inaction or, worse, neglect.

Ideally, on one hand, this would be integrated management based on a collaborative approach between State/Municipality/private sector, with fair burden-sharing, taking into account the strengths and weaknesses of each actor. On the other hand, by a coexistence based on a constructive and balanced dialectic between protection itself, valorisation and fruition, which cannot be separated according to the dictates of article 1 of the Cultural Heritage and Landscape Code, and not by a dichotomous division as has often been the case, especially in the concrete application of recent reforms of the state system of cultural heritage.

These reforms, which in the last ten years have characterised the organisation of the state system (and not only) of protection, management and valorisation of cultural heritage, will also be analysed in the light of the new constitutional reform on differentiated autonomy through the examination of some casestudies, focused on archaeological heritage, to highlight their consequences, both in terms of old criticalities and new opportunities.

The aim of this study is also the realisation of a joint project with the Interdepartmental Research Centre "DigiLab" - Sapienza University of Rome, which, starting from a historical examination, will come to understand, through the analysis of data including economic and human resources management data, the effectiveness and efficiency of the current system so as to orient decisions on the basis of a scientific analysis of the status quo.

4 **SOME ASPECTS OF ILLEGAL ANTIQUITIES TRADE IN THE DIGITAL SPACE IN POLAND**

Mroczek, Diana (Adam Mickiewicz University)

The trade in archaeological artefacts is strictly prohibited in Poland, which means that the black market for antiquities has been operating outside of the legal system. This presentation will examine these issues and take into the account historical background and the legislative changes that have occurred within the past year. The growing threat that social media, various e-commerce platforms, and other websites can pose to the preservation of cultural heritage will be discussed in detail, since these websites have the potential to act as middlemen for the illicit trade and exchange of artifacts. The crucial part of the presentation will explore the recent amendment in the Act of Protection of Monuments and Care for Monuments in Poland, dissecting its implications on combating illegal treasure hunting and its relation to antiquities trade and exchange. Additionally, the presentation will demonstrate the incorporation of technological solutions, including the transfer of accountability for discovered artifacts to the citizens during and after the search and the use of open-source data in the research process.

While "traditional" methods of antiquities trafficking often operate discreetly, the emergence and popularity of online platforms has reshaped this landscape, allowing for trade to occur more openly, although often obscured within legitimate auctions and legal nuances. This is especially true, since legal classifications and definitions of cultural heritage items can be unclear and confusing. The anonymity of these platforms further exacerbates the difficulty in tracing the provenance of artifacts, especially in the Schengen Area that allows the free flow of travel. The presentation will clarify the dynamics of the illegal antiquities trade in Poland and propose new coordinated efforts and solutions.

5 **THE IMPORTANCE OF PUBLIC INVOLVEMENT IN THE ADAPTATION AND MODERNISATION OF MOUND SITES IN LITHUANIA 1919-2023**

Viršiliene, Jurgita (Department of Cultural Heritage under the Ministry of Culture)

Today, the number of hillforts in Lithuania exceeds 1000. Currently, about 150 hillforts in Lithuania have been managed and adapted for visitors. In the 1930s, individuals began to raise the importance of their protection, public organisations - to highlight their significance, keeping the public's attention - dissemination of excavation results in the press. As a result of their efforts, the hillforts were de facto protected in 1935-1936.

In 1960 the 20 most important hillforts began to be protected de jure as Landscape Historical Reserves. Since 1970, work on the management of the hillforts has been carried out in accordance with the projects drawn up. Of the 25 projects drawn up in the 1980s and 1990s, 15 have been implemented. The intensification of research and management of the hillforts has enabled them to be brought to the attention of a wider public.

The Department of Cultural Heritage carried out a programme of preservation of Lithuanian hillforts damaged by natural forces in 1991-2010. It also supported research on hillforts. Of the approximately 100 hillforts that have been managed and made accessible to visitors. Since 2006, the Protected Territories Service has contributed to the preservation and adaptation of hillforts, implementing some 20 projects. Active conservation work has maintained public awareness of the importance of hillforts.

The public perception of hillforts was maintained through the publicity and dissemination of the results of hillforts research in the press. The results of the research were used to present the managed hillforts to the public. The emergence of the hillforts as the most important object of the region's prehistory has been achieved by constantly showing and reminding the public of their importance.

6 **SAFEGUARDING JULIOPOLIS: PREPARING SITE MANAGEMENT PLAN IN THE CONTEXT OF INTERINSTITUTIONAL COMMUNICATION AND LEGISLATION IN TÜRKIYE**

Büyükkarakaya, Ali (Hacettepe University, Department of Anthropology; Human Behavioral Ecology and Archaeometry laboratory (IDEA lab)) - Sertalp, Evren (Hacettepe University, Faculty of Communication, Department of Radio, TV and Cinema; Human Behavioral Ecology and Archaeometry laboratory (IDEA lab)) - Dolmuş, Muhammed (Human Behavioral Ecology and Archaeometry laboratory (IDEA lab))

Juliopolis (Iuliopolis) Ancient City is a settlement located in Ankara (Türkiye), where rescue excavations have been carried out by the Museum of Anatolian Civilizations (the MAC) since 2009, and is known to have been inhabited from the Hellenistic Period to the Ottoman Period. The settlement is located on the border between the provinces of Bithynia and Galatia. It is a strategic ancient center due to its location on both the Roman road and the Pilgrim Way

and its proximity to Ankyra, the capital of Galatia. A significant part of the Ancient City of Juliopolis is located under the dam lake of a hydroelectric dam completed in the 1950s.

Juliopolis Project has been carried out in partnership with Hacettepe University, the Museum of Anatolian Civilizations and Koç University Vehbi Koç Ankara Studies Application and Research Center since 2018. Juliopolis Digital Archeology Archive was created and made available for sharing with open access principles. The project's academic-based activities, such as research, public archeology events aimed at promoting the ancient city, and the creation of a Site Management Plan (SMP), have been supported by various supporters as well as the US Mission. In this respect, the project has gained the support of a public university, a state-affiliated museum, a private university and other public and private institutions in Turkey and is carried out with an innovative and multidisciplinary contemporary approach.

In this study, the process of creating the SMP of the Ancient City of Juliopolis, its relationship with the legislation in Türkiye and the dimensions of inter-institutional communication will be discussed. In addition, the impact and results of the multidisciplinary structure of the Project on SMP and the contributions of public archeology activities to the process will be evaluated.

7 DO NOT COMPARE - CONTRAST! THE DANGERS OF BORROWING MANAGEMENT PRACTICES FROM ELSEWHERE

Carman, John (University of Birmingham)

Although there are common bases to the management of the archaeological heritage across the globe (Carman 2015), the way these are operationalised from territory to territory vary significantly. The issue is never one of 'effectiveness' where the particular practice operates, but rather of suitability: heritage management systems must reflect basic understandings of what matters, how the world should work, and who should wield authority and over what and these vary from country to country, culture to culture. As I have argued elsewhere, borrowing what seems to be successful in another territory without careful consideration of exactly why it is successful there is a recipe for failure.

In particular, those (re)designing heritage management systems need to take into account the following:

- Who is deemed to carry proper authority
- What are the proper limits of law and government
- What constitutes 'heritage' (and what does not)

It does not follow that those who agree on the significance of preserving archaeological material necessarily agree on these issues: it will depend on the context from which they come.

This paper will explain why attempts to borrow from elsewhere are a bad idea!

8 REVERSING OLD PRACTICES. NEW COLLABORATIVE APPROACHES TO THE REVISION OF THE UNESCO WORLD HERITAGE TENTATIVE LIST

La Piscopia, Patrizia (National Monuments Service; Department of Housing, Local Government and Heritage) - Cave, Claire (University College Dublin)

In 2022 Ireland announced its new and revised Tentative List of cultural sites that could aspire to become UNESCO World Heritage properties one day. Compared to the previous list, compiled over a decade earlier, the latest one was shorter, not exclusively focussed on monumentality, and was backed by greater stakeholder involvement. This paper will analyse how, informed by official UNESCO guiding principles, Ireland has shifted its approach to the TL review process to produce a credible and dynamic list built on a participatory platform.

For a long time, the identification of sites and landscapes deserving to be brought on the global stage as World Heritage properties had been a prerogative of central government. This top-down approach was partially dictated by UNESCO procedural requirements that allow only State Parties to the 1972 Convention the opportunity to present sites for nomination to the World Heritage Committee. In time, UNESCO has tried to reverse the top-down approach by encouraging and supporting the involvement of local stakeholders in the identification, conservation and management of World Heritage properties.

In Ireland, the former centralised approach to heritage management, and World Heritage in particular, had seen the previous review of the Tentative List as a self-referential academic and bureaucratic exercise that relegated local stakeholder to the backstage. This had created at times a legacy of negative perceptions which needed to be changed to be able to successfully engage local stakeholders in the review process.

The paper will describe how Ireland has taken concrete steps to reverse old practices by offering guidance to local applicants, building local capacity, and designing support and guidance mechanisms. The new approach, based on communication and collaboration shortened the distance between local stakeholders and central government, and created the foundations for a transparent and flexible evaluation process of all Tentative List applications.

9 PROFESSIONAL ASSOCIATIONS AND TRADE ASSOCIATIONS IN ARCHAEOLOGY

Aitchison, Kenneth (Landward Research Ltd; Federation of Archaeological Managers & Employers; University of Liverpool)

Professional Associations are membership organisations, with individual people as members. And Trade Associations are also membership organisations – with commercial companies as members.

Both professional and trade associations have emerged and played roles in archaeological heritage management across Europe and globally. This paper will compare the roles played by these kinds of organisations, and will look in detail at the archaeologically-specific professional and trade associations that emerged in the first two countries where commercial, development-led archaeology became firmly established – the United Kingdom and the United States.

In the United Kingdom, the trade association is FAME – the Federation of Archaeological Managers and Employers, while the professional association is CIfA – the Chartered Institute for Archaeologists. In the United States, the trade association is ACRA – the American Cultural Resources Association, and the professional association is RPA – the Register of Professional Archaeologists.

The paper will examine the political and economic conditions under which these organisations emerged and how they have influenced the delivery of archaeological heritage management subsequently. The paper will also look at their scope (in terms of membership, finance, organisational infrastructures), and their future potential.

It will conclude by looking at a selection of other professional and trade associations across Europe, and the issues that have either fostered or hindered their development.

10 TENSIONS AND COMPROMISES: THE POWER DYNAMICS OF STATE AND LOCAL AUTHORITIES IN THE NATIONAL ARCHAEOLOGICAL SITE PARK (NASP) MODEL

Lyu, Junting (University of Cambridge)

The intricate interplay between state and local authorities in the management of archaeological heritage has long been a complex issue, given that archaeological sites are often nationally significant and locally managed. This complexity is further compounded during organisational reforms, when power dynamics need to be renegotiated. This paper focuses on the model of the National Archaeological Site Park (NASP) in China. Conceived within the conservation policy framework of the "Large-scale Archaeological Sites" (LAS) by the State Administration of Cultural Heritage, the NASP has been implemented nationwide over the past decade. Despite the NASP's inception with a strong state-authorized nature and nationalistic mission, China's administrative structure and the involvement of multiple stakeholders complicate its implementation. This study looks into the key dynamics underpinning the NASP project. Through fieldwork and interviews with various stakeholders of several NASPs, it becomes evident that the NASP represents an outcome of negotiations and compromises between the central government and local authorities. Moreover, comparative analyses of diverse cases reveal that the NASP model remains challenging to uniformly implement nationwide, particularly against the wider backdrop of China's ongoing social transformation. Furthermore, the NASP model in China serves as a typical example of archaeological site conservation in developing countries. By presenting and discussing different NASP cases, this paper also enriches the broader discussion on archaeological heritage conservation in the context of modernisation.

11 PRESERVING THE 'ORGANIC' LINK AT BEGUNIYA: UNDERSTANDING THE ROLE OF LOCAL POPULATION AT A 'PROTECTED MONUMENT' IN INDIA

Bagchi, Moubani (Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati) - Sharma, Sukanya (Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati)

Within the Indian context, laws and acts prevailing on the archaeological heritage exist in the essence of their protection and conservation. Archaeological heritage in India, comprising of built heritage, archaeological sites, and antiquities, is a common subject within the Union, State, and Concurrent Lists mentioned in its Seventh Schedule by the Constitution of India. As a result, there are Acts formulated for pan-Indian implementation on the archaeological heritage of national importance as well as for the respective states of India. In addition to the government bodies, other stakeholders like private trusts, endowment boards, monasteries, museums, and private individuals also exist in the scenario. The strong legal framework administering the archaeological heritage in India has even allowed some monuments labelled as 'Protected Monument' by the Archaeological Survey of India under the Ministry of Culture to experience harmonious coexistence of governmental and non-governmental parties in protection of the same. This paper, therefore, aims to highlight one such 'Protected Monument' from India – the Beguniya Group of Temples – which has witnessed inclusion of local population by the Archaeological Survey of India in matters relating to the monument, thereby, emphasizing on the need for the existing heritage laws in India to preserve the 'organic' and 'pathological' link between the 'Protected Monument' and its surroundings. This paper also points out the disadvantages of discontinuing this 'organic' link which might lead to making the 'Protected Monument' insecure in various ways.

12 COLLABORATIVE ARCHAEOLOGY, CULTURAL HERITAGE, AND THE MANAGEMENT OF MUSCOGEE (CREEK) NATION LANDS IN THEIR ANCESTRAL HOMELANDS OF GEORGIA, USA

Thompson, Victor (University of Georgia) - Hunt, Turner (Muscogee (Creek) Nation) - Butler, Raelynn (Muscogee (Creek) Nation) - Wendt, LeeAnne (Muscogee (Creek) Nation) - Garland, Carey (University of Georgia) - Luna Goya, Greg (National Park Service)

The Enfulletv-Mocvse (the Muskogee words for “new ways of doing”) Archaeology Field School was implemented through a joint collaboration between the Muscogee (Creek) Nation and the University of Georgia. The field school takes place in the heart of the ancestral homelands of the Muscogee Nation, near Ocmulgee Mounds National Historical Park and on lands recently reacquired by the Muscogee Nation that are part of the broader Ocmulgee Mounds National Historical Park landscape. The main purpose of these archaeological collaborations are three-fold. The first is to provide a model for training undergraduate university students in the context of collaborative archaeology. The second is to elevate collaborative archaeology in the region as a process that emphasizes equal voices in research. Finally, this collaboration provides information critical to the Nation for their management of cultural heritage on their lands, as well furthering the goals of co-management of the National Historical Park and the broader landscape.

13 COMMUNITY ROLE IN CONSERVATION AND MANAGEMENT OF THE CHINCHORRO CULTURE SETTLEMENT, NORTHERN CHILEAN ATACAMA DESERT, UNESCO WORLD HERITAGE SITE

Casanova, Paz (Independent Researcher) - Power, Ximena (Instituto de Investigaciones Arqueológicas y Museo R.P. Gustavo Le Paige (IIAM), Universidad Católica del Norte.) - Díaz, Solange (Independent Researcher; ICOMOS) - Smith, Sebastian (Independent Researcher) - Guzmán, Carolina (Independent Researcher) - Castillo, Camila (Chinchorro Marka Corporation)

The Settlement and Artificial Mummification of the Chinchorro Culture in the Arica and Parinacota Region (Atacama Desert, Northern Chile) was inscribed on the UNESCO World Heritage List in 2021. The property comprises three archaeological components: Faldeos del Morro, Colón 10, and Desembocadura de Camarones, which the Ministry of Culture officially manages. The property is characterized by the coastal desert environment and archaeological shell mounds, which reveal the long-term occupation of hunter-gatherers-fishers (HGFs) in the landscape and their funerary practices, including the oldest artificial mummification of the world (ca. 7400 BP).

Here, we will focus on the Desembocadura de Camarones component, a large shell mound (359.23 ha) in the Camarones district. During the last four decades, a fishing village has coexisted with the archaeological settlement, presenting social and legislative problems that have increased with the UNESCO Declaratory. Despite the political problems, modern HGF inhabitants of Camarones identify themselves with the Chinchorro Culture and voluntarily protect the archaeological sites nowadays.

We present a study case synthesizing an Emergency Project funded by the National Heritage Council of Chile in 2023. The project aimed to stabilize and protect two open archaeological sites in Camarones and included non-invasive archaeological studies and a backfill process carried out by a collaborative approach between conservators, archaeologists, the local community, and the Chilean State. The community was actively involved in the design and decision-making during the operational, archaeological, and conservation activities. The collaborative and decentralized nature of the project enriched the opportunities for mutual learning. On the one hand, the community embedded the technical and scientific criteria that guided the actions undertaken. On the other, the inhabitants shared their knowledge about the territory, the sites, and the maritime way of life, including the internal sociopolitical dynamics. This experience created new bases for developing collaborative management strategies for the property.

14 REIMAGINING ARCHAEOLOGICAL HERITAGE MANAGEMENT IN PERU: THROUGH AN ERA OF THE QHAPAQ ÑAN'S PARTICIPATORY POLICY

Uribe Chinen, Claudia (Pontificia Universidad Católica del Perú (PUCP))

Over the past two decades, community participation schemes have fundamentally reshaped ethical practices in archaeological heritage management on a global scale. However, the adaptation and interpretation of participatory approaches have led to nuanced pathways, as evidenced by recent debates and reported experiences, achievements and challenges. This paper delves into the implementation of a participatory framework for archaeological heritage management within the context of the Qhapaq Ñan Project in Peru. Beginning in the early 2000s, the Peruvian government's efforts to establish a participatory heritage policy coincided with the drive to attain the UNESCO World Heritage status for the Andean precolonial network of roads and sites. This dynamic context spurred debates among public heritage policymakers and specialists, prompting a reevaluation of the traditionally centralized and expert-centric governance models used in managing precolonial remains. In the absence of legal frameworks and widespread technical expertise, the development of participatory practices relied heavily on the skills, advocacy efforts and, multilevel negotiations of individual professional archaeologists working as heritage managers within the public

sector. This paper examines this process within the specific contexts of heritage management projects, which focused on archaeological monuments or segments of roads, under the auspices of the Qhapaq Ñan's policy. The successful integration of participatory practices into highly technical and regulated processes -such as national heritage declarations, zoning and enhancement- underscored the importance of striking a balance between heritage managers' expertise and their relationship with local communities. These participatory approaches were also tested in more flexible arenas, allowing for the involvement of non-expert community members in heritage interpretation, promotion and dissemination efforts. Ultimately, the Qhapaq Ñan's policy served as a catalyst for professional archaeologists to reconsider heritage ethics and spearhead innovative collaborative initiatives. Such initiatives have since emerged as benchmarks for good practices within the Peruvian heritage policy landscape.

15 DOES THE “POLLUTER PAYS PRINCIPLE” FIT ALL SITUATIONS?

Bortolin, Raffaella (Professional Archaeologist) - Pizzinato, Claudia (Professional Archaeologist; Università Ca' Foscari di Venezia)

The ‘polluter pays’ principle was introduced by the OECD in 1972 based on the assumption that polluters should bear the costs of implementing pollution prevention.

This principle becomes fundamental in the EU's environmental policy (art. 191(2) of the Treaty on the Functioning of the EU states) and must be properly applied in four areas of environmental policy: industrial pollution, waste disposal, water management and land use.

In 1992, the Valletta Convention was signed (ratified by Italy in 2015), according to which the funding of archaeological research and conservation must be supported by national, regional and local public authorities, according to their respective competencies. For major public or private works, the entire costs of the necessary archaeological operations must fall on funds from the public and private sectors.

This has been the practice in Italy since the 1990s: the costs for archaeology (assistance, excavation, restoration and enhancement phases) are borne by both public and private bodies.

This paper aims to address the following questions: is it correct to borrow the “polluter pays” principle into “the destroyer pays” also for interventions carried out by private citizens who have to comply with the rules of respect for the environment? Are not conservation operations a matter for society, since cultural property is everyone's property and everyone must take care of it? Why does the private citizen sometimes have to pay substantial sums to honour the protection principle? In order to overcome this inconsistency between the concept of common heritage and private support, it would be appropriate to provide a substantial state contribution with a view to greater economic sustainability and improving citizens perception of the importance of cultural heritage.

The paper will illustrate several cases of excavations supported by private citizens and what negative consequences are derived.

666 THE IMPACT OF DIGITAL METHODS IN BIOARCHAEOLOGY AND PALEOANTHROPOLOGY: INNOVATIVE APPLICATIONS AND TECHNOLOGICAL ADVANCES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Bantavanou, Panagiota (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, Komotini, Greece) - Ganiatsou, Elissavet (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, Komotini, Greece) - Arnaud, Julie (Dipartimento di Studi Umanistici, Università degli Studi di Ferrara) - Buzi, Costantino (Catalan Institute of Human Paleocology and Social Evolution (IPHES-CERCA), Tarragona; Department of History and History of Art, Universitat Rovira i Virgili, Tarragona) - Del Bove, Antonietta (Department of History and History of Art, Universitat Rovira i Virgili, Tarragona)

Session format: Regular session

The study of human remains is a fundamental part of archaeology, that is currently undergoing modernization through the improvement and/or development of methods and technologies. The recent innovations in both approaches and protocols increasingly allow for sustainable management of the invaluable sources of information represented by skeletal materials, also aiming at their long-term preservation. Technological advances and multidisciplinary approaches made nowadays possible an easier, safer, and more efficient extraction of data from human remains, with an increased power of analysis. This session wants to address such advancements applied to collections coming from archaeological and paleoanthropological contexts, and it welcomes papers that delve into automatic and standardized methods across the entire spectrum of archaeological and anthropological research. The focus extends to the utilization of tools and methodologies. This session will address the application and/or development of new approaches, rooted in

machine learning, artificial intelligence, databases and other computational tools. Furthermore, implying the application of existing methods to novel contexts or disciplines, or the use of cutting-edge technologies on old samples to obtain new data. It will represent a chance for scholars to present new opportunities and approaches - or novel data from known collections - to colleagues dealing with human remains.

ABSTRACTS

1 NEANDERTHAL OR NOT? THE OCCIPITAL BONE FROM THE MIDDLE PALAEOOLITHIC SITE OF CIOTA CIARA (PIEDMONT, ITALY)

Arnaud, Julie (Sezione di Scienze Preistoriche e Antropologiche - Dipartimento di Studi Umanistici. Università degli Studi di Ferrara; UMR 7194 HNHP, MNHN-UPVD, Département Homme et Environnement, Musée de l'Homme, (France)) - Frittitta, Riccardo (Sezione di Scienze Preistoriche e Antropologiche - Dipartimento di Studi Umanistici. Università degli Studi di Ferrara) - Profico, Antonio (Dipartimento di Biologia. Università di Pisa (Italy)) - Grimaud-Hervé, Dominique (UMR 7194 HNHP, MNHN-UPVD, Département Homme et Environnement, Musée de l'Homme, (France)) - Vialet, Amélie (UMR 7194 HNHP, MNHN-UPVD, Département Homme et Environnement, Musée de l'Homme, (France)) - Berruti, Gabriele L.F. (Sezione di Scienze Preistoriche e Antropologiche - Dipartimento di Studi Umanistici. Università degli Studi di Ferrara) - Daffara, Sara (Sezione di Scienze Preistoriche e Antropologiche - Dipartimento di Studi Umanistici. Università degli Studi di Ferrara) - Arzarello, Marta (Sezione di Scienze Preistoriche e Antropologiche - Dipartimento di Studi Umanistici. Università degli Studi di Ferrara)

The Ciota Ciara cave stands as the oldest evidence of human presence in Piedmont. The site, explored since the 1950s, has revealed Mousterian lithic industries and numerous paleontological materials, including three human remains identified as Neanderthal by Villa and Giacobini in 1993 although their precise stratigraphical position remains indeterminate.

From 2009, the University of Ferrara has undertaken a systematic investigation of the site, shedding light on the subsistence behaviors of prehistoric populations in Piedmont. Recent radiometric dating has positioned the site at the onset of the Middle Paleolithic, a pivotal period in Europe, marked by the emergence of Neanderthal. However, the scarcity of fossil hominins and their morphological variability pose challenges in determining if the identified human remains exhibit distinct Neanderthal features indicative of *Homo neanderthalensis*.

Since 2019, the Ciota Ciara cave has yielded eight additional fossil human remains, including seven teeth and an almost complete occipital bone. Several methodological approaches have been applied to examine the internal and external morphology of these fossils. Here we present the preliminary results of an exploratory analysis of the external surface of the occipital bone. Through geometric morphometrics, we investigate the conformation of the occipital bone and in particular the morphology of the occipital bun and suprainiac fossa to replace the Ciota Ciara individual in the European evolutionary context. Preliminary results show that the occipital bone bears a clear Neanderthal signal both in its conformation and morphology. However, in terms of dimension, it lies in the lower variability of the Neanderthal range of variation and in the upper variability for the bone thickness. This data corroborates the analysis performed on the teeth and the internal surface of the bone fragment. This preliminary analysis raises many questions, particularly about Neanderthal evolution, and opens an immense field of investigation for future analysis of this site.

2 THE BONY LABYRINTHS FROM MOITA DO SEBASTIÃO (PORTUGAL), FIRST INSIGHTS INTO THE MESOLITHIC VARIABILITY USING PALEOIMAGING

Coutinho Nogueira, Dany (CIAS - Research Centre for Anthropology and Health, University of Coimbra) - Pujol Arbona, Marina (CIAS - Research Centre for Anthropology and Health, University of Coimbra) - Umbelino, Cláudia (CIAS - Research Centre for Anthropology and Health, University of Coimbra; ICArEHB - Interdisciplinary Center for Archaeology and the Evolution of Human Behavior, University of Algarve)

The inner ear structures are often studied in Paleoanthropology as they are a useful phylogenetic indicator. While numerous human fossils from the Middle and Late Pleistocene have been studied, in particular Neanderthals and early anatomically modern Humans, there is a lack of data available for Holocene hunter-gatherer populations.

This study aims, using CT-scan images, to provide the first insights into the Mesolithic variability by analyzing the morphometric data from 9 individuals discovered at Moita do Sebastião (Final Mesolithic, Tagus valley). The burial activity at the site is dated around 8150 and 7500 cal B.P.

The results of the bony labyrinth morphometric study demonstrate a significant intra-site variability, as previously observed in other hunter-gatherer groups. The comparison with the Western European Late Pleistocene *Homo sapiens* (n=5) associated with Upper Paleolithic cultures shows differences between the two groups. The main difference concerns the relative position of the posterior canal in relation to the plane of the lateral canal.

On the other hand, the only Gravettian Portuguese fossil in this sample (Lagar Velho) exhibits a morphology similar to Mesolithic individuals, raising the question of a potential population continuity at the local level.

3 ENHANCING AGE ESTIMATION IN MODERN HUMAN SUBADULT: A GEOMETRIC MORPHOMETRIC APPROACH

Buzi, Costantino (Catalan Institute of Human Paleoeology and Social Evolution (IPHES-CERCA); Universitat Rovira i Virgili) - Chakraborty, Tannistha (Università degli Studi di Ferrara; University of Central Florida) - Arnaud, Julie (Università degli Studi di Ferrara)

This study is an exploratory application of geometric morphometric techniques to combine dental eruption and mandibular deformation in modern human subadults for age estimation. While both dental eruption and mandibular deformation are established indicators of maturity, their correlation with chronological age remains less than optimal. The study therefore applies a new protocol focusing on the mandibular body and the permanent dentition (incisor, canine, premolar and first molar only) of a sex-balanced sample of 48 individuals from age 4 years to 14 years. A combination of Type I and Type II landmarks are placed separately on the mandible body and the cusp of permanent dentition using CT scan images. The digital coordinates are then extracted in the R software interface to create a combined configuration, facilitating three-dimensional visualization and multivariate analysis. The covariation between the developing teeth and mandibular form is then observed through linear regression using PCs scores and centroid sizes. The results show the combined approach has a stronger allometric relation and higher variance of mixed dentition with less overlap of groups in comparison to the proxies analyzed individually. This approach therefore helps to identify the maximum correlation between phases of dental formation and mandibular and provides a more precise range of dental eruption. Significantly, by testing a new protocol in a well-known reference collection (in terms of sex and age-at-death), the study shows an enhanced accuracy in the age determination and lays the foundation for future applications of the protocol to fossil remains.

4 AN EXPLORATION OF NLP AND NER FOR ENHANCED SEARCH IN OSTEOARCHAEOLOGICAL AND PALAEOPATHOLOGICAL TEXTUAL RESOURCES

Lien-Talks, Alphaeus (University of York; Historic England; Archaeology Data Service)

Big Data presents opportunities in bioarchaeology and palaeoanthropology, but excavation reports become trapped in inaccessible archives. This study applies Natural Language Processing (NLP) and Named Entity Recognition (NER) to enhance metadata and map terms, improving accessibility of palaeopathology and osteoarchaeology data. Results from evaluations by bioarchaeology experts, students, and laymen show potential for NLP and NER to unlock previously inaccessible information, despite limitations. A survey using Likert scales verified these technologies allow laymen to better connect with resources.

The results demonstrate NLP and NER's implications for accessing previously inaccessible osteoarchaeological and palaeopathological records, enabling sustainable data extraction. NLP shows promise to efficiently answer research questions using Big Data from multiple sites. These computational tools will be central to bioarchaeology and palaeoanthropology by making records more accessible. They encourage public engagement by connecting these disciplines to the public through enhanced metadata.

This study utilises innovative applications of digital methods, implying existing technologies like NLP and NER to the novel context of palaeopathology and osteoarchaeology data. It highlights technological advances that allow for more efficient and sustainable management of skeletal collections' invaluable information. The focus extends to cutting-edge methodologies for archaeological and anthropological research through machine learning and AI.

5 INTERPOLATING THE PAST: BRIDGING GAPS IN ISOTOPIC SEQUENCES FOR COMPREHENSIVE DIETARY RECONSTRUCTIONS FROM INCREMENTAL DENTINE ANALYSIS

Ganiatsou, Elissavet (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, 69100, Komotini, Greece.) - Papageorgopoulou, Christina (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, 69100, Komotini, Greece.)

By analyzing stable isotopes of carbon and nitrogen extracted from sequential dentine collagen samples, it is possible to obtain a record of isotopic changes associated with diet across specific age spans. For instance, this method allows for the reconstruction of diet at six-month intervals from birth throughout the first 10 years of life and is commonly used to study ancient weaning duration. However, insufficient collagen in some samples often leads to missing sequential measurements, hindering the precise identification of isotopic changes related to diet. In such cases, addressing how to obtain a representative isotopic sequence becomes essential. Here we show the efficacy of linear interpolation in generating missing isotopic measurements. We utilized a reference dataset, comprised of 68 individuals, each represented by 11-13 subsequent isotopic measurements obtained through incremental sampling. From

this dataset, four, out of 13, random measurements were selected from each individual, and linear interpolation was applied to predict the missing values. To assess the accuracy of this approach, we used the WEAN tool to estimate the weaning age of each individual. We compared the results by calculating the standard error between the original and interpolated values. Our findings reveal an average difference of 0.05 months between the interpolated and true ages, demonstrating the effectiveness of interpolation in generating representative sequences. Additionally, the estimated weaning ages exhibited an average difference of 0.8 months, underscoring the potential to extract crucial biological information, such as weaning duration, from datasets with limited values. This research is part of CityLife, an ERC-Consolidator Grant-funded project investigating long-term human adaptation against the backdrop of urban evolution using ancient molecular, historical, and ecological evidence.

1. Ganiatsou, E., Souleles, A. & Papageorgopoulou, C. WEaning Age FiNder (WEAN): a tool for estimating weaning age from stable isotope ratios of dentinal collagen. *Archaeol. Anthropol. Sci.* 15, 50 (2023).

6 MORPHOMETRIC ANALYSIS AND MACHINE LEARNING FOR INTERPRETATION OF CREMATION FUNERARY PRACTICE

Bouso, Monica (Universitat de Lleida) - Monetti, Lisa (Drew University)

Cremated human remains have historically presented difficulties for the archaeologist when considering the estimation of the biological profile as well as interpretation of funerary practice, yet they represent a large portion of human remains from archaeological contexts. This presentation introduces methodology for interpretation of funerary practice from cremated human remains using morphometric analysis and machine learning technology.

The method is multidisciplinary, drawing from standard bioarchaeological methods, forensic anthropology, as well as ceramic petrographical analyses. By applying automated image analysis for interpreting the morphology of cremated fragments and their fracture patterns, large data sets can be collected rapidly. Random forest machine learning allows for robust analysis of the multivariate data.

When combined with other technological methods of analyzing cremated human remains that have developed over recent decades, such as digitized microexcavation and FTIR analysis, a more complete understanding of the funerary practice can be realized. This presentation will highlight the protocol of the methodology, our experience with its applications, advantages and areas for improvement, as well as the aspects of funerary practice and bioarchaeology it can allow researchers to consider.

7 AGE ESTIMATION OF HUMAN INDIVIDUALS (MICROAGE): SUPERVISED MACHINE LEARNING TOOL FOR BONE HISTOMORPHOMETRY

Bantavanou, Panagiota (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, Greece) - Souleles, Angelos (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, Greece) - Moraitis, Konstantinos (Department of Forensic Medicine and Toxicology, National and Kapodistrian University of Athens, Greece) - Valakos, Efstratios (Department of Biology, National and Kapodistrian University of Athens, Athens, Greece) - Papageorgopoulou, Christina (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, Greece)

Histological studies have indicated that specific bone microstructures, e.g., secondary osteons and osteon fragments, are strongly correlated with age. On this ground histomorphological and histomorphometric methods have been developed to examine bone micro-alterations emerging from age and their influence on age-at-death estimates. Despite the advantages of these methodological and analytical processes, their application is time consuming and, in some cases, yield imprecise age estimates. In order to accelerate the histological analysis and reduce the estimation error we generated MICROAGE, a tool that performs automated step by step histological analysis and provide high accuracy age estimates.

MICROAGE identifies the secondary osteons and osteon fragments observable in micro-images and calculates the osteon population density (OPD). Moreover, the tool performs a novel histomorphometric method based on OPD, and utilizes the corresponding regression equation for age-at-death estimates, that results standard estimation error of ± 3 years. For the training phase of the tool, machine-learning algorithms were developed using data (number of secondary osteons, number of osteon fragments and OPD) from modern individuals of known age and sex collected from reference collections and forensic cases. The data were retrieved manually, according to the histomorphometric method, prior to the machine-learning performance. The results of the algorithms, were thereafter validated for the accuracy of microstructure identification and calculation of the OPD values. MICROAGE introduces a rapid and automated performance of histological analysis and age-at-death estimations with high accuracy, that enables the retrieval of significant information from ancient and modern individuals.

Funding: This research is part of CityLife, an ERC-Consolidator Grant-funded project investigating long-term human adaptation against the backdrop of urban evolution using ancient molecular, historical, and ecological evidence.

8 MULTIMODAL EXPLORATION OF ANCIENT TEETH DENTIN MICROANATOMY USING TRADITIONAL HISTOLOGY AND HIGH-RESOLUTION IMAGING TECHNIQUES

Trocchi, Martina (Sapienza University of Rome) - Galbusera, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy; Department of Cultural Heritage: Archaeology and History of Art, Cinema and Music, University of Padua, Italy) - Cognigni, Flavio (Department of Basic and Applied Sciences for Engineering – SBAI, Sapienza University of Rome, Rome, Italy) - Bondioli, Luca (Department of Cultural Heritage: Archaeology and History of Art, Cinema and Music, University of Padua, Italy) - Coppa, Alfredo (Department of Environmental Biology, Sapienza University of Rome, Rome, Italy; Department of Evolutionary Anthropology, University of Vienna, Vienna, Austria; Department of Genetics, Harvard Medical School, Boston, United States) - Rossi, Marco (Department of Basic and Applied Sciences for Engineering – SBAI, Sapienza University of Rome, Rome, Italy; Research Center on Nanotechnologies Applied to Engineering – CNIS, Sapienza University of Rome, Rome, Italy) - Nava, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy) - Capuani, Silvia (National Research Council-Institute for Complex Systems ISC CNR, Department of Physics, Sapienza University of Rome, Italy; Enrico Fermi Study and Research Center – CREF, Via Panisperna 89A, 00184, Rome, Italy)

The analysis of microstructural and micromorphological features of dental tissues in archaeological remains has provided a detailed insight into various biological variables related to the life history of ancient populations, such as developmental mechanisms, stress events and dietary habits. With Virtual Anthropology's advent, high-resolution technologies for the non-invasive acquisition of morphostructural information from odontoskeletal remains has led to a continuous search for new methods and instruments. Recently, the use of high-field Magnetic Resonance Micro-imaging (μ MRI) techniques has allowed the visualization of water-filled porous matrix features at the microscopic level using a negative contrast technique, exploiting the strong resonance signal provided by proton properties in the fluid. This study proposes a multimodal approach using high-resolution imaging techniques, complemented by conventional histology, to visualize the microanatomy of dentin tissue in a sample of isolated permanent human canines from the Neolithic site of Arlit (Niger) and the Bronze Age necropolis of Olmo di Nogara (Verona, Italy). The samples were scanned using μ MRI system operating at high magnetic field (9.4T), X-ray microscopy system (XRM) for microtomographic acquisition, and finally sectioned for histological analysis. The proposed investigation aims to test a new examination protocol for identifying dentin tissue microstructures in samples from archaeological contexts using innovative and established methods, potentially expanding the currently available options for the analysis of human dental remains.

9 DEEP LEARNING ASSISTED SEGMENTATION OF CT-SCANNED ANCIENT BONES

Vanderesse, Nicolas (PACEA, UMR 5199) - Colombo, Antony (Archéosciences Bordeaux, UMR 6034; Ecole Pratique des Hautes Etudes) - Clément, Michaël (LaBRI, UMR 5800) - Bizon, Nolan (ENSEIRB-MATMECA) - Kuo, Sharon (Department of Biomedical Sciences, University of Minnesota Duluth) - Ryan, Timothy (Department of Anthropology, The Pennsylvania State University)

X-ray computed microtomography (μ CT-scanning) has become a customary characterization technique for ancient materials. It allows to produce volumetric images of the inner structure of the specimens under investigation, with contrast levels related to the local density of the material. The processing of μ CT data usually involves a segmentation step aimed at extracting a region of interest from the rest of the 3D image. In the case of ancient human or other animal bones, this operation can be complicated by the presence of exogenous material such as sediment or soil particles.

In these instances, a manual outlining of the bone is often the only workaround. This approach can be tedious and often depends on the expertise of the scientist. The project we present in this communication (IA-SeReOs) aims to leverage the versatility and classifying power of convolutional neural networks (CNN) to automatically discriminate the bone material from any background and thus speed up the processing of μ CT images.

Our CNN model comprises two parallel convolutional layers followed by a U-Net network commonly used in medical segmentation. The first parallel layers aim at computing intermediate representations of the images according to their bone/sediment content. The features are then passed to the U-Net bloc that performs the segmentation task, i.e. separates the bone from the background. After a proper training, the model is able to segment 3D images with reasonable results, yet in a sequential manner, i.e. one slice after the other in the volume. This is currently a limitation of the model, as successive slices are processed independently and, despite their similarity, can produce slightly different segmentations. Further work shall focus on enforcing prior morphological information into the model to enhance its robustness.

CONTRASTING MAGNETIC RESONANCE IMAGING AND COMPUTERIZED TOMOGRAPHY IN PALEONEUROLOGY: A COMPARATIVE ANALYSIS

Frittitta, Riccardo (Sezione di Scienze Preistoriche e Antropologiche - Dipartimento di Studi Umanistici. Università degli Studi di Ferrara (Italy)) - Profico, Antonio (Dipartimento di Biologia. Università di Pisa (Italy)) - Arnaud, Julie (Sezione di Scienze Preistoriche e Antropologiche - Dipartimento di Studi Umanistici. Università degli Studi di Ferrara (Italy); UMR 7194 - HNHP - Département Homme et Environnement. Muséum national d'Histoire naturelle, Paris (France))

Paleoneurology, a discipline within palaeoanthropology, aims to reconstruct the brains of extinct hominids using fossilized cranial remains.

Magnetic Resonance Imaging (MRI) and Computerized Tomography (CT scan) represent two distinct methodologies utilized in paleoneurology, each offering unique insights into ancient brain size, morphology, and variability. MRI is a non-invasive imaging technique and provides high-resolution images of soft tissues in living organisms, enabling researchers to explore brain anatomy and function in vivo. In contrast, endocast imaging (through CT scan) involves the creation of digital casts of the brain's inner surface from fossilized crania, offering insights into brain morphology and evolution across different species. While MRI facilitates real-time imaging and dynamic analysis of brain structures, endocast imaging provides static representations of brain morphology, primarily constrained by the quality and preservation of fossil specimens. Despite their disparities, both techniques play focal roles in advancing our understanding of brain evolution and adaptation in extinct organisms, underscoring the importance of integrating multiple imaging modalities in paleoneurological research.

This work aims to delineate and present the preliminary results regarding fundamental disparities between MRI and endocast imaging modalities, focusing on their principles, applications, and limitations. In this study, data from MRI and CT scans of thirty-seven living anatomically modern humans (AMHs) were employed using a new methodological approach. By applying principles of virtual anthropology, sixteen anatomical landmark points (Type I) were delineated to primarily analyze correlations between endocast and corresponding brain morphologies, through Principal Component Analysis (PCA), and Partial Least Squares (PLS). This approach offers insights into the relationship between cranial morphology and brain structure, shedding light on patterns of variation. Preliminary results show a correlation between the two datasets concerning brain volume and shape equal to 95,13%.

669 OTTOMAN-ERA/HISTORICAL ARCHAEOLOGY: MATERIALS AND METHODS IN CONTEXT

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Moudopoulos-Athanasίου, Faidon (Catalan Institute of Classical Archaeology) - Vionis, Athanasios K. (University of Cyprus)

Session format: Regular session

The various contexts of the Ottoman Empire span over 600 years and range from the Middle East to North Africa, Eastern and Southern Europe. While the same terminology is used for all regions, the impact of imperial influence among the various provinces is quite distinct, although differences and special characteristics emerge even within the same geographical or modern political units.

Although the field of Ottoman Studies and its focus on textual evidence comprises a well-established discipline, the archaeological investigation of the period is a recent development – grosso modo from the turn of the 20th century. Archaeological surveys, excavation projects and the study of relevant aspects of material culture developed recently as an outcome of systematic regional field projects in the Mediterranean but also from the postcolonial shift that rendered value to the 'local' or 'indigenous' archaeologies of the post-medieval era. Furthermore, the combination of archival research and archaeological methodologies have produced a rich databank that contributes to debates in both disciplines, History and Archaeology.

This Session invites contributions assessing results emerging from the Ottoman-era/ Historical Archaeology of Eastern and Southern Europe and the coastal areas of Turkey and the Levant. We focus on a broader methodological framework, from the intersections of Archaeology, Anthropology and Ethnography to material culture studies and the analyses of organic remains, as well as from approaches to natural and cultural landscapes, rural economy and daily life. Beyond addressing a specific subject, site or micro-region, we strongly encourage contributors to reflect on the broader imperial or disciplinary framework, placing their case-studies within a larger context to promote interdisciplinary and trans-border discussions and wider syntheses.

ABSTRACTS

1 LARISSA DURING THE OTTOMAN PERIOD; EXPLORING THE CITY'S NETWORK TIES THROUGH THE MATERIAL REMAINS

Thamnopoulou, Anastasia (University of Bonn)

Following the Ottoman conquest in the late 14th century and the establishment of the Tirhala sanjak in modern central-north Greece, the city of Larissa experienced a gradual growth in size and importance. This paper aims to investigate Larissa's development into a thriving commercial center, known at the time as Yenişehir-i Fener. The 'new city' soon became a hub for trade and commerce, with boasting workshops and connections that linked its residents to global markets.

Travelers' accounts, administrative records, and other written sources depict Larissa as a vibrant city with a substantial Muslim population strategically positioned at a crossroads, leveraging its geographical position for economic growth. The recently excavated Ottoman marketplace, the bezesten, provides material evidence supporting this narrative. Ceramic and porcelain remains tell the story of a city with access to global trade networks and availability in commercial goods. However, what trade connections were established throughout the almost five centuries of Ottoman rule in the region, how were these performed, and eventually how did they potentially affect the local populations and the social dynamics in this urban center, are some of the questions that need to be explored.

An interdisciplinary methodology that incorporates historical and archaeological perspectives, means in addressing each discipline's limitations, in an attempt to discuss the Ottoman past of Larissa and contribute to a more complete image of the city's development and its position in the world map.

2 UNVEILING BUCHAREST'S OTTOMAN LEGACY: ARCHAEOLOGICAL INSIGHTS INTO BUCHAREST'S HISTORIC INNS

Gavrila, Elena (Bucharest Municipality Museum) - Motei, Raluca-Iuliana (Bucharest Municipality Museum) - Pîrvulescu, Dan (Bucharest Municipality Museum)

The historic inns of Bucharest serve as reminders of the significant Ottoman influence within the Wallachia principality from the late 17th to the 19th centuries. Located in the middle of trade fairs or near them, these inns had an essential role in stimulating commercial and artisanal endeavors by facilitating the steady influx of goods from overseas. Most of the inns from Bucharest had a rectangular shape, with an interior courtyard reminiscent of those found in the Ottoman Empire. Access was made through one or two gates that were locked during the night or in times of danger. The massive walls, with small sized windows on the upper floors together with the secured entrances were necessary to ensure the protection of the merchants and their goods during a period marked by armed conflicts, robberies and natural disasters.

Despite accommodating a variety of activities, numerous of these establishments were short-lived, only a few of them managing to adjust to modern standards and pass the test of time. The gradual disappearance of these inns from the urban landscape of Bucharest, that mainly took place in the late 19th century, represented a significant loss for the city's heritage.

Archaeological investigations conducted in the historical center of Bucharest revealed foundations, cellars, wall structures and artifacts belonging to these long-lost inns. These discoveries complement the information documented in historical records, plans and notes from the era, all together contributing to the rediscovery of an important part of the Bucharest's Ottoman legacy.

3 SETTLEMENT FROM THE OTTOMAN-ERA (XV-XVII CENTURY) NEAR THE VILLAGE OF TARNAYANE, VIDIN REGION

Stalev, Konstantin (NAIM-BAS) - Vasileva, Elena (NAIM-BAS)

The archaeological study carried out near the village of Tarnayane in the Vidin district of Bulgaria provides a comprehensive overview of the history of the site from the Early Bronze Age to the Ottoman-Era. This report, which was initiated as a result of construction work, shows the extensive use of the site over millennia, which is emphasized by the findings of three different necropolises and a variety of residential and community structures. One of the most important findings is the transition from cremation to inhumation in the burial rites, which indicates cultural changes over time.

The Ottoman period forms the core of the study and shows a range of living conditions through dugout and above-ground dwellings as well as evidence of domestic and economic activity through ovens, hearths and a Christian necropolis with a west-east orientation. The report describes the material culture of this period through artefacts such as pottery vessels, including imported majolica, metal domestic objects, coins and animal bones dating from the 15th

to 17th centuries. These finds underline the economic and social dynamics of the settlement and its links to wider regional trade networks. Through the use of interdisciplinary research methods, including geophysical surveys, archaeometric analyses and anthropological studies, the investigation provides a nuanced understanding of the historical significance of the site. This detailed archaeological exploration requires further analysis to fully integrate the Tarnyane settlement into Bulgarian history, which promises to enrich our understanding of the region's past. The ongoing study underlines the potential of interdisciplinary approaches in uncovering the complexity of historical settlements and thus makes an important contribution to the field of archaeology in Bulgaria and beyond.

4 A GLIMPSE OF OTTOMAN SOFIA THROUGH POST-MEDIEVAL GLASS

Nikolova, Veronika (PhD student at the Bulgarian Academy of Sciences)

Sofia – the present-day capital city of Bulgaria – has been an important centre in the Balkan territories of the Ottoman Empire, from the conquering of the town in 1383/1385 until the defeat of the Ottoman troops by the Russian Western Squad in 1878. Because of its strategic position Sofia has served for centuries two important key administrative roles in the Empire, being the seat of the Eyalet of Rumelia – the major unit of the Ottoman lands in Europe – and also the capital of the Sanjak of Sofia.

These circumstances placed Sofia as an important economic and commercial centre in the Empire. During the 15th – 17th c., Sofia was flourishing, as the whole of the Empire. The prosperity of the town is confirmed both by the written sources and by the material remains of the period. The construction of new buildings, as well as imported luxury goods testify to this. Among those imported goods are the glass vessels, brought mainly from Italy, but also from other glass production centres in Europe and from the core Ottoman regions.

This presentation aims to provide an overview of the glass vessels found in Ottoman Sofia. Summarized information regarding the functional and typological diversity of the finds, their dating, and importantly about the origin of the vessels will be presented in an attempt to reflect on wider economy of Sofia in the 15th – 18th c.

Despite being often a neglected archaeological material, glass vessels are found over large areas in the Empire. Therefore, enhancing our systematic knowledge about the vessel glass consumption in important urban centres of the Ottoman Balkans, such as Sofia, can provide better understanding of the trade connections between the Oriental East and the European West and also to shed light on everyday life of the population.

5 SMOKING PIPES AND OTTOMAN LANDSCAPE : THE EXAMPLE OF UPPER MESOPOTAMIA

Guedeau, Nolwenn (Bonn University; Aix-Marseille University)

The present-day Iraqi Kurdistan region had a special position in the Ottoman Empire. They enjoyed administrative autonomy and the region was for a long time the battleground for the border between the empire and the Persian Qadjar dynasty. Thus we are in a hybrid and eclectic region. To understand questions of identity in this context, we will use material culture, and particularly clay smoking pipes. Pipes are a quantitatively very important type of object on every Ottoman sites. Their use coincides with the appearance of tobacco in the early 17th century, its consumption rapidly reaching all strata of the population (men, women, children, rich, poor). Pipes were produced in the large urban centres, such as Damascus, Cairo, or in the imperial workshops of Istanbul. However, each village had its own production for regional consumption. The aim of this paper will be to see how Kurdistan, and its multiple influences, is an interesting case study for understanding Ottoman imperialist economy over local communities.

6 MILETUS WARE: A RECONSIDERED VIEW

Dikkaya, Fahri (TED University)

Miletus Ware stands out as the quintessential archaeological material shaping the material culture of 14th and 15th century Anatolia and the Balkans. It has remained a subject of significance and contention in discussions on Ottoman material culture since Friedrich Sarre's initial description during the 1930s Miletus excavations. Departing from Sarre's characterization, Prof. Aslanapa of the Istanbul Art History School asserted that this pottery tradition should be linked to Iznik, not Miletus, labeling it as "Early Ottoman Pottery. In contrast to this Ottoman-centric categorization, Prof. Peker, also from the same school, offered a more comprehensive perspective within the Anatolian context, defining it as "Anatolian Principalities Period Pottery. These debates have significantly influenced the interpretation, distribution, and production analysis of Miletus Ware to date. Nevertheless, recent excavations yielding Miletus Ware samples are challenging existing notions regarding its distribution and production. This prompts critical questions: Is Miletus Ware truly an Ottoman production? Does it exclusively represent Anatolian Turkish material culture? This paper aims to reassess Miletus Ware in light of these inquiries, scrutinizing the pottery tradition with fresh data gleaned from recent excavations and research.

7 A NETWORK OF CONSUMPTION: THE DISTRIBUTION OF ORIENTAL DECORATIVE CERAMICS IN HUNGARY AND THE BALKANS DURING THE OTTOMAN PERIOD

Komori, Tünde (Central European University)

The presentation discusses oriental decorative ceramics excavated from Ottoman archaeological contexts in present-day Hungary, Romania, Bulgaria, and Serbia, such as Chinese porcelain, Iznik ware, and Persian faience. The main research questions connected to these types of ceramics include their distribution and by extension the trading network in Ottoman Rumeli, and the social value of these objects. The paper argues whether these vessels that are excavated from archaeological contexts can be considered luxury or merely prestigious everyday objects; as well as whether they were part of the commercial items called *res Turcica* in Habsburg sources, or they were personal belongings of the higher ranking officials of the Ottoman Empire. The second argument focuses on the involvement of the Ottoman Empire within the global long-distance trade of the sixteenth and seventeenth centuries based on the identification and mapping of the distribution of the Chinese porcelain sherds excavated in Rumeli. To this day it is unclear exactly how Chinese porcelain arrived in the Ottoman Empire, and the mapping of the porcelain finds in Ottoman Rumeli aims at providing more information towards solving this question.

8 VOICES FROM AFAR: THE POST-MEDIEVAL AND OTTOMAN PERIOD BURIALS AT THE MONASTERY OF AYIA NAPA, CYPRUS

Christofi, Polina (Department of Antiquities, Cyprus; "Saint Epiphanius" Cultural Academy, Institute of Studies Research and Culture)

The Monastery of Ayia Napa is considered to this day one of the most important pilgrim sites at the island of Cyprus and a landmark of the local community, with archaeological evidence dating its architectural development as early as the 13th century AD. Archeological research within the Monastery of Ayia Napa was initiated in 2019, mainly focusing on three different areas of interest. The present paper aims to draw a complete picture of the area/ sounding west of the 14th century church, which relates to strata of the 16th to the late 18th and 19th centuries, and to suggest a working theoretical model for its study.

West of the 14th century church and in front of the entrance to the underground chapel, primary and secondary burials were unearthed from three different strata. I will present the recently published anthropological data in the light of their contextual significance for the history of the Monument, taking into account historical sources, such as traveler accounts. My aim is to address a number of theoretical questions that I will attempt to answer by establishing the identity of the people interred. The main question I will try to tackle is the establishment of a terminus for the local belief systems. Special reference will be made to the modern belief that wants infertile women to conceive with the help of the icon of Virgin Mary of the Ayia Napa Monastery, as well as to Medieval accounts describing the Holiness of the local icon. Finally, adopting the basic principles of our discipline, based on the stratigraphical data, I will propose a chronological sequence for the material culture associated with the burials.

9 MAPPING THE OTTOMAN BALKANS: BUILDING A SPATIAL DATABASE OF ARCHAEOLOGICAL RECORD FROM THE OTTOMAN PERIOD IN BULGARIA

Kirilov, Chavdar (Sofia University) - Staykov, Vladimir (National Archaeological Institute with Museum - Bulgarian Academy of Sciences) - Darakchieva, Maria (Sofia University)

In 1925, the first Ottoman archaeological site in Bulgaria was partially excavated. Located near the village of Kalugersitsa in northeastern Bulgaria, the site was a Christian cemetery. As we approach the centennial next year, Ottoman archaeology in Bulgaria is on the verge of celebration. Despite the passage of time, however, it is still an underdeveloped scientific discipline, as in other modern countries that emerged after the collapse of the Ottoman Empire.

Nevertheless, hundreds of archaeological sites from the Ottoman period have been excavated in Bulgaria over the past century. These excavations have been driven by both scientific curiosity and compulsion, as Ottoman-era structures and layers often occupy the uppermost levels of many multi-layered sites. However, despite these extensive efforts, the results of these investigations have rarely been published, let alone thorough, and a comprehensive study of the Ottoman-era archaeological heritage in Bulgaria has never been undertaken.

To fill this gap, we have embarked on a project funded by the Bulgarian National Science Fund. Our mission is to create a spatial database that will provide a snapshot of archaeological research on the Ottoman period in Bulgaria. The database aims to summarize existing knowledge and to lay the groundwork for future, more in-depth studies. In this report, we present the first 18 months of our project, detailing our methodology, data collection processes, database structure, and initial analysis results. Our goal is to shed light on this period, which has been largely neglected in the field of archaeology. In doing so, we hope to contribute significantly to a deeper understanding of Bulgaria's rich archaeological heritage from the Ottoman period.

THE STATUS OF ANTIQUITIES IN THE OTTOMAN EMPIRE

Lekka, Anna (Greek Ministry of Culture)

European romantics and lovers of antiquity toured the lands of the Ottoman Empire in order to enrich their collections with objects that they considered to be the basis of European civilization. This phenomenon was reinforced in the 18th century after the French Revolution and the heyday of the strategy of establishing national museums, as well as by the Orientalism movement. The activity of European travellers and archaeologists in the territories of the Ottoman Empire resulted in the issuance of firmans that allowed the transfer of objects outside the empire, as long as they were not related to Islam and Ottoman history. There are many examples of Greek antiquities that were exported by European travellers, from the borders of the Ottoman Empire. Until the first half of the 19th century, there is no evidence of any law defining the status of antiquities. In 1835, Muhammad Ali, the Ottoman Khedive of Egypt, issued a decree banning the export of antiquities, established the Cairo Museum and the Egyptian Antiquities Authority, which remained under French control for 94 years. These practices were maintained under the British Protectorate (1914-1922). In the late Ottoman period, antiquities are associated with concepts related to the consolidation of the empire, international relations, power struggles, and the definition of national and cultural identity. Ottoman laws after 1864 stipulate their free movement within the borders of the empire and the prohibition of their export.

By examining the antiquities laws, that were in force during the Ottoman period and some typical examples of the transfer of antiquities within and outside the empire, we will attempt to describe the way in which the protection of cultural heritage was perceived in its various regions.

INTER-IMPERIALITY AND HERITAGE: COLLECTING AND DISPLAYING ARTEFACTS IN MID-19TH CENTURY ROMANIA

Coman, Roxana (inherit - Heritage in transformation | Käte Hamburger Kolleg | Humboldt University of Berlin)

Defined by Lauren Doyle as “a political and historical set of conditions created by the violent histories of plural, interacting empires and by interacting persons moving between and against empires” (Doyle, 2020) inter-imperiality is a concept that provides much needed insight into heritage studies. 19th century (former) Ottoman provinces of Wallachia and Moldavia were navigating between the imperial centre of Constantinople, building a nation state and undergoing an intense process of Westernization.

This proposal aims to focus on the collaboration between private collector, archaeologist, Dimitrie Papazoglu, and Alexandru I. Odobescu, archaeologist and the Commissioner for Romania’s pavilion at the Universal exhibition in 1867, Paris. Papazoglu’s private collection contained a significant amount of Islamic and Ottoman era artefacts, along with Roman, Greek, Egyptian antiquities. In 1867, he offered a number of objects to be exhibited by Alexandru Odobescu in the pavilion Romania prepared for the 1867 Universal Exhibition. This particular dynamic brings forth a recently considered dimension for heritage (Özlü, 2022; Çelik, 1992), that of the colonial, inter-imperial display mode within the framework of international fairs. Questioning the agency of collecting Islamic and Ottoman era artefacts in a nation-building and Westernizing context, and that of exhibiting artefacts in an international fair, this proposal intends to consider material culture as a mediating tool. The display strategies and the types of artefacts selected for the exhibition facilitate a better understanding of how archaeology, and heritage were defined.

TEKKES AND TÜRBES IN EVROS REGION. BETWEEN MATERIALITIES AND LIVED COMMUNITIES

Mylonelis, Ioannis (Aristotle University of Thessaloniki)

The Ottoman monuments of the Balkans today represent a part of the cultural heritage of the Ottoman Empire. In the case of Greece, the monuments are the “remnants” of the former Ottoman past and could be seen as a “palimpsest” whose upper engravings also mark the erasure of this past. The final deliverable of this process is only the preservation and display of the materialities, usually with museological characteristics. The region of Western Thrace is perhaps the only geographical part of the Greek territory, where Ottoman monuments and communities are located, which maintain connections between them to this day. Our research resulted in the systematic recording of old and modern places of worship and the search for the various cultural and religious events that make up the mosaic of the Muslim community of Thrace. A ‘mosaic’ composed of individual communities within the Muslim minority, with commonalities, such as that of Muslim identity, but also differences, such as those of what used to be called ‘mystical Islam’, known in the literature as ‘Sufism’. This article will attempt to highlight the Sufi monuments in the geographical area of Evros and trace the relationships that develop between the monuments and the living communities of the Alevi-Bektashi.

GLOBAL INTERACTIONS IN THE LATE OTTOMAN AND BRITISH MANDATE BOSNIAN COASTAL TOWN OF CAESAREA MARITIMA, PALESTINE

Eger, Asa (University of North Carolina-Greensboro)

The site of Caesarea Maritima was among the largest city-ports from the founding of its Roman era harbor through the Crusader Period and beyond. While numerous archaeological projects have explored its classical remains, few excavations have addressed the city’s fate following the Muslim conquest. None have included investigation into its last period, an Ottoman established Bosnian refugee “camp” village from 1878-1948. Equally, the National Park of Caesarea reveals hardly anything of this settlement. The now diasporic small community of Bosnians, part of Palestine/Israel’s history, is erased. In 2022, the Coastal Caesarea Archaeological Project began conducting excavations in an unexplored portion of the northern area within the Crusader walls. Among its excavation units, the project deliberately selected a Late Ottoman Bosnian house to excavate in full. While the results are still preliminary, the excavations reveal a multi-story well-built stone house unlike typical Palestinian Arab houses, built directly over Crusader structures and incorporating spolia. The material culture comprises globally sourced luxury items from the Ottoman Empire, France, Germany, Japan, China, New York, and beyond. This project aims to resurrect Late Ottoman Bosnian Caesarea through public history combining excavation and oral histories of descendants of its Bosnian residents and founders of the neighboring kibbutz of Sdot Yam. The project joins a small handful of projects that have embraced interdisciplinary modes of archaeology and public history in Israel looking at the Late Ottoman and British Mandate periods. This paper will present one aspect of the 2022-2023 field seasons, its latest phase, tracing global maritime connections in the final phase of the port of Caesarea.

POTS IN TRANSITION: RESILIENCE, CHANGE, AND REVIVAL IN CENTRAL ASIA AND ITS NEIGHBOURHOOD FROM THE PERSPECTIVE OF CERAMICS RESEARCH

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Fusaro, Agnese (University for Foreigners of Siena - International University) - Puschnigg, Gabriele (Institute of Iranian Studies, Austrian Academy of Sciences (Austria)) - Bruno, Jacopo (Sapienza University of Rome (Italy))

Session format: Regular session with presentations + final discussion

Central Asian ceramics, of both pre-Islamic and Islamic date, are a very vast field of study, where many different areas of scholarly expertise, methodological approaches, and academic traditions converge. Indeed, the pottery itself is highly diverse, but at the same time many links and correspondences are traceable through time and space across assemblages of different periods and regions. Therefore, comparative analysis and data sharing between ceramic corpora of different sites are fundamental to a better understanding of such complex and multifaceted dynamics. The lack of common standards and methodology in ceramic processing and data collection, however, often inhibits any comparative approach.

As scholars working in this field, we feel the need to set the state of the art and shape a new agenda in Central Asian ceramic and material culture studies.

Many issues are still to be thoroughly investigated; among them, we have chosen particularly stimulating topics that are deemed to raise lively debates:

- the complex issue of the transition between the pre-Islamic and the Islamic periods as visible in ceramics: cut or continuity;
- the revival of past fashions, techniques, styles, colours, etc. in ceramics;
- communal uniqueness (unique technology, unique use of specific raw materials, unique style, etc.) of ceramic productions, how to interpret them? local response/originality or contacts with distant cultures that are not otherwise evident;
- towards a common agenda and a minimum standard for recording and classification of Central Asian pottery: proposals and case studies.

Speakers are welcome to present data from their archaeological or art history projects, but at the same time are very much encouraged to pay attention to the methodological aspect of their research work, aiming for a final discussion on new standards, shared analytical approach, online platforms, and meeting places for interchanging news, projects, ideas.

1 UNVEILING POT-ENTIAL STORIES OF GREY WARES IN NORTHEASTERN IRAN AND SOUTHEASTERN CENTRAL ASIA FROM THE CHALCOLITHIC TO THE IRON AGE

Abric, Camille (Paris 1 Panthéon-Sorbonne; UMR 7041 ArScAn – VEPMO) - Lhuillier, Johanna (CNRS - UMR 5133 Archéorient)

Since the emergence of Burnished Grey Ware ceramics in the second half of the 4th millennium BCE, until the characteristic production of Archaic Dehistan in the second half of the 2nd millennium BCE, the appearance, disappearance and reappearance of grey wares in Northeastern Iran and Southeastern Central Asia have been interpreted in various ways by archaeologists. Diffusionist and migrationist theories from the 1960s-70s, at times tinged with nationalism based on the chosen trajectory, from Indo-Europeans to Iranians, scholars have often favored the ethno-linguistic thesis in the history of research to explain these phenomena. Today, with the advent of paleogenetics, it is crucial to reexamine a classic debate in ceramic studies, especially for ancient periods where texts are lacking: can we really establish the equation “pots = peoples”? However, a single approach is insufficient to comprehend the developmental trajectories of populations associated with grey wares.

Far from essentialist and evolutionist theses, which sometimes seem to conceal a fantasy of origins, this paper proposes, on the contrary, to consider Northeastern Iranian and Southeastern Central Asian grey wares systematically. Their study should not be limited solely to typology but should also explore their materiality using the ceramic technology method, in order to better highlight the producers as actors and thus contemplate their place within society, both locally and regionally. The adopted approach is not only synchronic but also diachronic, offering a comprehensive perspective on the evolution of this type of ceramics over time.

2 POTTERY ANALYSIS AND THE OXUS CIVILIZATION. REVIEW AND STRATEGIES FROM TOGOLOK DEPE 1 AS A CASE STUDY

Luneau, Elise (Deutsches Archäologisches Institut, Eurasien-Abteilung; CNRS, UMR 8215) - D'Ippolito, Luana (ISMEQ; University of Trieste)

The pottery characterizing the Oxus Civilization (ca. 2300-1400 BCE) in southwestern central Asia is commonly associated with a unique type of ware, defined as fine and wheel-fashioned. This observation is one example among the various issues concerning the study of ceramics at sites related to the Oxus civilisation. We will outline the current biases linked to the choice of the ceramics being studied and to the lack of analysis standards.

To illustrate these obstacles in studying the Bronze Age pottery production, circulation and use, the ceramic assemblage coming from the major Oxus settlement of Togolok Depe 1 in Turkmenistan will be used as a case study. Recent archaeological work within a joint Turkmen-Italian-Swiss Mission at Togolok Depe 1 provides new first-hand data for (re)analyzing the characteristics of the Oxus pottery production in the inner Murghab delta of Turkmenistan and assessing the sociocultural processes of transition throughout the Bronze Age. The paper aims to review and clarify the methodological issues and encourage ways of overcoming them to move towards a greater homogeneity and consensus in the study of ancient pottery in Central Asia.

3 POTTER'S MARKS, THE STORY BEHIND THEM

Ebrahimiabareghi, Setareh (University of Bern; ArchaeoConcept)

This presentation delves into the archaeological landscape of Tepe Sadeh in Sistan, shedding light on potter's marks discovered in this region and other ancient settlements across eastern Iran and Central Asia. Different marks and symbols have been seen on different parts of the pottery. These symbols remained undeciphered and are usually known as the potter's marks. These symbols and marks on pottery have intrigued archaeologists, leading them to examine their meanings and functions within their cultural and social contexts.

This presentation aims to explore the meaning and functions associated with the potter's mark, focusing mainly on Tepe Sadeh in Sistan. It delves into the potential categorizations of these marks, such as trademarks, clan identifiers, or counting marks. Can Potter's marks be compared to early writing systems? Through comparisons and distinctions across various sites, particularly Tepe Sadeh, this presentation seeks to establish connections between them and the possibility that these marks served as a form of communication.

4 THE ACHAEMENID “MIRAGE” IN GANDHĀRA: A STUDY OF THE 5TH-4TH CENTURIES BCE POTTERY FROM BARIKOT (SWAT, PAKISTAN)

Iori, Elisa (Max-Weber-Kolleg, University of Erfurt)

To what extent the Achaemenid domination had an impact on the preexisting socio-economic fabric in Northwestern South Asia is a puzzle. As for the Gandāra satrapy, the apparent absence of references to Achaemenid officers, the lack of Achaemenid administrative centres, and the late or post-Achaemenid date suggested for the diffusion of “tulip bowls” at Charsadda and Taxila have raised several debates about the nature and duration of Achaemenid control at the Eastern edge of the empire.

The distinctive ceramic assemblage of the 5th-4th centuries stratigraphy at Barikot (Swat, N Pakistan), however, draws attention to the fact that, whatever the form of Achaemenid control in the Gandāra satrapy, the Achaemenid rule had some tangible effects on urban society considering how the material culture, and thus social behaviour, changed in the relatively isolated mountain area of Swat.

Building on the main results of the study of 5th-4th centuries ceramics of the city of Barikot, this contribution discusses the socio-economic changes fostered by the annexation of the NW South Asia to the Achaemenid empire.

5 PARADIGMS OF CHANGE AND CONTINUE IN SASANIAN AND EARLY ISLAMIC VESSEL SHAPES AND DECORATIONS

Ziaii-Bigdeli, Layah (PhD Candidate)

This presentation investigates the evolution of tableware during the Sasanian and early Islamic periods highlighting its role in the development of elite social bonds and cultural identities. It posits that the Iranian elite's cultural identity was crucial to the Sasanian political framework, with elite social practices strengthening connections within elite networks. An examination of vessels through foodways and social archaeology lenses demonstrates how the designs and motifs prescribed specific use and practices. This analysis draws from a comprehensive database of Sasanian and early Islamic vessels, collected since 2019, incorporating materials from recent excavations and museum collections.

Despite the decline of the Sasanian Empire as a political entity, its material culture production persisted. The elite's access to luxury items continued, and in the post-empire landscape, various societal segments endeavored to elevate their status within the new socio-political context. Success in amassing cultural and economic capital translated into enhanced social power and fortified social connections. This drive for social advancement and status led to the mass production and standardization of goods, adhering to cosmopolitan artistic trends and signaling the advent of Early Islamic economies. These developments, alongside intensified trade with China, the decline of Sasanian and Sogdian metal workshops, technological advancements, and the adoption of Arabic as the lingua franca, significantly impacted material culture production.

Tableware, in particular, embodies these dynamic shifts, serving as symbols of prestige and practical tools within systems of taxation and monetary exchange. This study focuses on the artistic evolution of early Islamic tableware, exploring narratives of continuity and transformation while emphasizing the enduring significance of cultural heritage. It also sheds light on critical socio-cultural and political shifts that fueled these material culture transformations, offering insights into the complex interplay between culture, identity, and social hierarchy during this transformative era.

6 COARSE WARES FROM THE SURKHAN DARYA VALLEY (SOUTH UZBEKISTAN). CONTINUITY AND CHANGE BETWEEN THE KUSHAN AND THE ISLAMIC PERIOD

Bestetti, Maura (ERAAUB - Universitat de Barcelona) - Martínez Ferreras, Verónica (ERAAUB - Universitat de Barcelona) - Gurt Esparraguera, Josep Maria (ERAAUB - Universitat de Barcelona) - Ariño Gil, Enrique (Department of Prehistory, Ancient History and Archaeology - Universidad de Salamanca)

The paper investigates the morphological, compositional and technological characteristics of the most common types of coarse ware in the Surkhan Darya valley dated between the 2nd and the 11th/12th centuries AD. Two sites have been selected as representatives: ancient Termez for the Kushan, Kushano-Sasanian and Islamic periods, and Khosijat Tepe for the Early Medieval period. The research combines the archaeological contextualisation, the typological categorisation and the archaeometric characterisation (through WD-XRF, XRD and OM) of c. 50 vessels. They mainly consist of cooking wares and storage jars with different shapes and macroscopic characteristics. The aim is to identify the production areas and evaluate the continuity and changes in pottery production (functional categories, shape, raw materials, and techniques), and pottery distribution at a regional, trans-chronological level. The comparison between these vessels and parallels from other nearby sites provides further information on the matter. The results reveal that most of the coarse wares found at Termez and Khosijat Tepe were imported from several production areas in the region. The most significant changes can be detected in the shape of the artefacts. Some productions disappear at the end of the Kushan period, whereas others endure over time with similar compositional and technological features — presumably related to the intended performance characteristics of the vessels— but with formal changes. New types

and productions make their appearance especially in the Early Medieval and Islamic periods, suggesting exchanges with different regional pottery production centres, and the possible introduction of new practices connected with social and cultural transformations.

7 COMPOSITIONAL AND TECHNOLOGICAL FEATURES OF GLAZED AND UNGLAZED WARE FROM ANCIENT TERMEZ IN SOUTH UZBEKISTAN (9TH - 14TH CENTURIES AD)

Martínez Ferreras, Verónica (ERAAUB, IAUB, Department of History and Archaeology, Faculty of Geography and History, University of Barcelona) - Gurt Esparraguera, Josep M. (ERAAUB, IAUB, Department of History and Archaeology, Faculty of Geography and History, University of Barcelona) - Ariño Gil, Enrique (Department of Prehistory, Ancient History and Archaeology, Faculty of Geography and History, Universidad de Salamanca) - Georgieva Mihova, Iva (Faculty of Geography and History, University of Barcelona)

Pottery production was one of the main handicrafts in Termez during the Islamic period, as attested by several pottery workshops located in different areas. Starting from a previous archaeological, morphological and stylistic study, we present the archaeometric characterisation of glazed and unglazed vessels recovered by the Spanish-Uzbek IPAEB team in three pottery workshops (W2, W5 and W11). X-ray fluorescence (WD-XRF), X-ray diffraction (XRD) and thin-section optical microscopy (OM) were carried out on c. 70 ceramic samples and several local clayey sediments used as reference materials. The aim is to identify the types of wares produced in each workshop and to provide new insights into the stylistic and technological evolution of pottery manufacture (i.e., the similarities and differences according to the chronology, the type of ware, the shape or the function).

The results demonstrate that W2 and W11, located outside the defensive walls of the rabad (suburbs), were active during the Samanid period (9th-10th centuries AD). W2 mainly produced medium coarse basins, handled jars, and large flat lids for storage jars; pottery production in W11 was more diversified and entailed fine, Ca-rich unglazed items, sphero-conical vessels and glazed ware (principally underglaze painted and splashed sgraffiato). W5 proves that pottery manufacture moved to the shahristan (previous city centre) from the 12th/13th until the 14th centuries AD. The production involved fine unglazed pilgrim flasks with moulded relief decoration, very fine Ca-rich jugs with comb-impressed dots, sphero-conical vessels and glazed items represented by monochrome (i.e. turquoise and green) and splashed sgraffiato ware. Thus, Termez produced a varied repertoire of high-quality ceramics; they exhibit singular traits but are consistent with the changing fashions over time and the continuous influences arriving from nearby and distant territories.

8 GLAZE AND PIGMENT RECIPES IN ISLAMIC CERAMICS FROM TERMEZ (C. 9TH-14TH CENTURIES AD). TRADITIONAL TECHNOLOGIES OR NEW COLOUR EXPERIMENTS?

Panagopoulou, Adamantia (Demokritos) - Martínez Ferreras, Verónica (ERAAUB, Department of History and Archaeology, Faculty of Geography and History, Universitat de Barcelona) - Gurt Esparraguera, Josep M. (ERAAUB, Department of History and Archaeology, Faculty of Geography and History, Universitat de Barcelona) - Pidaev, Shakir R. (Institute of Fine Arts, Academy of Sciences of Uzbekistan)

In the present case study, the manufacturing technology of functional glazed pottery is investigated with a particular focus on the great variety of colours and glaze recipes used in Termez in South Uzbekistan. The finds, dating from the c. 9th-14th centuries AD, came from excavations conducted in pottery workshops located outside the rabad (suburbs) and the shahristan (previous city centre), and in a domestic dump. An assemblage of 30 ceramic fragments was examined for their advancement of production technology (decoration, surface treatment) through these centuries.

During the early Islamic period, pottery was widely produced in Central Asia, especially at important urban centres such as Termez, Samarkand, Bukhara and Akhsiket. Termez was located on the southern border of the ancient region known as Transoxiana or Mawarannahr. Because of its strategic location at one of the crossing points of the Amu River and one of the intersections of the Silk Road, it had a significant political, economic, and military role in Southern Central Asia. Numerous distinct handicraft productions have been identified in various parts of the city, with pottery production being one of the most significant, at least from the 9th century onwards.

The peculiarities of the colour recipes applied to the glazed pottery were investigated focusing on glaze technology and employed colorants. This was achieved by the use of an analytical workflow that considered the compositional details of pigments, slip coatings, and glazes. The physicochemical analysis was carried out utilizing Optical Microscopy(OM), Scanning Electron Microscopy(SEM-EDS) and Raman Spectroscopy. Through a wide range of glaze recipes (lead glazes with tin in some cases or alkali glazes), colour recipes and different underglaze technologies, this study of glazed ceramics was able to define and express the essential elements of each pottery workshop's perception of colour and determine the advanced technological processes involved in decoration.

9 RECONSTRUCTING GLAZED CERAMIC CONSUMPTION PATTERNS AND TECHNOLOGICAL TRADITIONS FROM SAMANID AND KARAKHANID PERIOD TRANSOXIANA

Klesner, Catherine (University of Cambridge) - Parshuto, Vikentiy (Institute for the Study of the Ancient World, New York University) - Mizaakhmedov, Sirojiddin (Samarkand Archaeological Institute, Cultural Heritage Agency of the Republic of Uzbekistan) - Torgoev, Asan (State Hermitage) - Stark, Sören (Institute for the Study of the Ancient World, New York University)

This paper presents the results of the archaeometric analysis of early Islamic style glazed ceramics, specifically slipware decorated vessels, from Central Asia. Glazed ceramics, introduced to the region in the 9th c. CE, served as important cultural markers and demonstrated the intentional affiliation that the residents in Transoxiana developed with the wider Islamic World. While an increase in research in the past ten years has turned to these intricately decorated vessels, some of the largest historical cities in Central Asia have yet to have any systematic study of their glazed ceramics, including the Samanid capital Bukhara. Here we present the study of Samanid and Karakhanid period glazed ceramics recovered from the cities of Bukhara and Tashkent. Building on prior compositional analysis which identified local production of these wares in Bukhara, Tashkent, and Samarkand, here we report the characterisation (by SEM-EDS) of the technological developments in these glazed slipwares during the Samanid and Karakhanid periods. This research provides key insights into the extent of "Samanid" and "Karakhanid" style slipware ceramics in the eastern Islamic World, and addresses questions about the degree of technological similarity between these major production centers and across these two periods. We also consider how these locally produced glazed wares relate to a number of imported glazed finewares from Mesopotamia, and the pattern of locally produced versus imported goods identified from the city of Bukhara, especially glass objects.

10 GLOBALIZED CERAMICS IN MEDIEVAL CENTRAL ASIA: LESSONS FROM A SMALL TOWN (DANDANAKAN)

Rugiadi, Martina (The Metropolitan Museum of Art) - Wordsworth, Paul (University College London)

The ceramic assemblage excavated between 2019 and 2023 in the medieval town of Dandanakan, in Turkmenistan, was produced locally, as confirmed by comparative analyses with bricks from a kiln just outside of the settlement. However, the style and technologies of Dandanakan's slip-painted, sgraffiato, and monochrome glazed wares, molded wares, and unglazed plain wares (mostly ewers), find parallels in ceramics from a large geography that broadly encompasses Khurasan and Mawarannahr. Clearly, similar wares were produced not only at Dandanakan.

Traditionally, medieval ceramic productions in the regions encompassing Iran and Central-Asia were understood as dominated by few centers in the region's biggest cosmopolises (such as Rayy, Nishapur, and Samarkand), a belief that paired well with collectors' need to easily identify visual styles (so-called Sava or Garrus ware, Kashan stonepaste, etc.) and with the few published assemblages. As more archaeological sites are being excavated and published, including Dandanakan, it has become apparent that a constellation of centers, including small towns, produced ceramics that are similar in style and technology.

In this fragmented and globalized landscape, carrying the legacy of epistemological frameworks still attached to the notion of Central Asia as essentially a network of trade in a vastly empty area, how can we understand today the resilience, change, and revival of styles and technologies across a vast region? How can assemblages from small towns further our understanding of the circulation and broadcast of visual languages? How can the study of small towns challenge our understanding of the production, circulation, and broadcast of visual languages?

11 THE LIFE AND AFTERLIFE OF THE ADÈS COLLECTION OF MEDIEVAL PERSIAN CERAMICS

Ting, Carmen (University of Cambridge)

Using the Adès collection of medieval Persian glazed ceramics that are housed at six museums across the UK as case study, this paper seeks to bridge the gap in narratives and approaches in studying intact museum pieces and their fragmentary archaeological counterparts. We draw on a range of non-invasive analytical techniques that are readily available in most museums to reconstruct the life and afterlife of the Adès collection, which comprises ware types including the lustre, mina'i, celadon and turquoise glazed ware. Our preliminary results show that the technologies used to produce these pieces are consistent with the established practices, but different technical traditions can be identified, suggesting these pieces were made in different workshops. Variation in the composition of the body of these pieces highlights the possibility that these workshops were located in different parts of Iran. This finding, in particular, contributes to the ongoing debate on how the production of medieval Persian glazed ceramics was organised. Together with the curators and conservators of the museums and a pottery artist from Iran, we are working towards incorporating this new information in the display of these pieces to the general public.

679 GENDER AND SEXUALITIES IN MATERIAL CULTURE OF THE ANCIENT WORLD

Session theme: 6. The Mediterranean from Within

Session organisers: Santos, Juliana (Université Paris 1 Panthéon-Sorbonne) - Belo, Taís (Universidade de São Paulo) - Pires, Thiago (Centro Universitário Celso Lisboa) - Kibuuka, Brian (Universidade de Coimbra)

Session format: Regular session

We are glad to invite for this session academic papers related to genders and sexualities in material culture of the Ancient World. We would like to debate about different points of views within postmodern perspectives, such as decolonialism, subaltern perceptions, feminist archaeology, intersectionality, women agencies, masculine dominance, patriarchy, etc.

The first studies on ancient gender and sexuality were carried out focusing on describing and attesting the rationality of the biological body through vestiges of material culture, and what were considered the principles of beauty, temperance, virtue and morality associated with the “normative” rules and its predetermined characteristics. Seen differently in today’s perspective, reflections on gender issues can allow us to observe dominant discourses that hide multiple experiences of gender and sexual representations. Thanks to political movements, such as feminism, it allows us to build critical thinking about how we should reflect on peripheral groups and societies. In this sense, the development of the concept of “gender” is linked to the need to be associated with a better understanding of how it operates in societies, which requires thinking about power in different times and places in a more complex way. Hence, the importance of this discussion may highlight how this kind of study is important to the present, revealing and adding an awareness on diverse sexualities and genders. Our objective is to reflect and produce critical and transdisciplinary remarks about material culture that represent and indicate discourses of power, in a search for a broader and updated analysis of materiality.

We invite you to participate with contributions oriented towards the above issues and other similar ones, such as: Science and theory in the study of human remains; Ancient Societies; Invisible people in the past; Intersectionality; Feminism in Archaeology; Decolonialism in the past; Subaltern groups in the past.

ABSTRACTS

1 RETHINKING ROMAN SEXUALITY: UNDERSTANDING SEXUAL EFFECTS OF THE ROMAN EMPIRE THROUGH ARCHAEOLOGICAL DATA

Vucetic, Sanja (University of Sheffield) - Madden, Kelsey (Institute of Classical Studies London)

The current approach to Roman sexuality has emerged from cultural frameworks geared towards studying the socio-sexual dynamics in Rome using textual evidence. Although recent research has moved beyond the penetration model of Roman sexuality, the current frameworks fail to engage with the context-specific socio-economic practices and empire-wide geopolitical forces that framed people’s lives in the colonised territories. Additionally, it prevents us from making sense of the rich archaeological data now available to us. Our understanding of the effects of Roman imperialism on provincial cultural change cannot further progress without an understanding of how the empire impacted people’s socio-sexual lives.

We argue that to progress the modelling of Roman sexuality, we must approach this social phenomenon as shaped by both the empire and local cultural change. We further propose that the investigations of the sexual effects of the Roman empire necessitate a productive dialogue between archaeology, queer, and new-materialist perspectives with previously overlooked factors, including the predatory characteristics of the empire (Fernández-Götz et al. 2020) and the agency of those who contested dominant socio-sexual power structures (Weismantel 2022; Owens 2023). Using the examples from Rome and the provinces, we explore these ideas and demonstrate that the Roman display of gender-based violence was linked to colonial discourse marked by predatory warfare and that sexuality was embedded in the provincial organised economies of power and colonial order.

2 POWER AND WOMEN’S REPRESENTATIONS ON MATERIAL CULTURE FROM THE EARLY EMPIRE: WHOSE VOICE?

Lopez Gomez, Helena (Universidade de Vigo)

Feminine representation in Roman monumental art started during the High Empire. Until then, Roman tradition established that women should not be seen in public and, at the same time, public portraiture and honorific statues were limited to citizens that had developed an important political or military role, areas where women were excluded, and that justified their null public representativeness. However, the switch that took place during the Early Empire should not be understood as a change in dominant discourses about patriarchy and gender roles, but as a coexistence between traditional views on women and their controlled introduction into public discourse. The aim of this pres-

entation is to put forward how Imperial narratives, shaped through traditional views on masculinity, took ownership of women’s representativeness using it on their own behalf, keeping alive key elements of patriarchal discourse about gender roles. At the same time, we also aim at analysing how taking a hold of the contexts of the new feminine representativeness in material culture meant direct control over women and their power of agency, in a way that allowed a coexistence between the ideal of feminine domesticity and a certain degree of public visibility.

3 CANDACE AND MATER PATRIAE: THE CONSTRUCTION OF FEMALE POLITICAL POWER IN AFRICA AND ROME IN THE EARLY ROMAN EMPIRE

Azevedo, Sarah

In this presentation we will discuss the construction of female power in Antiquity, based on the comparison of two examples of titles and positions of power held by women. The first example is that of Candace, a title attributed to the woman who ruled the Kingdom of Kush (or Cush), in Nubia. The second example is Mater Patriae, a title created in the context of the establishment of the Roman Empire, as a way of defining the political activities of the Roman emperor’s consort. Both examples demonstrate expressions of the exercise of political power by women in the same temporality, but in two distinct but connected spatialities. From a comparative perspective, and based on documents from material and written culture, we will analyse the specificities of this connection between Africa and Rome, focusing on the symbolic construction of female power, its implications in politics and the strategies of women like Amanirenas, Shanakdakheto, Livia and Agrippina in search of sharing power with men.

4 LANAM FECIT: »REAL« WOMEN IN ROMAN EMONA

Zupanek, Bernarda (Museum and galleries of Ljubljana)

In Roman times, the perception of sexual identity differed markedly from today’s understanding. The Roman view of gender was distinctly binary: an individual was considered either female or male. In a strongly patriarchal society, a “good woman” was defined as one who cared for the home, spun and wove, and bore sons. Weaving, as one of the fundamental virtues of women, has roots that trace back at least to ancient Greece, so deep that they extend into the realm of myth, as seen in the story of Arachne.

In some graves in the extensive burial grounds of the colony of Emona (Ljubljana, Slovenia), weaving tools - spindles and spindle whorls - were discovered, defining these graves as female. Some of these objects were made from precious amber, not functional, so they were interpreted as indicating the deceased’s status. Upon a review we found more graves with weaving setup than previously identified, yet the spindle in sometimes incorrectly interpreted and the spindle whorl is overlooked, as it could have been added without the spindle, as a pars pro toto. Most spindles are made of bone and there are some doubts about their functionality due to their often-small size.

It seems that these objects rarely denote status, nor are they solely indicative of sex/gender. We believe they represent the expression of ideal femininity, symbolizing a “good” member of the female gender, a “real” woman. Hence, the deceased is someone for whom their relatives, placing objects in the grave, either believed or wished to believe, to have been following the societal expectations and norms of true womanhood. We propose that these at first sight mundane objects are tools for constructing and reinforcing “ideal” gender identity for Emonan women, thus embedding this ideology in everyday life.

5 LIVIA’S COINS AND HER PUBLIC POSITION FROM A CURRENT FEMINIST POINT OF VIEW

Pagoto Bélo, Tais (University of São Paulo)

Women at the end of the Republic and beginning of the Roman Empire experienced social transformations that allowed them to be more publicly visible, especially through Patronage, and Livia, wife of Augustus, was the greatest example.

Livia’s public activities seem to have been linked to religion, in order to maintain her pudicitia, making the political camouflage itself with the religious, opening up space for the empress’ agency, guaranteeing her a position that such women didn’t have before.

Livia opened the way for other imperial women to enjoy an “apparent freedom” and acquire the right to have their names remembered through statues, plaques and coins, which deceived and disguised a male symbolic dominance, contributing to an imperial propaganda.

However, it will be shown how Livia was related to religion and pudicitia, through a material culture compound of coins, with the personification of goddesses linked to fertility, proving success, abundance and dynastic prosperity, and how these virtues enhanced the empire.

In the presentation, the written sources will also confirm that Roman women of that time were part of a hierarchical power, characterised by boasting male government. They were described in family environments, but with several exceptions, demonstrating a complexity between the public and the private.

In conclusion, the aim of this presentation will be to clarify that the main problem here is the position of women in Roman society, since this issue is not outside the scope of the present study. In this way, the exhibition will aim to invite to a reflection on the reality of the present, with the aim of generating awareness of current female factors in contrast to those of women in Antiquity.

6 SEXUALITY OF NORTH-EASTERN BARBARIAN SOCIETIES IN LATE ROMAN PERIOD

Myzgin, Kyrylo (Faculty of Archaeology, University of Warsaw) - Bursche, Aleksander (Faculty of Archaeology, University of Warsaw)

Several shelves of books have been written on gender and sexuality in ancient Rome. In contrast, almost nothing is known to date about the sexuality of societies living east of the Rhine and north of the Danube during the Empire. This is due to the extreme scarcity of sources: the only stereotyped written account in Tacitus' *Germania* and very few finds with native iconography. We will analyse and interpret two distinctive exceptions: certain types of barbarian imitations of Roman coins and one category of miniature gold foiled pendants found in East-Central Europe. While the first group of finds bears depictions relating to male sexual potency, the objects from the second group contain elements associated with female sexuality. Were these representations inspired by ancient art with which the barbarians were in constant contact (images on coins and precious stones, statues of deities, etc.)? Or are we dealing with the result of strictly barbarian representations of sexuality?

7 WOMEN IN INTELLECTUAL CONTEXTS: SELF-PROMOTION, SELF-PRESENTATION, AND GENDER INTERACTIONS IN THE EASTERN ROMAN EMPIRE

Caruso, Ada (Sapienza University of Rome)

Gender studies have been embroiled in Graeco-Roman archaeology for many years, largely addressed to matters surrounding the role of women in cultural contacts and transfers, with a particular focus on the domestic or religious spaces: women have been presented as daughters, wives and mothers in a stereotypical perspective that points to the polarity male/female and public/private. The relationship between women and intellectual contexts is quite underexplored instead. Archaeological research has highlighted only tentative cases through visual evidence (e.g. attic vases or Pompeian houses paintings) illustrating the interest of women in education. Through examining material evidence (statues and inscriptions), I will present three cases of studies from the Eastern provinces of the Roman Empire, which illustrate female presence in odeia, gymnasia and theatres, thus illustrating women participation in the cultural life on the ancient cities.

Such approach has never been applied to gender studies before. My attempt is to offer a theoretical perspective suitable to understand women's involvement in the society and to reshape research approach on the differences between men and women in their corresponding roles and between women and women in the same civic context. This may help to understand how women presented their own identity to the city and, by extension, how they contributed to the construction of the identity of 'woman'.

The geographical ambitus under consideration, the hellenophone provinces of the Roman Empire during the centuries from 1st to 3rd AD, constitute a very interesting ambitus of study with refer to gender aspects, due to the presence of Greek, Roman, Oriental elements, native and migrants co-existing together. These multicultural societies offer a peculiar perspective to investigate dynamics of social mobility and human interactions.

8 EPIGRAPHIC CLUES FOR WOMEN'S LIVES IN ROMAN PROVINCES

Ivezic, Hana (Archaeological Museum in Zagreb) - Radman-Livaja, Ivan (Archaeological Museum in Zagreb)

Basically any Roman agglomeration has left an epigraphic record, ranging from only a dozen up to thousands of inscriptions. A corpus of inscriptions found in a given city always represents a good starting point for the understanding of that city's life and history. Depending on the number of inscriptions, one may find valuable evidence about the city's inhabitants, their origin, occupations, religious beliefs and interests as well as about the municipal administration, urban life in general and important historical events. The research possibilities, while not endless, are nevertheless very large and may cover many different fields. Gender studies have become an integral part of Roman social history and epigraphy is more often than not, one of the best evidence at our disposal for the study of women in the Roman world. Most of the time Roman epitaphs are formulaic and follow well established standards, providing general information about the life of the deceased. Women are most often described by their filiation, marital status and motherhood. This is hardly unusual for a patriarchal society where most women had no true professional career. Nonetheless, the profession or social status is sometimes explicitly mentioned and it is not a totally uncommon occurrence. For this occasion, we are however interested in inscriptions of a more cryptic character, as far as the status of deceased women (or female dedicants of votive inscriptions) is concerned. We will present as a case study half a dozen inscriptions from Pannonia and Dalmatia, which, while not clearly stating their professional or social role, might be implying a somewhat different position than them just being described as daughters, spouses or mothers.

9 WOMEN IN VASE REGISTERS IN CLASSICAL ATHENS: A INTERCESSIONAL ANALYSIS

Santos, Juliana (Université Paris 1 Panthéon-Sorbonne)

In this communication we will reflect specifically on the lives of three different women based on their names on fragments of terracotta vases found in Athens between the 6th and 5th century BC. If there is a name, there is the possibility of building a memory that can weave a great social web. However, when we deal with women's names, we are dealing with a complex structure of invisibilization, which to date ranges from a smaller volume of documentary records, to identification as a potential research object, through analysis, cataloging and storage of material records. Our objective seeks to reflect on how such names could tell us about the relationship between women and the Athenian polis of the period. We will see if the female names are associated with a family group or *genos* of the period, we will investigate the probable origins (regional and morphological) and if there are real or mythological occurrences that can be attested in other documents. Furthermore, we reflect on the association between names and social class, geographic location and what types of vase fragments can lead us back to them.

10 THE METAMORPHOSES OF TRANSVESTITE MEANINGS: THE TRAJECTORIES OF GENDER REPRESENTATIONS IN THE FINAL SCENE OF EURIPIDES' MEDEA

Kibuuka, Brian (Coimbra University)

Some Greek tragedies from the classical period were produced in text, staged and then represented in images painted on vases. This paper uses textual and pictorial discourse analysis and pragmatics to analyse one of these tragedies, Euripides' *Medea*. The aim of the analysis is to map the shifts in meaning of gender representations in the final scene of the Euripidean tragedy, taking into account aspects of the pre-Euripidean myths, the framing of the myth of *Medea* in Euripides' tragedy, the fragments of other lost tragedies dedicated to *Medea*, and the representations of the final scene of the tragedy on Greek ceramics. The analysis of the images will consider the meanings attributed to them in the paintings and those that can be deduced from the multiple contexts of use of the vases. Finally, it will be shown how the same set of codes describing gender performances is subject to transformation depending on the context of its enunciation and the presence of hierarchies between the characters represented - hierarchies related to their gender.

11 REPRESENTATIONS OF GENDER LIMINALITY IN THE CULTS OF DIONYSOS AND CYBELE

Salerno, Emilia (Università di Palermo)

Mythological narratives of ancient cultures are replete with characters whose gender and sexual identity exist between normative definitions of masculinity and femininity. Indeed, the transgression of the male/female gender binary was only acknowledged in the divine realm or through the intervention of deities.

Dionysos/Bacchus and Cybele/Magna Mater *Idaea* stand out as two of the most 'liminal' deities in the Graeco-Roman pantheon. They are often interconnected not only in mythological narratives but also in rituals and processions. Textual evidence consistently highlights how both these gods, and particularly their followers, defy norms related to gender. However, when examining material sources, representations of gender liminality become tricky to assess.

This paper aims to investigate the iconographic representations of priests and devotees of Dionysos' and Cybele's cults, specifically looking for traits that (may) indicate a similar transgression of gender boundaries as recounted in literary evidence. Special attention will be given to a number of exemplifying representations produced under the Roman Empire, such as the famous portraits of Cybele's *galloi* (Vermaseren, *CCCA* 1, 504; 3, 249, 447 and 466) and some representations of satyrs and maenads (e.g. bronze of dancing satyr from Villa of the Papyri, in Herculaneum; Roman copy of a Greek relief of a dancing maenad).

In this paper, I will demonstrate that, although gender liminality is clearly acknowledged as a trait in literary references concerning Cybele's and Dionysos' attendants, its representation in material evidence is not equally straightforward. While ambiguous gender traits are more readily discernible in portraits of the gods or semi-divine creatures, such as *Attis* and the satyrs, representations of human cultic actors typically conform to physical sexual standards. To identify instances of defiance against gender norms in material culture, one must necessarily examine it through the lens of Roman narrative.

12 WOMEN IN SITULA ART BETWEEN ELITE REPRESENTATION AND EROTIC AGENCY

Schaller, Clara (Ludwig-Maximilians-Universität Munich) - Nebelsick, Louis (UKSW Warsaw)

The intriguing and vibrant narrative imagery of 7th – to 3rd century BCE East Alpine Situla Art (repoussé figured sheet bronze symposial sets and costume accessories from graves and sanctuaries) shows elite women participating in festive and ritual events. An iconographic analysis of the gender-specific roles and a comparison with attendant funerary evidence describes a remarkably clear division of activities assigned to men and women within the context of elite pictorial representation.

Interestingly, women appear relatively rarely in Situla Art and predominantly in Northern Italy. While symposial and ritual scenes generally show male figures dominating social performances and women often acting in seemingly subservient roles, our analysis of Situla Art's recurrent erotic imagery reveals predominant female agency. The lower register of a situla from a turn of the 6th /5th century elite woman's grave on the Alpine piedmont near Pieve d'Alpago, Veneto, is the most spectacular example. It tells a seemingly rustic, lusty narrative featuring intimacy, fornication, punishment, and procreation. Remarkably, and in stark contrast to most contemporary Mediterranean iconographies, women in this frieze are shown dominating drastically rendered erotic action within the framework of a female-charged Pan-Adriatic myth. Beyond the exegesis of this remarkable situla, we explore, typify and interpret Situla Art's surprisingly large number of erotic motifs shown within festive narratives and analyse these images, placing emphasis on the remarkably persistent evidence for female agency and authority in this remarkable early Iron Age erotic iconography. In conclusion, we reflect on the realities conveyed by this iconography of female-controlled intimate performances.

13 WOMEN'S GRAVES AND WOMEN IN GRAVES - REFLECTIONS ON FEMALE SARCOPHAGUS BURIALS IN HELLENISTIC ETRURIA

Nazim, Laura (Ruhr-Universität Bochum (Germany))

The Etruscan stone sarcophagi of the Hellenistic period have been studied so far from various points of view, but above all from stylistic perspectives.

In this way, the focus has inevitably been placed on a group of high-quality individual pieces that stands out from the crowd and represents these monuments and their significance within society and its burial rites. However, precisely these unique objects lead to the question of social, hierarchical but also gender specific differences within the aristocratic class of Etruria from the 4th century BC onwards.

Although our knowledge of the public cults, rites and offices in Etruria is not as extensive as in the Greek area, we do know some official titles and iconographic evidence of the political and religious activities of men in Etruscan society.

As far as the female sphere is concerned, the sources are still sparse and sometimes difficult to identify as part of female religious activity.

Reasons for this are missing literary sources such as the lack of depictions documenting the clear holding of an office by a woman, like for example a magistrate's procession as can be documented on the sarcophagi of men.

Nevertheless, hypotheses about female activities and their status in Hellenistic Etruria can be made based on single sarcophagi in comparison with other genres such as mirrors and tomb paintings.

The contribution will analyse the differences and similarities in the treatment of female and male sarcophagus burials regarding the used iconography, the position in the grave and the socialization with other burials in the funerary context. The key questions are:

What evidence of priestesses and ritual acts by women can be documented? How can female-only burials or a significantly higher proportion of women in graves be explained? Which conclusions can be drawn about the iconographical representations on women's and men's sarcophagi?

14 POWERFUL WOMEN IN THE SHADOW: THE RISE AND FALL OF HELLENISTIC MACEDONIAN QUEENS CULTS

Dipino, Luana (Independent Researcher; Sapienza University Alumna)

Compared to their male counterparts, Hellenistic queens are less documented, especially from a cultic and religious point of view. After their initial subordination within marital unions, queens gradually expanded their authority and even asserted themselves politically in critical circumstances, whether diplomatic, military, or political in nature. Many queens distinguished themselves by their abilities, ambitions, and decisive actions, leading to an increasing popularity and the attribution of divine honors similar to those accorded to kings, although more contained in their manifestations, both civic and dynastic. Yet many of them remain invisible to us today.

It is only from the 21st century onwards that female figures have received increased attention, as exemplified by the works of Carney (2010), Caneva (2012), Savalli-Lestrade (2003).

In line with this recent trend, the present study examines the emblematic case of the cults of the Hellenistic Macedonian queens. By comparing literary, epigraphic, and archaeological evidence, we aim to analyze the rise and fall of the Argead and Antigonid queens, showing how the attention devoted to their cults mirrored the power dynamics and popularity of their husbands. Compared to the more nominal honors accorded to early queens such as Eurydice and Olympias, and the exceptional cultic tributes paid to Philas I (spouse of Demetrius Poliorcetes), the later Antigonid queens cults are much less known, save for a few epigraphic references to female figures associated with the Macedonian ruler.

From the available data, it appears plausible that while Hellenistic rulers universally received honors commensurate with their status, the allocation of cultic tributes to queens, especially to a significant degree, often correlates closely with dynastic influence and the queen's perceived power within the kingdom, along with her individual characteristics and achievements.

15 A VIEW ON GENDER AND SEXUALITY THROUGH THE ANTHROPOMORPHIC FIGURINES OF URKESH

Mahmoud, Yasmine (IIMAS)

Anthropomorphic figurines are a powerful tool of subliminal messages as they help to construct aspects of the ideological identities of ancient people. Figurines have the power to transcend their intended function into a larger frame that allows for the assessment of the ancient's perception regarding gender and sexuality.

In this paper, I would discuss the corpus of anthropomorphic figurines from Urkesh/ Tell Mozan in northeastern Syria, as material culture that helps in shedding more light on gender issues. The collection comprises representation of nude females that have varied degrees of sexualization. The main focus will be on the meaning of such specific representations, dividing them into categories and discussing the underlying gender implications of such intentional representations.

The representation of naked females in Urkesh, and in many other sites in the area, is strongly present in the three-dimensional art. This emphasis on the female sexuality that exceeds that of the male's sexuality is one of the focal points of how we and the ancients view gender, views that we share to some extent even in our day and age.

My goal from this paper is to present previously unpublished materials from Tell Mozan, all the while discussing the gender issue that affects many aspects of our lives, recognizing it as a social construct to be analyzed as a specific category.

695 DESTRUCTION, BURIAL OR JUST FADING AWAY. ROMAN CASE STUDIES ON THE DE-SACRALISATION OF RELIGIOUS SITES AND MATERIAL CULTURE IN ANTIQUITY

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: King, Anthony (University of Winchester, UK) - Haussler, Ralph (University of Winchester, UK) - Spickermann, Wolfgang (University of Graz, Austria) - Marco Simon, Francisco (University of Zaragoza, Spain)

Session format: Regular session

The aim of this session is to explore what happened to religious sites when they (or a particular cult or part of a sanctuary) were de-sacralised, profaned and abandoned. Especially in Late Antiquity, many cult places were abandoned, but did they just fade away? Apart from the architectural remains, a particularly interesting question relates to the fate of the religious material culture, such as cult figurines and statues, altars, votive offerings, sacrificial instruments, and priestly garments. Some sites clearly show the deliberate deposition of such artefacts, such as the large metal deposition of carnices, a bronze horse and many more items at the La Tène sanctuary of Tintignac, or the deposition of Roman-period votive and ritual objects, for example from Bury St Edmunds, notably priestly regalia. Sometimes only a part of a sanctuary might be involved, for example when the cult of a particular god or goddess ceased, like Jupiter Dolichenus in the mid-third century CE: did people still consider his cult statues and altars to be 'sacred'? The aim is to investigate various sites from different periods to explore what happened to a cult and its material culture once the worship ceased. What is the meaning behind the depositions of religious items: burial or merely temporary storage? What rituals were involved in this process? It also raises the question of what alternative treatments we can identify, such as the destruction and recycling of de-sacralised artefacts. This session is less interested in the widely studied transformation of 'pagan' sites into Christian churches, but focuses on the afterlife of a religious place, cult and religious material culture.

ABSTRACTS

1 COMPARATIVE APPROACHES TO THE DE-SACRALISATION OF RELIGIOUS SITES IN THE ROMAN WORLD

Haeussler, Ralph (University of Winchester)

Across the interconnected, entangled Roman World, gods/goddesses and their cults come and go. New cult places were established while other deities fell out of favour, lost their benefactors and worshippers. While the foundations of new temples and sanctuaries is well documented, it is much more difficult to fully comprehend what the closure of a cult place entailed. Were sanctuaries and temples, which had been at the heart of a community for generations and

were filled with sacred and devotional artefacts, not to mention priestly regalia and other movable and non-movable objects, really merely abandoned? Or can we identify particular ritual activities relating to the processes of de-sacralisation and ritual closure? Were the cult objects, votive offerings and sacrificial tools destroyed, recycled, repurposed or carefully buried? The aim of this paper is to investigate a series of case studies from across the Roman empire that allow us to explore different scenarios in different periods, such as the closure deposits from Romano-Celtic sanctuaries, the abandonment of an entire town and its sanctuaries (e.g., Glanum in the 3rd century) or the decline and closure of Philae's Isis sanctuary in late Antiquity. This also leads us to a systematic discussion of different categories of objects, analysing cases of careful deposition, deliberate destruction and conscious de-sacralisation: from stone inscriptions to more precious artefacts. Ethnographic analogies are used to provide food for thought to understand the rituals involved when a religious site and/or religious artefacts were abandoned.

2 UBI ERAT LUCUS: RESACRALISATION AND TRANSFORMATION ON THE JANICULUM

Bianchi Mancini, Sofia (Max-Weber-Kolleg, Universität Erfurt) - Pérez Yarza, Lorena (University of Warsaw)

During the Roman Republic, the Trastevere and the Janiculum were located in the extra-urban area of Rome and housed religious places such as the *Lucus Furrinae*. Although this sacred grove is famous as the site of where Gaius Gracchus died, it seemed to fall into oblivion with the transition to the Empire. Simultaneously, the demographic changes brought eastern communities to Rome, which settled beyond the old *urbs* in peripheral areas such as the Trastevere and transformed the landscape of the Janiculum. It was at this time that the new communities began to establish their cults on the Janiculum. A sanctuary to Isis was built but, more importantly, a temple to Jupiter *Helio-politanus* was possibly erected near the ancient *lucus* on an already sacred site. It is no coincidence that archaeological and epigraphic evidence shows the memory of the sacred grove, with the religious recognition of its deities by the new cultores. The documentation illustrates that the *lucus*, or rather its memory, did not fade away, but it raises a historical problem: was the *lucus* abandoned or desecralised? While under Augustus several *luci* were desecralised, there is no record of such happening to the *Lucus Furrinae*, raising the question of how we can understand the overlap and substitution of cults.

The aim of this paper is therefore to discuss the treatment of a sacred space and the mechanisms used to deal with the religious reformulation of the Janiculum by first contextualising this process of transformation through the changes that various *luci* underwent during the Late Republic. The context will then be compared with the material and epigraphic sources from the second century CE, which will shed light on the conceptualisation of sacred sites and how materiality was used to shape the appropriation and refinement of their religious space.

3 VIOLENT DESACRALISATION: EXAMPLES OF ICONOCLASM IN SOUTHERN IBERIA

Marco, Francisco (University of Zaragoza)

In contrast to the limited attraction of traditional research in the material remains of image destruction, the last two decades have witnessed a more than notable increase in interest in iconoclasm, due in part to the effects of the new contexts of fundamentalism and terrorist violence on historiography itself. Images are destroyed because they are recognised as having agency and performativity. They are (inter)active artefacts endowed with a "technology of enchantment".

On this basis, this paper focuses on two significant cases of ancient iconoclasm in the south of the Iberian Peninsula, both belonging to the funerary world. The first concerns the necropolis of Cerrillo Blanco de Porcuna (Jaén), an excellent example of intentional destruction and burial of the past against a backdrop of social crisis at the end of the 4th century BC, which is manifested in other parallels also contemplated. The second, later example, is the so-called "Tomb of the Elephant" in Carmona (Seville), a cave complex with no less than three ritual rooms and adjoining chambers, which dates from the 1st-2nd century AD, already in the Roman imperial period. The interpretation of this complex, the chronology of its violent desecralisation and the attribution of its iconoclastic agents are also assessed. Both cases are viewed from the perspective of the de-ritualisation of the decommemoration of spaces and materials that had previously been activated through ritual, and are analysed in their respective historical contexts.

4 STILL CULT PLACES? EXPLORING THE MEANING BEHIND MONETARY DEPOSITS IN LATE ROMAN SANCTUARIES IN HISPANIA

Gomez, Jose Carlos (Universidad de Málaga)

The practice of monetary offerings in late antique cult places is a widely attested phenomenon in the provinces of Britannia, Gallia, Germania, Pannonia, and Noricum. This practice has been relatively frequently documented in Mithraic contexts or in Romano-Celtic sanctuaries whose monumental areas had been abandoned or dismantled prior to the date of the last monetary deposits. This means that the abandonment of the building does not necessarily entail the end of cult if such deposits were buried for ritual purposes. The presence of coins in some sanctuaries of Hispania has been precisely one of the arguments put forth to justify the continued use of these cult places until the late 4th or

even the mid-5th century, such as the *Endovellicus* sanctuary in Lusitania, the *Muntanya Frontera* sanctuary in *Tarraconensis*, or the *Mithraeum* of Lugo in *Gallaecia*. The aim of this study is to analyse the conditions under which these presumed late antique monetary deposits have appeared, as well as their characteristics and archaeological contexts, to determine if the practice of *iactatio stipis* could have been successful in some Iberian ritual contexts during Late Antiquity.

5 RUINATION, VENERATION AND SACRED MEMORY: THE ENDING OF TEMPLES IN ROMAN BRITAIN

King, Anthony (University of Winchester, UK)

Excavations in the late 20th and early 21st century have yielded high-quality sequences that enable us to explore change and development of individual sites in some detail. For Romano-Celtic and other temples and shrines in Britain, this can give new insights into the ending of temples as sacred sites. A forensic approach is adopted in this paper, with sequences presented for sites such as Hayling Island (Hampshire), Uley (Gloucestershire), Witham (Essex), Higham Ferrers (Northamptonshire), Bath (Avon) and Maryport (Cumbria). There is clear evidence for continued worship and votive deposition at some of these sites after the collapse or demolition of the buildings. At others there is evidence for deliberate deposition of sacred items, and a planned 'closure' of the site. Two, at least, of the sites show some evidence of a Christian presence in their late Roman levels. This prompts an evaluation of the notion of 'sacred memory' in the context of the Resonance framework of Hartmut Rosa. The paper concludes with consideration of religious change, Christianisation and residual paganism in Roman and post-Roman Britain.

6 ROTTEN BUILDINGS, PROFANE USE AND CHRISTIAN COMPETITION: THE END OF THE TEMPLES IN ROMAN GERMANIA AND GAUL

Spickermann, Wolfgang (University of Graz)

Unlike in Italy, for example, the process of the dissolution of provincial religion in the peripheral areas of the former Roman Empire was initially slower and with clear differences. Although many cult places were abandoned due to the destruction caused by the Germanic invasions in the 5th century, in some cases - as shown - the cult activities in the remaining sanctuaries continued for a long time or they were used for profane and cultic purposes. However, the final takeover of Gaul and Germania by the Germanic tribes will have had a serious influence on the religious beliefs and cult practices of the provincial religions. Unlike in the Ostrogothic kingdom of Italy, for example, we are unable to grasp the ideas associated with this due to the lack of crypto-pagan literature known from Italy. We can only infer from the prohibition literature cited in the examples that pagan rites continued to be practised in various parts of the population long after the Christianisation of the Franks. This did not necessarily require intact cult buildings; the population visited the ruined temples or open cult sites on hills or at springs as holy places. My article attempts to trace this process with selected examples.

7 FROM CELTIC CULT PLACE TO ROMAN TOWN: A CASE STUDY IN LAUSANNE-LOUSONNA (SWITZERLAND)

Guichon, Romain (Archeodunum Investigations Archéologiques SA / University of Lausanne)

Recent excavations at the archaeological site of Lausanne-Vidy "Route de Chavannes 15a" (Switzerland) have revealed a well-preserved monument identified as a protohistoric memorial site. A late Bronze age burial mound built on a Neolithic cemetery shows several redevelopments in the late Iron Age, suggesting the transition from funerary to cultic functions. An external ditch with a wooden palisade 30 meters in diameter contains various material deposits of human bones, animal remains, metal objects and numerous fragments of vessels and amphorae. This could be linked to community practices in a context of ancestral or heroic cult, contemporary with the Gallic War. After the monument was dismantled around 50 BC, a proto-urban settlement occupied the area and the first wooden buildings seem to respect the location of the Celtic memorial, allowing the hypothesis of a foundation rite similar to those known in the Greco-Roman world. From the Augustan period onwards, the space seems to be gradually desecralised and became the backyard of an urban *insula* in use until the late Antiquity. The indigenous cult place thus represents a kind of unconscious memory at the heart of the Roman *vicus*. This site is currently being studied as part of a doctoral thesis about the origins of Lousonna at the University of Lausanne (dir. M. Fuchs).

8 AN OVERLOOKED TREASURE IN THE LATE GALLO-ROMAN TEMPLE OF COBANNUS (BURGUNDY, FRANCE)

Perruche, Rebecca (UMR 6249 Chrono-Environnement) - Nouvel, Pierre (UMR 6298 Artheis)

The sanctuary of Cobannus, near Dijon, in the Burgundy region, is under excavation since 2019. The site is a fairly typical Gallo-Roman sanctuary, with a square temple, surrounded by a stone temenos wall. It was built over the rectangular Iron Age ditch, which was presumably used as a container for votive offerings.

However, the site is best known for the discovery, long kept secret, of an extraordinary treasure trove of Roman statuary and ritual furnishings. Unearthed illegally in 1977, its contents were sold by its discoverer and dispersed among prestigious American collections. In 2007, shortly before his death, full of remorse, he finally confessed everything.

The treasure was buried outside the sacred enclosure in a simple pit covered with tiles. The most valuable artworks were the bronze statue of Cobannus, a local deity who was equivalent to Mars, and a pair of portrait busts of rich young boys from the 1st century AD. It also contained numerous small statues, gold jewellery, metal vessels and at least 6,000 coins, stacked in three separate arcas (offering boxes). The most recent coinage dates from the reign of Julian the Apostate (around 363). This treasure therefore represents the closing deposit of the sanctuary, perhaps hastily created in the middle of the 4th century. However, this burial did not signify the end for the sanctuary. Coins of Valentinian and Theodosius indicate that it was still used as a pagan temple until the end of the 4th century. All the buildings were then violently destroyed by a fire, which led to the final abandonment of the temple.

The aim of this paper is to discuss the question of the end of sanctuaries in the Eastern Gaul, as well as the particular journey of the treasure of Cobannus.

9 FROM TEMPLE TO CHURCH: TESTING SETTLEMENT MODELS IN THE LATE ANTIQUE EGYPT LANDSCAPES OF MEDINET HABU, PHILAE AND ESNA

Guimerà, Ariadna (Autonomous University of Barcelona) - De Soto, Pau (63075)

The story of religion in Roman Egypt was dominated by the triumph of Christianity at expense of pagan religion. Generally studied in binary terms, the decline of the old gods of Egypt had its own dynamic away from the orthodox Church. Indeed, there were material signs showing the decline of the Egyptian paganism before Christians had achieved the religious control of the Empire. And Thebes, the old capital, is an excellent example of that.

Since the middle of the third century the hieroglyphic and Greek texts on the walls of temples showed a very low quality work. For thousand years, pharaohs and Ptolemaic kings had recorded their involvement to the restoration and embellishment of temples as a sign of wealthy cultic activity. This legacy continued under the Roman Empire but at a speedily declining rate. At Deir el Medina there is nothing later than Domitian; at Philae of Caracalla; at Esna of Decius. So, it is difficult to avoid that the imperial support for decoration of Egyptian temples drop after Tiberius, shrank after Hadrian and fade away with Constantine.

This communication will give a panoramic view of the sunset of institutional Egyptian and Greco-Roman religion through the study of the pagan temples in the Thebaid region and how this was related with the outset of Coptic Church. Furthermore, through the historical analysis, the historiographical phenomenon of the abandon, destruction, and Christianization of pagan temples will be reconsidered, and which are the new archeological perspectives for its study.

696 PREVENTIVE ARCHAEOLOGY IN EUROPE: CONTEXT OF EXERCISE, METHODS AND WORKING CONDITIONS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Salas Rossenbach, Kai (Institut national de recherches archéologiques préventives) - Stäuble, Harald (Archaeological Heritage Office of Saxony) - Marx, Amala (Institut national de recherches archéologiques préventives)

Session format: Regular session

Preventive archaeology or development led archaeology is now practiced throughout Europe in a variety of legal, institutional and field contexts. Although it produces most of the archaeological data in part of Europe, there is still a lack of discussion about the methods and working conditions.

Under monetary and time pressure, preventive archaeology has developed and is still developing, methods to study archaeological sites in a short time while maintaining or even improving the scientific quality of the excavation and post-excavation studies. In some countries, the excavation methods used by preventive archaeology are state-of-the-art and the skills of its experienced archaeologists are in demand. However, it is also a field, halfway between business and science, where workers are subject to not only the law of the market, but also to competition and the

vicissitudes of financial crises. Through presentations from different European contexts, this session aims to discuss the context of practice, methods and working conditions of the profession in Europe.

ABSTRACTS

1 A MATTER OF SCALES; THE DUTCH PRACTICE

Muller, Axel (RAAP)

Since the late 90's archaeology in the Netherlands developed into a market driven commercial system. The current evaluation of our Heritage Law gives an interesting opportunity to reflect on the past decades. An overview and evaluation of Dutch preventive archaeology is therefore especially relevant.

Preventive archaeology in the Netherlands has evolved into a rigid system, where a set of research 'modes' are more or less compulsory, before any civil project can be realized. This system is most suitable for the average fieldwork project but smaller or larger projects can be harder to fit in. For small projects the administrative workload is often out of proportion. And for large projects, it is a big challenge to make choices in the analysis of different datasets and to focus on the scientific end goals.

Flexibility can be increased in different ways on different levels as will be illustrated by presenting some case studies. However, these solutions are still very project specific and ad hoc, and a more fundamental change in our daily practice would benefit the scientific output of development-led archaeology.

2 ARCHAEOLOGICAL HERITAGE IN FRANCE: MITIGATION AND WORK PRACTICES IN THE 21ST CENTURY

Peake, Rebecca (INRAP - National Institute for Preventive Archaeological Research; UMR 6298 Artheis) - Marcigny, Cyril (INRAP - National Institute for Preventive Archaeological Research; UMR 6566 CReAAH)

Government legislation implemented during the last 30 years in France have provided a strong framework for archaeological mitigation that allows the management of archaeological risk during the early stages of all developer-led projects while ensuring high standards of practice in the field. These policies form the basis of "preventive" archaeology that has flourished since the 1990s with prominent commercial projects affording large teams of highly trained professionals the opportunity to develop sustainable fieldwork practices for the mitigation of archaeological sites. Evaluation plays a decisive role within this framework and the strategies in place for the detection and assessment of France's prehistoric and historic heritage before development follow stringent guidelines issued by regional archaeology services. Preventive archaeology has come under increasing pressure to provide a high standard of service with limited budgets and has had to develop methods to reduce intervention times while maintaining the scientific quality of its work. From preliminary geophysical survey to on site evaluation to recording systems, we aim to explore the methods in place across France and their practical application in the field. Our focus will be on mechanised trial trenching and excavation applied to large and small scale developments in both urban and rural contexts and how this widely used method contributes to our perception of the archaeological landscape. We will also address the question of managing data from sites whose surface area can exceed 10 hectares, some with complex stratigraphy. The French legislation today demands far-reaching interdisciplinary studies in archaeological mitigation (archaeology, palaeoenvironmental studies, materials sciences, etc.), all information being subsequently archived in a government data system, that guarantees public accessibility.

3 CISAP: AN INRAP TEAM DEVOTED TO THE STUDY OF UNDERGROUND ARCHAEOLOGICAL STRUCTURES" IN COLLABORATION WITH CHRISTOPHE TARDY, INRAP

Dolbois, Jérémy (INRAP - National Institute for Preventive Archaeological Research)

In the field of preventive archaeology, underground archaeological structures (such as wells, quarries, undergrounds, aqueducts, etc.) are recurring remains that were usually incompletely excavated or even untouched and most of the time abandoned for safety reasons.

Since ten years, an increasing number of archaeological state prescriptions have been taking those particular contexts into consideration and required a manual and secure excavation "in accordance with the rules of the art and respect for basic safety rules" for this type of remains.

To respond to those growing demands, The INRAP (French National Institute for Preventive Archaeological Research) made the choice to internalize this skill in 2016. The establishment of a trained team on specific risks of underground environment, the Intervention Unit on Deep Archaeological Structures (CISAP), responds to the will of a scientific treatment of these structures encountered during preventive excavations on the French territory.

Over the last 7 years, this unit has been involved in almost 90 field researches, considering various contexts. The team has acquired a solid experience and the trainings aim to develop specific technical skills within. It allows the team to carry out technical interventions, to propose complex intervention procedures and to consider new field contexts in the future.

This communication is proposed at first to present the materials and methods used to excavate underground remains, whether vertical or horizontal. It will insist on safety aspects and will allow discussions about practices for subterranean researches.

4 EXPERIENCES AND CHALLENGES OF ARCHAEOLOGICAL INVESTIGATIONS OF A GAS PIPELINE ROUTE IN LITHUANIA

Zabiela, Gintautas (Institute of Baltic region history and archaeology, Klaipeda University)

Lithuanian archaeologists do not have much experience in preventive archaeology. The gas pipeline network is the most developed in the last decades. Archaeological surveys of the Gas interconnection Poland–Lithuania path have been carried out in the period 2020–2021 in a 165 km entire length of removable topsoil averaging 8 m wide.

The Institute of Baltic Region History and Archaeology of Klaipėda University excavated 2 sections – 36 km total length. On the basis of these investigations the problems of preventive archaeology are presented.

The pipeline was designed to avoid crossing any known archaeological sites. During the planning works revealed 7 sites of ancient settlements. A further 15 archaeological sites were identified during surface stripping.

The stripping of surface soil and the search for archaeological features are survey, but the excavation of the sites is detailed research. The boundary between these 2 different levels of investigations is unclear.

Buried structures with little archaeological evidence and no finds can only be dated by 14C. Such undated structures are of little significance for archaeology, the dating of each one is expensive and the results are sometimes indicative of a recent period.

In 1999 Lithuania ratified the Valletta Convention, obliging the publication of research results, but developers do not take responsibility for publishing research material. It is not possible to estimate in advance the volume of such publications.

Linear infrastructure objects tend to divide archaeological sites into two parts after research. Their territories remain unclear, as the developer has no interest in carrying out research outside his work area.

National archaeologies have different standards for research and subsequent work on their material. The EU is working on harmonisation in various fields, and it is time to start addressing preventive archaeology at a common European level.

5 ARCHAEOLOGY BETWEEN HERITAGE, SCIENCE AND POLITICAL-ECONOMIC INTERESTS: TWO CASE STUDIES FROM SAXONY, GERMANY

Kretschmer, Saskia (Archaeological Heritage Office Saxony)

In recent decades, methods have become established in Saxony, particularly in open-cast mining archaeology, which have made it possible to work on large areas under standardised scientific criteria. Compared to the excavations of the 1990s, working conditions have been improved by taking archaeology into account earlier in the planning process. The use of modern technology also reduced the time pressure. In open-cast mining archaeology, standards are set both for the excavation and for post-excavation studies by consistently integrating neighbouring disciplines. Various developments have recently led to increasingly complex planning requirements in which archaeology has to assert itself not only against economic and political interests, but also, for example, against nature conservation concerns. Finally, current economic developments and crises are also reflected in the excavation budget.

The second case is a prime example of the impact of economic and political interests on excavation conditions. An extraordinarily rich archaeological site was investigated under enormous time pressure and with a comparatively low budget for the construction of a large leisure park. In order to keep to the time and cost schedule, a partial preservation of the site was agreed with the investor by means of conservation covering. This method is increasingly being used where – unlike in open-cast mining – it is possible to preserve the archaeological substance. In addition to the conservation interest of protecting the archaeological site for future generations, it is primarily economic considerations that lead to its implementation. The future strategy must be to expand the range of methods and develop them further in such a way that the quality of the excavation is not compromised.

6 CENTRAL GERMANY - SAXONY-ANHALT: A REGION IN TRANSITION

Friederich, Susanne (Landesamt für Denkmalpflege und Archäologie Sachsen-Anhalt)

The federal state of Saxony-Anhalt is located in the center of Germany, in the heart of Europe. Vast areas with minimal differences in elevation, often near highways, are currently predominantly used for agriculture but are increasingly being considered as industrial sites. This is due to the well-developed infrastructure, direct access to Germany's largest freight airport in Leipzig Halle, modern port facilities along the waterway network (Elbe and Mittellandkanal), and the significant railway hub in Halle for freight transport, which are major locational advantages rarely found elsewhere in Europe. Therefore, for the past two years, Central Germany (Saxony-Anhalt) has been increasingly coming into focus. Exemplary projects include the rebuilding of Daimler Truck's central warehouse or the mega-factory of chip giant Intel near Magdeburg. Within just one year, 1,000 hectares have been claimed. Additionally, there are still small mining areas in the lignite mining region as well as significant raw material extraction activities (gravel and sand).

The foundation for large-scale archaeological excavations has been primarily tested and positively evaluated in open-pit mines for the past 30 years. However, never before has it been necessary to document 100 hectares within three months within the former settlement area. The existing methods of preventive archaeology were fundamentally reviewed and refined in 2023. Ultimately, prospecting (so-called "hard prospecting with excavation cuts") continues to prevail today; it is the effective method for avoiding costly construction delays. Archaeology must always remain a reliable planning partner, even within tight timeframes.

7 PREVENTIVE CONSERVATION OF ARCHAEOLOGICAL MONUMENTS IN BAVARIA

Berg, Stefanie (Bayerisches Landesamt für Denkmalpflege)

Preventive archaeological monument preservation in the sense of well in advance planned excavations has been carried out in Bavaria for about 20 years. Strangely enough, this still comes as a surprise to many people. Apparently, the image of archaeological "rescuers" in front of an excavator conveys more emotional and long-term significance than our deliberate, sophisticated, well-prepared, but of course for many invisible work.

Bavaria is the largest of the 16 German federal states. Here the initiator of a construction project has to commission and finance a private excavation company to carry out the necessary work proposed by the monument authority and approved by the protection authority.

In 2022, for example, 900 archaeological excavations were professionally documented before construction work was carried out, enabling sections of settlements, burial grounds, fortifications etc. from our rich Bavarian history to be professionally documented, recovered and thus preserved for posterity. However, this also means the loss of monuments in situ and we can only assume that not all monuments have been discovered in time for the specialist investigation.

For us as a specialist authority, this results in many tasks, including, for example, checking the quality of archaeological work and documentation done by private companies in order to ensure permanent and sustainable documentation of the reports and archaeological finds and improving our level of knowledge with regard to the predictability of archaeological monuments. In addition, the focus is also on scientific processing, evaluation and publication.

I would like to present the administrative, legal and scientific requirements of preventive archaeological preservation and the resulting challenges. I would also like to give an insight into the tools we use to help us plan prospecting and excavations. These include desktop analysis with any subsequent in-depth non-invasive activities, GIS-supported geomorphological-historical landscape analysis and the municipal register of monuments.

8 DEVELOPMENT-LED ARCHAEOLOGY IN THE FORMER CZECHOSLOVAKIA. DIFFERENT PATHS OF CZECH AND SLOVAK REPUBLIC

Antal, Robert (Institute of Archaeology of the Czech Academy of Sciences, Brno)

Czech and Slovak republic shared a common history within Austrian-Hungarian Empire, during so called First Czechoslovak Republic and again after World War II in Czechoslovakia. This applies also to development of heritage care and development-led archaeology. Even though, the states divided in 1993, they used the same law from 1987 until year 2004, when new legislation in Slovakia was passed. In its time modern act is still effective in Czech Republic, but the change is now indispensable.

In the beginning, the contribution will briefly summarize the development of heritage care in former Czechoslovakia until 2004, consequently it will compare current state of art in divided countries, aiming to identify strong and weak aspects of archaeological heritage protection during construction works, and their impact on scientific research.

Firstly, the focus will be aimed on formal processes prior excavation with connection to the role of public administration and informatization of scientific knowledge in decision making. Secondly, the paper will describe the organizational structure and business behind research excavations, including obligations, territorial jurisdictions, scope of the excavation and influences on price making. In third part, brief overview on sanctions will be presented.

Last part of the contribution will explain, how presented aspects influence scientific research both in Czech and Slovak Republic, and summarize strong and weak points of both legislations.

9 SOCIAL-EPISTEMOLOGICAL REFLECTION ON ACADEMIC AND PREVENTIVE ARCHAEOLOGY

Novakovic, Predrag (University of Ljubljana)

One of the consequences of the considerable growth of preventive (also development-led or rescue) archaeology is an increased divide between academic and preventive archaeology, which is frequently but erroneously perceived as a distinction between 'thinkers' and 'doers'. While academic archaeology is considered a proper scientific endeavour which contributes new knowledge about past human life and culture, preventive archaeology became increasingly perceived as a technical routinized practice, and its contribution to the development of archaeology was minimized mostly to new discoveries and technical advancements in methods. Already in 2006, Richard Bradley, in his paper about two cultures in archaeological practice, warned against this divide and its long-term harmful consequences for archaeology in general. From the perspective of social epistemology (e.g. research freedom, original scientific vs applied knowledge, organization of work, labour division), we will demonstrate how epistemic asymmetries and dependences reveal different determinants and types of knowledge creation in academic and preventive archaeology. We conclude that the existing epistemic asymmetries do not support hierarchical relations and simple complementarity between the two. Instead, they act simultaneously and dialectically on different levels of the knowledge-obtaining process. Due to different national legislation, organizations, and academic and preventive research management, we will use Slovenia as a case study for a more detailed analysis.

10 CONTRACT ARCHAEOLOGISTS IN GREECE: THEIR PLACE AND ROLE IN THE DOMESTIC PROCESS OF ARCHAEOLOGICAL PRODUCTION

Daravigka, Klea (Phd candidate Aegean University, Lesvos, Greece)

While attempting to explain the role of contract archaeologists in Greece, the research opens up to their wider scientific/working context, that is the entire process of Greek archaeological production. Both the process and the state of contract archaeologists in the country are found to be shaped by a powerful dipole: the old but still robust ideological frame of a "guild", which informs the domestic archaeological production process, and neoliberal imperatives, that shape Greek state cultural management. The impact of the above dipole produces checkpoints, absences and traps for contract archaeologists and at the same time leads to a perpetual reproduction of "Greekness", a product-archetype which remains intact despite the myriad critical approaches and radical reinterpretations deposited throughout the process that could potentially turn into social benefits.

The discussion about the above situation however is totally absent in Greece. Working conditions of contract archaeologists or the role labor relations play in the archaeological process continue to be commonly regarded as irrelevant topics of no scientific value and are thus eradicated from the public agenda. This presentation will attempt to reinstate this controversial subject by opening a dialogue on an international level.

11 LIMITS AND POTENTIALITY OF PREVENTIVE ARCHAEOLOGY IN SICILY

Valbruzzi, Francesca (Museo Interdisciplinare di Messina; Confederazione Italiana Archeologi – Sicilia) - Giannitrapani, Enrico (Arkeos – Servizi integrati per i Beni Culturali s.c.; Confederazione Italiana Archeologi – Sicilia; Dipartimento Culture e Società, Università di Palermo)

In the contribution, the application of the preventive archaeology procedures carried out in the last decades in Sicily, the largest island in the Mediterranean with a vast recognised archaeological heritage, is discussed. After a historical overview of the application of preventive archaeology here, we address the limits afflicting the current research and conservation of the island's archaeology. The first of these limits is given by the regional administration's lack of appropriate cultural heritage management: none of the Soprintendenze, the cultural heritage offices competent for the various territories, have archaeologists in managerial positions. In this way, archaeological risk assessments are examined by personnel with no adequate archaeological background, mainly architects, geologists, and even agronomists. Because of the autonomy of Sicily for cultural heritage management, the recent normative and methodological developments in preventive archaeology occurring in the rest of the country are simply not applied in Sicily. The Sicilian academia's lack of interest in professional archaeology and preventive archaeology further worsens the situation, with insufficient training for the many professional archaeologists daily involved in preventive archaeology. Furthermore, despite the long history of research carried out in Sicily, its cultural, archaeological and paleoenvironmental framework still needs a more accurate definition, often undermined by the absence of information on extension, chronology, and cultural definitions for most of the hundreds of sites reported in the official archaeological maps, often generated without the aid of the most recent computer-based technologies. The definitions of archaeological potential and risk are then more a gamble than a consolidated practice. This situation can be remedied only with greater awareness from archaeologists, regardless of their position within universities and Soprintendenze or because involved in the profes-

sion, of the tools and cognitive processes available today, together with a greater level of multidisciplinary, open data and advanced digitalisation of the archaeological record.

12 ARCHAEOLOGY AND DEVELOPMENT: A POSSIBLE BINOMIAL

Pennisi, Ghiselda (Associazione Nazionale Archeologi (ANA)) - Nicoletti, Rossella (Associazione Nazionale Archeologi (ANA)) - Draïà, Eleonora (Università telematica Internazionale UniNettuno) - Palazzolo, Grazia (independent researcher) - Manenti, Marco (independent researcher) - Arena, Andrea (independent researcher)

Many legends go around archaeology and the archaeological heritage defence. Past choices and set of rules not always applied in a forward-looking way often spread the image of a bailiwick that is a barrier to development.

In this paper we would like to illustrate the methodology adopted by FS Group and the Archaeological Superintendence of Enna for the project of doubling of the Palermo-Catania HS line: an example of coexistence of development and protection and, at the same time, an extraordinary opportunity for scientific research aimed to the knowledge of historical processes of occupation of the territory.

The methodological approach adopted since the preliminary phase of evaluation of the Archaeological Impact has been oriented to identify archaeological traces through systematic surveys, excavation samples in areas with an high density of traces and geognostic surveys up to a final extensive excavation of the settlement that allowed to put into light a high imperial Roman settlement on the River Dittaino valley, in località Cuticchi (Assoro, En), a site with a remarkable informative potential in the general context of studies related to this period in Sicily.

13 PREVENTIVE ARCHEOLOGY OR RESCUE ARCHEOLOGY? CASE STUDY FROM BUCHAREST ROMANIA

Ignat, Theodor Aurelian (Bucharest Municipality Museum) - Majuru, Adrian (Bucharest Municipality Museum)

Systematic and preventive archeology in Romania is governed by almost 25 years old laws, and more important, it is a state monopol. Very few private archeological companies are on the market and they operate by providing consultancy. In reality private companies can not be authorized to do archeological excavation, so they do it under the umbrella of public institutions. This creates the unfortunate situation where those companies get most of the money, and take little to no responsibility for the scientific outcome of the archeological research.

Under the pressure of the contracts, preventive archeology has adapted its excavation methods to cope with the ever-increasing demand for archeological services. Mechanized tools reduce excavation time, but on the other hand are responsible for the loss of details that otherwise might be important.

Non-intrusive investigations that have the power to bring more data and help archeologists to better plan for the excavation, or to better understand the archeological record are very rarely used, as it is not mandatory by law. Even when used, it is considered unreliable by the public services, and can not be used in decision making processes. Attempts have been made to regulate the usage of non-intrusive investigations, but so far, they have been rejected.

The rapid development of the country is putting a great pressure on the preventive archeology, as across Romania are only 1034 registered archeologist, and just above 300 have the necessary credentials to manage an archeological project.

The most expensive commodity is therefore time, and very often little is left for the processing and publication of the results.

14 MORE THAN 30 YEARS OF DEVELOPMENT-LED ARCHAEOLOGY IN ROMANIA: A SWOT ANALYSIS ABOUT OPPORTUNITIES, CHALLENGES, CONSTRAINTS AND BENEFITS

Bors, Corina (National History Museum of Romania (MNIR)) - Damian, Paul (National History Museum of Romania (MNIR))

The European convention for the protection of the archaeological heritage was ratified by Romania in 1997 and set the premises for a new national legislation in regard to this issue. After a void of specific legislation which lasted for an entire decade, in 2000 was adopted the new law concerning archaeology and rather soon the "polluters/developers pay" principle was necessary to be implemented since a series of private industrial projects and public motorways projects were initiated. This was a completely new reality for the archaeology and the archaeologists in Romania. It's very useful that, three decades later to undertake an analysis about how was understood by the different stakeholder the development led archaeology and how is was perceived by the academic environment, the heritage agencies and, last but not least by the institutions involved in this "new kind" of archaeology.

An in-depth analysis will be made, considering the experience of the National History Museum of Romania, which has a major expertise as concerns the rescue/preventive/development-led archaeology in Romania during the last 3 decades. The paper will present a series of key issues such as: the importance of these large-scale rescue excavation

in providing new understanding and knowledge about the archaeological heritage; how to negotiate and communicate with the stakeholders in the benefit of archaeological heritage; the difficult dialogue between the administrative milieu (the heritage agencies) and the professional environment; the opportunities and constraints for developing a professional career in archaeology, yet these are not the only topics to be addressed considering the session's focus. The perspective provided by the paper encompasses certain positive evolutions, but also takes a closer look to the challenges which had to be overcome while undertaking large scale preventive excavation in Romania and recognizing their role in such paradigm shifting.

697 HUMAN-ENVIRONMENT INTERACTIONS IN EUROPEAN CALCAREOUS LANDSCAPES DURING THE PLEISTOCENE AND HOLOCENE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Branch, Nicholas (University of Reading) - Negrino, Fabio (University of Genoa) - Law, Matt (Bath Spa University) - Moore, Pete (University of Reading)

Session format: Regular session

The calcareous landscapes of Europe have long been understood to be an important setting for Palaeolithic and later prehistoric habitation sites and monuments, providing the eventual focus for some of the most iconic settlement and ceremonial complexes. Their landscapes and ecologies undoubtedly provided important qualities for the development of these complexes by virtue of their environmental characteristics resulting a diverse history of human-environment interaction. However, courtesy of their alkaline substrate, reconstructing the history of these landscapes and their interaction with human groups has routinely posed a number of methodological and analytical problems (e.g., geochronology, preservation), including in some geographical areas reliance upon a limited avenue of palaeoenvironmental proxies from geological archives (e.g., Mollusca), whilst in others dependence upon data from archaeological archives (e.g., caves). Due to these challenges, the true diversity of calcareous landscapes, the interrelationships that landscapes had upon the lifeways of populations at the time and the extent to which ecologies impacted settlement and subsistence choices, remain to be fully understood. This session seeks to hear about the latest research that has explored many of the methodological and analytical problems associated with the study of calcareous landscape history, and where research has provided important new insights into human-environment interactions in these settings, especially evidence for transformation, resilience and adaptation. Given that many geological and archaeological archives are located in these iconic calcareous landscapes, the session will also explore how these archives are being protected, conserved and managed in the face of a range of threats at the present day and those predicted for the future.

ABSTRACTS

1 DO CALCAREOUS LANDSCAPES MAKE A DIFFERENCE? ARCHAEOLOGICAL VISIBILITY IN THE LIGURIAN ARC BETWEEN PLEISTOCENE AND HOLOCENE

Negrino, Fabio (University of Genoa)

In calcareous landscapes characterised by caves and shelters, multi-layered deposits are quite ubiquitous, preserving archaeological evidence from the Lower Palaeolithic to the most recent aspects of human history. The particular morphological characteristics of these landscapes, which have favoured the use of caves and shelters for dwelling, resting and carrying out a wide variety of activities, combined with the ease of formation of deposits trapped in depressions created by karst erosion, have certainly favoured archaeological visibility, preserving information that would otherwise have been lost in other contexts.

An area of particular interest for testing the above claims is the Ligurian Arc (north-west Italy), characterised by well-circumscribed karstic limestone outcrops and areas with other lithologies. The conformation of the territory, consisting of the Apennine arc in continuity with the Alpine one, i.e. deep, sunken valleys and a steep coastline with rare coastal plains, is geomorphologically homogeneous, although climatically differentiated.

In the non-calcareous areas, however, siliceous raw materials from which artefacts can be made are abundant, which contributes to a difference in visibility, at least for open-air sites, between the different zones.

An initial analysis of the distribution of sites between the Middle Palaeolithic and the Neolithic in Liguria allows us to highlight some diachronic similarities, with similar distribution patterns, which could suggest how geological outcrops and landscape morphology influenced the way in which archaeological evidence was preserved. The only exception is represented by the evidence related to the Mesolithic, which does not fully correspond to what can be observed for the other phases, suggesting alternative interpretative solutions in which the human behaviour factor, as well as a different occurrence and use of siliceous raw materials, could have played an essential role.

2 HUMAN ENVIRONMENTAL DYNAMICS THROUGH STABLE ISOTOPIC ANALYSIS OF CAVE SEDIMENTS

Lattao, Virginia (Geosciences Centre, University of Coimbra, Portugal; University of Coimbra (Polo II), Faculty of Sciences and Technology, Department of Earth Sciences and Geosciences Centre, Coimbra, Portugal) - Aquilano, Antonello (Department of Architecture, University of Ferrara, Italy) - Collado, Hipolito (Junta de Extremadura, Mérida (Badajoz), Spain; Polytechnic Institute of Tomar, Portugal; Geosciences Centre, University of Coimbra, Portugal) - Garcès, Sara (Geosciences Centre, University of Coimbra, Portugal) - Gomes, Hugo (Geosciences Centre, University of Coimbra, Portugal) - Henriques, Maria Helena (Geosciences Centre, University of Coimbra, Portugal; University of Coimbra (Polo II), Faculty of Sciences and Technology, Department of Earth Sciences and Geosciences Center, Coimbra, Portugal) - Marrocchino, Elena (Department of Environmental and Prevention Sciences, University of Ferrara, Italy) - Rosina, Pierluigi (Polytechnic Institute of Tomar, Portugal; Geosciences Centre, University of Coimbra, Portugal)

Stable isotope analysis has been heavily used over the years to achieve reconstruction of environmental changes in continental settings. The objective of this research is to apply this analytical methodology to different cave deposits located in Iberian territory. The deposits studied contain archaeological traces of human occupation, with different chronologies. Part of this work is integrated into the MTAS and FIRST-ART projects, which study early artistic expressions on the Iberian Peninsula. The FIRST-ART project involves monitoring the environmental conditions of formerly occupied contexts. A multiproxy analysis methodology is planned, including stable isotope analysis (particularly $\delta^{13}C$) and sediment composition (using X-ray fluorescence analysis). The data obtained were evaluated in advance to determine whether this methodology can be used as a substitute for paleoenvironmental reconstructions. Results obtained from the study of ten caves located in Portugal, in the Spanish Extremadura, Asturias and Cantabria, will be presented and compared with proxies already established in previous studies carried out in the same caves studied here.

3 NEW INSIGHTS INTO THE PALAEOENVIRONMENTS OF THE CALCAREOUS LANDSCAPES OF SOUTHERN BRITAIN: A CASE STUDY FROM THE COTSWOLDS

Moore, Pete (University of Reading)

The calcareous landscapes of Southern Britain are among the most archaeologically rich in north-west Europe, yet their environmental settings are poorly understood. Courtesy of their well-draining, alkaline soils, they have routinely relied upon a limited array of proxy records, such as land snails, which can only broadly inform the nature of vegetation coverage (i.e. grassland, wooded). Such studies have largely come as secondary elements of anthropocentric monumental settings, rather than considering their broader 'natural' settings, subsequently creating a biased picture of past environments. This approach neglects to consider the true diversity of past landscapes, the interrelationships they had upon the lifeways of populations, and the extent to which this diversity impacted settlement and subsistence choices.

A key landscape which has been consistently overlooked by archaeological and palaeoenvironmental studies alike has been The Cotswolds, despite its significant evidence-base. Proximity to prehistoric centres such as Stonehenge and Avebury have long drawn attention away from the landscape, leading to a lack of consideration for its overall potential. This paper presents ongoing research into the palaeoenvironmental credentials of The Cotswolds, showing the results of extensive ground-truthing and preliminary insights into evidence yielded from two case study locations. The potential of such indications is then contextualised within their broader regional setting and the implications they have on other calcareous landscapes considered.

4 ENVIRONMENTAL CHANGES AND THEIR IMPACT ON HUMAN FREQUENTATION AT THE ARMA DELLO STEFANIN, LIGURIA (ITALY). A GEOARCHAEOLOGICAL PROSPECTIVE

Ghislandi, Sabina (Università di Genova) - Negrino, Fabio (Università di Genova) - Gravel-Miguel, Claudine (New Mexico Consortium) - Riel Salvatore, Julien (University of Montréal) - Rellini, Ivano (Università di Genova)

The proposed paper intends to present the geoarchaeological results on the Arma dello Stefanin deposit, investigated by the University of Montréal and the University of Genova in 2022.

The Arma dello Stefanin is a wide cave, opening at 400 m a.s.l. along the southern calcareous slope of the Rio Penavaria, in the municipality of Aquila d'Arroschia, Imperia (Italy), about 22 km from the current coastline. Scientific studies of the last century documented anthropic frequentation during the Epigravettian till the Neolithic. However, the attribution of the Mesolithic level has not been consistent in the previous publications, leaving uncertainties regarding the Pleistocene-Holocene transition within the cave.

Therefore, new and in-depth studies have been extensively conducted in the last two years, exploring the content of charcoal for radiocarbon dating, microcharcoal, pollen, cryptotephra and soil micromorphology on the stratigraphic sequence. In fact, the application of soil micromorphology to cave contexts has recently given the opportunity to

explore and analyze the depositional levels in relation to human activity, climate and environmental changes and their interactions.

The data presented in the proposed paper focuses on the micromorphological and physical-chemical analyses of the sediments formed during the Pleistocene and Holocene, within the stratigraphic sequence in the Anfossi e Maggi sections. The results show variation of the climatic and environmental conditions, with periods characterised by humidity and intense water dripping, providing information regarding the cave environment in relation to the archaeological evidence.

The aim is to increase the knowledge regarding the anthropic occupation and use of the cave, including the comparison with similar realities from Liguria and contributing to the wider discussion of the human-environment interaction in calcareous landscapes during Prehistory.

5 THE IMPORTANCE OF CALCAREOUS LANDSCAPES TO OUR UNDERSTANDING OF LATE PLEISTOCENE HUMAN-ENVIRONMENT INTERACTIONS IN WESTERN IBERIA

Haws, Jonathan (University of Louisville; ICArEHB, Universidade do Algarve) - Benedetti, Michael (University of North Carolina Wilmington; ICArEHB, Universidade do Algarve) - Carvalho, Milena (ICArEHB, Universidade do Algarve) - Ellis, Grace (Colorado State University; ICArEHB, Universidade do Algarve) - Cascalheira, João (ICArEHB, Universidade do Algarve) - Friedl, Lukas (University of West Bohemia; ICArEHB, Universidade do Algarve) - Bicho, Nuno (ICArEHB, Universidade do Algarve) - Barbieri, Alvisé (ICArEHB, Universidade do Algarve)

The western margin of the Iberian Peninsula is marked by two areas of Mesozoic calcareous substrates surrounded by Paleozoic basement rock draped in places by Cenozoic sediments. In Estremadura and Algarve, karstic landscapes form in Jurassic and Cretaceous limestone massifs interspersed with valleys filled with Miocene and Quaternary sands and gravels. Throughout the Pleistocene, human groups settled these areas in varying degrees of intensity. Although geomorphic bias may impact site preservation and visibility, several key features of the calcareous landscapes provide the bulk of information about Paleolithic land-use strategies and point to a likely preference for these areas. Caves house most of the stratified evidence for human settlement, providing key records of organic preservation, paleoclimatic and paleoenvironmental change, as well as diachronic patterns of human-environment interaction. The calcareous landscape known as the Maciço Calcáreo Estremenho (MCE) contains abundant caves, avens, sinkholes, and poljes or sunken karst valleys. These latter features formed lakes during the Pleistocene providing water to humans and animals. The limestone also contains chert, a highly valued and preferred lithic raw material for tool-making. Recent stable isotope studies from cave speleothems provide additional data on Late Pleistocene climates that can be integrated with Paleolithic archaeological and faunal records from caves, including the site of Lapa do Picareiro.

Here, we discuss the impact of calcareous landscapes on human-environment interactions with special emphasis on Lapa do Picareiro, which has become an important reference site for the Middle and Upper Paleolithic in Portugal. The ongoing excavation has produced an intact stratigraphic sequence of about 11 m with archaeological occupation layers from the Bronze Age to Middle Paleolithic. The sediments contain rich archaeological and faunal records and paleoclimatic data spanning at least 60,000 years, providing a continuous record of long-term human-environment interaction.

6 A CASTELNOVIAN STOP IN THE ALPINE HIGHLANDS AT ARMA DELLA NINA

Riel-Salvatore, Julien (Université de Montréal) - Gravel-Miguel, Claudine (New Mexico Consortium; Université de Montréal) - Negrino, Fabio (Università di Genova)

As part of our new project, which aims to document the Mesolithic occupation of Western Liguria, we are revisiting previously excavated sites as well as surveying untouched caves for new Mesolithic assemblages. From this survey, we recently discovered what looked like potential Mesolithic deposits of Arma della Nina. Arma della Nina is located in the highlands of the Val Pennavaire, where Arma dello Stefanin and Arma di Nasino have yielded recently identified in-situ early Mesolithic assemblages. We conducted a small, targeted excavation of the Arma della Nina in 2023 aimed at documenting its occupation. Unfortunately, the unusually high precipitations of that summer hindered field-work due to the porous quality of the limestone in which the cave opens, which let a lot of rain percolate down onto the excavation. While this stalled our excavation, the amount of water that percolated through the walls helped us understand the site formation history of this intriguing cave; while charcoal was abundant along the walls, our excavation at the mouth of the cave yielded almost no artifacts. Unfortunately, heavy erosion caused by percolating water has likely destroyed most the archaeological deposit. However, radiocarbon dates on charcoal recovered near the walls and a perforated shell help ascertain that the cave was occupied at least briefly during the late Mesolithic, which expands the spatial distribution of Mesolithic hunter-gatherers to regions that were likely challenging. In fact, Arma della Nina contains the first Castelnovian radiocarbon date associated with lithic artefacts from the whole Ligurian Arc and the Maritime Alps. However, our experience at the cave suggest that it might not have been a good shelter during

wet periods, which has brought to our attention the importance of considering the porousness of the caves we study to better contextualize their stratigraphy as well as their potential as occupation sites.

699 TRACING OVICAPRINE LIVES: BIOARCHAEOLOGICAL PERSPECTIVES ON SHEEP AND GOAT HUSBANDRY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Viñas Caron, Laura (Centre for Textile Research, University of Copenhagen, Denmark; Globe Institute, University of Copenhagen, Denmark) - Jæger, Jonas (Centre for Textile Research, University of Copenhagen, Denmark; Globe Institute, University of Copenhagen, Denmark) - Daly, Kevin (Trinity College Dublin, Ireland) - Le Meillour, Louise (Globe Institute, University of Copenhagen, Denmark)

Session format: Regular session

Domestic sheep and goat have played a pivotal role in past societies since their origin, but many aspects of their past lives remain poorly understood. This session aims to bring together current research on the initial stages of sheep and goat domestication and the development of husbandry practices through time, with a particular focus on the use of secondary products and craft materials such as dairy products, wool or skins.

Through this exploration, we seek to identify regional or broad patterns in species proportions, herd composition (age, sex) and morphological variation, providing insights into the socio-economic structures and cultural significance attached to small ruminant herding communities. At the same time, the recent adoption of novel scientific methods has allowed to gain new insights into their individual stories. In this sense, the session welcomes papers focusing on the discrimination of sheep, goats, and other small Bovidae that are most often challenging to distinguish morphologically, and the analysis of the latter in zooarchaeological assemblages. We also encourage studies addressing feeding and management practices, genetic changes, selection and movement of animals through time or space. Finally, the session seeks to highlight technological advancements beyond food production, such as craft practices or the value of wool products within ancient societies.

Thus, the session recognises the importance of adopting a multifaceted approach and we invite papers not only from zooarchaeology but also from the natural sciences, such as ancient and degraded DNA, palaeoproteomics (ZooMS and shotgun proteomics) and isotopic analyses. Papers which integrate evidence from multiple lines of inquiry or types of materials (e.g. wool textiles, leather, parchment) are particularly appreciated, as well as contributions from different time periods and geographical regions that have been understudied.

ABSTRACTS

1 THE ARCHAEOGENOMIC HISTORY OF SHEEP HUSBANDRY IN THE BALTIC SEA REGION

Günther, Torsten (Uppsala University) - Larsson, Martin (Uppsala University) - Morell Miranda, Pedro (Uppsala University) - Kaptan, Damla (METU, Ankara) - Kivikero, Hanna (University of Helsinki) - Kantanen, Juha (Natural Resources Institute Finland) - Somel, Mehmet (METU, Ankara) - Özer, Füsün (Hacettepe University) - Johansson, Anna (Swedish University of Agricultural Sciences, Uppsala) - Storå, Jan (Stockholm University)

Sheep have been the most popular ovicaprid in Scandinavia since the Neolithic but it is unclear how the first sheep in the region relate to later herds and modern breeds. Several large-scale prehistoric migrations into the region have been documented for humans, providing ample opportunity for different livestock breeds to be introduced at the same time. Long and short-distance exchange networks between sheep herders would provide additional possibilities for changes to the sheep gene pool over time. Nevertheless, modern North European short-tailed breeds are often assumed to be among the oldest domestic sheep populations, even thought to represent relicts of the earliest sheep expansions during the Neolithic period reaching Scandinavia a little less than 6000 years ago. This study sequenced the genomes of sheep remains from the Baltic islands of Gotland and Åland, dating from the Neolithic (~4500 cal-BP) to historical times (~1600 CE). Our findings indicate that Nordic sheep largely possessed the genetic characteristics of modern North European short-tailed breeds for at least 4000 years which contrasts the pattern seen in other parts of Europe during the same time frame. The long-term continuity suggests that either human preference or adaptation to local environments has played an important role in the history of sheep in the region. North European short-tailed breeds still play an important role in the region and several small local breeds are subject to conservation efforts while more popular breeds have been crossed with other breeds to increase their production properties. Our results provide important insights into the practices and preferences of sheep herders and breeders from prehistory until today.

2 NO KIDDING! THE USE OF SHEEP HIDES AT THE ROMAN FORT OF VINDOLANDA, UK

Greene, Elizabeth (University of Western Ontario) - Fremondeau, Delphine (University College London) - Stevens, Rhiannon (University College London) - Birley, Barbara (The Vindolanda Trust, UK) - Taylor, Gillian (Teesside University)

The Roman fort at Vindolanda on the northern frontier in Britain has produced the largest assemblage of archaeological leather from anywhere in the Roman empire. The assemblage spans over 200 years of occupation from the 1st to the 3rd centuries CE, offering an excellent opportunity to examine the characteristics of leather manufacturing in the Roman period. This oral presentation presents the preliminary analysis of the animal species exploited for manufacturing tent panels that were used by the Roman army. Past analysis using visual identification techniques emphasized the use of goatskin for Roman tents and research has calculated the number of goats the Roman army would have needed (van Driel-Murray 1990; Groenman-van Waateringe 2009). However, using ZooMS analysis, we provide results for the determination of species used for 102 Roman tent panels from Vindolanda. Preliminary work shows a much higher reliance on sheep hides rather than goatskins, and a small reliance on cow hides. Despite the common refrain that the Roman army used goatskin for their tents, not a single sample reflected this in reality. The analysis used tent panels from all periods of occupation at Vindolanda, starting with eight panels from the same tent found deposited together in a ditch from Period 1 (ca. 85-90 CE). The results showed that three panels were made from cattle hide and five came from sheep hide. Every other tent panel tested from occupation periods 1-7 (85-275 CE) was made of sheep hide. These surprising results have an impact on our understanding of the economy of the Roman army, and will be contextualized within the context of the Roman occupation of Britain, the military setting, and the empire as a whole.

3 DENTAL MICROWEAR IN THE HISTORIC ENGLAND 'SHEEP PROJECT' COLLECTION: A PILOT STUDY

Mainland, Ingrid (University of the Highlands and Islands) - Worley, Fay (Historic England) - Baker, Polydora (Historic England)

Analyses of tooth wear have been widely applied to dietary reconstruction across a range of domestic and non-domestic species, and within single species. Little research, however, has been undertaken on inter-individual variability within a population, despite the fact that foraging behaviour is known to vary between sexes, age groups and with season-of-grazing. Although insight into the nutritional status and hence productivity is arguably one of the primary aims of palaeodietary studies in domestic ungulates, few studies have been able to explicitly address linkages between animal/herd productivity and specific palaeodietary signatures, reflecting a lack of modern known diet comparative datasets with supporting data on animal performance under different nutritional regimes. Here we present the results of a pilot study into the potential for high magnification dental microwear analysis on the effects of short-term dietary shifts, grazing regime and sex on juvenile dentition in unimproved Shetland sheep. The study focuses on a sample of 62 sheep of known age, sex, nutrition, and date of death, raised in the Pentland Hills, Scotland as part of the Historic England sheep project. Analyses of gross tooth wear has indicated significant differences in wear rates between males, females and castrates in this population and that wear is also affected by pasture type (i.e. nutritional status). The pilot data are compared to a pre-existing dataset for seasonal and microwear variability, allowing a more nuanced understanding of the impact on microwear of pasture quality, both seasonally and inter-annually in the grasslands of NW Europe, including the Scottish Borders.

4 ALL'S WOOL THAT ENDS WOOL. TRACING SHEEP AND GOAT LIVES IN NEOLITHIC IBERIAN PENINSULA THROUGH ARCHAEOZOOLOGY AND ADNA

Alcàntara Fors, Roger (Departament de Prehistòria, Universitat Autònoma de Barcelona, Bellaterra, Spain) - Daly, Kevin (School of Agriculture and Food Science, University College Dublin, Dublin, Ireland) - Halpin, Aine (Trinity College Dublin, Dublin, Ireland) - Bradley, Dan (Trinity College Dublin, Dublin, Ireland) - Saña Seguí, Maria (Departament de Prehistòria, Universitat Autònoma de Barcelona, Bellaterra, Spain)

The introduction of sheep and goat during the Early Neolithic had profound and lasting impacts on the economy, culture, and ecology of the Iberian Peninsula, laying the foundation for subsequent agricultural and pastoral practices in the region.

While it is generally accepted that the sheep breeds that arrived at the Iberian Peninsula during the Neolithic have their origins in southwest Asia, we lack information regarding the genetic drift caused by its adoption and the mechanisms through which these small ruminants contributed to the expansion of the Neolithic package.

This communication addresses the adoption and spread, management and exploitation practices of sheep and goat in the Iberian Peninsula through the lens of archaeozoological data and aDNA samples from sites where both animals had relevant roles. Using this combination of proxies will allow us to trace the origins of the sheep and goat populations that entered the Iberian Peninsula during the Early Neolithic, how they spread through the territory, and if varying

management and exploitation practices might have been linked to the different species, their lineages, and herd genetic structure.

The results provide a high-resolution, multi-disciplinary insight into individual sheep and goat lives, providing contrasting perspectives on broader scale dynamics of the adoption of domestic small ruminants in the Iberian Peninsula.

5 ANCIENT GENOMES REVEAL 7000 YEARS OF INTERCONNECTED DEMOGRAPHIC HISTORY BETWEEN SHEEP AND HUMANS IN IBERIA

Morell Miranda, Pedro (Human Evolution Program, Organismal Biology Institute, Uppsala University, Sweden; Population Genomics working group, Veterinary Science Department, Ludwig Maximilian University, Germany) - Galindo Pellicena, M. Ángeles (Centro Mixto UCM-ISCI de Evolución y Comportamiento Humanos, Madrid, Spain) - Iriarte, Eneko (Laboratorio de Evolución Humana, Universidad de Burgos, Burgos, Spain) - Moreno-García, Marta (GI Arqueobiología, Instituto de Historia, CCHS-CSIC, Madrid, Spain) - Tejedor, Cristina (Department of Prehistory and Archaeology, University of Valladolid, Valladolid, Spain) - Rojo-Guerra, Manuel (Department of Prehistory and Archaeology, University of Valladolid, Valladolid, Spain) - Smith, Colin (Laboratorio de Evolución Humana, Universidad de Burgos, Burgos, Spain; Archaeology and History department, La Trobe University, Melbourne, Australia) - Carretero, José-Miguel (Laboratorio de Evolución Humana, Universidad de Burgos, Burgos, Spain) - Valdiosera, Cristina (Laboratorio de Evolución Humana, Universidad de Burgos, Burgos, Spain; Archaeology and History department, La Trobe University, Melbourne, Australia) - Günther, Torsten (Human Evolution Program, Organismal Biology Institute, Uppsala University, Sweden)

Animal domestication by humans was a crucial event in prehistory, with sheep being one of the oldest and most important domesticated species. As humans spread Neolithic practices throughout Eurasia, sheep were brought along, and their remains can be used to trace the presence of human populations and their interactions. However, the impact of later human migrations on sheep populations is less well understood.

To investigate this, we sequenced 17 high-quality ancient sheep genomes (0.0064-8.74x) from two caves in Northern Iberia with a rich record of human and animal remains that, in conjunction, span from the early Neolithic to the late Roman period. We found significant changes in the sheep gene pool that coincided with previously described cultural changes and migrations in humans. Specifically, we observed an increase in eastern ancestry in Iberian sheep during the late Chalcolithic, around the time of the arrival of Steppe ancestry to human populations in the area, which likely coincided with a shift in resource exploitation towards sustainable milk and wool production.

Further shifts in the sheep gene pool were observed during the Bronze Age and Roman periods, the latter one laying the foundation for modern Iberian sheep breeds. These findings demonstrate the complex and interconnected nature of the demographic history of sheep and humans, highlighting the importance of studying both to gain a deeper understanding of our shared past.

6 SHEEP VS GOAT: DIFFERENTIAL EVOLUTIONARY PATHWAYS IN THE NORTHWESTERN MEDITERRANEAN BASIN OVER THE LAST 8000 YEARS REVEALED THROUGH GEOMETRIC MORPHOMETRICS

Jeanjean, Marine (Institut des sciences de l'évolution de Montpellier - ISEM) - Evin, Allowen (Institut des sciences de l'évolution de Montpellier - ISEM)

Sheep (*Ovis aries*) and goats (*Capra hircus*) are important species of the Mediterranean basin since their domestication initiated ~10,500 years ago in western Anatolia. Despite their morphological similarity, distinguishing between these two species remains a challenge, hindering comprehensive studies on their respective evolution. Focusing on the North Western Mediterranean basin over the past 8 millennia, we explored the diachronic evolution of sheep and goats outside their initial domestic center. This study, part of the ERC granted DEMETER project, employs a 2D landmark and sliding-landmark geometric morphometric approach to quantify and analyse the size and shape of third lower molars. A total of 2237 archaeological teeth from over 170 sites located in Catalonia (Spain) and the South of France were analysed in addition to ~900 modern specimens. The study reveals distinctive morphometric evolutionary patterns, with sheep displaying greater size variability and morphological diversity through time than goat. These findings hint at differential selective pressures and historical uses, underscoring the unique evolutionary pathways of these species.

7 UNRAVELING THE GENETIC THREADS OF ANCIENT EURASIAN SHEEP THROUGH SPACE AND TIME

Halpin, Áine (Trinity College Dublin) - Daly, Kevin (University College Dublin; Trinity College Dublin) - Mattiangeli, Valeria (Trinity College Dublin) - Bradley, Daniel (Trinity College Dublin)

Genomic analysis of ancient domestic animal species can reveal important information about prehistoric societies, culture and even human behaviour. One such species is the domestic sheep (*Ovis Aries*). There are three broad episodes of human innovation which have impacted the ancestry of sheep. These are; domestication (~11,000 ya), the use of secondary animal products such as wool and milk, and the development of breeds. Analysis of whole genome data has the potential to reveal the effects that human intervention has had on the genomes of sheep through space and time.

This research focuses on the extension of a spatiotemporal dataset of approximately two hundred ancient Eurasian sheep genomes spanning from the early Neolithic to the Medieval era. Themes this research will aim to explore include the timing of domestication events, the genetic foundations of wool, fine scaled ancestry patterns in Eurasia, and spatiotemporal patterns of consanguinity in Eurasian sheep populations.

Many people have contributed to this dataset and subsequent analyses and will be acknowledged fully.

8 RE-EVALUATING SHEEP AND GOAT DIFFERENTIATION THROUGH MORPHOLOGICAL AND PEPTIDE ANALYSES: A CASE STUDY FROM MEDIEVAL AZERBAIJAN

Larson, Kara (Department of Anthropology, University of Michigan; Museum of Anthropological Archaeology, University of Michigan) - Haruda, Ashleigh (School of Archaeology, University of Oxford) - Garner, Daniel (Department of Anthropology, University of Michigan; Museum of Anthropological Archaeology, University of Michigan) - Cooper, Zaria (Department of Anthropology, University of Michigan) - Wordsworth, Paul (Institute of Archaeology, University College London) - Ventresca-Miller, Alicia (Department of Anthropology, University of Michigan; Museum of Anthropological Archaeology, University of Michigan; Department of Archaeology, Max Planck Institute for Geoanthropology)

The ability to distinguish between the remains of *Ovis aries* (sheep) and *Capra hircus* (goat) continues to be challenging and impacts discussions on herd management and composition. The use of scientific methods, particularly isotopic analyses of bioapatite, have become particularly reliant on the ability to distinguish between these two domesticated species. However, the differentiation of sheep and goat teeth, and to a larger extent mandibles, using visual morphometric criteria has been met with mixed results (Zeder and Pilaar 2010). Yet, visual criteria are still the principal method relied upon in zooarchaeological and isotopic studies. The potential unreliability of visual morphometric criteria directly impacts interpretations of herd management practices, herd composition, and pasture usage, among others. In this study, we conducted a participant survey to test the reliability of visual morphological criteria for differentiating sheep from goat using 58 mandibles from the Medieval period site of Bardha'a, Azerbaijan. Next, we conducted geometric morphometrics on high quality photographs of the teeth (in situ of the mandibles) to identify species based on criteria established by Jeanjean et al. (2022). To test the success of both methods, all 58 mandibles were analyzed using Zooarchaeology by Mass Spectrometry (ZooMS). Based on the results of these three studies, we will present recommendations for the identification of sheep and goat in archaeological contexts, particularly relevant for the use of isotopic analyses on mandibles and teeth.

9 SHEEP AND GOAT MANAGEMENT STRATEGIES IN ANCIENT SOGDIANA THROUGH ISOTOPE AND PROTEOMICS ANALYSES

Armaroli, Elena (Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia (Italy)) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main (Germany); Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia (Italy)) - Serrone, Eleonora (Department of History and Cultures, University of Bologna (Italy)) - Cipriani, Anna (Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia (Italy); Lamont-Doherty Earth Observatory, Columbia University (USA)) - Vonhof, Hubert (Department of Climate Geochemistry, Max Planck Institute for Chemistry in Mainz (Germany)) - Suyonov, Samaretdin (Samarkand Institute of Archaeology, Uzbek Ministry of Culture and Tourism (Uzbekistan)) - Berdimuradov, Amriddin (Samarkand Institute of Archaeology, Uzbek Ministry of Culture and Tourism (Uzbekistan)) - Mantellini, Simone (Department of History and Cultures, University of Bologna (Italy))

The monumental Sogdian fortress of Kafir Kala (~12 km south of Samarkand, Uzbekistan), was a key site along the ancient Silk Road. Its strategic location allowed to control the southern access to the city, but also the transmission lines for the irrigation system and water supply. Two main phases of human occupation have been recognized in the citadel. The first one is pre-Islamic (late 7th – early 8th century A.D.). During this period the citadel served as an important administrative center. The second phase dates from the Arab conquest of Samarkand (712 A.D.) until the

12th century A.D. In this period the citadel was converted into a residential unit. Ovicaprids predominate among the domestic fauna remains in both occupation phases. The second phase shows a greater focus on meat consumption and the production of secondary products, which is consistent with the change in function of the site. A total of n=20 molars from the Islamic phase were sequentially sampled along the crown length to obtain information on seasonal variation in oxygen ($\delta^{18}\text{O}$), carbon ($\delta^{13}\text{C}$) and strontium ($^{87}\text{Sr}/^{86}\text{Sr}$) isotope values. A total of n=25 plant samples were measured for the $^{87}\text{Sr}/^{86}\text{Sr}$ baseline. Stable isotope analyses were performed by IRMS; while Sr isotopes were measured by MC-ICPMS. Intra-tooth patterns of $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ values display significant differences among individuals, allowing the identification of at least three different animal management strategies. According to $^{87}\text{Sr}/^{86}\text{Sr}$ isotope analysis, only a few individuals display high seasonal mobility. However, many individuals show $^{87}\text{Sr}/^{86}\text{Sr}$ values non-compatible with the local baseline, meaning that they were likely raised far from Kafir Kala. ZooMS analyses are underway to understand if the isotope results can be related to the species. This multi-proxy work promises to be of great importance in light of the scarcity of data for this key but understudied area.

10 MIXED HERDS, MIXED FEED: A MULTIMETHOD APPROACH TO CAPRINES AND DIETS AT TEPE YAHYA, SE IRAN

Seabrook, Melina (Harvard University)

The production of meat, milk, hair, and manure were undoubtedly crucial factors driving caprine management. However, a purely economic approach to studying sheep and goats limits our understanding of a more complex system of human-animal relationships. Using traditional zooarchaeological and new archaeological science methods, I demonstrate the continued value of returning to older assemblages for increased data resolution into the lives of the animals for studying ancient caprine husbandry. My work focuses on fauna from an archaeological site of in Southeast Iran called Tepe Yahya. This fauna was last studied in 1986, before the introduction of newer archaeological science methods. Tepe Yahya is unique for its repeated occupations over 6,000 years. The site grew from a small village to a prospering urban center between 5500 BCE and 2000 BCE. This project takes a diachronic look at how provisioning for sheep and goats changed over time and how the process of urbanization affected these changes. A large assemblage of 405 sheep and goat mandibles was assessed for species and age, then sampled for paleoproteomic and isotopic analyses. Sheep and goats are often morphologically indistinguishable, however, using Zooarchaeology Mass Spectrometry (ZooMS), we can discern between these two species through differences in collagen. ZooMS allows for the inclusion of mandibles that would otherwise be excluded from the study. Carbon and nitrogen isotopic values are used to investigate the diets of these caprines, the types of plants they consume, and give insight into potential environmental conditions. The combined age profiles, species identifications, and carbon and nitrogen isotope ratios provide a level of insight into the caprines and their diet previously unattainable, that allows us to investigate how the animals were managed and cared for, going beyond a strictly economic view of caprine herds.

11 ANIMAL MOBILITY AND THE EMERGENCE OF ANIMAL HUSBANDRY IN THE SOUTHERN LEVANT: MULTI-STABLE ISOTOPIC ANALYSES OF PRE-POTTERY NEOLITHIC CAPRINES

Makarewicz, Cheryl (University of Kiel; University of Haifa)

Stable isotope data gleaned from the bone collagen and enamel bioapatite of herbivores has revealed how the role of seasonal provisioning of animals with fodder contributed to the initial management and eventual domestication of sheep and goats during the early Holocene. Surprisingly, how mobility configured nascent experimentation with animal husbandry remains largely unknown. Here, carbon, oxygen, and strontium stable isotope analyses of incrementally sampled caprine teeth recovered from key Pre-Pottery Neolithic sites located in the southern Levant, where people first experimented with animal husbandry and later herded fully-fledged domesticates, document the ways in which animal movement was enhanced or constrained by human caretakers. These isotopic data, coupled with faunal biometrical and ageing data that further inform on herd demography dynamics, further reveal the diversity of husbandry practices that directed domestication and also confront analytical challenges in the use of oxygen and strontium isotopes to trace movement in the southern Levant.

12 BUILDING -OVICAPRINE- BRIDGES: COMBINED PALAEOGENOMIC AND PALAEOPROTEOMIC ANALYSIS FOR THE STUDY OF CAPRINAE EARLY DOMESTICATION

Le Meillour, Louise (Section for Molecular Ecology and Evolution - Globe Institute - University of Copenhagen - Denmark) - L'Hôte, Louis (Smurfit Institute of Genetics - Trinity College Dublin - Ireland) - Bangsgaard, Pernille (Section for GeoGenetics - Globe Institute - University of Copenhagen - Denmark) - Yeomans, Lisa (Centre for the Study of Early Agricultural Societies - Department of Cross-Cultural and Regional Studies - University of Copenhagen - Denmark) - Zeder, Melinda (Department of Anthropology - National Museum of Natural History - Smithsonian Institution - Washington - USA) - Richter, Tobias (Centre for the Study of Early Agricultural Societies - Department of Cross-Cultural and Regional Studies - University of Copenhagen - Denmark) - Darabi, Hojjat (Razi University - Kermanshah - Iran) - Welker, Frido (Section for Molecular Ecology and Evolution - Globe Institute - University of Copenhagen - Denmark) - Daly, Kevin (School of Agriculture and Food Science - University College Dublin - Ireland)

The advent of domestic species marks a turning point in our (pre)history. With the cultivation and herding of domesticated plants and animals, humans became less reliant on what they could gather and hunt, shifting societies and their economies to controlled food production. Starting around 10,000 years ago, the domestication of sheep (*Ovis aries*) and goats (*Capra hircus*) is now understood as a geographically complex and gradual process. The management and control over reproduction of populations of the wild representatives *Ovis orientalis* and *Capra aegagrus* consequently led, after many generations of breeding in the anthropogenic environment, to the domestic forms of caprines currently herded. It is thus crucial for understanding these very first steps of animal domestication to specifically characterise archaeological faunal assemblages dating to this transition towards more intensive livestock management. The present paper aims at inferring the nature of caprine domestication in the Zagros Mountains using biomolecular methods. Genetic analysis showed limited success, but we nevertheless report the first ancient *Capra* specimens from Shanidar Cave and Tepe Guran, widening our temporal understanding of the local wild and managed goat populations. Some of the sampled specimens failed aDNA recovery and were thus sub-sampled for ancient protein extraction and characterisation through Zooarchaeology by Mass Spectrometry (ZooMS). We therefore report the first use of a dual biomolecular approach on faunal assemblages from southwest Asia, by combining ancient DNA and ancient protein analyses, shedding new light on the initial steps of Caprinae domestication.

13 SHEEP OR GOATS? CAPRINE MANAGEMENT IN THE CENTRAL SAHARA IN THE MIDDLE-LATE HOLOCENE (8300-3400 CAL BP)

Di Matteo, Martina (Department of Ancient World Studies, Sapienza University of Rome, Rome, Italy) - McGrath, Krista (Department of Prehistory and Institute of Environmental Science and Technology (ICTA-UAB), Universitat Autònoma de Barcelona, Bellaterra, Spain) - Soncin, Silvia (MARE, Department of Environmental Biology, Sapienza University of Rome, Rome, Italy) - di Lernia, Savino (Department of Ancient World Studies, Sapienza University of Rome, Rome, Italy; GAES, University of Witwatersrand, Johannesburg, South Africa)

The introduction of domesticated animals from the Near East to Africa is now well established, although it remains unclear how this took place in the case of sheep and goat.

Recent studies have shown how this process is complex and articulated (di Lernia, 2021; Le Meillour, 2021; Prendergast et al., 2019) and that sheep and goat require individual histories that are often lacking due to the difficulty of discriminating bones between the two species. This is further complicated in African contexts due to the presence of wild bovids of the same size of sheep and goat.

Most importantly, the introduction of domestic animals did not always result in a complete interruption of hunting activities and therefore distinguishing between domestic and wild species is crucial for the archaeological documentation of the passage towards a productive economy. Decades of research suggest that the Central Sahara has among the oldest evidence of domestic animals in Africa and therefore is a key spot to investigate such dynamics.

Here we present a high-resolution analysis of the faunal record from some archaeological contexts in SW Libya with ZooMS (Zooarchaeology by Mass Spectrometry). Representing the very first application of this method in the Sahara, this study has enabled the refinement of sheep and goat taxonomic determinations, highlighting the simultaneous presence of both species in archaeological levels dating to around 8300-8000 cal BP. These fragments constitute among the oldest goat and sheep remains of the African continent.

Thanks to our results, it is now possible to observe changes in the management of sheep and goats to cope with an increasingly unpredictable and variable environment and climate from the mid-Holocene onwards, even on a seasonal basis. Specialized goat breeding would appear to be the resilience strategy implemented by Saharan pastoralists to cope with the desertification process.

14 UNRAVELING PASTORALIST HUSBANDRY: INSIGHTS FROM DENTAL ANALYSES AT THE KASTEELBERG SITE, SOUTH AFRICA

Hutten, Louisa (University of Cape Town) - Stynder, Deano (University of Cape Town)

The Kasteelberg site, situated along South Africa's west coast, provides a unique opportunity to explore a pastoralist history extending over two millennia. With a significant accumulation of sheep dental remains, this archaeological site offers valuable insights into early herding practices within the region. Our study investigates whether the Kasteelberg people employed grazing strategies reminiscent of those observed in Khoekhoe pastoralist societies during the colonial era, aimed at optimizing grass availability for their livestock. Utilizing dental micro- and mesowear analyses, our study endeavors to elucidate the dietary patterns of Kasteelberg's sheep, shedding light on their grazing behaviours and the husbandry practices of their owners. The local region experiences seasonal fluctuations in grazing conditions, characterized by abundant grass during winter and scarcity in summer. Conditions were likely similar during the pre-historic period, with seasonal aridity prompting pastoralist mobility to more perennial inland pastures. Through the characterization of dental wear patterns on the molars of sheep and comparably sized wild bovids, our study aims to unravel the intricate dynamics of human-animal interactions and resource exploitation amidst varying grazing conditions during the prehistoric era. Given the paucity of studies in southern Africa, we draw upon insights from European research to augment our understanding of local farming and herding practices.

15 PASTORALISM AND PALAEOPROTEOMICS: INSIGHTS FROM DIEPKLOOF ROCK SHELTER, WESTERN CAPE, SOUTH AFRICA

Nyambiya, Humphrey (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB), Universidade do Algarve) - Hansen, Jakob (Globe Institute, University of Copenhagen) - Hutten, Louisa (Department of Archaeology, University of Cape Town) - Parkington, John (Department of Archaeology, University of Cape Town) - Welker, Frido (Globe Institute, University of Copenhagen) - Rhodes, Sara (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB), Universidade do Algarve) - Val, Aureore (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB), Universidade do Algarve; CNRS, UMR 7269 LAMPEA, Aix-Marseille Université, Aix-en-Provence, France; School of Geography, Archaeology and Environmental Studies, University of the Witwatersrand, Johannesburg) - Meillour, Louise le (Globe Institute, University of Copenhagen)

Animal domestication changed human subsistence strategies by ensuring availability of animal resources. Domesticated caprines were introduced to Africa from the Near East, and are documented in north Africa from 9000 BP. Caprines moved slowly southwards and appear in southern Africa only at 2000 BP. While the scientific community agrees that the appearance of livestock in southern Africa was from further north, how this happened and the nature and impact of herding practices on existing subsistence strategies remains debated. Recently, criticisms have been levelled against sheep identifications based on modern reference collections as there exist morphological overlaps between sheep, goat and other wild bovids. Here, we report dual species identifications from both zooarchaeological and palaeoproteomic approaches. We used Zooarchaeology by Mass Spectrometry (ZooMS) on 90 long bone specimens from Diepkloof Rock Shelter, Western Cape, South Africa. This site has a long chronology dated from 100 kya of the Middle Stone Age (MSA) layers to the late phases of Later Stone Age (LSA) dated to 1500 BP; thus covering the period when domesticated sheep and goat are attested in the region. Our results identified both wild and domestic taxa, demonstrates the exploitation of juvenile individuals, thereby supporting previous morphological identifications and past broad interpretations from various zooarchaeological studies. This paper will further discuss the importance of combining traditional zooarchaeology and palaeoproteomics, the combination of which promises to unravel intricate details of animal resource exploitation and human-animal interactions during this critical phase.

16 COMPLEX INTERCONNECTIONS BETWEEN CLOTH PRODUCTION AND THE ANIMAL WORLD: NEW PROTEOMIC INSIGHTS FROM ANCIENT SUDAN AND NUBIA

Viñas Caron, Laura (University of Copenhagen)

The animal world has tremendously influenced the economy of ancient Sudanese societies along the Middle Nile Valley. Most studies have focused on the dietary and symbolic role of animals so far and, thus, their importance in cloth production remains largely unassessed. Sheep and goat pastoralism spread along the Nile around the 5th millennium BCE, but the first attestations of wool textiles only date back to the 1st millennium BCE. Camel or dromedary was also probably used for wool production in ancient Sudan after its arrival during the 1st millennium BCE. However, the identification of wool fibres with morphometric methods is challenged by degradation, impeding the discrimination of sheep, goat or camel wool in most cases. Another long-lasting debate has revolved around the usage of domesticated versus wild animals (e.g. gazelle, giraffe or leopard) for skin garment production. Their correct identification is essential to understand which species were selected to answer the demands of garment production and assess how they were

managed within the whole economic system. Additionally, it can inform us about the interactions between sedentary and nomadic communities, landscape use and trade networks.

To elucidate these questions, the ERC project “Fashioning Sudan. Archaeology of Dress along the Middle Nile” is investigating cloth garments made of textiles and animal skins preserved in Sudan and Nubia and ranging from the Bronze Age to the Late Medieval Period (c. 2500 BCE to 1500 CE). Furthermore, we incorporate new developments in ZooMS and palaeoproteomics to identify the animal species used across time and space. In this paper, we will present the overall project and place our preliminary proteomic results within the broader context to shed new light on pastoral practices in ancient Sudan.

17 ANCIENT NUBIAN FURSKINS – TRACING OVICAPRINE BREED DIFFERENCES BY INVESTIGATING HAIR MORPHOLOGY

Skinner, Lucy-Anne (University of Copenhagen)

Biomolecular and morphometric techniques have been employed to identify the animal provenance of Nubian leather and furskin garments dating between the Early Nubian Period (3800BC) to the end of the Middle Nubian Period (1550 BC).

Animal provenance (species, breed, age) of Nubian leather has proved difficult to identify by comparing a skin’s Grain Follicle Pattern (GFP) with modern reference skin sets, because the diagnostic part (the skin’s grain surface) is typically scraped away during leather processing. However, Nubian furskin garments have residual animal hair. Since animal hair often has large inter / intra-species variations in morphology, it offers a viable alternative for morphometric ID. This paper builds upon results from the bio-molecular analysis of furskins, used to identify sheep and goatskin; carrying out systematic morphometric investigation of hair, whereby multiple diagnostic features have been recorded. These include hair length, hair bulb, tip and shaft shape, thickness, proportions of primary and secondary hairs, hair-density on the skin surface, and diagnostic patterns and features of the hair scale-cuticle.

Insights provided by morphometric investigation of hair from Nubian furskins include – an impression of fleece/hair types of domestic animal breeds living during different periods, suggestions of the season of animal slaughter, and differences in coat type depending on animal age.

Challenges with the methodologies employed include – fragility and degradation of ancient hair-shafts, high-magnification required and difficulties resolving images of hair scale-patterns (using regular microscopes), and issues interpreting the features of hair from ancient animal breeds when access to comparative reference hair samples was limited to modern breeds.

Nevertheless, (especially when supported / complimented by bio-molecular species ID), morphometric investigation using residual hair can provide insightful impressions of ancient breed appearance and animal management practices.

704 BIOARCHAEOLOGY OF ANCIENT PATHOGENS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Pochon, Zoé (Department of Archaeology and Classical Studies, Stockholm University; Centre for Palaeogenetics) - L’Hôte, Louis (Smurfit Institute of Genetics, Trinity College Dublin) - Barbieri, Rémi (Institute of Genomics, University of Tartu) - Wilkin, Shevan (Institute of Evolutionary Medicine, University of Zurich) - Majander, Kerttu (Integrative Prehistory and Archeological Science (IPAS), University of Basel)

Session format: Regular session

Epidemics and disease have played a pivotal role in shaping human history, leaving their indelible marks on societies and civilizations throughout time. Join us in an exploration of the profound impact of ancient pathogens on human history. We invite contributions that delve into the study of various pathogenic agents, including bacteria, viruses and eukaryotic parasites and their impact, all with relevance to archaeological research.

Our aim is to uncover how these ancient pathogens influenced human populations, their domesticated animals and crops. These influences encompassed direct contaminations, through devastating plagues, zoonotic outbreaks or endemic pathogens, but also indirect consequences, such as crop disease induced famines and livestock epidemics leading to restricted access to animal products.

This session offers a platform for scholars with diverse archaeological methodologies, including, but not exclusive to, bioarchaeological methods, palaeopathological analysis, metagenomic screenings, the study of immunological protein biomarkers, and historical account analysis. We invite your participation in the exploration of the past to better understand the profound impact of infectious diseases on past human history.

ABSTRACTS

1 BIOMOLECULAR INSIGHTS INTO THE SECOND PLAGUE PANDEMIC FROM THE LAZZARETTO VECCHIO OF VENICE

Gaul, Emily (Institute for Archaeological Sciences, Department of Geosciences, Eberhard Karls University of Tübingen, Germany) - Krettek, Kim-Louise (Archaeo- and Palaeogenetics Group, Senckenberg Centre for Human Evolution and Palaeoenvironment, Tübingen, Germany) - Reiter, Ella (Institute for Archaeological Sciences, Department of Geosciences, Eberhard Karls University of Tübingen, Germany) - Vazzana, Antonino (Dipartimento di Beni Culturali, Università di Bologna, Ravenna, Italy) - Figus, Carla (Dipartimento di Beni Culturali, Università di Bologna, Ravenna, Italy) - Benazzi, Stefano (Dipartimento di Beni Culturali, Università di Bologna, Ravenna, Italy) - Posth, Cosimo (Institute for Archaeological Sciences, Department of Geosciences, Eberhard Karls University of Tübingen, Germany; Archaeo- and Palaeogenetics Group, Senckenberg Centre for Human Evolution and Palaeoenvironment, Tübingen, Germany) - Spyrou, Maria (Institute for Archaeological Sciences, Department of Geosciences, Eberhard Karls University of Tübingen, Germany)

The Second Plague Pandemic, considered to be among the largest infectious disease pandemics of human history, is generally recognised to have lasted from the 14th to early 19th centuries, affecting regions across Eurasia and likely beyond. Over the last decade, biomolecular, archaeological, and historical data have yielded insights into global patterns of the disease’s distribution and the bacterium’s genetic diversity during the Second Pandemic. Yet, whilst more than 100 ancient *Y. pestis* genomes are currently available from this period, the precise mechanism and chronology of the disease’s dissemination remain subjects of debate, including the geographical origin(s) of successive plague waves during the period following the Black Death (1346-1353). To this end, important new perspectives might be derived from high-resolution analysis of mass burial sites proximal to centres of trade, which likely played a key role in the disease’s dispersal. In this study, we present the results of ancient DNA analysis conducted on individuals recovered from the Lazzaretto Vecchio, Venice’s first permanent plague hospital. Constructed in 1423 on the island of Santa Maria di Nazareth, it served as a quarantine facility for people infected with plague right until the city’s last major outbreak in 1630-31. Through a metagenomic screening of non-targeted sequencing data, we investigate broad viral and bacterial presence as informative for overall population health. In addition, we find a high degree of *Y. pestis* DNA preservation at the site, with traces of the pathogen detected in a large number of the individuals studied. As a major intersection of people and goods from across the Eurasian continent, the Lazzaretto Vecchio presents an important case study for our understanding of intra-pandemic dynamics. More broadly, our findings attest to the potential of denser sampling strategies, applied to single burial sites, as a tool for exploring localised temporal patterns of pathogen presence.

2 BLACK DEATH IN SÁPMI? THE IMPACT OF THE SECOND YERSINIA PESTIS PLAGUE PANDEMIC ON THE SAAMI POPULATION IN NORTHERN FENNOSCANDIA

Spangén, Marte (Museum of Cultural History, University of Oslo) - Jørgensen, Erlend (Norwegian Institute of Cultural Heritage Research)

The AD 1346–1353 Black Death pandemic constitutes one of the most distinct and best studied historical events in Europe, forming a unified and synchronous historical and epidemiological boundary horizon. However, studies of the impact of this plague and subsequent outbreaks in northern Fennoscandia are lacking, particularly concerning the Saami population. Existing studies focus on urban centers and agricultural communities, while there are few studies of the effect on indigenous and foraging populations, mainly due to the lack of relevant historical sources to draw on. This paper contributes to closing this knowledge gap through temporal frequency distribution analyses of 156 radiocarbon-dated burials and 543 typologically or historically dated burials in Saami areas (Northern Fennoscandia). The results strongly suggest that Saami groups were directly affected by the Black Death. They also reveal other interesting trends in burial customs. Combined with historical and archaeological evidence, we conclude that the plague had substantial impact on religion and social organisation among the Saami.

3 REFINING THE CHRONOLOGY OF THE SECOND PLAGUE PANDEMIC THROUGH PHYLOGENETICALLY INFORMED RADIOCARBON MODELLING

Keller, Marcel (Estonian Biocentre, Institute of Genomics, University of Tartu, Tartu, Estonia; Integrative Prehistory and Archaeological Sciences, Department of Environmental Sciences University of Basel, Switzerland; Department of Physical Anthropology, Institute of Forensic Medicine, University of Bern, Bern, Switzerland) - Guellil, Meriam (Estonian Biocentre, Institute of Genomics, University of Tartu, Tartu, Estonia; Department of Evolutionary Anthropology, University of Vienna, Vienna, Austria) - Slavin, Philip (Division of History, Heritage and Politics, University of Stirling, Stirling, UK) - Valk, Heiki (Institute of History and Archaeology, University of Tartu, Tartu, Estonia) - Robb, John (Department of Archaeology, University of Cambridge, Cambridge, UK) - Reitmaier, Thomas (Archaeological Service of the Canton of Grisons, Chur, Switzerland) - Baetsen, Willem (RAAP Archeologisch Adviesbureau b.v., Leiden, The Netherlands; School of Archaeology and Ancient History, University of Leicester, Leicester, UK) - Szidat, Sönke (Department of Chemistry, Biochemistry and Pharmaceutical Sciences, University of Bern, Bern, Switzerland; Oeschger Centre for Climate Change Research, University of Bern, Bern, Switzerland) - Tambets, Kristina (Estonian Biocentre, Institute of Genomics, University of Tartu, Tartu, Estonia) - Scheib, Christiana (Estonian Biocentre, Institute of Genomics, University of Tartu, Tartu, Estonia; St John's College, University of Cambridge, Cambridge, UK)

The second plague pandemic in Europe between the 14th and 18th centuries is one of the most studied pandemics in human history not only through historical research, but also through ancient pathogen genomics, counting now over 90 reconstructed genomes from dozens of places in Western and Central Eurasia. Yet, combining datasets of both disciplines has been challenging, since for most ancient *Yersinia pestis* genomes only broad radiocarbon dating intervals are available, often making it impossible to associate them with historically documented outbreaks.

For our study, we reconstructed new *Y. pestis* genomes from eight archaeological sites in England, Estonia, the Netherlands, Switzerland, and western Russia dating from the Black Death in 1349 up until the Great Northern War in 1710. This new genomic evidence showcases the presence of plague in the Eastern Baltic region over more than three centuries and elucidates the geographic spread of individual *Y. pestis* sublineages through Europe. Furthermore, we present a novel dating methodology by feeding relative chronological information from phylogenetic trees into radiocarbon models, which in some instances narrows down dating intervals for ancient plague genomes to only a few decades. Combined with an in-depth historical contextualization, this allows us to discuss the probable association of those genomes with documented epidemics, improving our understanding of the dynamics of the second plague pandemic. We expect that sequencing of additional ancient *Y. pestis* genomes along with radiocarbon dating will further improve the temporal resolution of our models, and suggest that the application of our methodology to other clonally evolving pathogens as well.

4 COEVOLUTION OF PATHOGENIC YERSINIA IN DOMESTICATED SPECIES

Hearne, Katherine (University of Oxford)

Yersinia pestis is a significant human-associated pathogen, and is relatively well researched in ancient pathogen genomics (Spyrou et al. 2019). Understanding of *Y. pestis* evolution during the Neolithic is being continuously refined as more ancient *Y. pestis* genomes are sequenced, allowing insight into the development of virulence factors since pathogen emergence c. 5000 years ago (Andrades Valtueña et al. 2022).

The shifting human-animal interactions and changing human and animal demographics associated with the Neolithic would have substantially affected pathogen evolutionary dynamics. To understand the early evolution of *Y. pestis*, from its clonal ancestor *Yersinia pseudotuberculosis* (McNally et al. 2016), it is essential to contextualise it within the wider ecological and pathogenic landscape of the genus *Yersinia*.

Dogs and pigs have a degree of resistance against *Y. pestis* infection, sometimes linked to their domesticated status (Barbieri et al. 2020), though this resistance is likely exhibited at the genus level. Here I consider the hypothesis that canids and suids are resistant to pathogenic *Yersinia* due to an extended period of coevolution, which pre-dates domestication. Changing interactions with domesticated species during the Neolithic likely increased human exposure to *Yersinia* species, and human susceptibility to pathogenic *Yersinia* may be due to an absence of coevolution.

Based on metagenomic screening of ancient and modern human and animal genomes I explore temporal and geographic patterns of *Yersinia* infection, including potential effects of demographic change upon disease burden. By shifting focus from an anthropocentric understanding of pathogen evolutionary dynamics to one encompassing animal ecologies I consider the hypothesis that *Yersinia* species are a major burden for humans because several important domesticates are resistant at the genus level. In this view, we increase our exposure to pathogenic *Yersinia* species by cohabiting with these animals, but are outsiders in their wider bacterial ecology.

5 RETZIUS COLLECTION: ABORIGINAL CRANIA FROM PUERTO RICO IN STOCKHOLM

Llorens-Liboy, Myriam (Independent researcher) - Nuñez-Garcés, Milton (Professor emeritus Oulu University)

This paper deals with the fate of a group of nine Taino crania of different age and sex. They were originally found in a burial cave on Puerto Rico and then taken to Sweden by the pharmacist Justus Adalric Hjalmarsson (1823-1876), who donated them to Professor Gustaf Retzius's collection in 1857. Later, the crania were incorporated in the collection of the Osteoarchaeology Laboratory of Stockholm University. Eight of the crania present, in major or minor grade, lesions similar to those left by treponematosi, and three of them show possible signs of intentional deformation. In 1971, the anthropologist Nils-Gustav Gejval and the pathologist Folke Henschel published a brief description of eight the crania. For three decades, the "Boricuas" crania were forgotten until they were rediscovered by Jan Storå and Milton Núñez in 2006. Their existence remained unknown to Puerto Rican archaeologists until Myriam Llorens-Liboy became a member of the research team in 2008. She was the first Puerto Rican to gain access to the crania and describe the results of the analyses made so far as well as future research plans and new possible osteological evidence.

6 NON-INVASIVE ANALYSES OF INCA MUMMIES REVEAL UNDOCUMENTED GENETIC AND PATHOGENIC VARIATION

Gelabert, Pere (University of Vienna; Human Evolution and Archaeological Sciences (HEAS)) - Hämmerle, Michelle (University of Vienna; Human Evolution and Archaeological Sciences (HEAS)) - Guellil, Meriam (University of Vienna; Human Evolution and Archaeological Sciences (HEAS)) - Socha, Dagmara (Center for Andean studies, University of Warsaw) - Sawyer, Susanna (University of Vienna; Human Evolution and Archaeological Sciences (HEAS)) - Cheronet, Olivia (University of Vienna; Human Evolution and Archaeological Sciences (HEAS)) - Bernaski, Mario (Museo de Arqueología de Alta Montaña (MAAM)) - Recagno, Gabriela (Museo de Arqueología de Alta Montaña (MAAM)) - Kuhlwiilm, Martin (University of Vienna; Human Evolution and Archaeological Sciences (HEAS)) - Pinhasi, Ron (University of Vienna; Human Evolution and Archaeological Sciences (HEAS))

The three Mummies of the Llullaillaco (Argentina) were discovered in 1999 on the top of the Llullaillaco volcano, making the volcano the world's highest ceremonial site. They were buried about 1.7m deep inside pit tombs. The bodies are the best-preserved mummies discovered to date in the Andes. Their perfect conservation owed to freezing temperatures, mild humidity, and an anaerobic environment. The Inca sacrificed them as part of a ritual called "Capacocha". Besides religious significance, the sacrifices helped exert social control and gained socioeconomic benefits over conquered provinces.

The mummies were sampled non-invasively at the Museum of Arqueología de Alta Montaña (MAAM) in Salta and the sequencing libraries were prepared in a dedicated ancient DNA facility at the University of Vienna. The sequencing data was analyzed following well-established bioinformatics tools adapted specifically to ancient DNA. We obtained a 3.2x, 14.3x, and 25.3x human genome from the three individuals, respectively. Their genomes reveal that they are genetically most similar to indigenous people from what is nowadays Peru, and provide genetic insights into their health conditions. These are unique genomes as they are from a time before the colonization of the Americas. Additionally, we identified pathogenic reads from both Human gammaherpesvirus 4 (HHV4) and Bartonella quintana, whereby the latter has not been sequenced from ancient individuals before.

7 TRACKING ANCIENT ZOOZOSIS AND LIVESTOCK PATHOGENS ACROSS THE DOMESTICATION PROCESS

L'Hote, Louis (Trinity College Dublin) - Makarewicz, Cheryl (Institute of Pre- and Protohistoric Archaeology-Christian Albrechts University, Kiel - Germany) - Gourichon, Lionel (CNRS, CEPAM (UMR 7264) - Université Nice Côte d'Azur - France) - Daly, Kevin (School of Agriculture and Food Science - University College Dublin - Ireland)

The Neolithic period in Southwest Asia was characterized by the domestication of livestock animals, which had a profound effect on human health, as it provided a stable source of animal protein and secondary products. This increased interaction between animals and humans is thought to have resulted in a heightened risk of zoonotic disease transmission, both within herds and between animals and humans. Here we present the recovery of zoonotic and animal pathogens from multiple species and temporal contexts, shedding light on the evolutionary trajectories and spread of these pathogens during the domestication process. Among these we report the retrieval of an ancient genome of *Brucella melitensis* from a Neolithic sheep in Mentese, Turkey (6024-5842 cal BCE), the agent of brucellosis, a prevalent zoonotic bacterial infection causing chronic infections and spontaneous abortion in livestock, a cause of substantial harm to both herd those communities reliant on livestock, such as pastoralist societies. Furthermore we explore the evolutionary and temporal dynamics within the *brucella* genus.

8 REDEFINING THE TREPONEMAL HISTORY THROUGH PRE-COLUMBIAN GENOMES FROM BRAZIL

Majander, Kerttu (Integrative Prehistory and Archeological Science (IPAS), University of Basel, Basel, Switzerland) - Pla-Díaz, Marta (Integrative Prehistory and Archeological Science (IPAS), University of Basel, Basel, Switzerland) - du Plessis, Louis (Department of Biosystems Science and Engineering, ETH Zürich, Basel, Switzerland; Swiss Institute of Bioinformatics, Lausanne, Switzerland) - Arora, Natasha (Zurich Institute of Forensic Medicine, University of Zurich, Zurich, Switzerland) - Filippini, Jose (Institute of Biosciences, University of São Paulo, São Paulo, Brazil) - Pezo Lanfranco, Luis (Institute of Biosciences, University of São Paulo, São Paulo, Brazil; 10. Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, Bellaterra, Spain) - Eggers, Sabine (Department of Anthropology, Natural History Museum Vienna, Vienna, Austria) - González-Candelas, Fernando (Unidad Mixta Infección y Salud Pública FISABIO/Universidad de Valencia-I2SysBio, Valencia, Spain; CIBER in Epidemiology and Public Health, Instituto de Salud Carlos III, Madrid, Spain) - Schuenemann, Verena (Integrative Prehistory and Archeological Science (IPAS), University of Basel, Basel, Switzerland).

Treponemal spirochetes constitute a group of both historically grievous and globally re-emergent pathogens with serious human health implications. In the absence of ancient DNA (aDNA) evidence until recently, their origins and evolutionary trajectories have remained widely debated. For instance, the severe syphilis epidemic in Europe, starting in the late 1400's, has in turns been ascribed either to Columbus' first expedition to America, or to an alternative, Old World or ancient global origin. In a novel study, we present indisputable genomic evidence of a pre-Columbian treponematoses from South America, dating back nearly 2000 years: four *Treponema pallidum* genomes, reconstructed from pathogen aDNA in prehistoric human remains from a sambaqui (shellmound) burial, Jabuticabeira II, south coast of Brazil, where at least three cases (in 56 evaluated individuals) of treponematoses were previously diagnosed with morphological methods. Unexpectedly, the recovered pathogen genomes appear extremely similar to the modern strains that cause bejel, an endemic type of treponematoses which today is mainly found in the hot and arid regions of the world, instead of humid, coastal environments. This spatial discrepancy despite the genomic likeness between the ancient and modern strains demonstrates the high adaptive abilities of *T. pallidum* subspecies under various conditions, and extends the plausible range of their dispersals in the past. One of the genomes exhibited a particularly high coverage (33.6X), allowing an in-depth analysis of the recombination events across the *T. pallidum* family and an improved molecular clock dating estimation with previously published diversity of ancient *T. pallidum* genomes and currently circulating treponemal strains. Together, these analyses suggest a pre-Columbian divergence time for all *T. pallidum* subspecies present today, and showcase the remarkable potential of archaeogenetics in solving essential questions of treponemal evolution and in illuminating their elusive origins.

9 GENETIC ASPECTS OF ANCIENT PATHOGENS IN SOUTH KOREA

Hong, Jong Ha (Institute of Korean Archaeology and Ancient History, Kyung Hee University, Seoul, Republic of Korea) - Shin, Dong Hoon (Department of Anatomy and Cell Biology, Seoul National University College of Medicine, Seoul, Republic of Korea)

To reveal epidemic patterns of infectious diseases among ancient populations, bioarchaeology employs various scientific techniques on archaeological samples. Over the past several decades, ancient DNA (aDNA) study has received considerable attention in the field of bioarchaeology. However, until recently, the number of aDNA research cases has been insufficient to acquire detailed information on genetics of ancient pathogens in Korea. Latterly in South Korea, various evidences of ancient pathogens have been discovered in mummies dated from the 15th to the 18th century through microscopic examination. Fortunately, aDNA analysis has been successfully conducted on a total of six ancient pathogenic agents. In this presentation, we will briefly introduce the paleopathological research being conducted in South Korea and present the results of examinations for five ancient parasite species and one bacterial species. The utility of aDNA analysis in the field of bioarchaeology will be explored thus. Genetic differences between modern and ancient pathogens, and differences among geographically disparate pathogens will also be presented in this study. This study is supported by the National Research Foundation of Korea (NRF) grant (NRF-2023R1A2C1006785).

10 INSIGHTS INTO THE ORIGIN OF LEPROSY BY ANALYZING ANCIENT MYCOBACTERIUM LEPRAE GENOMES FROM ANATOLIA

SEVKAR, Arda (Human-G Laboratory, Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey) - ALTINIŞIK, Nefize (Human-G Laboratory, Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey) - UYSAL, Gülfem (Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey) - GÖTHERSTRÖM, Anders (Department of Archaeology and Classical Studies, Stockholm University, Stockholm, Sweden; Centre for Palaeogenetics, 106 91 Stockholm, Sweden) - SOMEL, Mehmet (Department of Biological Sciences, Middle East Technical University, 06800 Ankara, Turkey) - ERDAL, Yılmaz (Human-G Laboratory, Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey; Husbio-L Laboratory, Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey) - ÖZER, Füsün (Human-G Laboratory, Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey)

Leprosy, caused by *Mycobacterium leprae*, stands as one of the most feared infectious diseases in human history and has elicited widespread apprehension and social stigmatization. Phylogenetic analyses of ancient and contemporary *M. leprae* strains have revealed that Europe, compared to other regions, harbored the most ancestral strains and displayed higher genetic diversity throughout time. These findings have led to two hypotheses regarding the origin of leprosy. The first hypothesis suggests that leprosy may originate from Europe or even the Near East. Conversely, the alternative hypothesis posits that Europe's higher genetic diversity stems from mutual interactions with neighboring regions. Even with relatively extensive genetic data comprising over 200 ancient and contemporary strains, the exact origins and evolutionary trajectory of *M. leprae* remain unresolved due to the spatial sparsity of ancient genomic data. Therefore, *M. leprae* whole-genome data from regions that have not been previously studied such as the Near East and Central Asia are needed to address these questions.

Here, we genetically screened 9 individuals from ancient Anatolia, spanning the Byzantine to the Late Ottoman Period, displaying palaeopathological signatures compatible with leprosy. Among four samples diagnosed as lepromatous leprosy, three of them yielded ancient *M. leprae* DNA. Phylogenetic analysis placed two Byzantine period samples in the 3K-0 Branch, representing the most ancestral strains. Furthermore, these two ancient strains are positioned in the outermost nodes of the 3K-0 Branch, supporting the first hypothesis. Another ancient strain from the Late Ottoman Period formed a clade in the 2F Branch, closely clustering with modern Ethiopian and historical Russian strains, possibly indicating Late Modern Period interactions between Eastern Africa, Near East, and Eastern Europe. Thus far, this study provides the first ancient whole genome data for the 2F and 3K-0 strains beyond Europe, enabling us to revisit the hypotheses proposed for the origin of leprosy.

11 INFECTIOUS DISEASES IN THE MEDIEVAL NECROPOLIS OF LAS GOBAS, IBERIA

Pochon, Zoé (Centre for Palaeogenetics; Department of Archaeology and Classical Studies, Stockholm University) - Rodríguez-Varela, Ricardo (Centre for Palaeogenetics; Department of Archaeology and Classical Studies, Stockholm University) - Yaka, Reyhan (Centre for Palaeogenetics; Department of Archaeology and Classical Studies, Stockholm University) - Sanchez-Pinto, Iban (Departamento de Geografía, Prehistoria y Arqueología, University of the Basque Country, UPV/EHU; GPAC, C. I. Micaela Portilla, University of the Basque Country, UPV/EHU) - Luis Solau, José (Departamento de Geografía, Prehistoria y Arqueología, University of the Basque Country, UPV/EHU; GPAC, C. I. Micaela Portilla, University of the Basque Country, UPV/EHU) - Lagerholm, Vendela (Centre for Palaeogenetics; Department of Archaeology and Classical Studies, Stockholm University) - Krzewinska, Maja (Centre for Palaeogenetics; Department of Archaeology and Classical Studies, Stockholm University) - Herrasti, Lourdes (Departamento de Antropología, Sociedad de Ciencias Aranzadi) - Azkarate, Agustín (Departamento de Geografía, Prehistoria y Arqueología, University of the Basque Country, UPV/EHU; GPAC, C. I. Micaela Portilla, University of the Basque Country, UPV/EHU) - Götherström, Anders (Centre for Palaeogenetics; Department of Archaeology and Classical Studies, Stockholm University)

The Las Gobas necropolis, spanning five centuries from the 7th to the 11th, represents a unique archaeological site offering insights into medieval populations in Northern Spain. Situated within an extensive complex of medieval cave settlements, Las Gobas provides a glimpse into the societal dynamics and interactions within this rural Christian community during the transformative era of the early Middle Ages. Through a comprehensive analysis, our study combines archaeogenetic methods with metagenomics to unravel the health, demography, and societal intricacies of this ancient population.

Here, we focus on the analysis of infectious diseases found at the site through ancient metagenomic screening. Employing the ancient metagenomic workflow, aMeta, developed in collaboration with the National Bioinformatics Infrastructure Sweden (NBIS), we identified significant ancient pathogens. From the screening of 33 individuals buried at Las Gobas, we detected ancient infectious diseases such as *Yersinia enterocolitica*, *Erysipelothrix rhusiopathiae*, and *Leptospira interrogans* using aMeta. These findings hold particular significance as they shed light on previously understudied diseases in ancient populations, highlighting potential implications such as contaminated water sources,

animal handling practices, and other factors contributing to the health challenges faced by medieval communities. Further investigation using KrakenUniq, Bowtie2, and MapDamage of the organisms under the default thresholds of aMeta indicates the potential presence of *Borrelia recurrentis* and the Variola virus, agent of smallpox. The detection of these pathogens, if confirmed, would offer unprecedented insights into the health challenges faced by medieval populations of Iberia and could indicate new opportunities for understanding disease transmission and societal impacts during this transformative period.

708 DIGITAL DISSEMINATION: USING NEW TOOLS TO COMMUNICATE WITH STAKEHOLDERS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Rinehart Macrae, Grace (University College Dublin; The Humanities Guild) - Loy, Aida (Independent Researcher) - Petrocelli, Alexandria (The Humanities Guild) - Martínez Espinosa, Isaac (Urraca Historiadores; Colegio Menesiano; Instituto de Estudios Riojanos) - Mora Rodríguez, Fernando (Asociación del Hórreo Asturiano; Red Horrea (Red Internacional De graneros elevados tradicionales))

Session format: Session with keynote presentation and discussion

As archaeologists and heritage specialists, we know that civil engagement is vital for a project to live, survive, and thrive. Without the inclusion of local communities, a project cannot happen. Local communities are indispensable for any archaeological or heritage project to happen and have continuity. As professionals, we know that people care mainly for what they know and hold close in their daily life. Similarly, in this digital age, adapting to new forms of media will prove imperative for the continuation of public engagement with archaeological sites and the field as a whole.

Short-form content has become our main source of social media with the highest return on investment (ROI) of any online marketing, comprising over 80% of internet traffic. The increase in the use of social media and online tools makes these projects diverse and civil engagement spreads in the online world as well as the offline.

With this session we want to create a space for communication, where we can discuss both sides of the same coin. On one hand we will look at the benefits and hurdles of establishing an online presence with archaeology outreach as a whole. Discussing real world examples of opportunities, impactful outreach, and new forms of research dissemination, as well as the need for online safeguards against doxing and cyber-threats. On the other hand we will discuss projects focused on the inclusion and participation of different stakeholder groups (with no importance of group size, age, gender or any of the participant's characteristics) where the civil engagement is the main key. Here we can discuss the after effects of the use of digital tools on archaeological dissemination in civil engagement and society.

ABSTRACTS

1 OUTREACH IN THE DIGITAL AGE

Petrocelli, Alexandria (The Humanities Guild) - Rinehart Macrae, Grace (The Humanities Guild; University College Dublin)

According to Google data in 2022, around 40% of Gen Z (18-24 year olds) in the United States are using TikTok and Instagram as their search engine as opposed to traditional sites. They are increasingly gathering their news, opinions, and understanding of history from social media as opposed to other, more traditional forms. As archaeologists, in order to reach this demographic, a presence through visual storytelling is imperative. With the rise of pseudo-historians and "amateur-archaeologists" whose platforms have garnered millions of followers, and algorithms pushing popular takes, this is the new battleground for presenting history and heritage with nuance that matters.

The Humanities Guild is an organization of over 130 members, that seeks to equip the underrepresented in the humanities fields. Over 75% of our members rely on TikTok for their primary outreach in history and archaeology. Our team focuses on community and advocacy, equipping our members to continue creating effective visual storytelling in both public and academic spheres.

With this experience in mind, this paper we will be discussing how short-form media can be used to communicate with stakeholders. This paper will seek to walk through the steps of creating engaging content that is not just sustainable but translates into communication and curiosity for heritage sites and their preservation.

We will also take a look at defensive engagement - proactive steps and tools to combat the ever-growing threats of doxing, death threats, and defamation.

2 ARCHAEOLOGY MEETS POPULAR CULTURE: PRESENTING THE PAST ON SOCIAL MEDIA

Duricic, Ana (Laboratory for Bioarchaeology, Faculty of Philosophy, University of Belgrade)

With the expansion of digital technologies, archaeologists do not have to depend on media representatives to be present in the public space. We are currently living in Web 2.0 era, characterised by user-generated content on media platforms, where users participate in production and dissemination of online content. This new media era with not just television, radio and newspapers, but also with social media networks, blogs and podcasts, creates new opportunities and problems for archeologists. The emergence of social media platforms has created new jobs – content creators – individuals who produce and share content on their social media profiles. With no restrictions or criteria a creator has to fulfil in order to produce content for social media, the amount of misinformation on the Internet is increasing. This also translates to archaeology. With that in mid, archaeologists should join social media and contribute to the narrative in the public space by presenting their research and providing credible information. Luckily, nowadays more archaeologists are recognising the potential this mode of communication can have on the visibility of the discipline in the public space. There is no one right way to present archaeology and each archaeologist or a team can choose a format, platform and style of content that resonates the most with their target group. The aim of this presentation is to show one way of presenting archaeology on social media. Djuroplov, available in two languages (English and Serbian) on different social media platforms – YouTube, TikTok and Instagram, combines archaeology and entertainment. The idea behind Djuroplov is to offer a new form of modern video content for social media focused on bridging the gap between the past and the present, using trending topics, popular video formats and humorous high-quality edits. Differences in approaches to different platforms will be presented as well.

3 A PROJECT OF DISSEMINATION AND HERITAGE EDUCATION IN THE RURAL ENVIRONMENT

Larrauri Redondo, Sergio (Instituto de Estudios Riojanos)

Our proposal is to expose a heritage project that we have been developing for almost 30 years. It is based on a global conception of heritage from the knowledge, recovery, dissemination and social uses. This heritage project is linked to the less populated rural area of a small region and its inhabitants, although the problems, realities and processes of research and dissemination of archeology, heritage and history can be extrapolated to other territories. In these years, we have approached the study and research from a historical-archaeological and patrimonial point of view on heritage assets located mostly in rural areas, little known and often abandoned. These studies are part of larger projects such as restoration, enhancement and integration into cultural, tourist, educational and social identity resources. Sharing research with society is one of our priority objectives, especially because of the neglect or lack of knowledge about these heritage assets. In this way, through various activities such as guided tours -also on site-, talks, exhibitions, etc., we link the nearby and not so nearby society with the heritage property, with its history and the need for conservation and enjoyment for this and future generations.

This research-dissemination process is based on a double methodology, traditional and digital, such as the use of GIS systems, apps, online photographic repertoires or social networks.

4 URRACA HISTORIADORES, DIFFERENT WAY OF EXPLAINING LOCAL HERITAGE

Espinosa, Isaac (Urraca Historiadores)

My proposal consists of the analysis and presentation of the model for the dissemination of archaeology, history, heritage and culture developed by Urraca Historiadores in La Rioja, Spain. It is a system that is developed from different points of view, digital and traditional, and is based on the use and development of local and regional heritage, relating it to users of all ages and educational levels. This research and development group is composed of Isaac Martínez and Belén Martínez who develop their work in local communities and educational centres using digital tools, new forms of dissemination in the humanities with traditional activities such as the elaboration of proposals with recycled materials, dissemination through conferences, research days or practical workshops. They also write monographic publications that combine (and are equally important) history and fun activities. The main concept is to reach out to local communities using heritage recognisable to the people living in those places, achieving several objectives. The first is to enhance the value of local heritage, the second is to make it known to local and foreign people, the third is to prevent its degradation, the fourth is to solve problems that may arise from its conservation, and finally to prevent abuse of heritage.

5 ALMA DE BOSQUE: A PROJECT PROMOTED BY HORREA ABOUT THE APPLICATION OF ROUTES OF THE CULTURE OF TRADITIONAL RAISED GRANARIES

Rodríguez, Fernando (Asociación del Hórreo Asturiano; Red Horrea)

The Ethnological Routes are part of ALMA DE BOSQUE, innovative project promoted by HORREA that, from the consideration of the culture of the elevated granaries as living heritage bearers of the ancestral wisdom of the people,

tries to update its potential to root us and thus to be able to face today's problems in a way different, continuing our story in the now. It is about the creation and application of routes based on the culture of traditional raised granaries.

These routes range from the study of the structures to the great intangible heritage that surrounds them, starting from the craft of the carpenter craftsman, the uses for sociability, traditional uses, oral memory and the stories of their owners whose families have often preserved them during centuries.

These routes are accessible through QR codes that allow access to videos that contain oral memory and information associated with the element in which the QR code is located.

This is a project that has already been successfully implemented in some town in Asturias and we want to present it to you along with the magnificent results obtained.

6 SHARING IS CARING. SOCIAL MEDIA AND PODCASTS AS HERITAGE DISSEMINATION TOOL ("PIEDRAS VIVAS Y OTRAS MOVIDAS" PROJECT)

Loy, Aida (Piedras Vivas y Otras Movidas; independent Researcher)

Dissemination is as an important part of the archaeological process as researching. At the same time, we all know that more involved and informed communities tend to care and participate more with the heritage around them.

Natural sciences have understood the importance of dissemination of the scientific process, methods and results, and the role of scientific disseminator has been an important and influential one since the end of last century.

Following this trend when the social media arrived to mainstream audience, natural science disseminators took to them and started creating dissemination sciences channels and accounts. Even with a few years delay, social sciences, archaeology and cultural heritage professionals are taking to the social media as disseminators to share their work and involved the communities.

It is in this space that we have created the podcast "Piedras Vivas y Otras Movidas" (Living stones and other stuff) as we think that this is lacking in the Spanish speaking community. In this podcast, two archaeologists (Aida Loy and Isaac Martínez Espinosa) who work with heritage dissemination in different ways, choose a topic to talk in every episode. To make each topic more approachable to the listeners we use our own personal experiences with the related heritage, likewise, we finish each episode talking about our favourite heritage within the theme. As well we invite other professionals to talk about their specialities and their personal experience working in a heritage related field. We understand that many times heritage professions are surrounded by a mysterious and romanticised vision of their activities, so we want to give a space to those professionals to tell us about their work, why they do it and how it is important.

7 'SAD GIRL' ARCHAEOLOGY: RECLAMATION OF EMOTIONAL EXPRESSION IN DIGITAL ACADEMIC SPACES

Black, Stephanie (Durham University) - Bowyer, Charlotte (Independent Scholar) - Parker, Han (University of Nottingham)

TikTok has grown to become one of the most popular social media apps, expected to reach over a billion monthly users in 2024. Its growth has attracted a diverse community of archaeologists and historians, who engage viewers with educational (and often humorous) short-form content. Within this space, a specific style of video - that of the 'Sad Girl' - has gained popularity. These videos focus on the creator: showing them crying, sad, or emotional about archaeology and history. Through poignant storytelling, these creators, primarily young women in their 20's, weave together threads of melancholy, nostalgia, longing and empathy, inviting viewers into intimate narratives that transcend academic boundaries.

As a platform, TikTok encourages authenticity and vulnerability, however manufactured that may be. The 'Sad Girl' fits within this space by intertwining personal narratives with archaeological themes, offering a specific lens through which to explore the complexities of human existence and the legacies of the past. Furthermore, these creators challenge traditional notions of objectivity and detachment in archaeological discourse by foregrounding subjective experiences and emotions. Rather than viewing archaeological sites and artefacts as mere relics of the past, viewers are invited to empathise with the individuals and communities whose stories are embedded within these material traces.

At its core, 'Sad Girl' archaeology represents a deeply personal and introspective approach to the field, creating a space where the emotional landscapes of individuals are free to be explored outside of the rigid constraints of traditional academic circles.

8 SOCIAL MEDIA AS A RESEARCH METHOD IN HERITAGE STUDIES: A CASE STUDY OF UNDERSTANDING MUSEUM FOLLOWERS' EXPERIENCES ON SOCIAL MEDIA

Bakogianni, Sophia (Byzantine and Christian Museum; Open University of Cyprus; Panteion University of Social and Political Sciences)

Social media has evolved to a ubiquitous and powerful form of two-way communication, that is both to keep informed and to share opinions, thoughts and feelings. Social media has also become a source of data for researchers from different disciplines to understand social media users' perceptions, attitudes, and feelings for various issues. Thus, tools and techniques have been developed to support social network analysis, based on mining text content from social media data, and/or identifying links that form the networks evolved on social media. However, given the recent limitations that social media platforms have imposed to researchers restricting access to platforms' data for research (e.g., Facebook and Instagram APIs shut down for researchers and X/Twitter's demands for payment to use the platform's data), there is the need for new methods to emerge in studying social media platforms.

In this context, this paper suggests that in-depth mixed-methods research of social media data has many potentials and benefits and offers an alternative to researchers overcoming platforms' restrictions and limitations. Through a specific case study examining how social media users interact with museums on Facebook, Instagram, X/Twitter, I contribute with an in-depth, user-centered method that goes beyond the metrics and analytics offered by the platforms to assess museum followers' experiences on platforms. The strength of the methodology used to implement the current empirical study and collect the data is that it goes away from the platforms' standpoints and centers its attention to users, aiming to extract their thoughts and feelings, preferences and motivations using exclusively traditional online methods (surveys, interviews, observations) in digitally saturated environments as social media is. Finally, this is a paper that advocates for methodological innovation and creativity in studying social media data, and especially in relation to museum and heritage studies.

709 TIES THAT BIND: COMMUNITY, ECOLOGY AND CHALLENGES OF SCALE

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Schmaus, Tekla (Washington State University) - Franklin, Kate (Birkbeck, University of London)

Session format: Regular session

This session invites participants to interrogate two concepts used by archaeologists to create boundaries around our questions and our assemblages. If community has long served as a heuristic term for the ties of culture, kinship, and mutual regard that contain human societies, then ecology has likewise served to delimit the linkages between human societies and the natural world in which they exist. But what happens if we untangle and re-tie these bindings and boundaries, questioning how ecology leaks into community and vice versa? How can multi-scalar and interdisciplinary archaeology knot knots across our categories of nature and culture? How might we consider seasonal interactions that forged shared identity with human and natural neighbors? Who—and what—would have been part of the larger imagined community and how are human, creaturely, and vegetal kinships manifest in material culture, landscape and/or ecofacts? We ask the participants to consider not only the material rhythms of everyday life, or the timescales of ecological change, but also the methods we use to recreate these patterns. How can newer scientific techniques (isotopes, aDNA, proteomics, etc) productively un-bound and re-tangle human and more-than-human scales in the archaeological past?

ABSTRACTS

1 FEEDING SHEEP, CREATING COMMUNITY: LINKING PEOPLE, ANIMALS, AND THEIR ENVIRONMENT

Schmaus, Tekla (Washington State University; University of Pittsburgh) - Eklund, Emily (University of Pittsburgh) - Greaves, Aspen (University of Pittsburgh) - Ebert, Claire (University of Pittsburgh)

A number of isotopic studies from Central Asia have provided glimpses into the lives of ancient people, teaching us about the weaning of human infants or the use of millet to fodder animals. But what do these glimpses tell us about the creation and maintenance of community, either within a local group, or across the region? This paper presents a novel stable isotope dataset from southeast Kazakhstan that can help us think through these questions. It also asks us to reconsider the earlier Central Asian datasets through the lens of communities and their ecologies. What insights on community can be derived from isotopic data on the diets of non-human animals? In the context of Iron Age Kazakhstan, can variation in caprine diet be used a proxy for human access to resources? Or does it better reflect cultural choices about animal husbandry, or even connections between different communities? Whatever the meaning of the variation, it indicates a need for reflection on the linkages between humans, their animals, and their ecosystems.

2 LANDSCAPES THAT BIND: MOBILITY AND MONUMENTALITY IN THE INDIGENOUS AMERICAS

MacLellan, Jessica (Wake Forest University) - Lanoë, François (University of Arizona)

The field of landscape archaeology often seems polarized between environmental and social approaches. However, cultural landscapes offer the potential to weave together archaeological concepts of ecology and community. Particularly in the Americas, the Western dichotomy of culture versus nature is often not meaningful to Indigenous people. Communities come together at various scales and integrate non-human entities (e.g., animals, plants, stones, bodies of water, mountains, caves, human-made objects, architecture) in activities that result in socio-ecological landscapes. In this paper, we combine environmental and social approaches to discuss the creation and use of monuments by both sedentary and mobile peoples in Mesoamerica and the North American Great Plains. We draw examples from various scales of interaction, construction processes, and levels of residential mobility. The resulting “built” environments were not separate from the “natural” environments, but rather parts of living and lived-in landscapes. We see a recursive relationship between people and their environments, in which enduring places shaped and were shaped by social communities.

3 CULTURAL RESPONSES AND COPING WITH THE NEGATIVE INFLUENCE OF PARASITES IN THE ROMAN EMPIRE: A SPATIAL APPROACH

Kheml, Sebastian (Masaryk University)

The ancient period experienced substantial migration and urbanization, directly impacting the general human condition and elevating the risk of pathogen and parasite transmission. Extensive archaeoparasitological research has indeed revealed the widespread prevalence of intestinal parasites in the Roman Empire throughout its existence. In response to these challenges, Greco-Roman society developed various sophisticated tools and practices, including sanitation, hygiene, waste disposal, and a specialised branch of ancient medicine. A related tool that has played a role in dealing with parasites was the worship of healing deities, particularly the cult of the god Asclepius, as evidenced by votive stelae uncovered at Epidaurus. However, the extent of cultic practices focused on mitigating dangers associated with parasites in the Greco-Roman world has not yet been thoroughly explored in the scholarship. This paper aims to investigate the potential influence and relationship between parasite burden and the prominence of religious healing centres. The quantitative analysis of archaeoparasitological data enables the identification of areas of parasitological importance, considering both species diversity and the severity of infection, which is expressed by the amount of eggs in the examined samples. These data, coupled with the epigraphic records of ancient healing deities, can serve as proxies in a comprehensive spatial analysis, shedding light on the interplay between natural and cultural factors that shaped the daily life of ancient society. While interest in archaeoparasitological findings is gradually increasing, their integration into mathematical GIS models is still in early stages.

4 FINAL FORM: REFRAMING ZOOARCHAEOLOGICAL REMAINS AS A CO-CREATED ARTEFACT THAT UNVEILS NEW DATA FROM THE MICRO TO MACRO SCALE

Haruda, Ashleigh (University of Oxford)

Animal bones are unique archaeological artefacts, shaped not just by the human hand, but also by inherited frameworks of ancestry, the palaeoenvironment of the shared human-animal community, and physiological processes of the individual animal. The existence of a domestic animal is evidence of this unique interplay between organism and human innovation, and investigating bones from this perspective reframes these objects as acts of co-creation between ancient humans and animals.

Zooarchaeological remains are analysed as a critical source of data on human economy and diet, yet there are additional datasets that have recently been revealed with the advent of a wealth of new biomolecular and digital approaches. These new methods, alongside expanded multivariate statistical power, have vastly increased resolutionary power, uncovering human and animal lives.

This paper proposes a new way to consider the final form of archaeological animal bones and will present examples from Eurasia that range from the micro to continental in scale, such as how bone shape and ancient DNA detail population variability, connectivity, and mobility at site level. Furthermore, at regional scales, the integration of zooarchaeological data with palaeoecological data using multivariate statistics will show how it is possible to detect unseen trends in ecological niche exploitation, while big data approaches at a continental and millennial scale to reveal the impact of social and cultural changes on day-to-day life in what we perceive as a *longue durée*.

Thus, these unique artefacts contain a wealth of biocultural information that can be interrogated and linked to the interplay between human decision making and the feedback from the animals themselves as they reach their final form before they are consumed and deposited in the archaeological record.

5 SOCIO-ECOLOGIES OF THE DEAD? RETHINKING THE SAXE-GOLDSTEIN HYPOTHESIS USING SCYTHIAN EPOCH MORTUARY LANDSCAPES

Johnson, James (University of Wyoming)

In 1970, Arthur Saxe suggested that corporate groups who maintain their rights to restricted resources will maintain formal disposal areas of the dead. A decade later, Lynn Goldstein followed up on the Saxe Hypothesis, adding that permanent, specialized, bounded areas for the disposal of the dead will be maintained by a corporate group, and that the more structured and formal the disposal area, the fewer alternative explanations for social organization. By the last part she meant that the more institutionalized the mortuary practices become in a culture, the more difficult it is to distinguish social organization based on mortuary evidence. But embedded in the Saxe-Goldstein hypothesis is another central actor, those of the restricted resources. In this paper, I interrogate how Scythian epoch burial mounds became not only useful and highly visible socio-political resources, but also ones firmly rooted in the historical and ecological imagination of Iron Age mobile pastoralists of Dnieper region of central Ukraine, ca. 700 – 200 BCE.

6 UNEARTHING FAMILY TIES: AN ANCIENT GENOMIC ODYSSEY THROUGH WESTERN EURASIA

Altinisik, N. Ezgi (Human-G Laboratory, Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey) - Vural, Kivılcım Başak (Department of Biological Sciences, Middle East Technical University, Ankara, Turkey)

The last 3000 years have witnessed many changes in social interaction between people of Western Eurasia. The emergence, expansion, and fall of several empires and cultures (e.g., Achaemenids, Hellenes and Roman Empire) have left traces on the social system and human activity in the region. Recent advancements in analytical methods allow us to identify these traces directly from the data in an interdisciplinary approach.

In this study, we compiled an extensive ancient genomic dataset comprising more than 1500 individuals inhabiting Western Eurasia over the past three millennia. Our analysis encompassed examination of both close-kin relationships and long-range relatedness among these individuals, achieved through the utilisation of shared identity-by-descent segments and pairwise mismatch rates. Additionally, we assessed runs of homozygosity within this cohort to elucidate shifts in inbreeding patterns from a spatio-temporal perspective. These analytical endeavours facilitated a nuanced comprehension of the variances in social structure evident across rural and urban locales within the studied region.

Here, we observed that in some sites, close-kin relationships up to the third degree were common, whereas they diminished in other sites. Strikingly, we also detected close-kin pairs coming from different sites, which allowed us to discover the historical family ties. Furthermore, the inbreeding analysis enabled the identification of small homozygous segments indicating a small population size, as well as longer segments suggesting recent inbreeding within an individual's ancestral lineage.

7 UNTANGLING PAST ARBOREAL RELATIONSHIPS AMONG ANCESTRAL KALISPEL LANDSCAPES

Carney, Molly (Oregon State University)

During the winters of 1850-1851, missionary Pierre Jean De Smet stayed in a Kalispel winter village in what is now northern Idaho, USA. Within his letters, De Smet writes of a nearby fuel wood lot which had been recently burned to clear understory, fell smaller trees, and maintain access for winter fuel. Contemporary conversations with Kalispel Tribal members and employees suggest that this practice was common, that the modern mesic forest composition is a product of contemporary US settler-colonial management practices and is not reflective of the systems of woodland care and stewardship that maintained regional plant communities for millennia. Here, we critically examine these colonial legacies and draw on these conversations and Kannigieser and Todd's (2020) concept of kin studies to center Northwest Indigenous conceptualizations of plants as kinspeople, ecological communities, and stewardship practices. Our work re-analyzes existing anthracological collections from 45PO149, a multi-component archaeological site located close to De Smet's winter lodgings. We merge existing archaeological models of fuel selection and historical records with place-based Indigenous onto-epistemologies in an attempt to reconstruct the past woodland composition and assess evidence for the use of cultural fire, but also to consider how past people-plant communities were co-constituted. We compare our work with other archaeobotanical reports from ancestral Kalispel lands and contemporary forest compositions to consider these reciprocal relationships which structured these woodland spaces. We hope that both our findings and framework will be used in establishing new ecocultural landscape practices and plans for today's inhabitants.

8 WHAT CREATURES CREATE CREATION? NETWORKED LANDSCAPE AND LABOR IN MEDIEVAL VAYOTS DZOR, ARMENIA

Franklin, Kathryn (Birkbeck, University of London) - Babajanyan, Astghik (Institute of Archaeology and Ethnography NAS RA)

This paper summarizes recent research by the Vayots Dzor Silk Road Survey, a collaborative project rooted in the medieval landscape archaeology of Vayots Dzor region of the Republic of Armenia. The VDSRS has compiled a complex record of the sites, monuments, and artifactual assemblages of this region, specifically focused on a period in the high Middle Ages (AD 13th-15th c), when the region was administered by the Armenian Orbelyan clan, favored vassals of the Mongol Ilkhanate. This paper will focus on the ongoing work of the VDSRS to knit together the networks of sites—monastic centers, fortresses, villages, bridges, field systems and standing monuments—with the medieval account of this social landscape contained in the rich epigraphic record. We work with the rich corpus of architectural inscriptions, which make up a distributed narrative about place in place, and which record relationships of patronage that tie together not just human beings, but also green landscapes, animal and plant lives, waters and soil. Ultimately this paper will explore what we can learn about medieval ecological thinking from the ways that human politics are enmeshed in natural-cultural systems, and dependent in their creation on the labors of non-human creatures.

710 AROUND THE BLACK SEA: RESILIENCE AND MOBILITY IN PREHISTORY

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Andriiovych, Marta (University of Oxford, School of Archaeology) - Bogaard, Amy (University of Oxford, School of Archaeology) - Manko, Valery (Institute of Archaeology of Ukrainian National Academy of Sciences)

Session format: Regular session

The Black Sea is a fascinating geographical and historical region. The region has a diverse and complex landscape in which prehistorical societies have lived since Palaeolithic times.

The Black Sea was shaped by rapid climate change caused by the 8.2k cooling event. This dry and cold period affected not only the prevailing climate but also the nature of the Black Sea as a large water body, from a lake to a sea. At the same time, the coastline changed rapidly, with water levels rising from 30 to 80 m a.s.l. and flooded numerous prehistoric monuments. The Black Sea was also situated on the periphery of a major migration route through which the Neolithic spread to Europe. What do we know about how Neolithic innovations spread from Anatolia and western Asia around the Black Sea? What role in the Neolithization of the region did the complex landscape of the Black Sea play in this process? The chains of the Pontic Mountains, the Caucasian Mountains and the Crimean Mountains cover a larger area around the western and northern areas of the Black Sea, contrasting with a massive grassland steppe landscape, with huge potential for the spread of early farming and herding.

We are looking forward to discussion of prehistoric evidence around the Black Sea region, the role of the landscape and seascape in prehistoric population movement and settlement, resilience to climate changes and patterns of migration, and the spread of innovations in the region from the Palaeolithic to the Chalcolithic periods. We will discuss the development of early societies in the area and to explore out how the Black Sea influenced the development of prehistoric communities.

We welcome contributions to our session from archaeologists (including those working on botanical or faunal aspects), geographers, geologists, and climatologists interested in the Black Sea region.

ABSTRACTS

1 INTRODUCTION TO THE PREHISTORY OF THE BLACK SEA - THE PREHISTORIC REGION OR NOT? (WITH A SPECIAL FOCUS ON NEOLITHIZATION)

Andriiovych, Marta (School of Archaeology, University of Oxford)

When we talk about the Black Sea region the first idea which came to us is the Ancient Greek colonization and the Early Medieval History connected to Byzantium Impair and Kyivan Rus, Trading ways, Ottomans and so on. The researchers have no doubts about the logic and reasons for the separation and establishment of the region in these periods. However, the prehistory period in the same geographical area is not a common term in archaeological sciences. Also, the trickiness of the potential of the region is that it involves not only the Black Sea shores itself, but rather the Seashores which are extended along the river that flows into the sea, and expanded by river valleys, the territories of mountains and valleys beyond them, and broad plains to the West and North of the sea.

The landscape and climate diversity certainly greatly impacted the spreading of the tribes around the sea from the Late Palaeolithic to the Chalcolithic period. Nevertheless, the region was on the way to spreading Neolithization to

Europe. And here is the question Was the region indeed a part of the Neolithization process? Or Black Sea region was a rather uncommon and not-so-obvious phenomenon in terms of question Neolithization Central Europe directions?

In this talk, we will try to clarify which characteristics will introduce the Prehistory of the Black Sea as a unique region or the territory recognized by several separated sub-regions and zones in Prehistory.

2 EARLY UPPER PALEOLITHIC GENOMES OF CRIMEA SHOW MIGRATION AND ADMIXTURE DYNAMICS OF THE FIRST MODERN EUROPEAN ANCESTRIES

Geigl, Eva-Maria (Université Paris-Cité, CNRS, Institut Jacques Monod) - Grange, Thierry (Université Paris-Cité, CNRS, Institut Jacques Monod)

Populations migrated from the Middle East through the Caucasus since the beginning of the Pleistocene. Our analysis of the genomes of 37-36,000 year-old skeletal remains from Buran Kaya III in Crimea revealed that these individuals were among the earliest to migrate into Europe after a major climatic crisis, the Heinrich Event 4 and the Campanian Ignimbrite volcanic super-eruption around 40,000 years ago. Their genomes also contained traces of the genomes of the earliest sapiens populations living in Europe and associated with the Initial Upper Paleolithic. This demonstrated that the newer migrants did not simply replace the earlier inhabitants of Europe, but some intermixing between the groups did occur. The genomes of the individuals from Buran Kaya III further revealed strong genetic relationships with pre- and post-Glacial populations from the Caucasus in agreement with archaeological evidence pointing to extended social contacts from the Zagros to the Carpathian mountains. These results indicate that the arc north of the Black Sea saw back- and forth migrations for thousands of years. Moreover, they were genetically closely related to the more than 5,000 years younger individuals in central and south-western Europe associated with the Gravettian culture. The individuals from Buran Kaya III were thus among the predecessors of the Gravettian artists that thrived between 31,000-23,000 years ago suggesting the Black Sea region played a key role in the early peopling of Europe. Bennett et al, 2023, Nature Ecology & Evolution, 7, 2160-2172.

3 TYPES OF MIGRATORY ACTIVITY IN PRE-NEOLITHIC TIMES

Valery, Manko (Institute of Archaeology of NAS of Ukraine)

1. The development of the Neolithic in the Black Sea region begins in the 7th millennium B.C. At this time we do not find any traces of migrations associated with the movement of populations.
2. All major migrations took place in the XIII-VIII millennium B.C. These migrations created the conditions for the formation of interregional networks within which the innovations of the Near and Middle East were spread.
3. Three types of migration are known. All of them were driven by both natural and anthropogenic factors.
4. Migrations along open spaces and river banks were the most comfortable. Migrations along the shores of the Black Sea were complicated by the mountainous terrain, the presence of many small rivers flowing into the sea, and the presence of swampy shores. Sea migrations were an alternative to the difficult journey along the coast. Migration through mountain passes is linked to the search for safe routes.
6. The presence of hostile populations along the coasts and in the open spaces dictated the need to use inaccessible routes in sparsely populated regions.
7. The movement of populations from one region to another often involved the practice of several types of migratory activity. The movement of the M'lefaatian population from the Middle East to the south of Eastern Europe involved both the use of open spaces and the use of inaccessible mountain passes. The migration of Karain B culture bearers was associated with the use of coastal shipping, and movements across plains and mountain systems are also recorded.
8. The experience of practising different types of migrations determined the peculiarities of the economic strategy of the aliens at the final point of migration. We observe a tendency to maximise the use of several landscape niches.

4 MESO-NEOLITHIC TRANSITION OF THE NORTHERN PONTIC REGION: OLD HYPOTHESES VS NEW DATA INTERPRETATIONS

Demchenko, Olha (University of Salamanca (Universidad de Salamanca))

The active archaeological fieldwork in the Northern Pontic Region (NPR) conducted from the 1930s enabled the accumulation of a vast amount of archaeological, paleozoological, and anthropological material belonging to the Mesolithic-Neolithic period. The mainstream hypothesis, dominant in current Ukrainian scholarly, was proposed in the 1950s. It concentrates on ceramics and posits an early Neolithization of NPR in second half of the 7 millennium BCE. Due to various circumstances, the interpretation of this material has generally aimed at demonstrating the emergence of animal husbandry and farming earlier than in neighboring countries. As a result, current Ukrainian scholarship tends to discuss the existence of several Neolithic cultures in the NPR from the middle of the 7th millennium BCE

(Bug-Dnistro, Surskyi, Azov-Dnipro, etc.). The concept of early Neolithization as a kind of “primacy” in economic development, as well as its popularization in scientific literature, has led to a distortion of the real picture.

We are revisiting old hypotheses using materials from previous excavations, incorporating modern research methods. As a result, we are demonstrating that despite the territorial proximity to early agrarian societies (such as the LBK), the steppe regions of the NPR maintained a Mesolithic way of life until the advent of the first metals. Therefore, the terms “early Neolithization” and even “Neolithic” cannot be applied to this region. Some old radiocarbon dates have been refuted by new ones obtained in 2022 and 2024. There are no reliable paleobotanical studies that could test the agrarian lifestyle. The methods of archaeozoological and paleobotanical analyses in the 1950s-1980s are unsuitable for current standards to identify vegetal and animal domestication. A recent review of previously studied osteological faunal remains (including DNA analysis) has shown the absence of domesticates. Genetic analyses demonstrate a lack of changes in population composition from the Mesolithic period until the Copper Age.

5 CAUGHT BETWEEN EVENTS (8.2KA AND 5.9KA): HUMAN RESILIENCE AND MOBILITY IN THE EASTERN BLACK SEA AREA BETWEEN 7000-4000 CAL. BCE

Lazar, Catalin Alexandru (ArchaeoSciences Platform, ICUB, University of Bucharest, Romania) - Vespremeanu-Stroe, Alfred (Faculty of Geography / ICUB, University of Bucharest, Romania) - García-Vázquez, Ana (ArchaeoSciences Platform, ICUB, University of Bucharest, Romania) - Popescu, Gabriel (ArchaeoSciences Platform, ICUB, University of Bucharest, Romania) - Tafani, Aurélien (ArchaeoSciences Platform, ICUB, University of Bucharest, Romania; University of South Florida, USA) - Covătaru, Cristina (ArchaeoSciences Platform, ICUB, University of Bucharest, Romania)

The period spanning 7000-4000 cal. BCE witnessed the coexistence of indigenous populations of hunter-gatherers alongside the arrival of Anatolian Neolithic farmers, who migrated in at least two distinct waves. Towards the end of this timespan, the gradual penetration (in several stages) of human groups from the North Pontic Steppes, coupled with the collapse of the Neolithic socio-economic model. The 3000 years at stake here are marked by two major Bond Events (8.2ka and 5.9ka), which profoundly impacted the dynamics, mobility, resilience, and adaptation strategies of human communities in this region.

The current paper will delve into the intricate interplay between the environmental, anthropogenic, climatic, and cultural factors that moulded the resilience and mobility of human populations located in the Lower Danube Basin and the Eastern Black Sea Coast. The analysis will encompass the archaeological signals from the target area, in conjunction with the 8.2ka and 5.9ka Bond events, alongside genetic, radiometric, isotopic, geoarchaeological, and palaeoecological data, related to the three documented population blocks (hunter-gatherers, Neolithic farmers, and populations from the North Pontic Steppes). Our approach is unconventional as it attempts to sidestep the traditional cultural-historical narratives written about this geographic area over the past century, instead opting to integrate diverse data sources to map the distribution of human groups in correlation with the specified Bond events.

This work was supported by a grant from the Ministry of Research, Innovation, and Digitization, contract number 41PFE/30.12.2021, within PNCDI III.

6 PREHISTORIC MIGRATIONS IN THE NORTH PONTIC REGION IN THE LIGHT OF INTERDISCIPLINARY STUDIES

Potekhina, Inna (Institute of Archaeology NAS Ukraine)

Numerous prehistoric burial sites in the territory of Ukraine, in particular in the steppes of the Northern Black Sea region - the so-called North Pontic Region - contain evidence of demographic and migration processes, connected, in particular, with the transition of ancient societies from hunting-gathering to agriculture and cattle breeding. Anthropological collections from Mesolithic and Neolithic necropolises in the Middle and Low Dnipro River Basin as well as from the burial grounds of a number of Eneolithic and Early Bronze Age cultures are an inexhaustible source of research into these processes. Recently, anthropological and archaeogenetic data have become an important factor in the discussion about the Indo-European homeland.

The proposed report highlights the dynamics of the anthropological composition of the population of the Northern Black Sea region from the Mesolithic to the beginning of the Bronze Age. Possible directions of migrations to and from the territory of Ukraine at this time are considered in view of new anthropological, archaeological and archaeogenetic data.

7 EASTERNMOST PAINTED POTTERY AT THE CUCUTENI A-TRYPILLIA B1 STAGE: POPULATION DYNAMICS AND INNOVATIONS IN THE SOUTHERN BUH AREA

Lobanova, Mariia (Odesa Archaeological Museum of the National Academy of Science of Ukraine)

The Cucuteni-Trypillia settlements in the Southern Buh area were the south-eastern periphery of this cultural complex during the 2nd half of the 5th millennium BCE. Their location allowed the population to face a number of modern innovations. The material complex includes findings that suggest contacts in the area with the population of the Gumelnița-Kodžadermen-Karanovo VI complex and the Seredniy Stoh culture.

The crisis of changing the Precucuteni tradition to Cucuteni is characteristic of this period. It is recognized by the appearance of painted pottery, the increase in population, and the complexity of social structures. In this regard, a larger number of settlements appeared, which are divided into local groups in research.

The new AMS dates for the settlements of the group (Sabatynivka 1, Berezivska HES, Kamiane-Zavallia 1, Shamrai) show that they existed during the 44-42 centuries BCE. The major innovation of the transition to the Cucuteni tradition is painted pottery. There are painted pottery examples among the ceramic complexes of the region's sites. It makes up a small percentage - 3-5% of the total number of ceramic finds among the Sabatynivka group settlements. They are also presented in several samples in the Borysivka group complexes. The painted ware is imported from the Cucuteni culture, the southwestern neighbors of the Southern Buh area population. The vessels do not come from a specific area or settlement. The analogies are recorded on many Cucuteni A3 sites in the Dniester and Prut area. Thus, the sites in the Southern Buh area are the easternmost area of distribution of painted ceramics among the currently known Cucuteni A-Trypilla VI settlements.

717 INTERWOVEN. TEXTILE EXCHANGES ACROSS THE MEDITERRANEAN FROM PREHISTORY TO US

Session theme: 6. The Mediterranean from Within

Session organisers: Ferrante, Nina (Sapienza University of Rome) - Morgado-Roncal, Leyre (University of Granada) - Muti, Giulia (Independent Researcher) - Rosell Garrido, Patricia (Independent Researcher; University of Alicante)

Session format: Regular session

The Mediterranean has long been a place of exchange and interaction, where traditions have been upheld while remaining open to new influences. The goal of this session is to re-investigate the interaction and exchange of ideas, technologies, objects, and people across the Mediterranean through textiles.

Over the past 30 years, significant strides have been made in the textile research. Thanks to its recent dynamism, the potential of textile culture has been highlighted to understand past and present societies. In past economies textiles and textile production, in fact, played a pivotal role. They were a valuable trading good, as well as the raw materials, tools, technologies, craftspeople, which circulated and spread across vast areas. This session invites scholars to explore the dynamics of the circulation, exchange, adoption and resilience of textile cultures. This encompasses technological, productive, and socio-economic aspects associated with ancient and traditional textiles in the Mediterranean.

Due to the elusiveness of archaeological textiles in the area, the studies have been mostly focused on the circulation of ideas and materials connected to other productions (e.g., metals, pottery, glass). When they got preserved, the focus was on technology and product exchange, but dealing with single aspects of material culture within specific chronologies and regions. In this session, we aim to gather, diachronically, different perspectives of Mediterranean communities to weave the fabric of the entire region.

Our main objective is to investigate the theme of textile exchanges in the broadest sense possible. In doing so, we will attempt to compare and synthesise different realities in the Mediterranean to create a comprehensive narrative. Participants are encouraged to submit proposals that delve into the agents and mechanisms of textile exchange identified above.

ABSTRACTS

1 TEXTILES AND GENDER IN THE LATE NEOLITHIC/EARLY CHALCOLITHIC OF SOUTHWEST IBERIA

Soares, Joaquina (UNIARQ – Centre for Archaeology. School of Arts and Humanities University of Lisbon)

The present contribution focuses on Late Neolithic/Early Chalcolithic “Engraved Stone Plaques” from the Southwest of the Iberian Peninsula (3250 to 2600 cal BC, 2σ). This typological set of ideotechnic artefacts, interpreted as representations of a female deity linked to textiles (spinning and weaving), will be analysed in a diachronic approach and dialectically articulated with the economic structure of the revolution of the secondary animal products exploitation.

The application of a new source of energy to agriculture, namely animal traction (*Bos taurus*) exploited by plough and cart, triggered an increase in production volume and unprecedented productivity yields that provided conditions for the development of crafts, as a new independent sector of social activity (intra-social division of labour).

Contextualizing idols and symbols from a socioeconomic perspective allows the construction of a comprehensive model of interpretation where gender will be discussed.

Neo-Chalcolithic textiles from the southwest of the Iberian Peninsula may have played an important role in the network of interactions and exchanges within the Iberian Peninsula and with the Western Mediterranean basin, namely North Africa and Sicily suppliers of ivory and amber in the period under analysis. However, this is a hypothesis that requires further investigation.

2 SPINNING IN THE CHALCOLITHIC OF THE SOUTHERN LEVANT: THE RESULTS FROM THE EXCAVATIONS AT YAVNE EAST

Cecconi, Gaia (Israel Antiquity Authority) - Betzer, Pablo (Israel Antiquity Authority) - Varga, Daniel (Israel Antiquity Authority) - Milevski, Ianir (Israel Antiquity Authority; National Council of Scientific and Technical Research, Argentina)

Spindle whorls are extremely valuable for understanding the evolution of textile industry (Costin 1990, 3) or other cultural significance (Barber 1991, 299). The study of these tools is critical in late prehistoric contexts, as the loom was not introduced until the 4th millennium BC (Barber 1991, 83; Levy 2006, 58; Newell 2012), and spindles are not frequently attested due to the perishable material (mostly wood) from which they were commonly made (Langgut et al. 2016).

During the most recent excavations conducted by the Israel Antiquities Authority at Yavne East, a Chalcolithic settlement associated with the Ghassulian culture (Gilead 2011) was discovered in the Southern Mediterranean Coastal Plain. The finds included a particular collection of spindle whorls, composed mainly by clay biconical specimens that we will present in this communication. The spinning whorls reveal interesting new data about the textile industry of the site, ruled mostly by the supported-spinning technique, during the second half of the 5th millennium BC. Moreover, the findings from Yavne East will be compared with other Chalcolithic Ghassulian sites, as Grar, Gilat, Bir Safadi, where mostly the drop-spinning technique was developed. These new archaeological evidences will be discussed as an indication that the textile industry of the Southern Levant was much more variegated than what it was previously considered. Therefore, the second half of the 5th millennium BC was a phase of technological development parallel to other regions of the Near East and Egypt.

3 UNRAVELLING A SPLENDID WEB. AEGEAN-STYLED DISCOID LOOM WEIGHTS IN THE EASTERN MEDITERRANEAN AND THEIR ROLE IN THE LBA MARITIME EXCHANGES

Muti, Giulia (Independent Researcher)

Textile artefacts offer invaluable insights into ancient societies, reflecting practical needs and socio-economic dynamics. This paper proposes an investigation into the spread of discoid loom weights beyond the Aegean in the Eastern Mediterranean during the Late Bronze Age (LBA, c. 1700/1600–1200/1100 BCE). Drawing from recent advancements in the study of textile production, this study aims to shed light on the transmission networks associated with these textile tools. The presence of Aegean-inspired discoid loom weights in Cyprus and key sites in the Levant, such as Ugarit, suggests intricate networks of exchange and interaction in the region during the LBA, providing new avenues for their understanding.

Using primary data and published literature, the research will map the distribution of discoid loom weights, describe their material and functional characteristics and analyse their archaeological contexts. By investigating the relationships between discoid weights and other materials, such as ceramic and metal objects, the dynamics of Aegean-Cypriot-Levantine networks will be elucidated. Furthermore, the implications of discoid loom weights in both female mobility and mercantile activities will be explored. This paper has two primary objectives. Firstly, it seeks to contextualise the long-term transmission of weaving practices and technologies across the Mediterranean. Secondly, it aims to offer new perspectives on the interconnectedness of ancient Mediterranean societies by comparing the possible channels, routes and extension of the transmission of textile practice with trade networks.

4 INTERWEAVING TRADITION AND INNOVATION: THE TEXTILE CULTURE OF THE LATE BRONZE AGE TO EARLY IRON AGE AEGEAN

Bowers, Madeline (Macquarie University)

By the end of Late Helladic IIIB2 (c. 1190 BCE) the last of the Mycenaean palaces was destroyed in a violent conflagration, representing the end of the palatial system and their vast capacity to produce and consume cloth. Despite the destruction of the palatial textile industries and the elite consumer market that it supplied, the need for cloth did

not disappear and garments, bedding, wrappings, sailcloth, etc. remained fundamental necessities for everyday life. As the Late Bronze Age transitioned into the Early Iron Age and the shared palatial koine broke down, the established traditions of material culture were selectively adapted, rejected, and transformed to suit the changing socio-political and economic environment, most notably in metallurgy and pottery. Changes within the textile culture too reflects the innovations of the period as new ideas, technology, and techniques were circulated throughout the Aegean and Mediterranean to a receptive audience.

This paper has assembled data on textile tools and surviving textiles from a sample of mainland Greek and Cretan sites to define the key features of the Aegean textile culture during Late Helladic IIIC to the end of the Protogeometric (c. 1190–900 BCE). Through the lens of the textile culture, this paper will explore innovation, tradition, and resilience in the Aegean during this period of significant cultural and economic change.

5 TEXTILES CRAFTS IN THE PHOENICIAN CITY OF GADIR (CÁDIZ): TECHNOLOGICAL AND SOCIOCULTURAL CHANGES IN ITS HINTERLAND

López Rosendo, Ester (CEFYF; Equipo de investigación Teatro Cómico de Cádiz) - Navarro García, M^a Ángeles (Equipo de investigación Teatro Cómico de Cádiz) - Gener Basallote, José M^a (Ayuntamiento de Cádiz) - Torres Ortiz, Mariano (Universidad Complutense de Madrid) - Pajuelo Sáez, Juan Miguel (Equipo de investigación Teatro Cómico de Cádiz)

One of the most famous crafts of the Phoenician city of Tyre was the production of purple-dyed textiles, a luxury product that gave her fame throughout the Mediterranean. In this context, some scholars have suggested that one of the aims that led to the settlement of Phoenician colonist in the Western Mediterranean was not only the search for metals, but also to take control of the sea routes to the Atlantic coast of Northern Africa, rich in murex to make purple.

In Iberia, clothes were basically made since the Neolithic with fibers of animal origin – such as wool – and leather, in addition to plant fibers such as esparto grass. From the Bronze Age onwards, there is evidence of non-locally cultivated flax seeds in some sites in Portugal and Southeastern Iberia, as attested in some Argaric tombs. Besides, in Southwestern Iberia we barely preserve remains of fabrics from Late Bronze Age local contexts, but we do have a whole tool set that inform us about craftsmanship to make textiles.

Phoenician colonization in Iberia possibly brought in new vegetable crops intended to produce fabrics, as well as new spinning and weaving technologies, new looms and, possibly, sophisticated dyeing and embroidering systems with gold threads.

The aim of this lecture is to analyse all these changes in Gadir and the local populations of its hinterland, which resulted in that the later ones were integrated into a trading network that implied the demand for luxury fabrics as prestige items, new techniques of making fabrics and new ways of dressing.

6 THE FUNCTIONAL INTERPRETATION OF SOME ARCHAEOLOGICAL SPACES THROUGH THE DISCOVERY OF UTENSILS DEDICATED TO SPINNING-SEWING IN THE SOUTHWEST OF SPAIN

Bueno Serrano, Paloma (Aut)

The discovery of movable archaeological objects dedicated to spinning and sewing in the southwest of the Iberian Peninsula allows the dates of textile production to be traced back to an advanced period of the Neolithic and especially to the Chalcolithic. The discovery of these tools in coastal and inland settlements allows us to know other aspects of the populations of recent prehistory in the Bay and mountains of the Bay of Cádiz. The archaeological excavations carried out in 2021 on the Cerro del Castillo de Chiclana (Cádiz). The joint study of all these findings allows us to establish a development and evolution in techniques that is also evident in other territories of the Iberian Peninsula. Specifically, and focusing on the archaeological site on which we focused our investigations, the findings have allowed us to understand the practice of spinning, weaving and sewing activities in the 4th-3rd centuries BC. The chronostratigraphic and spatial study of these allows us to contextualize it in a place within a building with special functionality and characteristics, possibly a sanctuary. These objects are, among others, needles, weights, tweezers and spindles. After analyzing the objects at hand typologically and functionally, we will dedicate a part to the role of women and their work in ancient society.

7 DRESSING THE PHOENICIAN AND PUNIC WORLD: EXCHANGES OF IDEAS AND INTERCONNECTIONS ACROSS THE MEDITERRANEAN

Ferrante, Nina (Sapienza University of Rome)

Investigating clothing in the Phoenician and Punic world proves to be a complex endeavour due to the scarcity of archaeological, iconographic, literary, and epigraphic evidence available to us. Likewise, elsewhere the Mediterranean region, the climate does not favour the preservation of perishable materials, discouraging archaeological investigations

on the topic. This includes not only Phoenician and Punic textiles but also many tools used in their production. In contrast, literary sources inform us of particularly valuable Phoenician and Carthaginian textiles, admired for their colours, embroideries and decorations. Likely, these textiles played an important role not only in conveying messages and ideas within the Phoenician and Punic world but also in becoming true emblems of the social status of their owners.

In this paper, through the analysis of archaeological remains studied for my PhD at the Sapienza University of Rome and the subsequent studies of iconographic sources, an attempt will be made to reconstruct Phoenician and Carthaginian clothing, style and fashion. All sources will be examined to uncover potential interconnections and influences with other ancient Mediterranean peoples. These interconnections took place through movements of people and trade in goods, creating a complex web that will be briefly illustrated in this paper.

8 TEXTILES FOR RITUALS IN ETRURIA: INTERACTIONS AND EXCHANGES

Gouy, Audrey (University of Lille)

As said by Livy, the Etruscans were “more than any other dedicated to religion, the more as they excelled in practicing it” (5.1.6). Indeed, rites were an essential part of Etruscan life. They had powers of transformation, and in particular the power to move an individual from one symbolic and social status to another. In this context, textiles were given a crucial place. Used as dress, furniture and building, they had a key role. More particularly, they accompanied ritual performances, such as dance, and banquet. And as such, they constituted an important form of non-verbal communication known to be effective.

This paper aims to investigate the use of textiles in Etruscan ritual practices from two perspectives. First, it will explore the selection of textiles made by Etruscans for rituals. This implies to reflect on the origins of Etruscan ritual textiles. Indeed, which textiles were specifically Etruscan? which ones were similar to Greek ones, or more widely Mediterranean ones? what could have been the ritual power and impact of foreign textiles in Etruscan ritual practices? what does this tell about Etruscan practices? This also implies to think in terms of circulation and dynamics of exchanges. Second, this paper will investigate the textiles that were specifically exchanged during rituals by the different participants, such as the garlands, wreaths, and covers. What were the possible meanings of such exchanges in rituals, and their impact?

9 CHANGES IN PERCEPTION IN BRITISH TEXTILES INDUSTRIES DURING PRE-AND ROMAN GLOBALISATION

Poulter, Helen (University of Winchester)

Textiles are a prominent part of humanity’s story, transcending language barriers. With the mobilisation of Roman globalisation, new and emerging trade and communication routes provided an imagistic presence. Textiles’ unique tactile and malleable nature provides an art of engineering structure and flexibility. These strands of structural engineering offer the key to the original purpose of a woven textile piece, as they provide weight, movement, and strength, whether it is cloth or braiding. Any associated objects, features and structures can indicate traditions and social trends amalgamating cultural styles and new ergonomic blends. Even textile equipment can reflect the stress and strains of an economy, whilst textile workers maintain textile traditions, with the added written and isotope information on materials connecting to other provinces.

Scholarship on textile trade connections has previously focused on costume, tool styles, shapes, decoration and, to a small extent, the material of the tools, including woven cloth types, different fibres, and yarn types (spun and spliced). Not all this research is aimed at Roman globalisation; for example, Dr Susan Harris’s (2018) work on spliced plant yarn from Must Farm has given a different insight into Britain’s prehistoric textile production methods. Dr Margarit Gleba (2018) has focused on the Iron Age Italian textile workers’ migration, highlighting traditional methods versus changing ideologies, including conflict with changing influence and fashionable trends during the rise of Roman culture.

Through experimental archaeology and other lines of inquiry, this paper will explore the viability of using a warp-weighted loom within the context of Iron Age and Roman buildings in Southern Britain. The effect of the working environment on equipment, fibres, and the individual worker has produced results that challenge previous assumptions and interpretations of production seasons in southern Britain, therefore providing a season for the sale of different types of fabrics and specialism.

10 THE SECONDHAND USE OF TEXTILES IN ROMAN EVERYDAY LIFE AND ECONOMY

Lovén, Lena (University of Gothenburg)

In ancient Roman society, everyone used textiles in daily life. Huge amounts of textiles were produced and for many different purposes, clothes, household products, sails, awnings, textiles for the Roman army, and more. Producing new textiles, especially of wool, was a vital part of Roman economy, trade, and consumption but textiles already in use were also regularly reused for various purposes. Literary and documentary sources testify to the reuse of textiles

and in many urban contexts, there is epigraphic documentation of the occupational groups of *centonarii*. They were specialized in dealing with discarded textiles and the recurrent appearance of *centonarii* in epigraphy reflects the scale and importance of this line of business. However important the reuse and secondhand market of textiles may have been in ancient Roman society, this is a sector of ancient textile economy which is still rather unexplored. This paper seeks to discuss some aspects of secondhand textiles in Roman society hitherto largely uninvestigated, which aims to a better understanding of the complexity of Roman textiles and textile economy.

11 GOLD THREADS IN A GROUP OF 14TH CENTURY LAMPAS OF ITALIAN AND PERSIAN MANUFACTURE: PRODUCTION, TRADE OR TRANSFER OF TECHNOLOGY?

Scibè, Cristina (University of Seville; Opificio delle Pietre Dure of Florence) - Solazzo, Caroline (Independent researcher) - Lam, Thomas (Museum Conservation Institute, Smithsonian Institution) - González López, María José (University of Seville)

By the end of the 13th and the beginning of the 14th century, the extensive commercial network across Euro-Asian territories, through the well-established trade routes across the Mediterranean, gave rise to an unprecedented trade and exchange of silk and gold fabrics and their raw materials from East to West and vice-versa. The appropriation and re-interpretation of designs, and the transfer of technology of weaving techniques and perhaps gold threads that followed, was also a result of the forced relocation of artisans from one area to another.

This phenomenon was especially evident in Italy during the 13th and 14th century. Although by the 12th century the silk industry was well established in the city of Lucca, the spread of Eastern textiles promoted a local production, characterized by a unique decorative style resulting in dynamic compositions of animals, fantastic creatures, vegetal motifs and pseudo-cufic inscriptions, developed by the unification of different cultures and tastes.

At this regard, a group of 14th century lampas fragments, assigned to Persian, specifically Iranian, and/or Italian workshops, having similar decorative repertoire is here presented as an example of the long history of controversial attributions. Similar textiles collected in worldwide collections, indeed, show uncertain or contradictory attributions.

The multidisciplinary and multi-analytical study of gold threads in this group of textiles, belonging to Persian and/or Italian manufacture, as well as in few contemporary Italian lampas, as regarded to be from Lucca or Venice, will be presented to reveal analogies and differences in materials and manufacturing techniques. The identified gold threads patterns of technologies provide a novel key to re-discuss the origin of these textiles, and raise the question whether a unique workshop was active with the corresponding trade of gold threads from one area to another, or if similar technology was adopted contemporaneously in workshops in Italy and Persia.

723 EGYPTIAN BLUE - FROM LITERATURE TO THE ARTIFACT TO THE LAB

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Baragona, Anthony (University of Applied Arts Vienna) - Rodler-Rørbo, Alexandra (Austrian Archaeological Institute) - Becker, Hilary (Binghamton University) - Verri, Giovanni (Art Institute of Chicago) - Kostomitsopoulou Marketou, Ariadne (Norwegian School of Theology, Religion, and Society)

Session format: Regular session

As the first artificial pigment, Egyptian blue has a millennia-long history of production, processing, working, and use. Throughout its impressive life history, this material has been used for making small objects, such as mosaic tesserae, for painting walls, for sculptures or architectural elements, and as a cosmetic.

Experimental archaeology, archaeometry, and research into ancient texts make it possible to understand more about how this first synthetic pigment was made, distributed, and used. The small chemical and physical variations revealed by these first two techniques, combined with a deep knowledge of the written record, is the key to constructing historical narratives about Egyptian blue.

Technological choices in ancient production practices and the provenance of resources are interesting meeting points for discussing cultural change and trade interactions in human history. An interdisciplinary dialogue between archaeologists and natural scientists is desirable to address challenges related to the analysis of archaeological materials. We invite contributions that inspire this dialogue and discuss their work on the development of analytical instruments and techniques, experimental approaches, analysis of production technology and material provenance.

1 FURTHER FLESHING OUT THE STAGES OF PRODUCTION OF EGYPTIAN BLUE IN THE ROMAN ERA

Becker, Hilary (Binghamton University, SUNY) - Smith, Gregory (Indianapolis Museum of Art at Newfields)

Egyptian blue scholarship has been necessarily dependent on the production steps outlined by Vitruvius in his *de Architectura*. Vitruvius's account mentioned the crucibles in which Egyptian blue balls were fired and while their shape and ideal firing time of these crucibles has been explored by Laetitia Cavassa and others, it is worthwhile to probe the blue incrustations that appear on the walls of some of these sherds from production in Egypt and Italy. This phenomenon, explained by Tite and Hatton, will be explicated with more detail.

Vitruvius' account vividly explains that once the ingredients were combined, the paste should be rolled into balls in the hands. Experimental archaeology importantly makes it possible to understand that process. One production variable that helped to make these balls more efficiently was which type of copper was used in the first place. This paper also explores the morphology of Egyptian blue in the Roman era. Egyptian blue was made in blocks or ingots from the Bronze Age to Archaic period, and yet Vitruvius instructed his readers to roll this pigment paste into balls. Raw Egyptian blue was fired in these very balls at least by the Hellenistic and Roman eras (Weatherhead and Buckley 1989; Kovalev et al. 2023). This paper looks at the morphology of Egyptian blue over time thinking about how this pigment was made and uses archaeometry and experimental archaeology to consider what the advantages and disadvantages of each shape in terms of production and economy would have been. And while the crucibles used to fire Egyptian blue and the shape this pigment was formed into were both explicitly mentioned by Vitruvius, it is worthwhile to explore in more detail both what Vitruvius said and what was not stated but which any Roman Egyptian blue producer might have known.

2 A NEW, BLUE EXPERIMENT - PART ONE: USING LABORATORY-CREATED EGYPTIAN BLUE PELLETS IN THE INTERPRETATION OF ARCHAEOLOGICAL MATERIAL FROM NORICUM

Baragona, Anthony (University of Applied Arts Vienna) - Rodler-Rørbo, Alexandra (Austrian Archaeological Institute) - Tehrani, Rebecca (Dresden University of Fine Arts)

Everyone knows how to make Egyptian Blue in the laboratory - grind some quartz sand, limestone, copper, and flux together, and "cook" it for a long time at around 900 °C. But the Romans, skilled as they were, did not make their pigments in a laboratory setting, and this is reflected in the great diversity of final pigment products that can be observed in the archaeological record.

This submission details the results of a series of laboratory experiments in which the parameters for producing Egyptian Blue were purposely adjusted to reflect a wide variety of hypothetical conditions, such as various non-standard recipes, differing firing times and temperatures, as well as the process by which the ingredients were mixed and milled together. The experiment produced a wide range of Egyptian Blue pigment pellets of variable quality. These pellets were then analyzed with light and digital microscopy as well as SEM-EDX and compared to a series of pellets excavated in Austria - Roman Noricum. By these means, new insight was gained into the production of Egyptian Blue in antiquity and the archaeological record of the Roman province of Noricum.

3 APPLYING LABORATORY-CREATED EGYPTIAN BLUE PIGMENT AS A PAINT TO REPLICATE WALL PAINTING FRAGMENTS FROM NORICUM

Tehrani, Rebecca (Dresden University of Fine Arts) - Baragona, Anthony (Freelance Conservation Scientist working with the University of Applied Arts Vienna, Austria) - Santner, Markus (Dresden University of Fine Arts)

You have just come back from the forum, and that wretched scoundrel Flaminius sold you a substandard batch of Egyptian Blue pigment! You don't dare to tell your boss, Flavius, of your error and besides - the intonaco will be ready in an hour! But worry not, you and your skilled artisans can make that wall as blue as if you had spent every last denarius.

This submission details an experiment in which Egyptian Blue pigment of differing qualities were used to produce replica Roman wall paintings. Variations in application, binder and paint stratigraphy were tested in an effort to match the historical record. Polished cross sections of the resulting painting replicas were then analyzed with light microscopy and SEM-EDX and compared to a series of wall painting fragments excavated in Austria, Roman Noricum. By these means, new insight was gained into wall painting practices in antiquity which allows for a better understanding when it comes to their conservation and its Egyptian Blue paint layers.

4 THE COMPLEMENTARY USE OF VISIBLE-INDUCED LUMINESCENCE IMAGING AND MACRO-X-RAY FLUORESCENCE FOR IDENTIFYING AND MAPPING EGYPTIAN BLUE ON ROMAN WALL PAINTING

Sessa, Clarimma (Technical University of Munich, Munich, Germany) - Tehrani, Rebecca (Dresden University of Fine Arts, Dresden, Germany) - Herm, Christoph (Dresden University of Fine Arts, Dresden, Germany) - Santner, Markus (Dresden University of Fine Arts, Dresden, Germany)

In this study, the combination of visible induced luminescence and macro-x-ray fluorescence was demonstrated to be a very effective methodology for the characterisation and mapping the Egyptian blue applied alone or in admixture. Both methods were applied to investigate excavated Roman wall paintings and stucco fragments assigned to the only known stage theatre (2nd century AD) in the Roman province of Noricum, in the Municipium Claudium Virunum. The fragments show various ornamental elements and figures of high artistic and technical quality, comparable to those in Pompeii. More than 500 fragments were catalogued and investigated non-invasively as part of the conservation and research project carried out by Dresden University of Fine Arts in collaboration with the Landesmuseum für Kärnten.

The visible-induced luminescence has been used as a fast-screening method for identifying the Egyptian blue. Only a representative selection of those fragments that showed luminescence was then investigated by means of macro-x-ray fluorescence. The two methods were compared in terms of sensitivity. The use of complementary imaging methods clearly shows the lavish use of Egyptian blue in the decoration of the theatre and the artists' skilful application. The study allowed a further understanding of the use of Egyptian blue, which was applied as a single paint layer or in admixture with other colourants to create cooler tones or used as a glaze to create subtle shading. In addition, the information obtained by means of macro-x-ray fluorescence complemented with laboratory analysis on micro-samples permitted the characterisation of additional pigments, thus unveiling the palette used.

5 REAL-TIME IDENTIFICATION AND VISUALIZATION OF EGYPTIAN BLUE USING MODIFIED NIGHT VISION GOGGLES

Nicola, Marco (Adamantio) - Sgamellotti, Antonio (5 Accademia Nazionale dei Lincei, Via della Lungara 10, 00165 Rome, Italy; Department of Chemistry, Biology and Biotechnology, Università degli Studi di Perugia, Via Elce di Sotto 8, 06123 Perugia, Italy) - Anselmi, Chiara (Istituto di Ricerca sugli Ecosistemi Terrestri, CNR-IRET, Via G. Marconi 2, 05010 Porano, TR, Italy)

The possibility to use light in the visible spectrum to induce near-infrared luminescence in some materials, particularly Egyptian blue and related pigments, offers a significant advantage in terms of their detection. Since 2008 this property has been exploited to reveal their presence even in minute quantities on ancient and decayed surfaces, using a technical-photography method. This paper presents a new type of imaging device that allows for a real-time, easy, and inexpensive identification and mapping of Egyptian blue and other luminescent materials. The new tool's potential is demonstrated by showing its effectiveness within some prestigious sites: a) Egyptian findings at Museo Egizio, Turin, b) underground Roman frescoes at Domus Aurea, Rome and c) Renaissance frescoes by Raphael, Triumph of Galatea and Loggia of Cupid and Psyche, at Villa Farnesina, Rome. The device is based on night vision technology and allow for an unprecedentedly fast, versatile and user-friendly approach that is employable by professionals including archaeologists, conservators and conservation scientists, as well as by un-mastered individuals such as students and casual visitors at museums and sites. The overall aim is not to replace existing photographic techniques but to develop a tool that allows rapid and preliminary recognition, useful for organizing and improving the work to be carried out with conventional methods. The ability to immediately track Egyptian blue and related materials, through real-time vision, photos and videos, provide also a new kind of immersive experience and can foster the modern use of these materials in innovative applications and future technologies.

6 TRACING THE TRAJECTORIES OF EGYPTIAN BLUE PRODUCTION TECHNOLOGY: XRD, SXRF AND SXANES ANALYSIS OF HELLENISTIC AND ROMAN SAMPLES

Kostomitsopoulou Marketou, Ariadne (MF Norwegian School of Theology, Religion and Society, Oslo, Norway) - Pinakidou, Fani (Department of Physics, Aristotle University of Thessaloniki, Thessaloniki, Greece) - Ravan, Eva Luna (Istituto di Scienze del Patrimonio Culturale, CNR, Catania, Italy; Sapienza University of Rome, Rome, Italy) - Romano, Francesco Paolo (Istituto di Scienze del Patrimonio Culturale, CNR, Catania, Italy) - Brecoulaki, Hariclia (Institute of Historical Research, National Hellenic Research Foundation, Athens, Greece) - Rodler-Rørbo, Alexandra (Austrian Archaeological Institute, Austrian Academy of Sciences, Vienna, Austria) - Karydas, Andreas (Institute of Nuclear and Particle Physics, NCSR "Demokritos", Athens, Greece)

Egyptian blue (EB) is the artificial blue pigment that dominated ancient Mediterranean art. It is produced through a complex pyrotechnological process, during which a copper compound is heated with silica- and calcium-rich sand and

an alkali flux, in temperatures ranging from 850 to 1050 °C. The outcome of this process is a multicomponent material, which includes a newly synthesized copper calcium tetrasilicate (CaCuSi₄O₁₀) crystalline phase, responsible for the pigment's impressive blue colour.

Despite the wide diffusion and use of Egyptian blue (EB) across the Graeco-Roman world, there is little information regarding the pigment's manufacturing loci and trade. Variations in the choice of starting materials used and/or the operational sequence followed for the production of EB could result in products of varying chemical and mineralogical compositions.

The present contribution discusses the XRF and XANES (Cu-K edge) analysis of EB samples carried out at the Elettra Synchrotron (Trieste, Italy). In addition, we have performed at the lab XRD analysis of the same samples. The analysed samples derive from a range of well-documented archaeological sites, including wall paintings from Macedonian tombs and pellets from Kos (Greece), Noricum (Austria), and Ostia (Italy). The analysis sheds light on the choice of starting materials and the specifics of the production process, such as firing conditions, through the characterisation of the chemical state (XRD, and XANES) and environment of Cu-species (XANES). The obtained results contribute to EB provenance research and illustrate technological adaptations and developments.

7 RAW MATERIAL POTENTIAL SOURCES FOR EGYPTIAN BLUE MANUFACTURING DURING THE LATE ANTIQUITY IN THE CRYPT OF ST. STEPHAN'S CHURCH

D'Erme, Chiara (University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Switzerland.) - Cavallo, Giovanni (University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Switzerland.) - Villa, Luca (Foundation pro Monastery of St. John, Müstair, Switzerland) - Cassitti, Patrick (Foundation pro Monastery of St. John, Müstair, Switzerland; Albert-Ludwigs-Universität Freiburg, Abteilung für Frühgeschichte und Archäologie des Mittelalters - Otto-Friedrich-Universität Bamberg.)

The crypt of St. Stephan's church in Chur, Canton of Grisons, served as the resting place for the arch martyr's relics and the bishops of Chur. Likely built in the 5th century, it underwent two decorative phases (Phases 1 and 2). A church adorned with mosaics and frescoes, probably from the early 6th century, was later erected above the funerary chamber (Phase 3).

Under the SNSF-funded project "Forgotten Colors", researchers investigated mural paintings within the crypt and fragments of painted plaster from archaeological excavations. The former spans the ornamental phases of the crypt, while the latter can be linked to both the crypt and the upper church.

Technical photography revealed the typical Visible Induced Luminescence (VIL) of Egyptian blue (EB) in both wall paintings and fragments. Hand-held X-ray spectrometry (HH-XRF) highlighted EB's main constituents and an additional Zn content. Micro-stratigraphic research, using the combination of optical and electron microscopy, confirmed the presence of EB (Ca, Cu, Si with constant CaO/CuO ratio) for all the archaeological phases. In the phases of the crypt (1 and 2), the presence of Zn is generally associated with other chemical elements (Ti, Fe, Ni) in grains dispersed in the paint layer, and sometimes found in EB grains in variable percentages (0.3-1.5%). It is noteworthy that Sn is also detected as metal residue within EB grains and in the paint layer.

In both cases, their presence can be connected to the impurities in the metal used as the copper source for pigment production.

The analysed EB sample from the upper church does not show the presence of Sn and Zn.

The analytical results suggest a difference in the raw materials employed for EB manufacture used in the crypt (5th-6th century) and in the paintings probably referable to the upper church (early medieval).

8 FROM PELLETS AND PAINTINGS. EGYPTIAN BLUE FINDINGS FROM AGUNTUM (EAST TYROL)

Zerobin, Bianca (University of Innsbruck, Institute of Archaeology) - Auer, Martin (University of Innsbruck, Institute of Archaeology) - Goldenberg, Gert (University of Innsbruck, Institute of Archaeology) - Tropper, Peter (University of Innsbruck, Institute of Mineralogy and Petrography)

Excavations in the Roman town of Aguntum (today's Dölsach, East Tyrol, Austria) brought to light several hundred blue pellets, which were stored in two ceramic vessels. The room where the pellets were found, was used as a storage room. In addition to the pellets grain, marble plates, pottery, metal tools and other objects were excavated in this room. During the 3rd century AD a big destructive fire in the town center destroyed the storage room. As the room was not uncovered after the fire, the 3rd century inventory remained intact.

Regarding the blue pellets, initial qualitative analyses with XRD were able to confirm the mineral phase cuprorivaite (CaCuSi₄O₁₀) as the characteristic and colouring main component of Egyptian blue in the finds from Aguntum.

Such a quantity of this material is very rare, if not unique, north of the Mediterranean. In addition to the pigment pellets, several fragments of wall paintings with blue components were also found in Aguntum. Some of these fragments show relatively coarse-grained blue pigments under the microscope, which were applied to a brown painted surface.

It is assumed that the pellets of Egyptian blue were used as raw material for the blue wall paintings. This synthetic pigment was a standard colour for the Romans and was widespread throughout Noricum.

The approximately 800 pigment pellets from Aguntum represent one of the richest finds of Egyptian blue north of the Mediterranean to this day. It remains an open question, whether these pellets were imported or produced in the region. However, only very few pellets have been analysed so far and the questions of provenance still need to be researched in more detail.

9 AN UNCOMMON INSTANCE OF EGYPTIAN BLUE LIME-PAINTED INTONACHINO FROM "THE ROMAN VILLA OF TORRE DI PORDENONE" (NORTH-EASTERN ITALY)

Sbrolli, Clelia (Università di Padova) - Dilaria, Simone (Università di Padova) - De Zotti, Anna (Università di Padova) - Salvadori, Monica (Università di Padova)

The increasingly tight integration of analytical techniques within the realm of Greek and Roman wall-paintings' research are highlighting how Egyptian Blue was a fairly common pigment, frequently documented for the making of blue/greenish hues in ancient fresco and secco pictorial decorations.

This contribution aims to report a peculiar employment of this artificial pigment, documented along with the investigations of some wall-painting fragments recovered from the "Roman villa of Torre di Pordenone" (Friuli Venezia Giulia, North-Eastern Italy). This site, located along the Noncello River, yielded numerous well-crafted wall-paintings from secondary debris, featuring marine-themed motifs. These fragments, showcasing decorative and figurative patterns of the full III style, contribute to the villa's exceptional wall decoration system. A noteworthy distinctive feature is the use of uncommon raw materials, in both the layers constituting the preparation mortars and the painted decorations. These were characterized through transmitted-light polarized optical microscopy, for a petro-mineralogical description of mortar layers constituting the tectorium, and reflected-light optical microscopy, for a microstratigraphic analysis of painted decorations. Moreover, the most intriguing aspect is the identification of a blue painted intonachino layer, conferred by the mixing of cuprorivaite as a pigmentation phase within the lime binder of the uppermost intonachino layer, as confirmed by in detail SEM-EDS and micro-Raman analyses. This utilization of the Egyptian blue marks an uncommon instances of Roman "blue lime-painted mortar" thus re-opening the discussion concerning the availability of this artificial pigment in ancient markets.

10 E(TRUSCAN)-BLUE. A SURVEY ON THE EGYPTIAN BLUE IN THE PAINTED TOMBS OF TARQUINIA

Adinolfi, Gloria (Pegaso Srl) - Bellelli, Vincenzo (PACT) - Tomassetti, Maria Cristina (PACT) - Carmagnola, Rodolfo (Pegaso Srl)

This infra-disciplinary research is carried out within a comprehensive programme of investigations on Etruscan painting techniques promoted by PACT, in which the MAP project is also involved. The research is focused on Egyptian blue mapping in the painted tombs of Tarquinia, between the 6th and 5th centuries BC. The ongoing investigation features different phases using different methodologies, starting with areal-based investigations aimed at the spatial characterisation of Egyptian blue through non-invasive imaging techniques (VIL), followed by punctuative archaeometric analyses to determine the composition of the pigments, its laying pattern and prevalent associations with other pigments. The comparison between different pigments used to chromatically render the colour blue, as we perceive it today, leads to the evidence of the almost exclusive use of Egyptian blue in Tarquinian painting. Initial results are presented that highlight the different methods of EB use, which go beyond the expression of the chromatic value of blue, sometimes with unexpected results.

11 STUCCO RELIEFS WITH AN EGYPTIAN BLUE BACKGROUND AT THE ART INSTITUTE OF CHICAGO

Verri, Giovanni (Art Institute of Chicago) - Raff, Katharine (Art Institute of Chicago)

Originating in ancient Greece, wall and ceiling reliefs became commonplace in the Roman period across the empire. Historically, the term stucco has been used to refer to both lime- and gypsum-based moldable plasters, which harden to a stable material upon setting. Due to their plasticity, they can be formed into a variety of shapes as well as painted. Because of their durability, stucco reliefs and moldings have been extensively used to decorate both private and public buildings, including bathhouses, where decorative frames and figurative scenes are commonly found in varying degrees of complexity. The Art Institute of Chicago holds in its collection two 1st century CE stucco reliefs (1922.4428-9), showing animals, women and mythical creatures against a vivid-blue background, executed with Egyptian blue. Albeit monochrome at first sight, the stucco reliefs show evidence of elements of polychromy. This presentation will discuss the scientific investigations of the two reliefs at the Art Institute of Chicago, including broad-band imaging,

macro X-ray fluorescence, hyperspectral imaging, Fourier-transform infrared spectroscopy, with a focus on how Egyptian blue was applied to the background.

12 SPECTRAL VARIATIONS OF EGYPTIAN BLUE IN EARLY ROMAN JUDEA

Asscher, Yotam (Department of Conservation of Material Culture, School of Archaeology and Maritime Cultures University of Haifa, Israel; Department of Artifacts Treatment and Laboratories, Israel Antiquities Authority, Jerusalem, Israel) - **Sharabi, Naama** (Department of Archaeology, The Hebrew University of Jerusalem, Israel)

As Egyptian blue is an artificial pigment, the final product varies in structure depending on temperature and the mixture of lime with silica and copper. The structure and chemical variations of Egyptian blue can be characterized in the lab using spectroscopy, which recently has become portable with instruments such as X-ray fluorescence (pXRF) and fiber optic reflectance (FORS) spectrometers. These techniques are also non-invasive as they characterize the surface of the material, and therefore can be brought to the archaeological site or the museum environment. The structural and chemical characteristics of Egyptian blue are directly linked with workshop production techniques and their accessibility to the raw materials.

In this study we characterize Egyptian blue in Herodium, a palace complex built by King Herod (37-4 BCE), c. 12 km south of Jerusalem, in the kingdom of Judea. We discuss the spectral variations of Egyptian blue of a pigment ball, blue and purple colors mixed in pottery vessels used as raw materials, and wall painting fragments retrieved from the palace.

Analyses of the color schemes of the wall decorations shows a preference for luxury colors. The dark-blue may be connected to the techelet that had specific importance in Jewish religion. This color was manufactured of the purpura snail and was used in the veil of the Jerusalem Temple and in the garbs of the High Priest. Flavius Josephus associated it with the sky and the Rabbinic sources to the throne of glory of the Almighty.

Herod succeeded the Hasmonean dynasty that served both as kings in Judaea and High Priests in the Jerusalem Temple. Herod strove to legitimize his rule by marrying a Hasmonean princess, and engage in reconstruction of the Temple. The Egyptian blue, that resembled the techelet, was used to decorate his palaces as a symbol of his piety.

13 EPHESIAN EGYPTIAN BLUE: MATERIAL PROVENANCE AND PROCESSING IN THE LATE HELLENISTIC PERIOD

Rodler-Rørbo, Alexandra (Austrian Academy of Sciences) - **Kostomistoupoulo Marketou, Ariadne** (MF Norwegian School of Theology and Religion) - **Baragona, Anthony** (Freelance, Associated with the University of Applied Arts) - **Jansen, Moritz** (Deutsches Bergbau-Museum Bochum) - **Klein, Sabine** (Deutsches Bergbau-Museum Bochum) - **Artioli, Gilberto** (University of Padua)

The Hellenistic and Roman period were particularly colorful – people processed various materials to use them as colorants and it is likely that material provenance mattered. Yet, little is known about where these materials came from and where they were processed. Some colorants such as Egyptian blue (a synthetic calcium-, silica- and copper-based pigment) were produced from easily available resources and were likely an output of far-reaching trade networks. Mineralogical-petrographic and geochemical analysis can help tracing production processes and raw material provenance to reveal the connectivity of ancient societies through pigment trade. Even though Egyptian blue is considered among the most widely used ancient colorants since the Egyptian Bronze Age until late Antiquity, provenance studies have so far been limited to a few case studies from museum collections. This work investigates the provenance of the copper compound of Egyptian blue pigments used for wall paintings at Ephesus at the west coast of Anatolia during the late Hellenistic period. Egyptian blue production technology is compared to the Egyptian blue production of the late Hellenistic pigment workshop of Kos, Greece, and raw material provenance is compared to available copper resources. This enables a better understanding of interaction across trade networks and contributes to generating a pigment-specific reference database for provenance studies.

14 EXPLORING EGYPTIAN BLUE: INTEGRATING MULTISPECTRAL AND REFLECTANCE TRANSFORMATION IMAGING FOR IN-DEPTH DOCUMENTATION AND STUDY

Shaheen, Islam (Sapienza University of Rome; Grand Egyptian Museum) - **Hamza, Nagmeldeen** (Grand Egyptian Museum)

This research aims to transform the documentation and understanding of cultural artifacts adorned with Egyptian blue pigment, employing cutting-edge technologies to revolutionize preservation and study methods. The primary focus lies in the integration of advanced digital techniques for the comprehensive examination of polychrome artifacts, with particular emphasis on the distinctive properties of Egyptian blue.

Through a systematic exploration of Multispectral Imaging (MSI) and Reflectance Transformation Imaging (RTI), this study delves into the intricate layers of Egyptian blue pigment and its application on various artifacts. MSI serves as a non-destructive initial method, enabling swift and cost-effective surveys to identify painted layers and historical pig-

ments, including those hidden beneath the surface. RTI, on the other hand, captures detailed images that reveal the nuances of Egyptian blue pigment, providing insights into its geometry, morphology, and surface texture.

Central to this research are artifacts from the Grand Egyptian Museum collection, including Cartonnage mummy trappings and a wooden coffin lid from the 21st Dynasty and different fragments of Egyptian blue from the collection of Tutankhamun. These artifacts serve as focal points for examining the polychrome surfaces adorned with Egyptian blue, unraveling their layered compositions and aiding in dating and iconographic deciphering.

Through a synergistic approach combining MSI and RTI, this research yields fresh insights into the material characteristics of Egyptian blue pigment, pushing the boundaries of technological applications in the study and documentation of polychrome artifacts.

15 TRACING EGYPTIAN BLUE: A DIACHRONIC STUDY OF USE, PRODUCTION, AND APPLICATION IN THE BRONZE AGE MEDITERRANEAN

Hunter, Allisen (Florida State University)

The pigment Egyptian blue is widespread throughout the Bronze Age Mediterranean and possesses a variety of manufacturing and application processes. While the identifications of these processes and the presence of Egyptian blue at a site can provide more data as to a site's connections, an examination of these factors across a variety of sites and through time and space can demonstrate broader patterns of use. These patterns may further demonstrate the role of artisans, the borrowing and negotiation of practices, and the complexities of techniques present at individual sites.

This paper demonstrates the advantage of utilizing previously published data sets of analytical and technical studies in order to produce a diachronic study of Egyptian blue's use, manufacture, and application to better understand the patterns present in the Bronze Age Mediterranean fresco. The presence of Egyptian blue at a site demonstrates the spread of technology and its exclusion may indicate separate practices. The presence of tin or arsenic in a pigment's composition alongside the chosen application practice suggests the origin of the pigment's production technique and-, therefore, the greater social implications and connections of a site. A diachronic study of Egyptian blue and its components in the Bronze Age Mediterranean allows for greater complexities of use, production, and application and their social relevance to be revealed.

727 THE ROMAN ECONOMIC MOSAIC: EXPLORING THE COMPLEXITY OF ECONOMIC DYNAMICS DURING THE ROMAN EMPIRE

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: **Zerzeropulos, Katharina** (ROOTS Cluster of Excellence; Christian-Albrechts-Universität zu Kiel) - **Coto Sarmiento, María** (Centre for Urban Network Evolutions (UrbNet); Aarhus University)

Session format: Regular session

Economic mechanisms of the Roman Empire varied across regions, influenced by geography, time, and geopolitics. Frontier zones, characterized by a strong military presence and mingling of populations, exhibit distinct demand and supply dynamics in contrast to the Mediterranean seaboard, where Roman authority was firmly established and military influence minimal.

Italy, at the empire's heart, enjoyed privileges, benefiting from Rome's substantial consumption. In contrast, provinces on the periphery, influenced to a lesser extent by Rome, might have faced fewer advantages or exploitation, particularly if agriculturally rich.

This session explores the Roman Empire's influence on diverse economic dynamics, examining how policies and trade practices led to both convergence and divergence in the economic system. We welcome contributions that offer ideas related to the following topics,

1. Identifying varying economic patterns from small-scale to large-scale markets
2. Debating how different geopolitical contexts affected markets in frontier vs. non-frontier regions and their impact on market differences (private vs. state markets)
3. Exploring complex supply dynamics, including the dominance of specific goods in fringe areas, unrelated to transportation costs.
4. Old and novel approaches for studying economic dynamics (modeling, network analysis, GIS)

This session aspires to identify and scrutinize varying mechanics of trade that characterized the Roman Imperial period across the expanse of the Empire. Through an examination of specific case studies rooted in regional contexts or material evidence, it is anticipated that distinct dynamics will emerge, delineating variances in regions, eras, product markets, and sub-systems within the Roman Empire, thereby facilitating a nuanced understanding of the economic mechanisms governing the Roman world.

We invite contributors who can provide insights into local, regional, inter-regional, and intra-regional economic patterns, with the aim of synthesizing these findings into a comprehensive economic framework for the Roman Empire and generating novel methods for identifying these outside of isolation.

ABSTRACTS

1 AN INTEGRATED MODEL FOR THE ECONOMY OF THE EARLY ROMAN EMPIRE

Zerzeropulos, Katharina (Institut fuer Ur- und Fruehgeschichte Kiel; ROOTS Cluster of Excellence)

Several studies have been done on the Roman economy in the past decades and even centuries by focusing on historical sources and only to a small degree on the actual large archaeological record. This mostly preferred qualitative over quantitative studies as historical sources for the time under investigation are sparse and treat only particular settings, mostly those of the richer strata of society. To get a better picture of the entire society from 50 BCE to 150 CE, we should use the potential that archaeology offers through its large amount of data available in the form of artifacts recovered in sites around the empire. The main merit of archaeological data comes from a) its quantity, b) its potential to give insight into all strata of society, c) its relatively unbiased nature (compared to historical sources), and d) its existence throughout geographical space. The traceability of certain archaeological materials, in this case, fine wares and amphorae, also allows us to reconstruct trade flows and economic measures for comparison.

The second part of the investigation is the modeling of fictive distribution patterns that are based on varying economic mechanisms that may have been in place. Several distribution patterns will be created by using parameters that can influence these patterns. The scenarios that will be tested are:

- Basic models: Random, Transaction costs
- Network models: State-networks, Private networks
- Economic/political models: Protectionism, Imperialism, Combination Protectionism/Imperialism
- Historical/inferential model
- Price-based model

The article will focus on the conceptualization of the models and the theory behind them. The material distribution patterns of the archaeological record have already been presented in a previous EAA session in 2023.

2 THE ECONOMIC DYNAMICS AND CONNECTIVITY OF LATE ROMAN THRACE

Watson, Claire (University of Chicago)

For much of the 21st century, scholars (e.g., Leidwanger 2020; Pitts and Versluys 2014) have continually reaffirmed the dense, diverse, and sustained network of connections across the Roman Empire, adding developed perspectives utilizing an ever-growing corpus of evidence to earlier arguments around the relative connectedness of provinces and settlements. This concern with connectivity emerges perhaps most prominently in studies of trade and the Roman economy, along with interrelated concerns such as ancient globalization. However, many evaluations of connectivity remain somewhat nebulous. What specifically can we say about connectivity, both in theory and in practice, using Roman evidence for the movement of goods across the empire? How can we best evaluate and compare discrete regions' connectedness, and what does that reveal about the economic life of specific provinces and the factors influencing those dynamics?

By utilizing the disparate archaeological record of amphorae from sites across the diocese of Thrace—situated in modern Bulgaria and Romania—this project aims to elucidate the relative weights or densities of connections in which Thrace was involved via trade. As a diocese containing several frontier provinces, how does Thrace relate to the wider Roman world, in both a social and economic sense? And, furthermore, how does Thracian connectivity—to the extent that it can be quantified and evaluated—compare to that of the relatively more secure, well-connected interior? And how do different types of sites—rural settlements and urban centers; riverine, coastal, and inland—compare to each other within a given province? The answers to these questions promise to advance our understanding of the economic functioning of, and the lived experience within, Roman eastern Danubian frontier provinces.

3 RETHINKING ROMAN MINING DOMAIN BORDERS: INNOVATIVE INSIGHTS (CASE STUDY ON THE NORTH PART OF METALLA DARDANICA IN UPPER MOESIA)

Maric, Marija (University of Novi Sad, Department of History, Faculty of Philosophy)

The organization of Roman mining was a meticulously controlled process encompassing various activities by imperial authorities, including the delineation of mining domain borders, the organization of administrative systems, infrastructure development, and more. The *Lex Metalli Vipascensis* and *Lex Metallis dicta* from Vipasca provide direct insights into this process. The described territorial organization concept was extended to additional mining provinces

considering peculiarities. Scholars such as Alföldy (Noricum) and Dušanić (Danubian provinces) defined the borders of mining districts based on an analysis of the position and function of customs stations (*Ad Fines*) and written sources. They further explored social, political, economic, and other relationships within and beyond provinces in the Central Balkans. Due to a lack of relevant research following the issue, archaeological sources rarely informed their hypotheses.

Recent excavations in the northern part of metalla Dardanica and surrounding areas reveal a considerably stronger presence of Roman mining activities than previously thought. Furthermore, spatial assessments by GIS have revealed new information about resource area organization, particularly in late antiquity, when the economic system, including metal extraction, processing and distribution, transformed. During this period, emerging architectural forms like villae rusticae and fortifications became significant landmarks in the mining landscape, confirming changes in provincial organization.

This talk reconsiders assumptions about mining domain borders, focusing on the northern part of metalla Dardanica and reevaluating older arguments in light of recent archaeological findings. It prompts a reevaluation of the principles of border establishment by imperial authorities in the Central Balkans. Additionally, adjusting domain borders raises questions about their significance in organizing economic activities, particularly their symbolic and functional relevance as boundaries between mining domains and urban agri or metalla within territoria metallorum. Finally, consideration will be given to how this spatial change affects the interpretation of the economy at the district, provincial, and imperial levels.

4 THE IMPACT OF ROMAN IMPERIAL ECONOMY ON LOCAL HISPANIC ECONOMIES: A COMPARATIVE APPROACH

Sastre, Inés (CSIC) - Orejas Saco del Valle, Almudena (CSIC) - Currás Refojos, Brais (CSIC)

Rome's strategic interests in certain areas of provincial land generated early and drastic interventions. This is clearly seen in areas that produced precious metals, such as gold in western Hispania and silver in the southeast. The acquisition of these resources implied the development by the Roman state of instruments for their control and exploitation, as well as for the mobilization of the necessary workforce. Research has often focused on these singular assets, but the material evidence indicates that Rome's intervention had a greater scope with a profound impact on local communities, their social relations, and their economies. In this contribution we address the processes of change under the Roman dominion from an economic point of view in some regions of the Iberian Peninsula marked by the impact of mining following a comparative approach: Northwestern (Gallaecia and Asturia), north-central Lusitania and Carthago Nova. Our aim is to propose a reflection on the degree of real implementation of market economies and the extent of the participation of local communities in them during the Iron Age and Roman expansion in Hispania. We will take into account many different scales of analysis, from local to imperial, around the following historical realities:

- The role of the Roman administration through the presence of the army and fiscal control of productive activities. This directly affects technological development and also the forms of ownership, with clear differences in the diverse periods and areas considered.
- The relationship between public interests and private participation.
- The foundations of the wealth of the elites: control of land and agricultural production versus investment in extractive or commercial activities.
- The weight both of the forms of peasant organization and the prestige mentalities of the elites, and their relationship with the forms of organization of production.

5 BETWEEN THE ATLANTIC AND THE MEDITERRANEAN: THE ARCHAEOLOGICAL SITE OF TORRINHA

Azevedo, António (Coimbra University)

In the ancient and small town of Salir in inland rural Algarve (region from south of Portugal), there is an open field with a lot of pottery pieces in the surface that is recognized as the archaeological site of Torrinha. The site was intervened by Dra. Helena Catarino, with the procedure of archaeological prospection in that area during her campaign in the nearby Islamic fortress of Salir.

Unfortunately, Torrinha was never excavated and there isn't any kind of archaeological data about structures or any kind of geological unit recorded. In a couple of years, the 514 pieces were collected from the surface, kept under the laboratory of the local museum of Loulé, to be studied by students in the institute of archaeology of Coimbra University.

Only by the analysis of those materials, the results shows the chronological occupation of this site that probably started in the first century AD until, at maximum, sixth century as a roman villa. It is important to emphasize the presence of terra sigillata, as the example of Arretine ware, South Gaulish Samian ware, Spanish Samian ware, African Red Slip

ware and Phocaean Red Slip, many categories of amphorae, and other kind of domestic artifacts. The results provide important information about the social-economic reality of the first six centuries of our Era in rural Algarve, which is not so scientifically well known as other archaeological roman sites in it's famous coast.

6 SUPPLY DYNAMICS IN THE CHANGING LATE ANTIQUE ECONOMY: STORAGE TOPOGRAPHY AND NETWORK OF THE ROME-SYSTEM

Pizzi, Marina (University of Regensburg)

Late Antiquity marked a significant turning point in the reorganization of the annona system. Considered that substantial changes affected the Italian peninsula, which acquired a new role in producing goods for Rome or mediating their movement toward the old capital of the Empire, the supply system of the latter must have evolved as well.

Reconstructing supply dynamics is challenging due to the multitude of aspects involved, not all of which are concretely documented. However, storage, as a crucial - perhaps the most crucial - material evidence of supply, can considerably help shed light on its functioning. Unfortunately, this aspect has so far been largely overlooked, especially as far as Late Antiquity is concerned.

For this reason, this paper primarily aims to delve deeper into the case of Rome, offering a picture of storage in the city between the 4th and 7th c. AD, secondly trying to contextualize its situation in terms of evolution of the metropolis-hinterland system. On one hand, storage facilities will be considered from a typological perspective, examining how different categories may have been connected with specific functional roles within the city's supply system. On the other hand, they will be analyzed from a topographical and distributional perspective using GIS and network analysis. The combination of traditional and newer approaches will hopefully lead to some new insights on this theme.

7 ANALYZING POST-GETAE OLBIA'S ECONOMIC RELATIONS THROUGH BONE AND IVORY ARTIFACTS

Semenova, Alisa (Institute of Archaeology National Academy of Science of Ukraine.)

After surviving the devastation by the Getae in the mid-1st century BCE, the Hellenistic colony of Olbia Pontica saw a revival in the early 1st century CE. Since then, its history has been closely related with the Roman Empire. This connection is evidenced by numerous Roman artifacts and epigraphy sources, which have been discovered within the polis limits.

I aim to explore the connections between Olbia and Rome, focusing specifically on bone artifacts, such as examples of standardized Roman craftsmanship. I will draw parallels with data from other Roman sites. Some of these artifacts could possibly be crafted by local workshops based on Roman models. Thus, in addition to the import of goods to the frontier regions, the spread of crafting techniques and standards is also conceivable. Discoveries of bone artifacts and other Roman items indicate the intense economic ties between Olbia and the Roman Empire. Initially, these connections existed as areas of Rome's interest, later extending to become part of the province of Moesia Inferior.

Moreover, some unique items made of ivory that are not common in the Greco-Roman world were found in Olbia. These artifacts come from Central Asia, for example, the unique ornamental comb and the decorated overlays. The discussion about how these artifacts ended up here is ongoing since it might be connected to the influence of the Sarmatians. They played another crucial role in shaping the political and, as a result, the economic life of Olbia. The significant influence of the Sarmatians in the latter half of the 1st century CE is evident from the fact that coins of two Sarmatian kings, Pharzoios and Inisemeus, were minted here, and other archaeological evidences.

8 A THOROUGH INVESTIGATION OF A ROMAN INKWELL FROM THE ROMAN TOWN OF CONIMBRIGA, PORTUGAL

Oliveira, César (HERCULES Laboratory & IN2PAST, University of Évora, Portugal) - Bottaini, Carlo (HERCULES Laboratory & IN2PAST, University of Évora, Portugal; Queen's University Belfast, School of Natural and Built Environment, Belfast, UK) - Candeias, António (HERCULES Laboratory & IN2PAST, University of Évora, Portugal) - Pereira, António (HERCULES Laboratory & IN2PAST, University of Évora, Portugal) - Miguel, Catarina (HERCULES Laboratory & IN2PAST, University of Évora, Portugal) - Cardoso, Ana Margarida (HERCULES Laboratory & IN2PAST, University of Évora, Portugal) - Perpétuo, João (ARQUEOHOJE, Viseu, Portugal) - Correia, Virgílio (Conimbriga National Museum, Condeixa-a-Velha, Portugal) - Dias, Vítor (Conimbriga National Museum, Condeixa-a-Velha, Portugal)

The ancient Roman city of Conimbriga stood out as the main city of the Conventus Scallabitanus, a Roman province within Lusitania. It is one of the largest Roman settlements in Portugal, having been the subject of systematic excavations since 1930. Some of the main findings include Roman dwellings with intricate mosaic floors, a forum, a basilica, thermal baths, and defensive walls.

During recent excavations at locations designated for drainage well installation to reinforce the Roman wall, archaeologists discovered a small metallic inkwell of the "Biebrich Type," which is characteristic of the first half of the 1st century AD, still retaining remnants of its contents. The rarity and importance of the find justified the intervention of the HERCULES Laboratory in the study of these materials, using a multi-analytical approach combining chromatographic techniques, NMR, FTIR, XRF, and SEM-EDS for the characterization of the metallic inkwell and the ink preserved within it.

NMR analysis revealed a notable concentration of aromatic compounds within the ink, while chromatography identified it as predominantly black ink consisting of amorphous carbon, a byproduct of the combustion of organic matter, mixed with beeswax, as a binder. Additionally, FTIR analysis detected the presence of calcite and phosphate groups. SEM-EDS analysis unveiled elevated levels of phosphorus and calcium, indicative of the presence of bone black, as well as iron, suggesting the existence of ferrogallic compounds. XRF analysis confirmed that the inkwell was crafted from a ternary alloy comprising copper, tin, and lead.

In conclusion, the ink would be a mixture of amorphous carbon with gall nuts, which act as a source of tannins, iron sulphate, a binder, and water.

9 MARKET COMPETITION IN WAR TIMES? THE IMPACT OF OLIVE-OIL PRODUCTION ON THE ROMAN ECONOMY

Coto-Sarmiento, Maria (Centre for Urban Network Evolutions (UrbNet), Aarhus University) - Brughmans, Tom (Centre for Urban Network Evolutions (UrbNet), Aarhus University)

The production of olive oil became essential during the Roman military campaigns in the border region of Germania (Germany). Hundreds of olive oil amphorae were supplied to the army, creating a large-scale infrastructure specialized in the production of olive oil from different areas of the Roman Empire. However, high uncertainty regarding the organization of the supply to the military stationed along the frontier border remains unresolved.

We present an approach by combining computational models and archaeological data to explore the economic mechanisms during the Roman Empire. We use archaeological data as a data proxy to understand the dynamics of the inter-market competition and shed light on the reasons behind the dominance of olive oil from the Iberian Peninsula over other regions, and why this production increased and suddenly dropped. We implement a theoretical framework to analyze the impact of economic competition in the olive oil market on production and consumption within a frontier region in Germania.

In the model, the producers will be represented by three different main regions of olive oil production, while the consumers are military and civilian sites in Germania. To do so, we design four hypothetical scenarios, each representing a market structure based on the hypotheses of free market principles and interventionism in olive oil production. The model will provide a comprehensive understanding of how transport costs, productivity, and pricing mechanisms impact strategy decision-making, competitiveness and adaptability within the Roman market.

Our preliminary results suggest: a) initial production influences but it requires a higher percentage, b) strategies can be effective without requiring substantial investments and c) effective interventionism does not require a high percentage of government involvement.

Computational models can improve our understanding of different economic dynamics in the Roman Empire, offering a new perspective on how significant changes in economic patterns unfolded over time.

10 SOLDIERS' MARKET. RETAIL TRADE IN MILITARY CAMPS ON THE PANNONIAN LIMES

Dumitrache, Iulia (Accademia di Romania, Roma; Alexandru Ioan Cuza University of Iasi)

The presentation's primary objective is to identify and characterize potential patterns and networks of self-supply mechanisms among military personnel, including ordinary soldiers and officers, stationed on the Pannonian borders. Our study will focus on three main coordinates: the products supplied, the distribution routes, and the commercial agents involved, who may be individuals or members of profile associations.

The study aims to examine archaeological findings related to military settlements, specifically focusing on food items such as oil, fish, and wine, textiles, and luxury ceramics. Literary sources and epigraphic evidence, such as tituli picti or inscriptions on instrumenta domestica, will also be used to trace the origin and itinerary of the goods. The research seeks to answer the following questions: Is it possible to distinguish between military-provided products and personal purchases? What influences the consumption preferences of military personnel who sometimes spend their own money on personal items? Is there a correlation between the origin of the military personnel and their preferred products, or is it a result of the globalization of tastes and preferences? Can we identify the role of the military in promoting certain types of goods in the civilian provincial milieu?

11 WEAVING RESILIENCE: ECONOMIC DYNAMICS OF RURAL COMMUNITIES IN THE ROMAN WEST**Moreno-Navarro, Fernando (Università degli Studi Roma Tre)**

This work explores the adaptive strategies and resilience of rural communities in the Roman Mediterranean, focusing on how domestic economic practices reflected and promoted adaptation to economic, social, and environmental changes. By integrating theories of resilience and adaptive cycles, it aims to better understand the dynamics of rural life in ancient societies and their role in broad socio-cultural transformations.

Centring on the Theory of Resilience and the concept of the adaptive cycle, this work examines how domestic economies were integrated into cycles of exploitation, conservation, collapse, and reorganization, assessing their influence on the communities' resilience capacity. Through network analysis and theories of complex systems, economic connections are mapped, and their impact on community adaptability is interpreted.

Adopting a comparative approach, we analyse domestic economies in different regions of the Roman west to illustrate how rural communities faced and adapted to changing conditions. This relational analysis of archaeological data underscores the importance of local responses to climate change and regional policies as essential adaptive functions.

This approach broadens our understanding of the Roman economy and the adaptability of its rural communities, providing insights into socio-cultural transformations within the Roman Empire. We highlight the relevance of everyday economic practices in the formation of resilient and adaptive communities, contributing to our knowledge about the ancient rural economy and its capacity for adaptation and resilience in the face of adversity.

12 CENTRALITY, PUBLIC SPACES, AND THE ROMAN PROVINCIAL ECONOMY: A NETWORK-BASED INVESTIGATION OF THE NORTH WESTERN PROVINCES**Vadineanu, Paul (Universität zu Köln) - Paliou, Eleftheria (Universität zu Köln)**

The Forum, a public space often thought about in terms of its monumentality and prestige and rightfully considered a staple of Roman urbanism, has been undoubtedly connected to economic activity or at least viewed as benefiting from such activity directly or indirectly. Indicative in this respect is the case of the Roman Forum, concerning which Cicero noted in 66 BC: "This system of credit and finance which operates at Rome, in the Forum, is bound up in, and depends on capital invested in Asia; the loss of the one inevitably undermines the other and causes its collapse". However, while the fora of Rome and of *coloniae* and *municipia* across the Empire have long been a subject of historical and archaeological investigation, those of secondary agglomerations, along with various other open public spaces have not seen the same interest.

In this study, we will attempt to investigate the roles these smaller towns played within the settlement network of the Roman provinces and what their economic function in the provincial urban milieu may be. Through the use of network analysis, we will examine the regional and supra-regional patterns of interaction linking the individual settlements of Germania Inferior, Superior, and Raetia in an attempt to explain the possible connection between the observed position within the network and the presence or absence of open public spaces such as fora. The connective tissue of the provincial road systems will be included in the network model as a proxy for economic exchange while each town will be considered a node that participates in this exchange. Different measures of centrality will be addressed as they pertain to the particular positions the nodes may occupy.

13 MARMORISATION OUTSIDE ROME: ON THE INTERACTIONS OF LATE REPUBLICAN MARBLE IMPORTS ON ARCHITECTURE, ECONOMY AND PERCEPTION**Beck, Dennis (University of Bonn)**

In the course of the most expansive phases of the Roman Republic in the 2nd-1st century BC, an abundance of diverse marbles and new materials became available and part of a living environment that was in a state of continuous change due to ever-changing hierarchies of materials and values, influences and fashions. In this paper, the influence of new building materials on the existing „Roman and Italic architecture“ and the associated modifications will be discussed with some examples and key studies. While research on late Republican marble imports was strongly guided by written sources, especially Pliny the Elder, and focused primarily on Rome, a broad spectrum of archaeological contexts show a different picture. This article is therefore dedicated to the oldest archaeological contexts, predominantly mosaics and depictions in wall paintings, which should also provide an overall picture of marble imports outside the Urbs. Some examples will be used to discuss the associated changes within architecture and decoration, and how the relationship between marble use and for instance monumentalization can be evaluated. Some discuss the interactions between imitated marbles and physically used marbles? Which networks and actors are responsible for the marble trade during this period and which marbles were commonly traded and used?

This session aims to provide an overview of current research on imported marbles and site-specific case studies. It seeks to shift the focus away from Rome in order to broaden our understanding of the earliest uses of marble during the Roman period.

14 FOUR SMALL-QUARRY STONES FROM EGYPT'S EASTERN DESERT AND THEIR DEPLOYMENT IN THE VESUVIAN CITIES**Barker, Simon (Ghent University)**

Decades of archaeology in Egypt's Eastern Desert and accrued documentary evidence, set alongside an ongoing census of lithic decor in Campania, allow a more nuanced understanding of the interplay of Roman investment in the Desert. This paper focuses on four types of stones (granito della colonna, gabbro eufotide, Wādi Umm Esh serpentinite, and ophites) from Egypt's Eastern Desert that come from quarries which were physically quite small, at least in comparison to the better known and more fully explored operations at Porphyrites, Mons Claudianus, and their satellites. Because they have attracted less attention from archaeologists and papyrologists, their chronological profiles are less clear and their ancient names, with the exception of ophites, remain unknown. However, these stones enjoyed a surprisingly wide distribution in Italy, albeit not in large quantities.

In this paper we aim to set the Egyptian evidence directly against that for its distribution and use in Campania, with the hope of learning more both in terms of chronology and contexts of use. Production of four lesser-known Egyptian stones seems in all cases to have begun under Augustus (prior to AD 14), and diffusion in Italy was well established before the eruption of Vesuvius in AD 79. Elsewhere we have studied the case of ophites; here we look at all four. Interestingly, the distribution of the four stones considered here stands in stark contrast to those from the large quarries of Porphyrites and Mons Claudianus.

15 THE MARBLE URN FROM THE GERMANIC CEMETERY IN OČKOV**Kalapáčová, Anna (The Institute of Archaeology of the Slovak Academy of Sciences)**

Očkov cremation cemetery is the biggest Germanic burial site in southwestern Slovakia and it's dated to the B2/C1 – C3 stages of the Roman Period. In grave 222, the bones and other finds were discovered in the marble urn. It is so far the only known find of a marble urn from the territory of Barbaricum. The grave is exceptional and probably an elite individual was buried in it. Based on the grave attachments the grave has been dated to the first half of the 3rd century. The urn was probably made several centuries before being placed in the grave. Because the urn from Očkov has no analogies even in the Roman world, we tried to determine the provenance based on natural science analyses.

Material composition and provenance were examined by ratios of stable isotopes of carbon and oxygen by mass spectroscopy (MS), powder X-ray diffraction (XRD), polarized light microscopy, scanning electron microscope coupled by wavelength-dispersive X-ray spectroscopy (SEM/WDS).

The marble urn from grave 222 was made of pure white calcite marble with distinctive crystals without dolomite content and made on a lathe. Based on the results of the analyses we could be inclined to assume that the marble from which the Očkov urn is made probably has an origin in the quarries of Carrara (Apuan Alps, Italy).

Compared to known Roman provincial marble urns, it is characterized by a higher degree of processing. Probably it was made directly in Italy, where the tradition of stoneworking was prevalent. The main question is how the urn came from the Roman environment to the Barbaricum and whether the Quadi used the urn before it was placed in the grave or they came into contact with burials with stone urns on the territory of the Roman Empire.

729 RECENT ADVANCES IN DOCUMENTING THE ARCHAEOLOGY OF CAVES AND THEIR ENVIRONMENTS**Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps****Session organisers: Machause López, Sonia (Universitat de València) - Trimmis, Konstantinos (King's College London) - Skeates, Robin (Durham University) - Diez Castillo, Agustín (Universitat de València)****Session format: Regular session**

New ways of thinking about caves and about humans and their multi-dimensional relationships call for new ways to record the archaeology of caves and their environments. Over the last decade, rapid progress has been made by archaeologists in rethinking the cultural life of caves, acknowledging: the diversity of cave forms and of their human uses; their landscape contexts; the connectivity of their occupants, practices and materials; the complexity of taphonomic processes; and the embodied, sensory and psychological human experiences of cave environments and performances. In the process, traditional conceptions of caves as inanimate underground spaces in bedrock have begun to be replaced by ideas about the dynamic affordances and vibrancy of caves and of the arguably symbiotic relations and affects of caves, people and other forces.

With these dynamics in mind, this session aims to showcase recent technological advances in recording and interpreting these complex relationships, over various spatial scales—ranging from the landscapes that caves form an integral part of through to cave environments and sediments—and over time.

We consequently welcome papers that centre on but are not limited to:

- progress made in documenting the archaeology of caves and their internal and wider environments.
- new technologies and techniques for recording human behaviour and activity in caves, such as: 3D scanning, photogrammetry, LiDAR, and virtual reality applications.
- field-based and digital methods that document and model the place of caves within wider natural and cultural landscapes.
- experimental methods that seek to make sense of how people performed in and experienced cave environments
- interdisciplinary approaches to human-cave interactions and conceptions, including those that incorporate local knowledge, oral traditions and ethnographic studies.

ABSTRACTS

1 CONVERSATIONS WITH CAVES: ELUCIDATING THE ROLE OF THE VISUAL BRAIN IN THE EMERGENCE AND EARLY DEVELOPMENT OF PALAEO-LITHIC 'CAVE ART'

Wisher, Izzy (Aarhus University) - Pettitt, Paul (Durham University)

Palaeolithic archaeologists have long recognised anecdotally that Upper Palaeolithic figurative imagery (40,000-15,000 cal BP) formed part of a continuum of sensorial experiences in the dark zones of European caves. The effects of light sources, shadow and visibility, movement and perspective of viewers, and synecdoche and pareidolia evoked by the topography of walls and ceilings in the dark zone, have all been documented to play roles in the nature and placement of 'cave art'. In recent years, we have developed visual palaeopsychology, an interdisciplinary field dedicated to testing hypotheses related to sensorial dimensions of Palaeolithic art through collaborations between archaeology and visual psychology. Our research integrates archaeological materials, such as photogrammetric models of cave walls, as high-resolution stimuli within psychological experiments. Through utilising approaches such as eye-tracking and virtual reality (VR) experiments, we have provided nuanced insights into how psychological phenomena informed the making and experience of Upper Palaeolithic cave art, and how certain perceptual phenomena may be responsible for the emergence of figurative representation. In this talk, we document our pioneering research in visual palaeopsychology, using several examples from cave art sites in northern Spain. We demonstrate caves acted as suggestive environments for Upper Palaeolithic peoples, actively shaping their engagement with artistic behaviours.

2 TOUCHING THE DARK: EXPLORING PALAEO-LITHIC EMBODIED CAVE MARKINGS IN CROSS-CULTURAL CONTEXT

Oosterwijk, Barbara (University of Exeter)

In rock art research, the predominant focus has been on the visual character of artistic expressions, while sensory experiences such as smell, taste, and, more notably, touch have been overlooked. During the European Middle and Upper Palaeolithic, a period characterized by the coexistence of different human actors, an intriguing category of cave markings emerges: embodied markings. The creation of these cave markings required a bodily attitude, involving not only the deliberate formation of an outline representing specific body parts but also physical contact with the cave surface. The tactile interaction and marking of distinct formations and surfaces seem to have constituted a pivotal element in the early exploration of underground spaces. The personal and exploratory character of embodied markings, along with the restricted accessibility of certain locales, connects their occurrence with thrill-seeking and risk-taking behaviour, associating their emergence with young individuals.

Hand stencils, painted finger dots and finger lines have a ubiquitous distribution, appearing on every continent except Antarctica. In this presentation the appearance of embodied markings will be contextualised through a comparative analysis of examples drawn from Palaeolithic caves, including Ardales and El Castillo in Spain, and Pech Merle in France. Furthermore, the analysis will extend to ethnographic and prehistoric parallels in Australasia, the Americas, and Africa, where the occurrence of handprints and stencils, often accompanied by intricate decorations, will be explored. Thus, in contrast to accentuating the differences in the interactions between human actors and their environments, this research endeavours to examine commonalities in both people and their practices.

3 "DEEP IN CAVES": SENSORIAL ANALYSIS OF IBERIAN RITUAL CAVES (5TH-3RD CENTURIES BC)

Skeates, Robin (Durham University) - Machause López, Sonia (Department of Prehistory, Archaeology and Ancient History, University of Valencia, Valencia, Spain) - Trimmis, Konstantinos (Centre for Hellenic Studies, Department of Classics, King's College, London, UK) - Diez Castillo, Agustín (Department of Prehistory, Archaeology and Ancient History, University of Valencia, Valencia, Spain) - Nequeruela Villanueva, Daniel (Department of Prehistory, Archaeology and Ancient History, University of Valencia, Valencia, Spain)

This paper presents the first results of the project "Deep in Caves: Iberian Ritual in Context" (CIGE/2022/94). This project is studying Iberian Iron Age caves (5th-3rd centuries BC), with an emphasis on defining various stages of the ritual processes performed in and around them and their sensory dimensions. These natural spaces evidently were arenas for diverse rites of passage, as documented archaeologically by the remains of offerings such as indigenous and imported ceramics, metal ornaments and faunal remains. Geographically, our research is focussing on caves situated within the Iberian territories of Kelin and Edeta (Valencia, Spain).

Applying and adapting recent methods developed by members of our team in other Mediterranean contexts, we have recorded some environmental/sensory variables (such as temperature, humidity and light). We are considering the extent to which these aspects of cave environments/sensoria might have impacts on the movements of ritual participants and their choice of specific areas of a cave within which to perform certain ritual actions.

The initial results of this work are already offering new insights into Iberian ritual practices in the Valencian area and helping to develop new approaches to recording cave environments/sensoria that can be extended to other regions and periods of study.

4 "STALAC-RITE": GEOCHEMICAL ANALYSIS OF STALACTITES IN RITUAL CONTEXTS

Machause López, Sonia (Departament de Prehistòria, Arqueologia i Història Antiga (Universitat de València)) - Gallego, Gianni (Departament de Prehistòria, Arqueologia i Història Antiga (Universitat de València)) - Albelda Borrás, Vanessa (Independent researcher) - Trimmis, Konstantinos (Centre for Hellenic Studies (King's College of London)) - Skeates, Robin (Department of Archaeology (Durham University)) - Diez Castillo, Agustín (Departament de Prehistòria, Arqueologia i Història Antiga (Universitat de València))

The recent identification of stalagmite and stalactite fragments in Iberian Iron Age open-air sites raises important questions about the use of these particular mineral formations inside and outside the ritual space of contemporary caves. Since the macroscopic definition of stalactite and stalagmite characteristics (colour, presence of carbon, etc.) is too imprecise to distinguish different sources and to determine the provenance of samples, scientists have tried over the last decades to develop methods to improve the characterisation of these speleothems from a chemical, mineralogical and petrographic point of view.

In this study, we characterise samples collected during the excavation of an open-air site: El Castellar (Casinos), as well as other natural speleothems sampled from the cave walls and from the fragments found on the ground of two Iberian Iron Age ritual caves: Sapo and Merinel. All three sites are located in the inland area of the Valencian Community (Spain), in the ancient territory of Edeta (Tossal de Sant Miquel, Llíria). Samples from the caves were separated into inner and outer fragments and individually analysed to check layers variability. Subsequently, a non-destructive methodological approach was developed to distinguish between different sources in a restricted geographical area (a radius of 15 km). Measurements of the stalactite and stalagmite samples' chemical profile were carried out employing two different analytical techniques: portable X-Ray Fluorescence and Laser Ablation Inductively Coupled Plasma Mass Spectrometry. Results indicate that relative concentrations of major elements, trace elements and rare earth elements identified in samples from caves and from the open site were affected by different depositional and post-depositional conditions. Finally, the obtained data were processed by multivariate statistics to investigate the potential provenance sources of stalactites from El Castellar.

5 GEOMATIC PERSPECTIVES ON UPPER PALAEO-LITHIC HAND STENCILS: INSIGHTS FROM EL CASTILLO CAVE

Spaey, Olga (IKER (CNRS - UMR 5478); UBM; UC) - Arriolabengoa, Martin (UPV/EHU) - Intxaurre, Iñaki (UPV/EHU) - Salazar, Sergio (IIIPC; UC) - Irurtzun, Aritz (IKER (CNRS - UMR 5478)) - Garate, Diego (IIIPC; UC)

This work presents a fresh perspective on space analysis within Upper Palaeolithic decorated caves. We argue that previous research approaching this notion encounters several gaps, surfacing on multiple levels: (i) subjectivity, (ii) vagueness, (iii) restrictions on its conceptualization, (iv) and its planar illustration (two-dimensional description and representation), among others. To address the aforementioned issues, we propose a new methodological approach relying on digital quantitative tools for spatial analysis (Geographic Information Systems) and three-dimensional vis-

ualization, allowing new forms of study with quantitative data, to enable researchers comprehend the complexities of spatial distribution in a more objective and systematic manner. Note that, while GIS is today widely embraced in archaeological studies in general, particularly in the field of landscape archaeology, its application to three-dimensional objects is far from obvious, as these tools were designed for a two-dimensional universe (plan view). Our proposal attempts to go beyond these limits. We applied it to the case of El Castillo cave (Cantabria, Spain), specifically on the distribution of its hand stencil motifs. To proceed to the 3D restitution of its Palaeolithic state, we carried out a geomorphological study of the entire cavity, to assess the processes at play and their distinct phases of development during the (Pre)historic times. This work, completed with archival record analysis (to identify more recent changes), enabled us to proceed to the modification of the tridimensional object of the cave and directly address, via the GIS, questions such as visibility (via different body postures), capacity (volume), accessibility (Least Cost Path, access difficulties) or spatial organization (distribution of the motifs within the space and arrangement of the figures in relation to each other). The results of these analyses, assessed through statistical methods, enable us to enhance our understanding of the Palaeolithic social groups that invested the cave during ancient times.

6 **ARCHAEOLOGICAL AND SPELEOLOGICAL DYNAMICS OF A DEVELOPED KARST SYSTEM AND SUBTERRANEAN RITUALS IN THE EARLY 5TH MILLENNIUM BCE SOUTHERN LEVANT**

Ullman, Micka (Department of Cross-Cultural and Regional Studies, University of Copenhagen, Denmark) - Davidovich, Uri (Institute of Archaeology, The Hebrew University, Jerusalem, Israel)

Har Sifsof Cave, located in the Mountainous Galilee, northern Israel, is a developed karst system measuring 518 m in total length and 49 m in vertical extent. The cave contains rich archaeological assemblages dated to the 5th millennium BCE, including pottery, flint tools, stone tools, architecture, and human remains. Archeological and speleological analysis coupled with a three-dimensional SLAM-based LiDAR modeling of the cave and adjacent surface topography were incorporated to address issues of site formation process and spatial arrangement of human activity in the cave. The study shows that by the fifth millennium BCE the underground system assumed its present configuration, indicating that ancient human activity in the cave involved overcoming multiple environmental obstacles and hazards. In tandem, changes in the configuration of voids and shafts in the upper part of the underground system led to the secondary deposition of external flint-bearing sediments alongside the primary deposited remains in the cave. These insights, combined with a meticulous typo-technological study of archaeological assemblages, their spatial distribution in the cave, and the broad cultural context, suggest that ancient human activity in the cave revolved around fertility cults associated with the agricultural cycle of cereal grains and the death and regeneration of humans and crops, nourished by the vitality of the concealed, humid, and dark underground.

7 **MAPPING IN THE DARK. AN EVALUATION OF DIFFERENT SURVEY METHODS IN ARCHAEOLOGICAL CAVES FROM LASTOVO ISLAND, CROATIA**

Trimmis, Konstantinos (Universidad de Valencia) - Drnić, Ivan (Archaeological Museum in Zagreb) - Brkić Drnić, Kristina (University of Zadar) - Đukić, Ana (Archaeological Museum in Zagreb)

Surveying caves, and especially caves with archaeology, is a challenging attempt, due to the cave environment and the absence of satellite or broadband reception underground. This paper evaluates all different methods that have been employed for surveying and recording the caves at the Island of Lastovo in Eastern Adriatic, and especially for the recording in Rača cave. Rača is the most important archaeological site on the island due to the wealth of archaeological finds from different periods. The archaeological layers indicate various human activities, carried out over the course of 7000 years. For the recording in Rača during the present archaeological research in the cave since 2021 and in other four caves on the island with evidence of human interaction, Heeb's paperless mapping, Total Station, handheld and airborne Structure from Motion Photogrammetry, and mobile phone based LiDAR have been employed. Further of a presentation of the outputs of applying these methods in Rača and in other caves, all applications are evaluated against SfM photogrammetry that have been the backbone recording methodology for the same elements of the project until the 2022 season. The recording opportunities that each application offers for surveying and recording archaeology underground are presented, alongside the project's workflows.

8 **THE UNDERLANDSCAPE PROJECT: AN INTERDISCIPLINARY AND SHARED STUDY OF THE UNDERGROUND ENVIRONMENTS**

Baldassarri, Monica (Università degli Studi di Milano; CNR ICCOM di Pisa; Sistema Museale di Montopoli in Val d'Arno) - Alberti, Antonio (Università di Pisa) - Bertacchi, Andrea (Università di Pisa) - Chiti, Letizia (Università di Pisa) - Deri, Maria Grazia (Università di Pisa) - Fiorentino, Girolamo (Università del Salento) - Serradimigni, Marco (Università di Pisa) - Salvatori, Enrica (Università di Pisa) - Senesi, Giorgio (CNR IISTP di Bari) - Palleschi, Vincenzo (CNR ICCOM di Pisa)

Over the last two years, the University of Pisa and the CNR conducted a multidisciplinary and diachronic study on the mountain landscapes of Lunigiana, Garfagnana and Mediavalle del Serchio (north-west Tuscany) as part of the PRIN 'UnderLandscape' project, aimed to the definition of an analysis protocol applicable in particular on hypogean structures and based on non-invasive scientific techniques, operating mainly in situ.

Lunigiana, Garfagnana and Mediavalle present several examples of caves and rock shelters in different contexts and types of settlement, which can be studied by acquiring a deeper knowledge of these structures and the past and present environment where they are located. The experimented methodology integrates the technical-scientific and historical-archaeological approaches through the application of non-destructive diagnostic methods and digital and multimedia technologies for archaeological, geo-historical and palaeobotanical research, including 3D modelling and aerial photography from drones. Part of the project involves also the collection of oral sources and the sharing of the research progresses with the local population. The last phase of the project is the redevelopment of the investigated sites through the creation of shared geo-tourist itineraries, in order to promote the cultural and identity values they contain, thanks to the involvement of the local community.

In this communication we intend to present the research strategy adopted in the UNDERLANDSCAPE project, together with an initial analysis of the data collected, introducing as case studies several caves and a hypogean church located in Lunigiana and Mediavalle as well as their past and present environment.

9 **DIGITAL SURVEY FOR DOCUMENTATION AND VIRTUALIZATION OF ROCK PASTORAL SITES IN ASPROMONTE NATIONAL PARK (ITALY)**

Pizzonia, Lorella (Mediterranean University of Reggio Calabria) - Stilo, Francesco (Mediterranean University of Reggio Calabria)

The documentation of underground and rock heritage has undergone great development in recent years, thanks to the growth and diffusion of digital survey technologies. In terms of documentation, these developments initially led to the production of accurate graphic documents, useful for the morphological and spatial analysis of cave contexts. Subsequently, the spread of technologies such as virtual reality (VR) and augmented reality (AR) have allowed the sharing of the 3D digital documentation collected to an audience of users not limited to professionals and researchers. In the field of digital survey, the documentation of rocky and underground environments in particular, has always presented peculiar problems, in particular relating to the insertion of these contexts within the surrounding landscape. These problems were subsequently overcome thanks to the spread of UAVs for aerial photogrammetry. This contribution intends to explore the concrete application of these technologies applied to the study of rock pastoral sites in the Aspromonte National Park in Calabria (Italy). These non-invasive archaeological interventions are inserted in contexts previously not investigated from a scientific perspective, as part of an interdisciplinary research that involves the disciplines of representation and archaeology.

10 **THE WRITINGS ON THE WALL! THE MODERN GRAFFITI OF RAČA CAVE IN LASTOVO ISLAND CROATIA**

Theodoroudi, Eleftheria (Basketball Museum YMCA Thessaloniki)

Rača cave is located in the southeast part of the Lastovo Island in the Eastern Adriatic. First descriptions of the cave date back to the 19th century, with minor archaeological research and excavation undertaken during the WW II and later in the 1950s. Materials from this excavation were published in the 1970s. The cave presents elements of diachronic occupation from the Late Neolithic to the modern times. An interesting feature of the cave and focus of this paper is that it is full of contemporary graffiti all over the walls of all of its five chambers.

The graffiti covering the cave walls are mostly inscriptions of names and dates with few figurative pictures. Most of them are dated in the 20th century, although there are a few dated in the 19th. During the Lastovo Archipelago Cave Archaeology Survey, a systematic recording of the graffiti took place. For the recording of the graffiti, apart from the macroscopic observation and visual identification, we used Reflectance Transformation Imaging (RTI) and Structure from Motion Photogrammetry. These methods have been used in a variety of archaeological contexts but in our case they have been proven effective and they revealed the earliest graffiti in the cave that is an inscription of 1673.

Using archaeological tools we recorded the ephemeral and ordinary human presence in the cave. The shift to the small scale, however, managed to illuminate the narratives that make up the island's contemporary historical trajectories.

731 CHANGES IN LIFE, CHANGES IN DEATH: AN INTEGRATIVE APPROACH TO THE NEOLITHIC TRANSFORMATIONS IN SOUTHWEST ASIA

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Fernandez, Eva (Department of Archaeology, Durham University.) - Pearson, Jessica (Department of Archaeology, Classics and Egyptology, University of Liverpool.) - Chamel, Berenice (Institut Français du Proche-Orient (IFPO), Beyrouth; French Ministry of Foreign Affairs/CNRS) - Plug, Jo-Hannah (Department of Archaeology, Classics and Egyptology, University of Liverpool.) - Blevins, Kelly (Department of Archaeology, Durham University.)

Session format: Regular session

The Neolithic was a period marked by profound transformations in subsistence, lifestyle, and social organisation. In Southwest Asia populations grew and aggregated in permanent settlements, farming and animal domestication became the main ways of subsistence, and the environment was slowly modified to meet the needs of the new economic system. These changes had an impact on the health status and disease outcomes of these very first farmers, permeated into their cultural and ritual spheres and crystallised into their varied funerary traditions.

Advances in archaeological science during the past decades have enabled the recovery of a rich body of first-hand data on aspects like subsistence practices, chronologies, funerary traditions, mobility, pathologies, genetic relatedness, biological and social kinship of some of these farming groups. The information is, however, greatly fragmented due to the limitations imposed by the harsh climate conditions -incompatible with good biomolecular preservation- and the political instability in the region, and still highly compartmentalised with limited engagement across disciplines.

This session aims to bring together different research areas within archaeology that can contribute to the understanding of the changes in lifeways, social organisation, and funerary traditions, to push the discussion towards a more integrative overview of the life and death in Neolithic societies (ca. 10,000-5,000BCE) of Southwest Asia.

We welcome contributions from researchers working in human, animal and environmental bioarchaeology in disciplines such as ancient DNA, isotope analysis, proteomics, dating, osteoarchaeology, zooarchaeology, geoarchaeology or archaeobotany, as well as more theoretical approaches to settlement patterns, economic systems, and burial customs. We particularly welcome studies that provide a multi-disciplinary approach to the life and death of the world's first farmers.

ABSTRACTS

1 AN INTEGRATIVE APPROACH TO UNDERSTANDING INFANT DEATH IN THE LATE EPIPALAEOLITHIC OF THE LEVANT

Richter, Tobias (University of Copenhagen)

Prior to the advent of modern sanitation and hygiene standards, infant and mortality rates were generally high in most pre-industrial societies. The Neolithic Demographic Transition, which set in with the development of plant cultivation and animal herding during the Epipalaeolithic-Neolithic Transition in southwest Asia, has been argued to have resulted in a concurrent increase in both fertility and infant and child mortality rates. The undoubtedly frequent death of newborn babies and young children was certainly a traumatic and challenging experience for parents, families and the wider social group. How did Late Epipalaeolithic and Early Neolithic societies experience and cope with the deaths of newborns and young children?

This paper will explore how Late Epipalaeolithic and Early Neolithic societies experienced and coped with the deaths of newborns and young children based on the excavations at the Late Epipalaeolithic Natufian site Shubayqa 1. Here, excavations revealed a high concentration of neonatal, infant and child remains buried beneath stone pavements. Previous work has revealed aspects of their life-histories and the funerary practices associated with their interment. Integrating these perspectives, this paper will discuss possible interpretations for the high frequency of neonatal, infant and child remains at the site, and consider the wider implications of this evidence for understanding human lifeways during the Epipalaeolithic-Neolithic transition.

2 CONTINUITY AND CHANGE IN MORTUARY PRACTICES IN SOUTHWEST ASIA FROM THE NEOLITHIC TO THE EMERGENCE OF COMPLEX SOCIETIES

Philip, Graham (Durham University)

The human remains of the Neolithic in Southwest Asia have been studied in considerable detail in recent decades. Characteristic practices include skull removal, the curation of body parts, burial under house-floors (and offsite cemeteries in some cases), and where provided grave goods were modest. By the 3rd millennium BCE (Early Bronze Age), evidence for the existence of complex societies is clear across a wide swathe of Southwest Asia, which raises the question of where the treatment of the dead fits into these developments.

In some parts of Southwest Asia, practices that resemble those documented in the Neolithic appear to continue into the Early Bronze Age and there is archaeological evidence to argue for threads of continuity that extend back to earlier traditions. However in other regions, there is extensive evidence for 3rd millennium mortuary behaviours that, in many respects, look quite different from earlier practices. The significance of this is emphasised by the paucity of evidence from some parts of Southwest Asia for mortuary activity dating to the 4th millennium BCE. This leads to the possibility that the practices that we observe in 3rd millennium BC contexts, in some areas at least, might represent, not a modification of past practices to meet the needs of new forms of social organisation, but rather a re-invention of burial, perhaps even a complete re-evaluation of the relationship between the dead and (parts of) the community of the living. The current paper is intended to open these questions for wider consideration.

3 EXPLORING MORTUARY PRACTICES DURING NEOLITHIC PERIOD IN TEPECİK-ÇİFTLİK HÖYÜK

Emmez, Yaren (Yeditepe University, Department of Anthropology, 34755 Atasehir, Istanbul, Türkiye; Hacettepe University, Department of Anthropology, 06800 Beytepe, Ankara, Türkiye; Human Behavioral Ecology and Archaeometry Laboratory (IDEA Lab), Hacettepe University, 06800 Beytepe, Ankara, Türkiye) - Büyükkarakaya, Ali Metin (Hacettepe University, Department of Anthropology, 06800 Beytepe, Ankara, Türkiye; Human Behavioral Ecology and Archaeometry Laboratory (IDEA Lab), Hacettepe University, 06800 Beytepe, Ankara, Türkiye)

The Neolithic period is marked by a distinctive reshaping of humanity's relationship with nature. The transition of communities to permanent settlements and the shift in primary subsistence strategies through plant and animal domestication inevitably led to social changes within these communities. Rituals within these communities serve as crucial markers for understanding and tracking these social transformations. Archaeologically, evidence of rituals can be traced within the mortuary contexts.

Various mortuary practices and material remains of rituals in the Neolithic period of Southwest Asia illuminate the diversification in human thoughts and behaviours towards death, consequently aiding in understanding the changes in social structures during this transformative era. This study examines the mortuary practices observed in Neolithic settlements of Southwest Asia, focusing on the Tepecik-Çiftlik Höyük located in Central Anatolia, considering geographical and chronological similarities and differences. Data provided from Tepecik-Çiftlik Höyük has been analyzed to explore and interpret mortuary practices and rituals, comparing the similarities and differences observed in various settlements across Southwest Asia during the Pre-Pottery Neolithic (PPN) and Pottery Neolithic (PN) periods. Additionally, the study explores whether Tepecik-Çiftlik Höyük's potential involvement in an obsidian exchange network could have facilitated cultural exchange, thus examining its interaction with other Southwest Asian settlements.

By scrutinizing the changing practices between the PPN and PN periods, this research aims to elucidate how these shifts reflected regional interactions and processes of cultural change. Understanding how evolving practices between PPN and PN periods impacted inter-regional interactions and cultural transformations provides a comprehensive perspective on Neolithic era life and mortuary practices.

4 DEALING WITH THE DEAD AT TELL EL-KERKH, NORTHWEST SYRIA

Jammo, Sari (Nagoya University) - Tsuneki, Akira (University of Tsukuba)

The social transformations during the development of the Neolithic societies in the Near East have long been investigated from the perspectives of economics, subsistence, tools-production development, and changes in funeral practices in the Pre-Pottery Neolithic A and B periods. However, the cultural changes at the transition from the Late PPNB (Late PPNB) to the Pottery Neolithic (PN) have not received sufficient attention, and only limited data have been released. Nevertheless, the small but rich body of data derived from excavated sites in different regions has revealed some of the secrets of the Neolithic societies in this transitional social period, illustrating major changes in settlement organization, cultural materials, subsistence strategy, society segmentation, funeral practices, and means of expressing identity. Excavations at the Neolithic settlement of Tell el-Kerkh, located in the south of the Rouj Basin, revealed a series of intermittent occupations spanning approximately 3,000 years from Early PPNB to Late PN periods. Remains of 294 individuals unearthed dated to the Late PPNB and Late PN periods. The Late PPNB settlement revealed a handful of burials, while in the PN settlement the majority of burials were located in an open-air communal cemetery, including several burials, mainly of infants and small children, discovered in a designated space outside the

cemetery. Researchers discuss this transition from the perspective of environmental, economic, demographic, and social factors. This paper discusses the social transition toward the Late PN period from the perspective of changes of funerary practices, household burials and the shift of burial location at Tell el-Kerkh. We argue that transformations in PN societies and the diversity of burial customs can be attributed to changes in social structure and the increasing of household autonomy. Furthermore, we suggest that these societies had developed distinct local or regional-based culture, which distinguishes sites and regions.

5 A MOMENT FOR THE MISFITS: HOW DO BODY DATA SPEAK TO SOCIAL STRUCTURE IN FEMINIST, MORE-THAN-HUMANIST FRAMES?

Kay, Kevin (University of Leicester)

Archaeology tends to reconstruct social structure as a complex, singular system in which individuals have particular positions. New methods are quickly fitted into this framework—adding new information about (say) diet or DNA atop older ways of classing bodies based on sex or mortuary treatment. The expectation is that, as new data become available, a more holistic understanding of social structure, and individuals within that structure, will become possible.

But what if no one has a, singular, social position? Feminist, intersectional and posthumanist theorists have argued this for decades. Our bodies are multiple; in different moments and different interactions, their capacities, identities, and significant features shift and rearticulate. These conversations rethink social structure—from an enveloping system to an emergent quality of moments, which never encapsulates any one of us in our entirety. Indeed it is the tension between our dis-unified positions that tends to prompt our most concerted thought about—and struggle against—social patterns. Archaeologists in SW Asia have engaged with such theory, but theory-driven research in the region has not always been quick to accommodate new methods. There is a risk of our best theory remaining in the philosophical clouds, leaving the work of bringing in new tech to old epistemologies.

I don't think feminist theory, intersectionality or posthumanism belong in the clouds, and want to explore how new and old burial data can do work in an epistemology of multiples. By showing how arrays of data around Neolithic bodies illuminate diverse, momentary and fracturing social positions, I aim to reappraise the role emerging methods play in unravelling Neolithic worlds.

6 CONTRIBUTION OF FUNERARY DATA TO EXPLORE TELL HALULA'S ROLE IN EXCHANGE NETWORKS OF THE 8TH MILLENNIUM CAL BC

Gomez Bach, Anna (Universitat Autònoma de Barcelona) - Molist, Miquel (Universitat Autònoma de Barcelona) - Orri, Olivia (Universitat Autònoma de Barcelona)

The study and excavation project of Tell Halula site, settled in the Middle Euphrates Valley (Syria), is providing a significant set of innovations for understanding the early agricultural-pastoral populations in a diachronic view from the Pre-Pottery to the Pottery Neolithic. The collection of funerary evidence from the second half of the 8th millennium cal BC (Middle and Late PPNB) is particularly noteworthy. Paleoanthropological studies and already conducted social approaches have allowed the highlighting of the main characteristics and an approximation, among other topics, to the population, traditions, and funerary gestures recovered in the domestic units that form the essence of a structured village.

This communication aims to, based on the evidence of material goods associated with the burials (grave goods, accompanying objects, etc.), review and expand the role of the population of Tell Halula in the circulation and exchange networks of the 8th millennium in the northern region of the Near East.

7 METRIC AND NON-METRIC DENTAL TRAITS FROM THE NEAR EAST POPULATIONS ON THE TRANSITION FROM HUNTER GATHERS TO FARMERS

Dyowe Roig, Albert Epite (Departament de Prehistòria, Universitat Autònoma de Barcelona) - Martínez Martínez, Laura M. (Departament de Biologia Evolutiva, Ecologia i Ciències Ambientals, Secció de Zoologia i Antropologia Biològica, Universitat de Barcelona, Barcelona, Spain; Institut d'Arqueologia de la Universitat de Barcelona, Barcelona, Spain) - Molist Montaña, Miquel (Departament de Prehistòria, Universitat Autònoma de Barcelona) - Pérez-Pérez, Alejandro (Departament de Biologia Evolutiva, Ecologia i Ciències Ambientals, Secció de Zoologia i Antropologia Biològica, Universitat de Barcelona, Barcelona, Spain; Institut d'Arqueologia de la Universitat de Barcelona, Barcelona, Spain) - Estebananz, Ferran (Institut d'Arqueologia de la Universitat de Barcelona, Barcelona, Spain) - Coqueugniot, Eric (- UMR Archéorient, Maison de l'Orient et de la Méditerranée. Lyon, France)

Neolithization was a major event in human history, marking the transition from hunting and gathering to agriculture and pastoralism as a means of survival. This change occurred around 12000 cal BP during the Holocene, a period of global warming. The Neolithic period in the Near East brought several changes in social practices, including subsistence strategies and settlement patterns. To track dietary and ecological adaptations in Hominini, tooth size and

enamel thickness are important markers of food availability. There is evidence that tooth size has decreased throughout Homo sapiens' evolution. For example, the dentition of hunter-gatherers was larger than that of agricultural groups. Some researchers suggest that the decrease in dental size between the Palaeolithic and Neolithic periods was due to a process of gracilization, which was necessary to support masticatory pressure despite the loss in muscle mass.

This study analysed metric and non-metric dental traits of adult human premolars and molars from 28 different sites and periods of the Early Neolithic in the Near East and Anatolian Peninsula. Buccolingual and mesiodistal diameters of the tooth crown and ASUDAS non-metric dental traits were analysed. The results show significant differences ($p < 0.05$) in dental area between different prehistoric periods. In addition, the buccolingual measurements show a higher rate of difference than the mesiodistal measurements.

Regarding the analysis of non-metric traits, the results show that there is a higher frequency of these traits between sites from the same period. For example, Tell Halula showed higher frequencies than the samples from other sites of the same period. Additionally, different frequencies were observed between periods.

We are grateful to all the curators and technical personnel of the different institutions where the specimens were molded. Grants PID2020-112963GB-I00, funded by MCIN/AEI/10.13039/501100011033 and by "ERDF A way of making Europe", by the "European Union".

8 INVESTIGATING PATTERNS OF MOBILITY DURING THE PRE-POTTERY TO POTTERY NEOLITHIC OF SOUTHWEST ASIA USING STRONTIUM AND OXYGEN ISOTOPES

Plug, Jo-Hannah (University of Liverpool) - Blevins, Kelly (Durham University) - Abbès, Frédéric (Universite Lyon 2) - Akkermans, Peter (Leiden University) - Bach Gómez, Anna Maria (Universitat Autònoma de Barcelona) - Chambrade, Marie-Laure (The University of Chicago) - Coqueugniot, Eric (Universite Lyon 2) - Pearson, Jessica (University of Liverpool) - Fernández-Domínguez, Eva (Durham University)

In addition to fundamental changes in modes of economic subsistence, the Neolithic transition in Southwest Asia (starting ca. 12,000 years ago) was associated with increased sedentism and unprecedented population aggregation. This paper investigates, for the first time, the role of inter-regional mobility in Northern Syria throughout this pivotal process from a diachronic perspective, by combining archaeological (burial location, mortuary treatment) and isotope (strontium and oxygen) evidence from five sites (Cheikh Hassan, Dja'de El Mughara, Tell Mureybet, Tell Halula, and Tell Sabi Abyad) spanning the Pre-Pottery Neolithic A to the Pottery Neolithic period (9th to 6th millennium BCE). Our preliminary results show that whereas the PPNA is marked by significant variability (suggesting that the population frequented various isotopically distinct areas), the populations of the PPNB show an increased homogeneity in Sr and O values (suggesting limited intraregional mobility). In contrast, the final stages of the Neolithic are marked by a more mixed pattern of mobility, with substantial numbers of non-locals making part of the population buried locally. Importantly, combining our isotope data with the mortuary evidence, it is clear that throughout the Neolithic in this region newcomers were afforded similar treatments in death and buried in the same locations as those born locally.

9 LIVESTOCK AND SOCIAL CHANGE IN THE PPNB OF SOUTHERN JORDAN

Price, Max (Durham University) - Makarewicz, Cheryl (University of Kiel)

Human-animal relations in the Neolithic are usually understood in terms of their dietary significance. The shift from hunting to herding did have radical implications for human diets. Yet ethnographic information reveals that domestic animals are also significant sources of wealth. The Pre-Pottery Neolithic B societies (c.8500-7000 BC) east of the Jordan Valley experienced significant changes in social structure. Broadly speaking, the mode of production, or the ways in which surplus production was organized and mobilized, shifted from one grounded in the community to one centered on extended households. This pattern of household atomization, widely observed by archaeologists, has only been tangentially related to livestock production. We suggest that the adoption and expansion of livestock keeping was, in fact, a major driving factor in the shift in mode of production in the PPNB. Taking a broadly Marxist perspective, we posit a model in which wealth in livestock was mobilized for the reproduction of "wealth-in-people," or the accumulation of rights stemming from relationships between people. Wealth-in-people was the key asset for PPNB households; wealth in livestock served as a major component of its reproduction. This might explain why the gradual dominance of livestock production in the region coincided with major social changes.

10 FOLLOWING THE HOOF-PRINTS: PARALLELS AND PECULIARITIES OF SMALL RUMINANT DOMESTICATION IN SOUTHWEST ASIA

Daly, Kevin (University College Dublin)

Sheep and goat, the so-called "ovicaprines", are thought to have entered under management by humans in Southwest Asia during the ninth and eighth millennium BCE, an intensification of a process which led to phenotypic and genetic distinction from their wild progenitor species. However, the difficulty in distinguishing sheep and goat archaeological

remains have limited our ability to determine if these domestication trajectories were entangled at a herd level or if sheep and goat management was practised by distinct communities.

This presentation will synthesize our current understanding of the genetic makeup of early managed sheep and goat herds, to directly address the question of entangled domestication histories in the earlier phases of small ruminant management. We will draw together archaeozoological, carbon isotope, animal palaeogenomic, and animal pathogen palaeogenomic data to identify the current knowns and unknowns of small ruminant domestication in Southwest Asia.

The large number of other contributors to this work will be acknowledged in the presentation itself.

11 ANCIENT HUMAN DNA PRESERVATION AND GENETIC AFFINITY OF PRE-POTTERY AND POTTERY NEOLITHIC SITES OF NORTHERN SYRIA

Blevins, Kelly (Department of Archaeology, Durham University, UK; Center for Bioarchaeological Research, Arizona State University, USA) - Plug, Jo-Hannah (Department of Archaeology, Classics and Egyptology, University of Liverpool, UK) - Akkermans, Peter (Faculteit Archeologie, Universiteit Leiden, The Netherlands) - Chamel, Bérénice (Laboratoire Archéorient- Jean Pouilloux, UMR 5133. Maison de l'Orient et de la Méditerranée, Université Lyon, France; Institut Français du Proche-Orient, CNRS, Lebanon) - Coqueugniot, Éric (Laboratoire Archéorient- Jean Pouilloux, UMR 5133. Maison de l'Orient et de la Méditerranée, Université Lyon, France) - Molist, Miguel (Departament de Prehistoria, Universitat Autònoma de Barcelona, Spain) - Orange, Marie (Laboratoire Archéorient- Jean Pouilloux, UMR 5133. Maison de l'Orient et de la Méditerranée, Université Lyon, France; Department of Archaeology, Classics and History, University of New England, Australia) - Pearson, Jessica (Department of Archaeology, Classics and Egyptology, University of Liverpool, UK) - Fernández Domínguez, Eva (Department of Archaeology, Durham University, UK)

The Neolithic transition in Southwest Asia led to significant changes in population density and modes of subsistence. Around 12,000 years ago, people began living within semi-permanent structures and became at least partially reliant on agriculture. To understand population movement and contact during the transition to farming in the yet unsampled Middle Euphrates region of Northern Syria, we extracted human DNA from 175 petrous portions and dental pulp chambers from 5 sites spanning the Pre-Pottery Neolithic A (PPNA) to the Pottery Neolithic period (9th to 6th millennium BCE): Cheikh Hassan, Dja'de El Mughara, Tell Mureybet, Tell Halula and Tell Sabi Abyad. Modifications to DNA extraction pre-treatments methods allowed us to increase the amount of endogenous DNA in some of the samples, but preservation was still challenging, and less than 10% of the sampled individuals retained enough DNA after in-solution hybridization capture of 1,350K single nucleotide polymorphisms (SNPs). Ten individuals from Tell Sabi Abyad, Tell Mureybet, Dja'de el Mughara and Tell Halula yielded >6,000 SNPs, and were taken forward for downstream computational analyses. Our preliminary results show that these individuals cluster closely with other Pre-Pottery Neolithic farmers from Northern Mesopotamia and show affinities to Pre-Pottery groups from the Southern Levant, Anatolia and the Zagros, adding to the tapestry of genetic contributions to the first farmers of Southwest Asia.

12 GENOMIC INSIGHTS INTO THE EMERGENCE OF NEOLITHIC VILLAGES IN WESTERN ANATOLIA

Koptekin, Dilek (University of Lausanne, Lausanne, Switzerland; Middle East Technical University, Ankara, Turkey) - Umurtak, Gülsün (Istanbul University, Istanbul, Turkey) - Duru, Refik (Istanbul University, Istanbul, Turkey) - Fidan, Erkan (Bilecik Şeyh Edebali University, Bilecik, Turkey) - Çevik, Özlem (Trakya University, Edirne, Turkey) - Erdoğan, Burçin (Akdeniz University, Antalya, Turkey) - Korkut, Taner (Akdeniz University, Antalya, Turkey) - Malaspinas, Anna-Sapfo (University of Lausanne, Lausanne, Switzerland) - Götherström, Anders (Stockholm University, Stockholm, Sweden) - Ancient DNA Teams, METU/Hacettepe (METU/Hacettepe Ankara, Turkey)

The emergence of Neolithic villages in Western Anatolia, particularly between 7000-6000 BCE, has caused debates regarding the driving forces behind this transition. While earlier hypotheses leaned towards demic diffusion from the Fertile Crescent, recent studies have indicated the complexity of population dynamics during this period. Here, we aimed to interpret the origins and movements of Neolithic populations in Western Anatolia by integrating material culture analyses with paleogenomic data.

The analysis of ancient human genomes dating back to the pre-7000 BCE period reveals a local population in Western Anatolia genetically linked to Epipaleolithic Central Anatolia. This suggests population continuity in the region, possibly indicating cultural interactions or the gradual adoption of farming practices by local hunter-gatherer groups. However, during the Pottery Neolithic phase, spanning 7000-6000 BCE, genetic affinity between Western and Central Anatolian populations hints at significant population movement and cultural exchanges among regions.

Interestingly, while migration from neighboring areas seems to have played a role in shaping the genetic landscape of Western Anatolia, our analysis also indicates evidence of local admixture with local groups, particularly in Northwest Anatolia. This finding aligns with cultural evidence, highlighting the presence of foraging and fishing activities in early

Neolithic villages in the region. Furthermore, intra-site and inter-site variability particularly notable in the NW Anatolia, underscores the complexity of population interactions and local dynamics during the Neolithic transition.

In summary, our analysis suggests a multifaceted process of Neolithization in Western Anatolia, characterized by a combination of demographic movements and cultural interactions from Central Anatolia, and admixture with local populations. These findings contribute to a deeper understanding of the complex socio-cultural and genetic dynamics that shaped the emergence of Neolithic societies in Western Anatolia.

13 ANCIENT GENOMES OF ÇATALHÖYÜK: LACK OF FEMALE EXOGAMY AND PREVALENCE OF MATERNAL RELATEDNESS AMONG INTRAMURAL BURIALS

Somel, Mehmet (Middle East Technical University) - Yüncü, Eren (Middle East Technical University) - Küçükakdağ Doğu, Ayça (Middle East Technical University) - Kaptan, Damla (Middle East Technical University) - Kılıç, Muhammed (Middle East Technical University) - Hodder, Ian (Stanford University) - Knüsel, Christopher (University of Bordeaux) - 2014-2017, Çatalhöyük Human Remains Team (University of Bordeaux) - 2014-2017, Çatalhöyük Excavation Team (Stanford University) - Ancient DNA Team, METU/Hacettepe (Middle East Technical University)

Patterns of genetic kinship among burials from prehistoric sites can reveal gender-related aspects of mobility patterns and social organization. We present an archaeogenomic dataset including 132 individuals spanning the 7th millennium BCE from Neolithic Çatalhöyük in Central Anatolia. The genomic sample as a whole shows no indication of female exogamy, a result consistent with those obtained from other Neolithic sites in Anatolia (c.8000-6000 BCE) and contrasting with patrilineal-like genetic kinship patterns observed in various European Neolithic sites (c.5000-3000 BCE). Next, we focus on the identification of genetic kinship among co-burials within Çatalhöyük houses. Analysis of genetic kinship among co-buried individuals within 23 Çatalhöyük buildings, mostly subadults, reveals a diachronic decline in the frequency of close biological relatives among co-burials, indicating changing burial practices and possibly house-use through the occupation of the site. In addition, we find that Çatalhöyük individuals co-buried within the same buildings were more closely related maternally than paternally. This pattern is detected using both pedigree reconstructions and analysis of uniparental markers and can be observed through the occupation of Çatalhöyük. Our results suggest that house-based social organization in Çatalhöyük may be biased towards maternal kinship networks and that this pattern of social dynamics was maintained in the context of changing social traditions.

14 UNRAVELING THE FUNERARY RITES: INSIGHTS FROM BURIAL PRACTICES AT ÇATALHÖYÜK CHARNEL HOUSE

Harabasz, Katarzyna (Uniwersytet Szczeciński)

This paper examines the burial practices observed within a charnel house at Çatalhöyük, shedding light on the complex rituals and funerary customs of its inhabitants. The analysis encompasses the interment of twenty individuals across different phases of the charnel house's existence, with distinct patterns regarding the placement and treatment of remains. The study identifies a diversity of burial practices, including the interment of fetus skeletons. The meticulous recording of skeletal remains and associated artifacts provides insights into the social and cultural significance of these burials. The presence of intricate burial pits and associated artifacts underscores the significance of these rituals within the community.

Moreover, the transition from in-house burials to specialized burial chambers reflects shifts in funerary practices over time, suggesting evolving beliefs and social structures within the Çatalhöyük settlement. That contributes to our understanding of prehistoric burial customs, emphasizing the importance of interdisciplinary approaches in revealing the complexities of ancient societies and their rituals.

15 KINSHIP AT ÇATALHÖYÜK: PART 2, THE BIOLOGICAL DATA

Ensor, Bradley (Eastern Michigan University) - Souvatzi, Stella (University of Thessaly)

Kinship, though rarely biologically based, is an organizing principle of human groupings, intergroup relations, and identities forged through practice. The kinship practices at Neolithic Çatalhöyük have been the subject of speculation using dubious associations between material culture and social organization or misunderstanding the relationship between biodistance and kin group compositions and postmortem burial location. Our 2022 EAA presentation on Çatalhöyük applied a well-tested archaeological approach to infer residence and descent in the North Area excavations. That analysis identified specific cognatic residence strategies - bilocal corporate groups, neolocality, and stem families - and that descent was probably bilateral. Here we focus on the phenotypic and aDNA sources. Previous bioarchaeological literature on Çatalhöyük typically lack a framework for identifying kinship practices. Other problems are the inclusion of infant and child traits, when residence and descent require analysis of adults who lived long enough to have married, the assumption that spouses are buried together, the lumping of burials across long time spans, a questionable assumption of biological homogeneity within kin groups, and a failure to seek the specific residence and descent strategies negotiated. We reevaluate the published phenotypic and aDNA data using revised models

on intra- and intercemetary biodistance based on cross-cultural ethnographic patterns for group composition and postmortem location by combination of residence and descent (Ensor 2021; Ensor et al. 2017). Though prior studies on Çatalhöyük observed a lack of close biological relationships among individuals interred within houses, the revised models enable the identification of the strategy behind that pattern. The results conform with our 2022 archaeological results: kinship at Çatalhöyük was cognatic, which, as opposed to descent groups with exclusive memberships, enables flexibility in negotiating relations and identities within and among groups.

732 WETLAND ARCHAEOLOGY: ADVANCES IN PRACTICE AND POLICY IN THE 21ST CENTURY

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Stratigos, Michael (University of Aberdeen) - McLeester, Madeleine (Dartmouth College) - Schepers, Mans (University of Groningen)

Session format: Regular session

Wetland Archaeology can give exceptional insight into past lives. With unparalleled preservation conditions, archaeological finds from wetland environments have gained far-reaching wider cultural importance. The last 30 years of wetland archaeological research has been dominated by investigation aimed at capitalising on those conditions to illuminate the past, especially histories of changing environmental conditions, alongside work aimed at understanding how wetland conditions have and are changing with a view to ensure in situ preservation of these sensitive and important archaeological deposits. However, there are new horizons for wetland archaeology as broader efforts to combat climate change and catastrophic declines in biodiversity are implicating, utilising, and championing wetland environments; often in a very direct sense, reversing the decades and centuries of drainage, reclamation and marginalisation which was responsible for both the creation and destruction of the archaeological record. Wetlands of various kinds are often regarded as the 'low-hanging-fruit' for restoration in mitigating climate change to, for example, reduce the impacts of floods or sequester carbon. These restoration, rewilding, and carbon capture initiatives are a 'brave new world' for wetland archaeology with new threats emerging for the ways in which wetland archaeology is protected and managed in most jurisdictions. This session aims to take stock of new turns in wetland archaeology theory, practices and policy set within the context of global, national, regional, and local efforts to mitigate climate change and reverse declines in biodiversity. We seek papers from all wetland archaeological contexts, from the conceptual to practical, that deal with these new realities, moving beyond simplistic, single-direction narratives. Papers communicating new wetland archaeology management policy or practice with respect to ecological restoration and carbon sequestration policies are particularly welcome.

ABSTRACTS

1 THE DEATH OF PRESERVATION IN SITU FOR WETLAND ARCHAEOLOGY?

Gearey, Benjamin (Dept Archaeology UCC)

In this paper, I reflect on the continuing and catastrophic degradation and loss of archaeological sites and deposits in wetlands, and especially peatlands, across northwest Europe and consider what, if any reasons, we have for future optimism. Recognition of this parlous situation is nothing new, but recent years have brought new insights into the rate and nature of loss of both specific sites and the problems of maintaining the integrity of others. The 'climate emergency' may well exacerbate this situation, but human impact has long been, and will probably continue to be the key issue. I consider the potential benefits for tangible heritage, that wetland rehabilitation programmes might bring, considering the various practical challenges to ensuring ecological restoration programmes take sufficient account of the particular character and vulnerability of archaeological remains. I pose the question of whether the time may well be very near that we must accept that certain sites may not be preservable, and require either excavation or sacrifice.

2 NATURE RESTORATION: A GIFT TO NATURE - A THREAT TO THE ARCHAEOLOGICAL HERITAGE AN EXAMPLE FROM LOLLAND, DENMARK

Måge, Bjørnar (Museum Lolland-Falster) - Groß, Daniel (Museum Lolland Falster) - Koivisto, Satu (Museum Lolland Falster) - Mortensen, Morten (National Museum of Denmark)

In recent years, there has been an increased focus on re-establishing wetlands, bogs and waterholes to reduce CO₂ emissions on the Danish islands Lolland and Falster, as in the rest of Europe. In this contribution, we will present archaeological results made in connection with a major nature restoration project at Røgbølle Sø on Lolland. During the deconstruction of drainages around the lake, well preserved Late Pleistocene and Early Holocene layers were uncov-

ered, that witness a varying history in the water milieus during these periods. The preliminary analysis shows massive fluctuations in water levels as well as human presence in the area.

Furthermore, we will discuss the major challenges we as archaeologists and cultural heritage advocates are going to face in the coming years by pointing out to authorities and decision-makers that achieving a better balance in nature, often has a very destructive effect on the rich cultural heritage found in wetlands. We must create a focus on and, above all, provide means to investigate wetlands before they are made wet again – and we thereby silencing their cultural-historical statements forever.

3 ALKEN ENGE - TO PRESERVE THE REMAINS OF A 2000 YEAR OLD ARMY

Hertz, Ejvind (Museum Skanderborg) - Simmelsgaard Platz, Marie Louise (Danish Nature Agency; Danish Nature Agency) - Brok-Brandi, Hans (Skanderborg Municipality)

Over the past 20 years, the research of bones from several hundred warriors sacrificed in a lake in central Jutland, Denmark, has opened up new perspectives for the exploration of the Iron Age man, from an anthropological point of view and societal civilian as well as military. As something very special, the DNA have turned out to be extremely well preserved, and it is now a clear goal to preserve the remaining remains in situ under anaerobic and waterlogged conditions. The best preservation conditions for human DNA are found precisely where the human remains are sacrificed. The wetland is therefore considered as a genome bank for further exploration of the Northern European Iron Age population. Therefore, for a number of years, efforts have been made to secure the finds by raising the water level in Alken Enge but without much success. The best-preserved parts of the sacrifice are located in the backyards of a number of houses. Museum Skanderborg's wish to construct a sheet pile combined with a dike between the houses and the sacrifice poses a dilemma for the house owners. It will protect the houses against flooding during the extreme rainfall events, which has already happened three times to some of the houses. But are the house owners ready to give up their backyards in exchange for flood protection and the preservation of the archaeological remains in the museum's interest?

Fortunately, The Danish Nature Agency has stepped in with a wetland project mainly to capture carbon that could lead to a solution. It is a project that covers Alken Enge and the entire Illerup river valley, and therefore as a side benefit, the project will also improve the in situ preservation conditions of the known weapon sacrifice site in the river valley.

4 A COMPARATIVE APPROACH TO WETLAND ARCHAEOLOGY: CASE STUDIES FROM NORTHWESTERN OHIO AND SOUTHERN CARPATHIAN BASIN

Bossio, Laura (University of Michigan Museum of Anthropological Archaeology) - Tomazič, Iride (University of Michigan Museum of Anthropological Archaeology)

Wetland archaeology serves as a valuable lens to explore different adaptations to critical wetland ecologies. This study compares two wetland archaeological sites – the first in Northwestern Ohio, United States, and the second in Banat, Southern Carpathian Basin. While geographically distant, analysis of these two sites allows for the comparison of lifeways at the edge of wetlands and the study of human-wetland interactions through millennia.

The first case study explores the Buttonwood site of Northwestern Ohio, situated at the First Rapids of the Maumee River and bordering the now-extinct and expansive (ca. 4,000 km²) "Great Black Swamp. This site contains occupations from the Archaic period (ca. 8,000-6,000 BC) to the Late Prehistoric (ca. AD 1500), along with a more recent historic component. Notably, this site contains one of the earliest ditch-enclosed village sites of the region. The village site, along with preceding and post-dating occupations, will be analyzed to discuss the intensification of wetland locales.

The second case study delves into the lifeways of societies that lived at the site of Crna Bara, Serbia. The site was identified as a Copper Age (4500-3800 BC) site in the 1940's; however, recent work discovered a multi-period locale extending from the Neolithic (showing Starčevo occupation) to the 20th century. The long occupation of Crna Bara allows for a multiperiod analysis of changing interactions and exploitation of the nearby wetlands.

By synthesizing the archaeological data from these regions, this comparative approach facilitates discourse on human-wetland interactions from the social and environmental perspectives while also presenting the outcomes of 19th century drainage in both locales. The comparative approach emphasizes the importance of wetlands as diverse and critical ecosystems that maintain the natural balance for humans, animals, and nature alike.

5 DETECTING WILD RICE IN ANCIENT LAKE SEDIMENTS, ARCHAEOLOGICAL SITES AND FOOD RESIDUES ACROSS THE UPPER GREAT LAKES OF NORTH AMERICA

Kooiman, Susan (Southern Illinois University Edwardsville) - Boyd, Matthew (Lakehead University) - Dunham, Sean (United States Forest Service)

Wild rice (*manoomin*, *Zizania* spp.) is closely linked to past and present Indigenous cultures in the North American Great Lakes region and an important contributor to northern wetland ecological diversity throughout the Holocene. However, wild rice is difficult to detect in sediments and archaeological sites using traditional methods such as pollen analysis, plant macrofossil analysis, and excavation/survey. Modern plant distribution data, while useful for understanding possible past wild rice stands, can also be problematic due to recent environmental changes and deliberate seed dispersal. Here, we present recent developments in the detection of *Zizania* focusing on silicophytolith analysis layered with archaeological and modern ecological data. Application of this method to the analysis of lacustrine sediments, archaeological food residues, and soil samples, highlights both the potential as well as the limitations of this method for understanding the long-term history of wild rice at the stand level and the incorporation of *manoomin* into Indigenous foodways. In addition to enhancing archaeological interpretations of past human-environmental interactions in this region, information gleaned from wild rice phytolith studies have the potential to contribute to Indigenous food reclamation and food sovereignty efforts, wetland restoration projects, and other contemporary issues.

6 THE CRITICAL ROLE OF WETLANDS IN ANCESTRAL NATIVE AMERICAN AGRICULTURE IN THE NORTHERN GREAT LAKES, USA

McLeester, Madeleine (Dartmouth College) - Casana, Jesse (Dartmouth College) - Alperstein, Jonathan (Dartmouth College) - Tang, Yiyi (Dartmouth College)

The dense forests of the northern Great Lakes region of the USA and Canada seem an unlikely place for expansive ancestral Native American agricultural fields, especially ones dedicated to sun-loving crops, like maize. The short growing season in these northern climes, thick forest cover, alternative staples like wild rice, and past settlement history composed of small-scale societies all would suggest limited agricultural production. Despite these circumstances, our recent lidar survey documented expansive raised fields at the ancestral Menominee Sixty Islands site in Michigan's Upper Peninsula, challenging long-standing conceptions of agricultural intensification. Seemingly critical to a successful harvest, wetland soils were incorporated during the construction of the garden beds, likely to enhance soil fertility. Sixty Islands, dating to approximately AD 1400, is the largest, intact ancestral Native American agricultural field in the eastern United States, yet ongoing resource extraction from open mining infrastructure to sustainable forestry to private landownership threatens it. Here, we describe our ongoing efforts to document and investigate the expansive raised fields and the role of wetland resources in agriculture at this threatened site in Michigan's Upper Peninsula using lidar, excavation, and phytolith analysis. Results illustrate the previously unacknowledged, tremendous scale of landscape construction by ancestral Menominee communities.

7 UNDERREPRESENTED-LANDSCAPES: METHODS AND ANALYSIS OF HUMAN PAST AFFECTION OF WETLANDS. THE SALTWORKS PRODUCTION DURING THE ROMAN TIME IN CADIZ (SPAIN)

Aragón, Enrique (Universidad de Almería) - Rondán Sevilla, Isabel (Universidad de Cádiz) - Lagóstena Barrios, Lázaro (Universidad de Cádiz)

The wetlands and marshland landscape has changed drastically over the last millennia. Relative Sea Level (RSL) change and coastal dynamics -by natural or anthropic actions- since the Pleistocene modified the morphology, impacting societies and affecting their design for decisions on organisation, habitat establishment, and use of their resources. This paper will focus on relevant evidence about saltworks production during Roman times in southern Spain. Most significant study cases for coastal wetlands have been selected from the province of Cadiz (Spain), allowing insights into the development of occupation of the territory, use and evolution as well as enhancing the role of this type of economic activities integrated into ancient wetlands. Whether focused on a specific research question, this contribution addresses a broader concern in the field of expertise, exposing the relevant use and occupation of wetlands during History within a society-environment relationship as a theoretical framework (WETMAP Project). More specifically, this paper is an opportunity to present a methodology based on non-invasive techniques (LiDAR, UAV, GPR, Magnetometry and micro-topography) to cover extensive areas occupied by wetlands that are still underrepresented and overwhelming to cover by research. Finally, this study is used as a framework to claim the need to consider wetlands as one of the most fragile cultural landscapes, with a rich historical and archaeological heritage that awaits yet for a formal establishment of actions and policies to be treated and studied not fragmentarily but as a single entity.

8 CUTTING THROUGH: ARCHAEOLOGY'S ROLE IN MAJOR INFRASTRUCTURE FOR GREEN ENERGY

Christie, Claire (Headland Archaeology (UK) Ltd)

Major infrastructure projects are essential to meeting national and international targets for reducing carbon emissions. Headland Archaeology (UK) Ltd has experience in the UK handling these major infrastructure projects which aim to reduce carbon emissions and traverse or are located wholly within wetland environments – past and present. The scale of these projects offers unique insights into human/environment interactions in wetlands crossing the full profile from coastal to marsh and fen. This paper will present results from some of these investigations which demonstrate a range of interactions from the development of prehistoric trackways, coastal industries and the placement of settlement to programs of reclamation. A key focus will be how people have coped with both rapid and long-term environmental change in wetland habitats. Furthermore, this paper will highlight how commercial archaeology can bring benefits to addressing the climate crisis by communicating these long-term human perspectives to both developers and the wider public.

9 FULL POLICY, EMPTY POCKETS: FINANCING CULTURAL HERITAGE IN PEATLAND RESTORATION

Everett, Rosie (Scotland's Rural College (SRUC Edinburgh); University College Cork)

The achievement of 20+ years of lobbying from academic, commercial and curatorial bodies for protection of peatland cultural heritage (here defined as tangible archaeology and palaeoecology) in policy directly associated with programmes of peatland restoration cannot be underestimated. The one-line peatland cultural heritage has been allowed in national and international policy (e.g., England Peat Action Plan; United Nations Environment Programme Global Peatland Assessment), often ascribing the protection of peatland cultural heritage to “ensure that restoration projects deliver cultural heritage, education and enjoyment, alongside other public goods” (EPPAP, 2021) is the gold dust we (the ascribed lobbyists) sought to kickstart mitigation strategies and best practice in the inclusion of cultural heritage in peatland restoration programmes. In 2023, UK archaeology was given even more hope with the inclusion of peatland cultural heritage in the Peatland code 2.0, further solidifying the value and requirement for its inclusion in peatland restoration programme strategies.

In theory, the duality of policy representation and inclusion in the Peatland Code, provides a platform for financial mechanisms through government initiatives (e.g. the Nature for Climate Grant Scheme) to support restoration groups to finance an archaeologist as part of the restoration team. We know that this is happening on a small scale, but as with most cultural ecosystem services, this a voluntary contribution. We also know from recent training with UNEP Global Peatlands, there is both limited knowledge and limited funding on archaeological mitigation in peatland restoration on a global scale.

This paper explores the paradox of full policy, empty pockets in peatland restoration, and the gaps in funding mechanisms for cultural heritage protection. As a potential solution, this paper also explores the emerging market of private enterprise and why blended finance options and the carbon credit market may be the key to protecting peatland cultural heritage.

10 THE 'RESTORER-PAYS' PRINCIPLE? WETLAND ARCHAEOLOGY AS TABOO TRADE-OFF IN NATURE-BASED SOLUTIONS

Stratigos, Michael (University of Aberdeen) - Everett, Rosie (Scotland's Rural College) - Gearey, Benjamin (University College Cork) - McLeester, Madeleine (Dartmouth College) - Schepers, Mans (University of Groningen)

This paper articulates a new challenge for wetland archaeology in the 21st century as efforts to combat climate change and halt catastrophic declines in biodiversity ramp up. Globally, wetland environments are the 'low-hanging fruit' for nature-based solutions that target carbon sequestration and halting biodiversity loss. These programmes of nature-based solutions are being pursued by environmental charities, local/national nature conservation authorities and increasingly by businesses/investors participating in growing markets for carbon sequestration and biodiversity net gains. While undoubtedly necessary, such developments can and often do have negative impacts to cultural heritage, including the archaeological record. In most of the world, archaeological mitigation for development operates under a 'polluter pays' principle that ensures archaeological heritage is, at the very least, recorded before it is destroyed. With transition to 'greener' economies, we now face a new situation -- the 'restorer-pays' principle. This paper lays out the case that archaeological heritage is often a 'taboo trade-off' in nature-based solutions in wetland environments for a variety of context specific reasons. We argue that the Ecosystem Services Framework is one potential way that wetland archaeology can successfully navigate this new landscape and demonstrate the value of the archaeological record both intrinsically, but also to the benefit of most nature-based solutions. The paper will illustrate this with a range of case studies. As wetland archaeologists, we must highlight this taboo trade-off with urgency and bring an

archaeological perspective to nature-based solutions in the 'green' economy that can effectively understand human/environment relationships change through time.

733 INTERDISCIPLINARY APPROACHES TO THE ARCHAEOLOGY OF ROMAN TEXTILES - A STORY TOLD THROUGH THREADS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: coletti, francesca (Department of Classics, Sapienza University of Rome) - Carroll, Maureen (Department of Archaeology, University of York) - Droß-Krüpe, Kerstin (Department of Alte Geschichte, Ruhr-Universität Bochum)

Session format: Regular session

The recent academic interest in textile research demonstrates how much ancient fabrics can shed light on social and economic factors of past societies. They are one of the early tangible expressions of technology, culture, and identity. During the Roman Empire, textile production and trade reached levels of globalisation not seen in Europe before, including Africa, Asia, and China via the Silk Roads. Despite the existence of historical sources, in-depth archaeological investigations of Roman textile production, trade, and distribution are still needed. While there has been considerable debate about textile production and trade in the Roman world, this has mainly taken place on a regional level. A systematic collection of data across the various regions of the Roman Empire is lacking, precluding their meaningful historical-archaeological evaluation. For this reason, a sound interpretive perspective of local textile features and peculiarities has yet to be gained that enables us to reconstruct a broader picture of Roman textile cultures.

This session aims to investigate the technology and economy of textile production in the Roman Empire by integrating data from a broad range of evidence such as fabrics, textile tools, literary sources, and archaeological contexts. The aim is to combine local and empire-wide scales of investigation to generate new knowledge regarding natural resources, technical operations, tools, workplaces, and social practices connected with Roman textile cultures. Textile consumption also will be explored in the session. Textiles have always played a prominent role, in everyday life as well as in death, being highly informative about self-perception, group identities, and ritual. The session seeks to provide new knowledge and data related to a potential standardisation in Roman textile economics by bringing together scholars from different disciplines and fostering interdisciplinary discussion which will result in a deeper understanding of textile craft development, production, and consumption.

ABSTRACTS

1 LIVING LAVISHLY: LUXURY TEXTILES FROM DURA-EUROPOS AND PALMYRA

Fowlkes Childs, Blair (New York University)

Almost a century after Rudolf Pfister published his seminal work *Textiles de Palmyre* (3 vols.) between 1934-1940, almost eighty years after he and Louisa Bellinger produced the final report on textiles from the Yale University-French Academy Excavations at Dura-Europos in 1945, and nearly a quarter century after Andreas Schmidt-Colinet, Annemarie Stauffer and Khaled al-As'ad published *Die Textilien aus Palmyra* in 2000, interest in the textiles discovered at Palmyra and Dura-Europos is burgeoning. New interdisciplinary research utilizing current technology is contributing to our knowledge of the production and trade of textiles in ancient Syria on the western edge of the Silk Roads/Routes. This paper focuses on several textiles from both Dura-Europos and Palmyra that contribute to our understanding of the representations of luxury textiles on Palmyrene sculptures dated to the second century and first half of the third. Additionally, a discussion of the use of digital color reconstructions, photomicrographs, other images and diagrams in the 2023 exhibition "Stories of Syria's Textiles: Art and Heritage across Two Millennia" at the Katonah Museum of Art provides an important example of a collaborative project that combined the research of archaeologists and conservators for the benefit of a wide public as well as a scholarly audience.

2 BEYOND THE RAINBOW: TECHNICAL AND SCIENTIFIC FINDINGS OF FOUR TEXTILE FRAGMENTS WITH SHADED BANDS FROM DURA-EUROPOS

Poskrobko, Janina (The Metropolitan Museum of Art) - Ferrari, Martina (The Metropolitan Museum of Art) - Lackner, Rachel (The Metropolitan Museum of Art) - Shibayama, Nobuko (The Metropolitan Museum of Art)

Four outstanding 3rd-century textile fragments excavated in Dura-Europos, Syria, and belonging to the Yale University Art Gallery collection (Table 1), became the center of a multidisciplinary study by The Metropolitan Museum of Art's Departments of Textile Conservation and Scientific Research.

Two of the fragments—one which features weft-faced plain weave shaded bands alternated with tapestry weave bands of a geometric pattern (1933.488), and the other, which is the earliest known example of weft-faced compound plain

weave called taqueté (1933.486) — were displayed in the Met's 2019 exhibition *The World Between Empires*, while the other two—both weft-faced plain weave shaded bands alternated with tapestry weave bands of a geometric pattern (1933.490a-b and 1933.489a-c)—underwent in-depth analysis for comparative studies. Remarkably, three of these textiles exhibit a wide range of colors (including bright pastels and rainbow hues) in their shaded bands, adding a striking feature to overall aesthetics.

This paper presents the collaborative efforts of Textile Conservators and Conservation Scientists in building upon the groundbreaking report published 75 years ago by L. Bellinger and R. Pfister on the Dura textiles through photomicrography, weave structure analysis, computer-aided design diagramming, fiber identification, multiband imaging, and dye analysis. The result of this comprehensive investigation leads to historical and technical insights regarding textile provenance, material sourcing, and yarn preparation (carding, spinning, etc.), which are also essential for establishing connections to textiles from diverse cultural realms and periods.

The study aims to deepen our understanding and interpretation of these fragments excavated along the Silk Road and specifically at multicultural Dura-Europos, located at the intersection of empires and characterized by a diverse tapestry of communities, ethnicities, and religious identities.

3 THE ORIGIN, PRODUCTION, (RE-)USE AND TRADE OF DELICATE FABRICS AT THE TRANSITION FROM LATE ANTIQUITY TO THE EARLY ISLAMIC PERIOD

Hildebrandt, Berit (Georg-August-University Goettingen)

Since Ferdinand von Richthofen coined the term "Silk Road", silk has been a focus in the exchange of textiles between East and West. However, ancient texts use different terms for silk and compare or even confuse its origins well into Late Antiquity: While the term *bombycina* seems to be always related to insects, *serica* from the East were often likened to or explained as plant fibres. However, the question has not yet been asked how these mix-ups may have come about.

This contribution aims at taking a comprehensive approach regarding the origin, production, (re-)use, and trade of delicate fabrics made of plant and animal fibres that were traded along the Silk Roads at the end of Late Antiquity and during the Early Islamic period. It will do so by comparing ancient Greek, Latin and Arabic texts with new archaeological textile finds of the middens of the Early Islamic settlement of Nahal Omer/Israel in order to gain new insights into the *chaîne opératoire* of high-end textile production and trade along the Silk Roads, and in particular the availability and spread of raw materials and their connected technologies. It will also discuss the implications of these results for our data collection as researchers and future collaborations in the field of textile archaeology, especially with regard to the sciences.

The research about the textiles at Nahal Omer is part of the collaboration project "Revealing the Israeli Silk Road" between Lower Saxony and Israel with Prof. Guy Bar-Oz and Dr. Orit Shamir, as well as Nofar Shamir and Dr. Roy Galili, and financed by the Ministry of Science and Culture of Lower Saxony/Germany: <https://www.israel-silk-road.com>.

4 UNRAVELLING THE GOLDEN THREADS: SCIENTIFIC INVESTIGATIONS OF ROMAN GOLDEN TEXTILES FROM THE VESUVIAN AREA

Rossignoli, Guia (Opificio delle Pietre Dure) - Cagnini, Andrea (Opificio delle Pietre Dure) - Galeotti, Monica (Opificio delle Pietre Dure) - Gennaioli, Riccardo (Opificio delle Pietre Dure) - Miele, Floriana (National Archaeological Museum of Naples) - Patera, Anna (Opificio delle Pietre Dure) - Petrocchi, Dominique (Opificio delle Pietre Dure) - Porcinai, Simone (Opificio delle Pietre Dure) - Scibè, Cristina (Opificio delle Pietre Dure) - Rotondi, Giovanni (Opificio delle Pietre Dure)

The presentation focuses on the interdisciplinary research performed at the Opificio delle Pietre Dure in Florence, under the guidance of the National Archaeological Museum of Naples, concerning the extensive collection of golden Roman textiles at the at the aforementioned museum. These artifacts, coming from different excavation sites conducted from the second half of the 17th century BC in the Vesuvian area, are the world's largest assemblage of its kind, encompassing various items such as golden ribbons, netting, and a rare silk thread spool.

This paper will focus on some of the results of the scientific investigations conducted at the Florentine Institute, which have uncovered crucial aspects of the materials and execution techniques used in the production of these precious artefacts. Through a combination of advanced analytical techniques including both optical and scanning electron microscopy with microprobe and spectroscopical and chemical analysis on microsamples, directly or embedded on cross sections, researchers have meticulously examined the morphology, materials and weaving patterns, shedding light on the sophisticated craftsmanship of ancient golden Roman textile production.

Furthermore, the conservation project encompasses not only the restoration of these invaluable and unique artifacts but also the design and implementation of suitable conservation strategies and storage solutions for both display and archival purposes. By integrating scientific inquiry with conservation practices, this endeavour not only advances our

understanding of Roman textile technology but also ensures the long-term preservation and accessibility of this unparalleled cultural heritage.

Overall, this presentation underlines the importance of an interdisciplinary approach in unravelling one side of the perspective of Roman history related to the golden threads of the textile remains from the Vesuvian excavations.

5 ROMAN TEXTILE TECHNOLOGY AND CONSUMPTION: THE TEXTILE COLLECTIONS FROM THE VESUVIAN AREA

Coletti, Francesca (Sapienza University, Department of Classics)

The large corpus of textile remains and imprints from Pompeii and the Vesuvian area offers the chance to significantly improve our understanding of Roman textile technology and consumption in the I century AD, drawing conclusions from this important site located at the centre of the Empire.

The specific environmental conditions caused by the volcanic eruption in AD 79 sealed the city of Pompeii and the surrounding areas, preserving a multitude of archaeological evidence. Among that, a wide range of textile finds have been preserved: garments, soft furnishings, soles, nets, cordages, as well as gold threads and purple/gold fabrics.

This presentation aims to show the major results of the analysis carried out on the textile fragments and fabric imprints preserved on the human plaster casts. Microscopic and archaeometric analyses allowed us to obtain essential information concerning the chaîne opératoire: spinning, weaving, and finishing techniques, as well as the qualities and the standardization of the textile materials, allowing in some instances the reconstruction of garments and their reuse.

6 NEW DEVELOPMENTS IN CHARACTERIZATION OF ARCHEOLOGICAL TEXTILES: A COMPLETE STUDY OF DYES AND PROTEINS ANALYSIS IN A UNIQUE WORKFLOW

Serafini, Ilaria (Sapienza University of Rome - Department of Chemistry; Smithsonian Institution - Museum Conservation Institute) - Ciccola, Alessandro (Sapienza University of Rome - Department of Environmental biology) - Bosi, Adele (CNR -ISC) - Coletti, Francesca (Sapienza University of Rome - Department of Classics) - Galli, Marco (Sapienza University of Rome - Department of Classics) - Gleba, Margarita (Padua University - Department of Cultural Heritage: Archaeology and History of Art, Cinema and Music) - Favero, Gabriele (Sapienza University of Rome - Department of Environmental biology) - Kavich, Gwénaëlle (Smithsonian Institution - Museum Conservation Institute) - Cleland, Timothy (Smithsonian Institution - Museum Conservation Institute)

Archaeological textiles represent precious remains from ancient culture, due to their historical and cultural importance. However, their complicated state of preservation requires highly sensitive analytical tools to perform a comprehensive study. The PARCA project focuses on both components of ancient wool textiles, dyes – anthraquinone ones- and keratins (IFs) and keratins associated proteins (KAPs). It aims to develop an innovative protocol that would combine dye and protein analysis in a single extraction, minimizing the sampling while maximizing the amount of information obtained.

Starting with madder-dyed wool mockups, proteins and dyes from madder dyed wool were extracted simultaneously using the novel TCEP/CAA method or a modified urea method. After extraction, dyes were isolated with various clean-up methods, such as μ -SPE, stage tips, or paramagnetic beads evaluating their application in different steps of the protocol to minimize any possible alteration in the protein composition. Proteins were digested with trypsin either in-solution or on the beads and desalted with C18 SPE/C18 stage tips. Peptides were separated with ThermoScientific Acclaim PepMap 100 trap and analytical columns at 300 nL/min; dyes with a Waters BEH Shield RP18 with an Ultimate 3000 at 200 μ L/min and detected on an Orbitrap Elite. The methodology was tested on laboratory charred samples, investigating the survival of proteins and dyes at different temperatures (200 to 300°C).

The contribution presents the preliminary results of the new methodology applied on wool samples from the I century AD, which are part of the textile collections of the Archeological Park of Pompeii and the Museum of Museum of the Roman Ship in Nemi (Italy).

Acknowledgments-This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 101029204. This project was also supported by the Smithsonian Museum Conservation Institute Federal and Trust funds (GMK, TPC).

7 INTRODUCING THE ROMAN TEXTILE DATABASE

Dimova, Bela (University of Padua)

There has been considerable research and debate about textile production and trade in the Roman world, but this debate has mainly taken place on a regional level, with empire-wide questions rarely addressed. A systematic collection of data across the various regions of the Roman Empire is still missing precluding their meaningful historical evaluation. Another important challenge in Roman textile studies is the fact that there is a wealth of collected primary data that are unpublished or difficult to access and use. In order to make a qualitative and quantitative leap in our

knowledge there is a need to unite and integrate the heterogeneous archaeological documentation of ancient textiles. There is also an urgent need to preserve and make universally accessible the archival data accumulated by scholars in different countries. The Roman Textile Database – which this paper introduces – addresses these needs. The Roman Textile Database is an open access platform, created within the project ADigTex, involving Universities of Sapienza and Padua.

The Roman Textile Database comprises a digital corpus of textile fragments, tools and all the attached archaeometric and contextual documentation. It digitizes and unites the extensive scientific archives of Roman textiles, and will serve as a tool for both research and preservation of data (in some cases of no longer extant textiles). In doing so, the Roman Textile Database will lay the foundation for future multi-scalar analysis of Roman textile production and enable researchers to perform more complex spatial and statistical analyses of large sets of textiles to identify empire-wide chronological, geographical, fashion and social trends.

8 TEXTILES FROM THE ROMAN PERIOD IN THE GERMANIC PROVINCES

Linscheid, Petra (University of Bonn)

In the framework of two projects „Textile finds in the LVR-LandesMuseum Bonn“ and „The Textile Archive of Hans Jürgen Hundt“ (<https://www.iak.uni-bonn.de/christliche-archaeologie/de/forschung/textilforschung/kontextil>) about 150 textile finds from Roman Germania Superior and Germania Inferior had been recorded, most of them are unpublished so far. Many of the textile finds came to light in 3rd century graves near Villae Rusticae, others were found in the context of hoard finds or settlements. The textiles are partly old findings, partly they are from recent excavation, the majority of them comes from the Rhineland. The techniques are tabby, twill, tapestry and sprang. Bast fibres and wool are the most frequent materials, rarely gold thread and silk are encountered. The textiles provide insight into various textile functions: into clothing comprising tunics, hair nets and girdles, utilitarian textiles like purses and ropes and the role of textiles in burials as shrouds and wrappings of grave goods, urns and ashes.

9 TEXTILES AND FUNERARY RITUAL IN ROMAN YORKSHIRE

Carroll, Maureen (University of York)

The paper presents an in-progress research project at the University of York that focuses on the notable mortuary practice in the city of Roman York and its environs of pouring liquid gypsum over the wrapped corpses of adults and children in stone or lead sarcophagi before deposition in the ground in the 3rd and 4th centuries A.D. As the gypsum hardened and the human tissues decomposed, a negative impression formed in the casings that preserves the contour, shape, and position of the bodies as well as the remarkably detailed imprint of textiles used to clothe and shroud the dead. A particular strength of the research is the generation of new knowledge about the nature and function of burial textiles and how they reflect the social status and identity of the people in them. In addition to examining remains of embedded textiles and threads in the gypsum, we are transforming the negatives in the casings into positive images through 3D digital technology, capturing unparalleled detail and allowing a nearly complete visual reconstruction of the burials before the sarcophagi were sealed in antiquity. An additional project aim is to use mass spectrometry and Raman spectrometry to reveal resins, dyes, and chemicals originally used on the textiles. The wrapped bodies in Yorkshire will be related to contemporary elite Roman mortuary customs attested on continental sites of wrapping, adorning, and partially preserving bodies in textiles as part of lavish funerary displays.

10 AN ASSEMBLAGE OF ARCHAEOLOGICAL TEXTILES FROM SOKNOPAIU NESOS (FAYYUM, EGYPT)

Cozza, Francesca (University of Salento, Lecce, Italy)

The arid climatic conditions of the Egyptian desert have guaranteed the good preservation of organic artifacts, such as archaeological textiles. During the excavation campaigns at Dime es-Seba/Soknopaiou Nesos (Fayyum, Egypt, 3rd century BC - 8th century AD), between 2019 and 2022, a substantial number of well-preserved textile fragments were unearthed within the ST6 building. Although its interpretation is not yet certain, it seems likely that the building, located within the temenos and built between the 1st and 2nd centuries AD, was connected to cultic practices, and may have functioned as a deipneterion. The purpose of this paper is to present the assemblage of the discovered textiles, identifying the main typologies, and proposing a preliminary interpretation of their function within the building. In addition to the good preservation of the textiles, the exceptional nature of this case study lies in the strong connection of the materials to the context of their discovery. In fact, despite the disruption of the stratigraphy due to repeated clandestine excavations, the consistency of findings in the stratigraphic units suggests that, with a high degree of probability, they have been found in the same place where they were originally used. Therefore, the analysis of these archaeological textiles within their context can contribute not only to shed new light on textile technology and production, but, in combination with an interdisciplinary study of documentary and iconographic sources, it can also lead to a further insight of their function within a cultic building in Roman Egypt.

11 AN ANALYSIS OF THE ROMAN TEXTILES FROM QASR IBRIM

Hitchens, Sarah (Independent Researcher)

Qasr Ibrim is a multi-phase site situated in Lower Nubia on a strip of land above the Nile floodplain. This meant that the site was not subject to the effects of Nile flooding nor did the area receive much rainfall resulting in the excellent preservation of organic material including thousands of textile fragments. For most of its history, Ibrim was, at various times, a commercial, political, and religious centre. It was controlled by different northern and southern polities at various points throughout its long history. Control of the city and its surrounding area was often disputed throughout antiquity. Due to the site's geographical and political situation, Qasr Ibrim has been described as a frontier post.

This was particularly evident in the first century BC when the expansionist policies of Kushite rulers in Lower Nubia brought them into contact with Roman Egypt resulting in conflict which came to a head at Qasr Ibrim when Roman forces led by Egypt's second Prefect C. Petronius captured the city. After which, a Roman garrison was stationed at Qasr Ibrim in circa 25/24BC. However, the length of the Roman occupation at the site is debated.

Large deposits of Roman material, including textiles, were discovered at the site. The analysis of these textiles will form the basis of this talk. The textiles ranged from fine to coarse and included examples of clothing as well as clearly utilitarian textiles. They were made using different fibres and weaves. The textiles not only represent the cloth and clothing left behind by a Roman legion in a foreign land, but also give an insight into Roman textile traditions at the edge of the Roman empire.

12 THREADS OF WAR. TEXTILES AND SCALE ATTACHMENT IN ROMAN SCALE ARMOUR

Wijnhoven, Martijn (Institute of Archaeology of the Czech Academy of Sciences, Brno)

The Roman army might not immediately spring to mind within the field of textile studies. However, textile played a crucial role in the army, serving not only in clothing but also as a significant component of their equipment. An illustrative example is scale armour, characterised by metal scales attached to a textile base. While instances of scale armour with preserved textile bases are rare, they do exist. Some cases involve fragments preserved under favourable conditions, as seen in multiple examples from Dura-Europos in Syria. In other instances, characteristics of the original textile endure in the corrosion products of the metal scales, as observed in findings from Carnuntum in Austria. This paper aims to examine the collective evidence for Roman scale armour featuring textile remnants. This examination extends beyond the textile used as a base garment to include the diverse methods employed to affix scales onto this foundation. Through this analysis, it becomes apparent that there was no singular method but rather a diverse spectrum, potentially reflecting the cultural diversity of the individuals serving in the Roman army.

13 TEXTILE USAGE IN THE ROMAN IMPERIAL DEFENSIVE EQUIPMENT

Spagiari, Fabio (Università degli Studi di Padova) - Malaman, Elisabetta (Università degli Studi di Padova)

The study of the Roman military equipment has always aroused scholars' interest; however, the usage of textile elements in the production of the Roman soldier's defensive weapons is greatly underestimated, due to the rare preservation of these components, as well as their lesser conspicuousness when compared with the metal parts. The protection of the head was complemented by a lining inside the helmet, consisting of a sort of hat made of wool, linen or felt. Well-preserved examples come from Didymoi (Cardon, Granger-Taylor, Nowik 2011), Mons Claudianus and Dura Europos (James 2004). These could be attached to the helmet bowl and to the cheek-pieces by resin glues, as found in two helmets from Newstead (Curle 1911) and on the face mask from Hellange (Müller 1912). Similarly, fabrics could be used as linings for greaves and armguards as reported in Dura Europos (James 1990) and Carnuntum (Von Groller 1901), respectively. The presence of the fabric is not only related to making the elements of the soldier's panoply comfortable to wear but it is also an integral part of their production technology: fragments of scale armours from Dura Europos, Carpow and Carnuntum attest the use of a linen backing for sewing the scales of the armour (Wild 2011). A layer of fabric was also placed within the construction system of the shields, with the purpose of connecting the wooden part and the outer skin, as demonstrated by the findings at Masada (Stiebel, Magness 2007), continuing an older tradition mentioned by Polybius (6, 23, 3). This contribution aims to highlight the importance of textiles in the different elements of the Roman soldier's defensive weaponry during the Imperial age through an analysis of the textile remains observing the fibres used, the techniques employed and the possible presence of regional differences or large-scale standardisation.

14 TOWARDS THE ARCHAEOLOGY OF ROMAN TEXTILES IN SERBIA - PRODUCTION OF TEXTILE IN VIMINACIUM

Marjanovic, Milica (Institute of Archaeology Belgrade) - Dankovic, Ilija (Institute of Archaeology Belgrade)

Textile use and production have been insufficiently researched areas in Roman archaeology for a very long time. Although significant advances in exploring this topic have been made in recent years, the knowledge gap in certain

geographical areas still exists. Textile production is mostly an unexplored and rather unpopular topic in Serbian archaeology, including the Roman period. There is not a single detailed study on the Roman textile industry, while textile specimens and tools for its production are published sporadically. Almost complete lack of information about Roman textile production leads to numerous mistakes in archaeological reasoning, such as misinterpretation of certain textile-related tools.

This paper aims to shed light on the textile production in Roman provinces in the territory of Serbia, starting with the overview of finds from Viminacium, the industrial and economic center of the province of Moesia Superior. During several decades of excavations, this site yielded plenty of artifacts used in all stages of yarn and textile production. Several textile specimens were also discovered, most of them originating from graves and usually mineralized. Three structures from the Viminacium suburban area were interpreted as locations of possible textile production-related activities, based on architectural features, artefacts, and the presence of pigment pieces. Gathering and systematizing of all available data from Viminacium are necessary first steps towards a better understanding of textile production and use in Roman provinces in Serbia. Only after that, it will be possible to continue with more detailed analyses, such as physicochemical ones, for determining the basic characteristics of the material (type and origin, spin, weaving method, traces of pigments, wear marks on the tools) or distribution patterns of artefacts, which will show the possible workshop locations within the city.

15 TEXTILE WORKSHOPS IN POMPEII: PAST RESEARCH AND FUTURE PERSPECTIVES

Casa, Giacomo (Sapienza Università di Roma)

Thanks to the exceptional preservation of textiles, utensilia, and workshop, the ancient city of Pompeii represents a privileged context for studying Roman textile production. Indeed, the large number and variety of workshops related to the different stages of textile production and treatment (*officinae lanariae*, *officinae tinctoriae*, *fullonicae*) offers the chance to reconstruct in detail the entire textile chain - *operoire* and, at the same time, provides valuable insight into the specific activities, installations and actors involved in the production. This enormous informative potential aroused great interest in scholars, who have investigated textile workshops with different approaches, not only from a productive-technological point of view, but also from a socio-economic perspective. This contribution aims to give an overview of the state of the art, highlighting the need for further investigations on production stages and contexts, which are still largely unknown and critical in tracing the broader dynamics of Pompeian textile production. In particular, the paper offers new insights for the study of Pompeian textile working places, considering two main aspects: 1. a workshop-based approach, considering their multi-functionality, in which different activities and stages of production could have taken place; and (2) a broader approach that will discuss the Pompeian "topography of textile production" by examining the distribution maps of textile utensilia in order to identify production districts. This research will re-discuss and contribute to the topic of Pompeian textile production through remarkable key studies.

735 POST-MEDIEVAL CEMETERIES ON THE FOCUS - ANTHROPOLOGICAL AND ARCHAEOLOGICAL STUDIES ABOUT THE PAST 500 YEARS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Líbor, Csilla (Hungarian National Museum) - Lepionka, Hubert (Podlaskie Museum in Białystok) - Dec, Olga (Adam Mickiewicz University) - Balogh Bodor, Tekla (Hungarian National Museum)

Session format: Regular session

Due to the successful session on the 29th EAA, we are once again hosting a session focusing on post-medieval cemeteries. Researching post-medieval/modern cemeteries offers us a variety of possibilities and information for us about our past. Bioarchaeological research of these human remains and their archaeological contexts enriches our knowledge in several ways: we can learn about the social structure, burial customs, migrations, population changes, diseases, health conditions, crises, and violent events. Opposite to earlier periods, bioarchaeological data can often be testified by a written source about the individual or a community, or even by documented major historical events. For example, in the case of studying epidemic periods, the cemeteries of the last 500 years can provide the best opportunity to examine different impacts on human populations in the past. Furthermore, it raises important ethical questions, since, on the one hand, the relatives of those buried may still be alive, thus opening up the possibilities to connect those buried with the living local community. In this way, through the exhibition and storytelling of the remains and material culture, the local community can become closer to their own history and heritage and foster a sense of pride and connection to the past. On the other hand, actual trends in museum studies emerge, which concern the question of how human remains from a period so close to our present can best be treated and exhibited.

This session represents a developing but essential field of archaeology. This session aims to bring together researchers who share a similar interest in cemeteries of the post-medieval/modern period.

Expected papers may include:

- Presentation of excavations and findings.
- Bioarchaeological analysis of the cemeteries
- Paleopathological analysis of the individuals
- Ethical questions
- Storytelling through post-medieval material culture and human remains in exhibitions.

ABSTRACTS

1 UNVEILING THE SECRETS OF THE LATE MEDIEVAL CHURCH OF MANEA BRUTARU IN BUCHAREST (ROMANIA)

Sonu, Diana (Bucharest Municipality Museum) - Manea, Ioana (Bucharest Municipality Museum)

Between 2020 and 2023, an archaeological rescue excavation was carried out at the church of St. Nicholas Manea Brutaru in Bucharest. Our objective is to present the main discoveries, namely 210 graves and 39 more reburials, long forgotten. In an effort to gain deeper insights into the daily lives of the deceased, we have used both quantitative and qualitative methods to analyze the graves. The history of the church begins in the latter half of the 18th century, more specifically in the year 1777, when three merchants from the Popa Radu neighborhood provided funding for the construction of a wooden church. As a result, a cemetery was established in close proximity. After the church was destroyed by fire a decade later, another one made of brick was erected. As a consequence of limited space, the new church was built on top of the cemetery linked to the old one. Therefore, approximately half of the uncovered graves were found beneath the second church. Until a new law mandated the relocation of all cemeteries on the city outskirts to lessen the epidemiological risk, parishioners continued burying their dead around the newly constructed church for another hundred years. Initial examination of the graves and burial inventory indicates that the community did not consist of wealthy individuals but rather a varied group facing the challenges of the time, such as infant mortality and venereal disease.

2 UNVEILING FAMILIAL DYNAMICS IN THE MIDDLE AGES: A CASE STUDY OF THE VANISHED VILLAGE OF GAĆ, POLAND

Gembicki, Maciej (University of Adam Mickiewicz, Faculty of Archaeology) - Snow, Meradeth (University of Montana, Department of Anthropology) - Airola, Danielle (University of Montana, Department of Anthropology) - Czaplinska, Tina (University of Montana, Department of Anthropology) - Krzpekowski, Marcin (Regional museum of Wagrowiec)

Our study aims to explore the potential of spatial, genetic, and archaeological analyses in investigating familial dynamics using a high medieval-modern cemetery in Gać as a case study.

Throughout three seasons, an international team affiliated with the Regional Museum in Wagrowiec and Mortuary Field School, operated by the Slavia Foundation, has conducted regular examinations of the cemetery located in the abandoned village of Gać. So far, our investigations have uncovered 206 burials spanning from the 14th to the 16th century. Throughout our research in Gać, numerous phenomena have emerged that hold promise for addressing our research objectives.

Initial findings from spatial analyses suggest a non-random distribution of graves. Clustering of subadult burials has been observed, along with a notable proximity between the burials of women and subadults. This spatial arrangement may signify the existence of family units, likely centered around the interment of a mother alongside her prematurely deceased offspring.

A particularly intriguing observation is the practice of placing additional skulls within the coffins of the deceased. We hypothesize that this custom may have served as a gesture of reverence towards a deceased relative whose original grave was inadvertently disturbed during burial proceedings.

3 EXTERIOR SPLENDOR - EARLY MODERN BURIALS (C. 1600-1738) IN THE CLOISTER AT RIBE CATHEDRAL

Knudsen, Maria (Museum Vest (Denmark))

Between 2008 and 2012, hundreds of burials dating from AD c. 860-1800 were excavated south of the cathedral in the town of Ribe in Denmark. 168 of the graves had been buried in the cathedral's cloister (ambitus) in the period c. 1600-1738, when Ribe transformed from a major trade- and ecclesiastical center into a small provincial town. The digitised and phased material shows diverse aspects of burial practice and living conditions for people of higher status in an early modern, Danish town.

This paper will present the physical aspects of the burial practices used, including coffins and their decoration, the location of the graves in the cloister and the few preserved examples of personal adornment. It will be discussed what this can tell us about the social status of the buried, and in some cases bring us very close to individuals.

Osteological studies of the skeletons have also increased our understanding of the living conditions of a specific social group in a Danish town in the early modern period. Thus, the distribution of age and gender gives an insight into both child mortality and gender-related vulnerability, while the skeletons in general show a variety of diseases. Finally, the material includes a few examples of abortion, stillbirth and death in childbirth.

The few objects found in graves, as well as a single burial with the head in the east, may be examples of superstitious acts that were supposed to help the deceased on their journey into the afterlife. And perhaps especially those who had met death in a tragic way. Similarly, the extensive decoration of the coffins may be a last attempt to shine a light on a life that had still been hard despite relatively high status.

4 ST. ROMBOUT'S CEMETERY IN MECHELEN, BELGIUM (10TH-18TH CENTURY AD): AN ARCHAEOGENETIC PERSPECTIVE

Pierini, Federica (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Giffin, Karen (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Coppola-Bove, Lorenza (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Department of Legal Medicine, Toxicology and Physical Anthropology, Faculty of Medicine, University of Granada, Granada, Spain) - Kirkpatrick, Casey (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Department of Anthropology, University of Western Ontario, London, Ontario, Canada) - Van de Vijver, Katrien (Royal Belgian Institute of Natural Sciences, Brussels, Belgium) - Bos, Kirsten (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany)

St. Rombout's Cathedral cemetery, located in the historic city of Mechelen (Belgium), is currently recognised as the largest excavated churchyard assemblage in the region of Flanders. With its use spanning the 10th through 18th centuries, the cemetery offers a unique opportunity to evaluate genetic continuity amongst the inhabitants of Mechelen over a large temporal interval. In this work, we apply an archaeogenetic approach to investigate population-level genetic changes in the community represented in the cemetery. Genomic human DNA was generated for 203 individuals, representing the cemetery's full period of use. A notable shift in population composition was apparent in the post-medieval period, which aligns with historical documentation for the presence of the Spanish military in the city. Overall, our genetic analysis, which encompasses a large temporal transect, offers invaluable insights into periods of transition from the pre- to post-medieval centuries, which are characterised by complex economic and political transformations in this city of historical prominence.

5 CHILDREN OF SZÉCSÉNY - BIOARCHAEOLOGICAL APPROACH OF THE NONADULT REMAINS OF A POST-MEDIEVAL CEMETERY FROM HUNGARY

Líbor, Csilla (Hungarian National Museum) - Balogh Bodor, Tekla (Hungarian National Museum) - Szénásy-Laczkó, Virág (Hungarian National Museum) - Zay, Orsolya (István Dobó Castle Museum)

In 2019, we had the opportunity to excavate a cemetery from the 17-18th centuries in Szécsény (Hungary). We could not excavate the whole site, and our work took place in the cemetery's middle and northeast segments. The graves were relatively rich in finds and this essentially reflects post-medieval trends. Among the almost 300 graves, more than 50% were nonadults. This phenomenon is common in the medieval, and post-medieval eras, but in the case of Szécsény, we have more than 30 "párta", different kinds of hair pins, and bon pins also. These objects have important meanings, therefore help us understand and study the transition between children and grown-up women. In these centuries, hair was a significant carrier of information. The hairstyles of children, unmarried and married women were significantly different.

Even the bones exhibit relatively bad preservations, a very high percentage of the examined children showed pathological changes. In particular, there were many lesions associated with infectious diseases. We were able to excavate a relatively small part of the cemetery, and 300 graves cannot be considered - many. However, thanks to the non-adult's graves, we can get a clear picture of the health status in this settlement at the time.

6 THE EXCAVATIONS OF CHILDREN'S BURIAL GROUNDS (CILLÍNÍ) IN IRELAND

Mundt, Courtney (Queen's University Belfast)

Children's Burial Grounds (Cillíní) are an archaeological site type found across the island of Ireland. These burial grounds were created as a response to the Roman Catholic Church's Counter-Reformation when the Council of Trent (1545-1563) reformed and reaffirmed canon laws. Canon Law 1239 forbade the burial of the unbaptised in

consecrated ground as they were seen to still be 'tainted' with Original Sin, while Canon Law 1240 stated that certain adults – such as suicides, murderers, strangers, and shipwreck victims – were not eligible for burial in consecrated ground as well. As no instruction was given on where to bury these individuals, cillíní were established in order to safely bury these 'unfortunates' whose souls were bound for Limbo. Some cillíní were still in use before and after the Second Ecumenical Council of the Vatican (1962-1965) removed laws like Canon Law 1239. Many cillíní have now been memorialised and the human remains of those excavated from them reburied in consecrated ground by the local communities, who still view them as part of their heritage and community.

Even with 1693 recorded across Ireland, only 52 cillíní have been excavated since 1955. Primarily, these sites are found during the excavations of older archaeological monuments (i.e. disused ecclesiastical sites and graveyards, ringforts/raths, fortifications, megalithic monuments) or before urban development. While earlier excavators believed that these sites were pre-Christian pagan cemeteries that may have been reused during the early Christian period, archaeological evidence found during these excavations has confirmed that these sites are Post-Medieval or Early Modern in origin and usage.

This paper aims to discuss these excavations and their results found during the analysis of excavation reports, historical documentation, archives, databases, folklore, oral history and publications, research undertaken as part of the author's doctoral dissertation.

7 LIFE AND DEATH IN THE POST-MEDIEVAL WORLD

Balogh Bodor, Tekla (Magyar Nemzeti Múzeum)

Storytelling through post-medieval material culture and human remains in museum exhibitions can offer a vivid window into the past, illustrating the everyday lives, social structures, beliefs, and practices of people from that era. Although the post-medieval period is very close to our time and therefore its appearance in the walls of museums in the classical sense was previously difficult to imagine, today more and more examples are known from all over the world. But how can the objects and human remains of the recent past be correctly presented museologically and ethically? Precisely because it is such a recent past, people have a different attitude towards human remains, but also towards material culture. However, there are two different ways to view the objects and remains: scientific and emotional. What can the recent past tell us and why is it important to exhibit its objects and stories? In my presentation, I will bring examples of good practices and case studies that can hopefully shed light on the many interesting lessons of the post-medieval period.

8 DOLMANS AND THEIR OWNERS – DOLMAN REMAINS FROM THE GRAVES IN THE CHURCH OF ST. MARTIN AT PROZORJE, CROATIA

Stingl, Sebastijan (Institute of Archaeology) - Kokotović, Tea (Institute of Archaeology) - Belaj, Juraj (Institute of Archaeology)

Near Zagreb, at the site called Prozorje, there are ruinous remains of the Church of St. Martin. Archaeological campaigns conducted over a period of several years during the first two decades of the 21st century excavated the nave, sanctuary, lateral chapels and sacristies, as well as a narrow space around some of the church walls. Almost 300 graves have been excavated and documented, most of which can be dated to the 17th and 18th centuries. Some of these graves are particularly intriguing since they contain vertical rows of buttons situated in the chest area of the deceased. The comparison of the appearance of the buttons, the position in which they were discovered on the skeleton, and the spacing between the rows with contemporary paintings confirmed that they were part of a male garment called dolman. This paper will place these dolman finds into a wider geographical and social context and, using the comparison of these new findings with the bioarchaeological analysis and available historiographic data, try to determine who the persons buried in them were.

9 CHRISTIAN CHANGES WITH PERSISTING PAGANISM? COMPARATIVE STUDY OF MOGIŁKI CEMETERIES RITES IN THE POST-MEDIEVAL TERRITORY OF TODAY PODLASIE, NORTH-EASTERN POLAND

Lepionka, Hubert (Podlasie Museum in Białystok)

Mogiłki is post-medieval cemeteries with are typical to the village landscape of today's Podlasie region in North-Eastern Poland. They are characterised by standing erratic tombstones, with small peddles on top of the grave, mostly located on the top of the hill in the eye range of the village to which it belonged. They are dated from the late 15 st to late 18th century.

The discussion about the origins of cemeteries called Mogiłki was disputed long ago in archaeological literature. In one publication they were associated with the full Christian phase of the colonisation of Podlasie, in others as remain the

last descendants of pagan believers. Some historians said that they were just incidental epidemic graveyards. In this not-well-studied hypothesis weeb of assumptions could be one true way to answer the question:

How much Christian, were commoners in the borderland of the Polish Crown and the Grand Duchy of Lithuania?

Since 2017 Podlaskie Museum in Białystok has had a running project focused on the recognition, interpretation, and description of Mogiłki sites in the interflaves of the Biebrza and Bug rivers. Based on project information, current thoughts and recent studies, there will be an attempt to find answers.

10 ANTHROPOLOGICAL COMPARATIVE ANALYSIS OF THE POPULATIONS FROM THE POST-MEDIEVAL STELAE CEMETERIES FROM PODLASIE REGION, POLAND

Dec, Olga (Adam Mickiewicz University) - Słodka, Angelika (Independent Researcher) - Lepionka, Hubert (Podlasie Museum in Białystok)

The phenomenon of post-medieval stelae cemeteries ('mogiłki') – characteristic for the archaeological landscape of north-eastern Poland and western Belarus – has been functioning in archaeology since the 20th century when first small-scale excavations were carried out at three different sites in Podlasie region, Poland. This made it possible to obtain first scientific information on Podlasie 'mogiłki'-type necropoleis. However, until 2018 research into this phenomenon was still based solely mostly on historical sources and scarce archaeological data from 20th century, despite the fact that research and recognition of the problem could be considered as opened.

Between 2018 and 2022, first truly interdisciplinary and broad research of the 'mogiłki' in Podlasie region was initiated, which allowed for a much better understanding of the issue – and the inclusion of much needed bio-anthropological data. Revisiting previously researched material and incorporating it into broader context allowed for a clarification of a trend, where despite the common denominator ('mogiłki'-type cemetery with clearly distinguished socio-cultural standing) each of the cemeteries retained individual character. This character varied: from different distribution of pathological conditions, intensity and number of infectious lesions to suggestive low intra-population genetic variability. The in-depth and cross-sectional summary of the data obtained so far allowed for a comparative anthropological analysis of the rural populations of post-medieval borderlands of Eastern Europe.

11 TALES FROM BEYOND THE GRAVE – WHAT BURIALS FROM VALENÇA FORTRESS CAN TELL US

Alves, Alexandrina (Lab2PT; CIAS)

For the past 20 years, Valença, a fortress located on top of a hill, south of the river Minho, and a relevant localization of the Portuguese northwest border, has been excavated. The archaeological interventions comprised the surrounding area of two churches, located inside the fort, Santa Maria dos Anjos and Santo Estêvão.

The excavations exposed part of both churchyards, where a total of 160 graves were identified, and 57 individuals (27 from Santa Maria dos Anjos; 29 from Santo Estêvão) were excavated and totally or partially exhumed.

Despite the chronological and physical proximity of the two churches several differences between burial rituals were observed, namely diverse grave techniques, and separate corpse management.

The medium state of preservation of the human remains partially compromised the palaeodemographic data, although from the 40 adults, sex was estimated for 26 (26/40; 65%) individuals, with a wide age at death range. For the 17 non-adults recovered, age at death varies between 6 months to 12-year-old.

Multiple paleopathological lesions were observed, thereby enabling us to attempt to delineate the health status of this population sample. Degenerative joint disease and trauma are the most frequent conditions observed, but infectious, benign tumors conditions are also present.

The study of the remains from both cemeteries expanded our knowledge of Valença population during the 16th to mid-19th centuries.

12 A TALE OF TWO CLOISTERS, A TALE OF TWO CITIES – A FUNERARY BIOARCHAEOLOGICAL COMPARISON OF TWO POST-MEDIEVAL BURIAL SITES

Lema Seabra, Ana (CIAS)

Urban Archaeology in Portugal, especially in commercial rescue archaeology, is often chronologically focused on post-medieval sites, sometimes with human remains. This presentation aims to compare two post-medieval burials sites from two different major cities in Portugal, the Convent of Saint Eloi in Porto and the Convent of Corpus Christi in Lisboa. The convent of St Eloi, also known as the convent of St Maria da Consolação, was located in the city of Porto, built in the end of the XV century and closed down in 1836 – like all convents in Portugal due to the extinction of the Religious Orders, and run by the Order of Saint Eloi. The Convent of Corpus Christi, located in Lisbon, was built in 1648 and given to Order of the Carmelitas Descalços to run in 1661, it suffered great damage during the Earthquake of 1755 and plans for rebuilding were halted due to the Extinction of the Religious Orders.

On both sites, cloister like structures were identified with the presence of human remains in primary burial position (as well as ossuary and reductions). We aim to compare and characterize both burial sites from a funerary bioarchaeological standpoint in regards to the buried population type, the use of lime and type of materials present with the human remains.

13 THE INFORMATIVE ROLE OF POST-MEDIEVAL OSSUARIES: THE EXAMPLE OF THE CRYPT OF SANT'AGOSTINO IN SASSARI (XVII-XIX CENTURIES)

Milanese, Marco (University of Sassari - Department of History, Human Sciences and Education) - Moshfegh Monazah, Leila (Institutt for historiske og klassiske studier - NTNU - Trondheim (NO)) - Roggio, Cinzia (University of Sassari - Department of History, Human Sciences and Education)

In postmedieval cemeteries and churches is commonly reported the presence of ossuaries and burial crypts, which are usually excluded from the anthropological analysis due to the high cost of these studies and to the wrong convention of the uselessness of this kind of secondary deposition to the reconstruction of the bioarchaeological context.

The proliferation of confraternities, often linked to corporations, favored the creation of burial places dedicated to them, identifiable by crypts or chapels built in cemeteries or churches that were the headquarters of the confraternity.

The crypt of the Church of St. Augustine, Sassari, excavated under the chapel of the Gremio dei Viandanti, contains hundreds of remains of the brothers of the Gremio, dated back between 1633 and 1810.

The crypt is the subject of a multidisciplinary project aimed at reconstructing the history of the members of the Gremio dei Viandanti, a post-medieval corporation that is still alive. All bones will be analysed to assess the biological profile and reconstruct the health status of this limited social group. In addition, the presence of tissues, through genomic analysis, can supply useful data to complement the information obtained from bioarchaeological and paleopathological studies.

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14 PALAEOPATHOLOGICAL ANALYSIS OF INDIVIDUALS FROM A POST-MEDIEVAL SITE IN SLOVENIA

Lisic Fox, Nidia (University of Ljubljana) - Leskovar, Tamara (University of Ljubljana)

Researching post-medieval cemeteries can provide significant insights into past events and overall population by forming biological profiles of individuals and creating demographic structure of a specific population. This can often be supported by other resources and documented events offering a wider picture of a certain location and period. Moreover, palaeopathological studies are an integral addition to skeletal remains analysis in order to learn about health conditions, diseases and even population changes.

However, post-medieval cemeteries are often neglected due to being so close to the present as well as raising possible ethical questions. The aim of our research is to show how studying post-medieval cemeteries can contribute to overall research development of different time periods, better population understanding and specific past-present connections.

The basic analyses were performed on the skeletons discovered in 196 graves at site Vrazov trg, Slovenia. It was noted that numerous individuals were with various pathological changes. For this study, 10 most interesting individuals were chosen in order to highlight the potential of more in detail palaeopathological study.

15 PATHOLOGICAL CHANGES IN HUMAN BONES FROM THE MODERN PARISH CEMETERY AT ST. BARBARA CHURCH IN WROCLAW

Galdyn, Natalia (Wroclaw University of Environmental and Life Sciences) - Bernacka, Natalia (Wroclaw University of Environmental and Life Sciences) - Kwiatkowska, Barbara (Wroclaw University of Environmental and Life Sciences) - Dąbrowski, Paweł (Wroclaw Medical University)

The study aimed to characterize pathological changes in the bones of Wroclaw residents buried at St. Barbara's Church, a modern parish cemetery dating back to the 17th-18th centuries. The study involved analyzing 58 specimens from 12 sites, including 19 male, 16 female, and 23 specimens of indeterminate sex, including 13 juveniles and children. The conditions were characterized using Gladykowska-Rzeczycka's division in 1976.

Lesions of the masticatory apparatus were observed in the greatest numbers, with injuries being equally frequent in each age category and slightly more frequent in men. Degenerative changes were more common in adults and mature individuals, while inflammatory changes occurred only in the adultus and maturus age categories. Developmental dis-

orders were comparably frequent in both sexes, while endocrine disorders, metabolic disorders, and neoplasms were least frequently observed.

The population from St. Barbara's Church was compared to the populations from St. Paul's and St. Peter's churches and the Salvatore cemetery. Most remains belonged to adults, while the most pathology was present in the populations from St. Barbara's church and the Salvator cemetery. However, lesions characteristic of diseases like tuberculosis were rarely present in all three populations.

The bone remains used in the research came from: Grant number: NCN 2017/25/B/HS3/02006. Grant title: "On the threshold of industrialization – interdisciplinary evaluation of prosperity and quality of life of early modern inhabitants of Wrocław".

736 INTERDISCIPLINARY TRAJECTORIES IN MORTAR ANALYSIS OF HISTORICAL BUILDINGS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Bellato, Giulia (Trinity College, University of Cambridge) - Bianchi, Giovanna (Department of History and Cultural Heritage, University of Siena) - Lubritto, Carmine (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, MARE Centre, University of Campania "Luigi Vanvitelli") - Arighetti, Andrea (École normale supérieure, Université PSL)

Session format: Regular session

The relationship between archaeology, history, and archaeometry is a long-debated topic that has become increasingly prominent in recent years, thanks to the constant evolution of research procedures, as well as the increasing sophistication of the tools of analysis at our disposal. As such, the creation of new frameworks of research and the continuous updating of skills and technical knowledge are essential to keep up with these developments.

To enhance current models and pave the way for new research directions, a collaborative approach is crucial. This hinges on a close dialogue between scientists and social science researchers, underpinned by a shared understanding of the procedures defining the various archaeometric specialisations.

The proposed session makes a case for this interdisciplinary approach by focusing on the processes of production of the mortars used in the construction of historical buildings. Within this field of research, the analytical archaeometric procedures adopted in recent years have become increasingly more precise in defining both the characteristics and the dating of samples. In most studies, however, the work of the scientists remains isolated from the overall data produced by historical and archaeological research.

This session draws from the experience acquired within an ongoing research project studying a series of Italian medieval castles through the archaeometric analysis of their mortars. Its objective is to initiate a dialogue with other interdisciplinary projects where mortar analysis plays a pivotal role in shaping historical models.

Taking a wide diachronic perspective, it presents a set of case studies examined through field- and lab-based procedures, comparing both different methods and their results. Ultimately, it intends to offer a valuable model of a research process that elaborates a unified and seamless interpretive framework based on different kinds of data and on the integration of different specialisations.

ABSTRACTS

1 APPLICATION OF THE RADIOCARBON METHOD TO MORTARS IN ARCHAEOLOGICAL CONTEXTS

Vecchiattini, Rita (Dipartimento Architettura e Design (DAD) - Università di Genova; Istituto di Storia della Cultura Materiale (ISCUM)) - Pesce, Giovanni (Department of Mechanical and Construction Engineering - Northumbria University; Istituto di Storia della Cultura Materiale (ISCUM))

Among all the archaeometric dating methods, the dating of organic material using the Radiocarbon method has been one of the most commonly used since the 1960s, especially in the archaeological and anthropological fields. Since early 2000s, however, the Radiocarbon method has also been applied with some success to "lumps of pure lime" contained in historic mortars, within archaeological or architectural contexts.

The possibility of extending the application of the Radiocarbon dating method from the organic material deliberately or accidentally included in the mixtures, to the inorganic material (i.e., lime) is changing the research perspectives and its application. Dating the carbonation of lime in a mortar means, in fact, directly dating its setting time and therefore, the actual construction time of a building.

The experience, accumulated by the authors and by ISCum since 2008, in selecting, preparing and radiocarbon dating over 70 lumps of lime extracted from mortars of 28 different contexts allows now some reflections on this particular application of the Radiocarbon method.

This paper summarises the main critical limitations and potentials related to the application of the radiocarbon method to lime mortars samples in archaeological contexts with examples derived from specific case studies.

2 LIFE AFTER 14 YEARS OF EXPERIENCE WITH MORTAR DATING BY CRYO(2)SONIC PROCEDURE: CURRENT STATE OF THE ART AND FUTURE PERSPECTIVES

Marzaioli, Fabio (Università degli studi della Campania, Dipartimento di Matematica e Fisica) - Passariello, Isabella (Università degli studi della Campania, Dipartimento di Matematica e Fisica) - Terrasi, Filippo (Università degli studi della Campania, Dipartimento di Matematica e Fisica) - Nonni, Sara (The University of Manchester at Harwell) - Secco, Michele (Università degli Studi di Padova-Dipartimento dei Beni Culturali: archeologia, storia dell'arte, del cinema e della musica (DBC)) - Ricci, Giulia (Università degli Studi di Padova- Dipartimento di Geoscienze) - Artioli, Gilberto (Università degli Studi di Padova- Dipartimento di Geoscienze) - Lubritto, Carmine (Università degli studi della Campania, DiSTABiF)

This contribution aims to describe the history of Mortar Radiocarbon Dating by CryoSonic method since its first developments and testing in 2010. CryoSonic (CRYO-Breaking, SONication and Centrifugation) was firstly developed and applied @ CIRCE (Centre for Isotope Research on Cultural and Environmental heritage) Laboratory- Università degli Studi della Campania "Luigi Vanvitelli" (formerly Seconda Università degli Studi di Napoli) - Department of Mathematics and Physics based on a development of a procedure defined by Nawrocka, et al. (2011). Over about 1.5 decade initial procedure was developed and adapted in order to respond accurately to the great heterogeneity of real field mortars including low degree hydraulic ones (i.e. cocciopesto and pozzolanico). This procedure aims at the physical isolation of a real fraction from mortars differently from a widely spread family of procedures based onto stepped digestion.

Several study cases with well constrained chronological boundaries have been tested in order to verify procedure accuracy. Based onto experienced intensive testing of Cyo(2)Sonic, current state of the art (including efficiency %) and future perspectives of the applied procedure will also be described.

3 TECHNOLOGICAL CHANGES AND CONTINUITIES IN MORTAR PRODUCTION: A VALUABLE TOOL FOR THE CHRONOLOGICAL INTERPRETATION OF COMPLEX HERITAGE CONTEXTS

Razzante, Valeria (Dipartimento dei Beni Culturali, Università di Padova) - Secco, Michele (Dipartimento dei Beni Culturali, Università di Padova) - Dilaria, Simone (Dipartimento dei Beni Culturali, Università di Padova) - Ricci, Giulia (Dipartimento di Geoscienze, Università di Padova) - Previato, Caterina (Dipartimento dei Beni Culturali, Università di Padova) - Bonetto, Jacopo (Dipartimento dei Beni Culturali, Università di Padova) - Chavarría Arnau, Alexandra (Dipartimento dei Beni Culturali, Università di Padova) - Brogiolo, Gian Pietro (Dipartimento dei Beni Culturali, Università di Padova) - Marzaioli, Fabio (Dipartimento di Matematica e Fisica, Università degli Studi della Campania Luigi Vanvitelli)

In the last decades, archaeometric analysis of historic mortars has provided promising responses to improve knowledge on the technical evolution of construction practices. In this contribution, an interdisciplinary and multi-analytical approach is presented, combining historical research, archaeology, and archaeometry, to highlight noticeable variations and continuities in mortar production practices throughout different historical periods in two paradigmatic sites: the city of Padua and the site of Castelseprio-Torba (Varese).

Due to the presence of differentiated geological resources from the Euganean Hills, the city of Padua offers a peculiar context of great variability in mortar recipes. The multi-analytical study applied to mortars sampled from different Roman public structures of the city and its surroundings indicated a systematic utilization of Euganean volcanic aggregates as activators of the pozzolanico reaction; in post-classical periods the adoption of pozzolanico binders was replaced by a consistent production of natural hydraulic lime. The regular use of the Euganean marl – a clayey limestone – as raw material for lime production, has been identified both in the sections of the medieval and Carrarese walls, as well as in the latest Renaissance defensive structures.

A different perspective, linked to a continuing standardization over time, is offered by the late antique and medieval site of Castelseprio-Torba. Recent research highlighted a traditional way of producing mortars linked to the exploitation of local natural deposits (clay-rich sediments), to promote articulated pozzolanico reaction processes based on both calcium and magnesium systems, with formation of calcium and magnesium aluminum silicate hydrates (C-A-S-H and M-A-S-H, respectively). In this context, radiocarbon dating was applied to mortar samples collected from the masonry structures of the Torba monastery, providing an absolute chronological reference, and overcoming intrinsic limitations of relative chronology subjected to the diachronic continuity of mortar production technologies.

4 BINDER SELECTION PROCEDURE OF FLORENTINE HISTORICAL BUILDINGS FOR RADIOCARBON DATING

Calandra, Sara (Department of Earth Sciences, University of Florence, Italy; Department of Chemistry Ugo Schiff, University of Florence, Italy) - Cantisani, Emma (Institute of Heritage Science - National Research Council of Italy, Sesto Fiorentino (Florence), Italy) - Fratini, Fabio (Institute of Heritage Science - National Research Council of Italy, Sesto Fiorentino (Florence), Italy) - Salvadori, Barbara (Institute of Heritage Science - National Research Council of Italy, Sesto Fiorentino (Florence), Italy) - Conti, Claudia (Institute of Heritage Science - National Research Council of Italy, Milano, Italy) - Arrighetti, Andrea (École normale supérieure, Université PSL, France) - Barone, Serena (National Institute for Nuclear Physics, Unit of Florence, Italy; Department of Physics, University of Florence, Italy) - Liccioli, Lucia (National Institute for Nuclear Physics, Unit of Florence, Italy) - Fedi, Mariaelena (National Institute for Nuclear Physics, Unit of Florence, Italy) - Garzonio, Carlo (Department of Earth Sciences, University of Florence, Italy)

Mortar of historical building reveal details about raw materials, ancient technology, original recipes, and supply areas. These details let us identify the phases of construction. Since the pioneering studies of Labeyrie and Delibrias, (1964), mortar binder can be dated by absolute dating using radiocarbon. In principle, the datable carbon fraction is represented by the so-called anthropogenic calcite (CaCO₃), i.e. the carbonate binder resulting from the hardening of slaked lime [Ca(OH)₂] reacting with CO₂ from the atmosphere. The possibility of dating an aerial mortar has by radiocarbon depends on the complete separation of the binder from source of contaminations (components in the mortar mixture). Standard and approved experimental strategies for removing the sources of contamination have not yet been established.

The purpose of our research is to design a binder selection procedure for radiocarbon dating of historical mortars and apply it to mortars from the Florentine area (Cantisani et al., 2021).

Our procedure for selecting binder includes: 1) chemical, mineralo-petrographic characterization of mortar samples to identify the nature of binder, aggregates, the presence of lumps and hydraulic behavior; 2) mechanical separation of lumps or/and bulk samples and their characterization using non-destructive methods: cathodoluminescence, spectroscopic methods (ATR-FTIR and micro-Raman) (Calandra et al., 2022; Calandra et al., 2023) to evaluate the origin of calcite; and also, X-ray powder diffraction (XRPD) to identify mineralogical phases. And then proceeded to select samples consisting mainly of anthropogenic calcite; 3) carbonate micro-sample preparation (acid dissolution combined with Lilliput graphitization reactors (Fedi et al., 2020)) and ¹⁴C measurement by accelerator mass spectrometry (AMS).

This workflow has been applied on mortars from Trebbio castle, an important architectural Cultural Heritage in the surroundings of Florence (Italy). The procedure has allowed us to select suitable mortar samples, obtaining reliable dating results, comparable with the historical construction phases of the castle.

5 CHARACTERIZATION AND PREPARATION OF ARCHAEOLOGICAL MORTARS FOR AN EFFECTIVE RADIOCARBON DATING: THE CASE-STUDY OF SAMPLES FROM MEDITERRANEAN AREA

Di Cicco, Maria (University of Campania Luigi Vanvitelli) - Germinario, Chiara (Department of Sciences and Technology, University of Sannio, Benevento) - Grifa, Celestino (Department of Sciences and Technology, University of Sannio, Benevento) - Spagnuolo, Antonio (Energreenup srl, Via Acquaviva Caserta) - Altieri, Simona (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, University of Campania "Luigi Vanvitelli" and MAREa Centre, Via Vivaldi 43 Caserta) - Mantile, Noemi (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, University of Campania "Luigi Vanvitelli" and MAREa Centre, Via Vivaldi 43 Caserta) - Sabatella, Arianna (Department of Sciences and Technology, University of Sannio, Benevento) - Lubritto, Carmine (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, University of Campania "Luigi Vanvitelli" and MAREa Centre, Via Vivaldi 43 Caserta)

The dating of historical buildings is a crucial aspect of their study and evolution. Lime-based mortars are a highly effective building material for providing dating clues. This is because the carbon dioxide absorbed during the setting of the mortar on archaeological structures reflects the content of ¹⁴C that existed in the atmosphere at that time. However, it is important to note that some factors may influence the reliability and accuracy of radiocarbon measurements.

Due to the complexity of the problem, a number of chemical and mechanical procedures have been used in recent decades to prepare lime mortars for radiocarbon dating, including the Cryo2Sonic preparation protocol. However, these procedures may not completely eliminate contamination agents such as carbonate in aggregate, calcination relics, or secondary calcite from the carbon in the original binder, which can result in inaccurate dating of samples.

To minimise the impact of contaminants on dating procedures, the selection of the material must be accurate, and an appropriate characterization of mortar is fundamental.

The following research focuses on preparing, characterising and dating samples from various archaeological Mediterranean contexts. It highlights the importance of conducting a preliminary mineral-petrographic characterisation using Polarised Light Microscopy, Fourier Transform Infrared Spectroscopy and simultaneous thermal analyses to identify potential sources of dating contamination. The presentation will cover:

- the case-study of decorated plasters from an archaeological site Pollena Trocchia (Campania region, Italy), representing the “ideal” materials for reliable dating procedure, because of their nature (lime-based mortars containing volcanic aggregate) and their strict chrono-stratigraphic constraints, marked by the deposits of 79 CE and 472 CE Vesuvius’ eruptions;
- the case-study of mortars collected by Medieval Andalusian Castles, studied with the aim of highlighting how contamination effects can affect radiocarbon dating.

6 THE LIMEKILN OF THE MEDIEVAL SETTLEMENT OF MONTECORVINO (FOGGIA, APULIA): A MULTIDISCIPLINARY RESEARCH

Cardone, Angelo (Università degli Studi di Bari - DiRIUM) - Cataneo, Carlo (UniSalento - Dip. Beni Culturali) - Della Penna, Valeria (Università di Foggia - DISTUM) - Eramo, Giacomo (Università degli studi di Bari A. Moro - Dip. Scienze della terra e geoambientali) - Favia, Pasquale (Università di Foggia - DISTUM) - Fiorentino, Girolamo (UniSalento - Dip. Beni Culturali; LAP- Laboratorio di Archeobotanica e Paleocologia) - Giuliani, Roberta (Università degli Studi di Bari A. Moro - DIRIUM; Prin MY-FORTLANDS) - Stella, Matilde (UniSalento - Dip. Beni Culturali; LAP- Laboratorio di Archeobotanica e Paleocologia)

Montecorvino (Vulturino-FG) is an abandoned medieval site in the north-western Apulia; it was a *kastron*, founded by the Byzantines in the first half of the 11th century. The arrival of the Normans, after a few decades, involved the reorganization of the town: at the western end, an artificial embankment was built, surrounded by a moat; at the top a *castrum* was planted, dominated by a high quadrangular tower; it was articulated over time, with the construction of a wall and a second tower, up to transform, in the 2nd half of 13th century, into a fortress, densely occupied. Below the hill, towards the east, in the direction of the town, in recent excavations a limekiln (diam. about 3 m) has been discovered; given its size, it would seem to refer to one of the main building phases of the *castrum*. The structure was found with its last load of stone and full fuel.

The peculiarity of the discovery provided opportunity studying the context with a multidisciplinary approach: archaeological examination, archaeometric analyses and archaeobotanical study.

Archaeometric analyses have been set, aimed at acquiring information both on the nature and origin of the materials used to build the kiln and to make lime, and on the operation of the kiln. Samples underwent to petrographical analysis in thin section, X-ray powder diffraction (XRPD) and scanning electron microscopy coupled with energy-dispersive spectroscopy (SEM-EDS). Blocks of local siliceous limestones are the prevalent lithotype used for both the kiln and the lime production. Moreover, it was developed an experimental protocol to map the temperature distribution in the kiln.

Anthracological analysis of the charcoals remains allows us to determine the composition of the fuel, the formation way of the anthracological assemblage and the choices adopted for the functioning of the limekiln.

7 COMBINING MORTAR, WOOD, CARTOGRAPHIC AND DOCUMENTARY EVIDENCE TO UNDERSTAND THE MEDIEVAL TOWERS OF NEGROPONTE

Blackler, Andrew (Hellenic Society for Near-Eastern Studies) - Panagopoulou, Adamantia (Institute of Nanoscience and Nanotechnology “Demokritos” National Center for Scientific Research, Athens)

More than a hundred towers once dotted the medieval landscape of the Greek island of Euboea (Negroponte). They have traditionally been seen in a colonial context as constructed by Frankish and Venetian feudal landowners to display their power and control the local population immediately following the annexation of central Greece in 1204 by forces of the Fourth Crusade. In 2022/23, in a program supported by the Castle Studies Trust (UK), samples of mortar and wood were taken from within the walls of seven towers on the island.

The results of their analysis undertaken at the ‘NCSR’ Demokritos laboratory in Athens have enabled not only a revised build dating but also, through chemical study have identified different construction technology phases and raw material provenance sites. These results combined with GIS analysis, and contemporary documentary and cartographic evidence, have contributed to the development of a completely new understanding of their role during the nearly three centuries of Latin control (1204-1470).

This paper studies the process of sampling from the initial identification of target towers, given budget limitations, to the interaction between the various specialists and how this contributed to secondary analyses being undertaken. It then discusses how an understanding of the historical context coupled with the involvement of experts from multiple scientific disciplines was critical to the development of the final conclusions.

8 THE KEYS TO SUCCESS: INTERDISCIPLINARITY IN THE DATING OF MORTARS FROM SANTALLA DE BÓVEDA (LUGO, GALICIA, SPAIN)

Sanjurjo-Sanchez, Jorge (University of A Coruña) - Blanco-Rotea, Rebeca (Landscapes, Heritage and Territory Laboratory (Lab2PT), University of Minho (Portugal)) - Freire-Lista, David (Departamento de Geología, Universidade de Trás-os-Montes e Alto Douro (UTAD) and Centro de Geociencias da Universidade de Coimbra (Portugal).) - Benavides García, Rosa (Independent Researcher)

Since 2007, a team made up of geologists, archaeologists, art historians and restorers began to work collaboratively from different institutions in Galicia, University of A Coruña, University of Santiago, CSIC, and now in Portugal, University of Minho, we started to work with the mortars of different historical buildings with the aim of characterising and dating them, in the conviction that the mortars, being a material that must be made at the time of construction, were the key to answering some important historiographical debates about different architectures located in this region of the Iberian Peninsula, mainly for the Late Antiquity and Early Medieval Ages.

At that time, we began to work on Santalla de Bóveda, an important monument that preserves some mural paintings that have been identified as Roman, Early Christian or Early medieval, although researchers have not reached a consensus. The building was a very attractive case of study not only because it was a challenge to respond to this lack of consensus, but also because it preserves mortars of very different functionality and paintings that are an icon for the history of art, archaeology and architecture.

The continuous process carried out since then has been a methodological path that has accompanied the advances in dating techniques. Today, the monument has 40 dates, result of having combined three methods and that allow us to clearly date the stratigraphic sequence identified thanks to the archaeological study. Only the combination of different dating techniques applied to different materials and an interdisciplinary study, where archaeology and geology have collaborated closely with other disciplines to formulate the right questions, select the right samples and refine the methodology, have allowed us to reach solid conclusions that today open new interpretative hypotheses for early medieval architecture in Galicia.

9 THE CASTLES PROJECT

Bianchi, Giovanna (University of Siena) - Arrighetti, Andrea (École normale supérieure, Université PSL) - Bellato, Giulia (University of Cambridge) - Lubritto, Carmine (University of Campania “Luigi Vanvitelli”) - Garzonio, Carlo Alberto (University of Florence)

The study of medieval castles and of their transformations, in both structural and socio-political terms, is a long-standing key theme of Italian historiographical research. Though it has been tackled extensively through historical, archaeological, and archaeometric study, it still retains numerous open questions that carry significant historiographical implications. The precise chronology of the transformations of castles between the second half of the 11th century and the end of the 12th, for instance, remains unclear. One of the key elements of this transformation involves the shift to durable materials, accompanied by the increasing use of lime-based binders.

This paper presents the preliminary findings of an ambitious project developed by the universities of Siena, Florence, Turin, and Campania. It is based on a study of a set of Italian medieval castles from Tuscany, Piemonte, and Liguria, selected because of their historical and archaeological significance. It is aimed at refining our understanding of castles construction phases, specifically through the development of new protocol for the dating of historical lime-based mortars.

The field of archaeometry has seen great strides in recent years, especially in terms of the development of increasingly precise procedures for the dating of historical mortars. However, these types of analyses still retain significant challenges, not least that of successfully integrating the archaeometric data with that produced through historical-archaeological research. The paper presents an innovative framework of research which centres mortar dating in the creation of historical models. At the same time, it also explores the contribution that historical-archaeological analysis can bring to archaeometry, especially regarding the creation of new protocols of analysis. It aims at offering a valuable example of interdisciplinary research and at opening a fruitful discussion regarding the challenges and the advantages of creating research frameworks that can integrate data from different specialisations.

737 COMPUTATIONAL LANDSCAPES: DEBATING FUNDAMENTAL ISSUES OF ARCHAEOLOGICAL NARRATIVES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Herrera-Malatesta, Eduardo (Center for Urban Network Evolutions, Aarhus University) - Verhagen, Philip (Faculty of Humanities, Vrije Universiteit Amsterdam)

Session format: Regular session

Landscape research in archaeology has greatly benefited from the increasing application of computational methods over the last decades. Common examples come from spatial point patterns (Bevan 2020), Bayesian statistics (Crema and Shoda 2021), network analysis (e.g., Brughmans et al. 2024), 3D modelling (Campana et al. 2012), agent-based modelling (Romanowska et al. 2021), and Geographical Information Systems (Conolly 2016). While these and other methods have positively impacted archaeology and landscape studies, there have not been many studies assessing the impact of using advanced computational methods to create narratives about past landscapes. Some exceptions include Verhagen et al. (2021) who have discussed the challenges of comparing advanced spatio-temporal simulation models in archaeology. Bevan and Crema (2021) presented a review of the issues arising from the recent interest in constructing long-term proxies of human activity using simulation methods. Tenzer et al. (2023) have warned about the potential negative ethical implications of using AI and Machine Learning in archaeology without a full understanding of the inner workings of these complex computations. In addition, there is a growing trend of archaeologists working on quantifying uncertainties of archaeological data and models, as well as on best practices to deal with data incompleteness and imperfection (Lewis 2021).

With this session, we aim to bring together a group of specialists in computational and landscape archaeology to debate how computational approaches, methods and technologies contribute to enhancing landscape archaeological narratives. We invite presentations that explicitly apply and discuss any of the wide range of computational methods in landscape research in archaeology, with emphasis on critical considerations of, for example, how to avoid black box methodologies, potential ethical considerations, dealing with uncertainties in data, applicability of modelling concepts and archaeological theories, integration of different approaches, and issues of using legacy data for advanced modelling and simulations, among others.

ABSTRACTS

1 UNSHATTERED LANDSCAPES: A FRAMEWORK FOR DEALING WITH UNCERTAINTIES AND BIAS IN ARCHAEOLOGY

Herrera-Malatesta, Eduardo (Urbnet, Aarhus University)

The fragmentary nature of archaeological data is the key factor that affects past landscape reconstructions and loads archaeology and archaeological narratives with uncertainties. For decades, archaeologists have sought to reduce uncertainties by relying on stricter methodologies and advanced technologies. For example, to overcome survey uncertainty, the systematic total area survey was created. To overcome data and model uncertainty, advanced computational methods are used in the discipline. However, the use of these and other strategies does not reduce uncertainties if other aspects of the archaeological process are still within black-box methodologies and implicit reproductions of standardised steps. Furthermore, the application of advanced computational methods is not a solution by itself, as they need to be properly set up for each specific case study. All these uncertainties strongly affect the narratives we create about past peoples and their landscapes. This paper presents a framework for computational and landscape archaeologists seeking to have a systematic and transparent structure to deal with uncertainties in archaeology. The framework, which will be exemplified by different case studies, consists of three steps. First, the identification of uncertainties in spatial data and the creation of a robust procedure to deal with data and model uncertainties. Second, the exploration of how the relationship between spatial statistics and network methods can maximize their potential for enhancing our understanding of past events in space. Finally, a discussion of how implicit information in geovisualizations increases uncertainties and how this can affect narratives about the past. The analyses to be presented in this paper are part of a web application created to help colleagues, not specialized in computational archaeology, perform spatial analyses in a simple and straightforward manner and clearly understand the percentage of uncertainty embedded in their data and models.

2 GAMES OF HABITATION: UNRAVELING SETTLEMENT DYNAMICS IN SOUTHEAST ROMANIA'S CHALCOLITHIC. A MULTI-SCALE SPATIAL ANALYSIS

Covataru, Cristina (ArchaeoSciences Platform, Research Institute of the University of Bucharest (ICUB), Romania)

Over the last decades, the development and application of innovative computational methods in archaeology have broadened the research horizons for understanding (pre)historic societies. These methods have provided new insights into how people interacted with their environment and each other thousands of years ago.

This paper aims to explore the dynamics of prehistoric landscapes inhabited by the well-known Hamangia, Boian and Gumelnița communities (5200-3900 cal. BC) in southeastern Romania. This period synchronizes with the prosperous "golden 5th millennium" of Southeast Europe.

Point pattern analyses were employed to investigate settlement distribution patterns and the interaction between sites in a well-defined spatial-temporal frame. Kernel Density Estimation (KDE) was used to visualize the probability site of finding settlements in a specific area, considering several criteria like site cultural classification, different radii and observation windows, and the inclusion/exclusion of sites with unknown coordinates. The inter-community relationships from these focus areas were further explored by analyzing the distance between communities, using several geostatistical analyses such as the nearest neighbor test (NN), F-function, G-function, and K-function.

These analyses were conducted entirely through open-source software (QGIS and plugins), ensuring accessibility and reproducibility. Certain limitations still exist, including the accuracy and precision of site location, as well as the irregularities in the distribution and duration of these cultural phases, aspects which may influence the results. Despite these limitations, this methodology provides valuable insights and can potentially form narratives about settlement distribution, region landscape preferences, spatial and temporal dynamics, inter-community relationships, and implicitly about collective decision-making.

This research was supported by a grant from the Ministry of Research, Innovation and Digitization, contract number 41PFE/30.12.2021, within PNCDI III; and by financial support from the "Simion Mehedinți - Nature and Sustainable Development" Doctoral School, Faculty of Geography, University of Bucharest.

3 FROM NEAR-EMPTYSAPES TO HIGH DENSITY PAST: GAME-CHANGING IMPLICATIONS

Campana, Stefano (University of Siena)

In the last two decades we have seen a revolution in the archaeological density of the past showing in some circumstance the potential for a near-total recovery of past evidence. Methodologies used for study of the ancient landscape now offer a wide and seemingly ever-expanding variety of 'new' remote sensing methodologies, increasingly widely deployed for archaeological exploration and mapping purposes. In addition to improvements in technical capabilities massive evidence has been identified through decades of development related large excavations. Integrated, large-scale and continuous archaeological prospection and development-related fieldwork share responsibility for "the resulting flood of archaeological data". The outcomes of these studies find no parallel in the results of past surveys. It is a matter of resolution: the unprecedented high density of the information that such landscape investigations can now produce, as compared with the low-density results achieved in the past. This paper is aimed to discuss the implications of high-resolution representations of the past that have far-reaching archaeological consequences and have yet to be fully appreciated. In the first place, the archaeological outcomes show much more complicated landscapes dominated by labor, production, communication, and trade, and not just by settlements. Field boundaries and road systems, workshops and production sites, water features, dams and so forth, clearly predominate but obviously there are also settlements which, notwithstanding their remarkable sizes, are now somewhat in the background, clearly forming just part of a much broader picture. Methodologically, the implication of the results of landscape-scale geophysical survey and targeted minimalist excavation are nothing less than revolutionary.

4 RECONSTRUCTING REGIONAL GEOGRAPHIC VARIATIONS IN THE RATE OF THE SUB-SAHARAN EIA

Mes, Alexes (University of Cambridge)

Beginning around 4,000 BP, large-scale eastern and southern migrations expanded throughout sub-Saharan Africa resulting in major subsistence and cultural changes. The dispersal is associated with an early iron age (EIA) cultural package consisting -- wholly, or in part, at various times -- of a more sedentary lifestyle, thick-walled pottery, iron metallurgy, cattle-keeping and crop cultivation.

Behind all large-scale human dispersals lies a body of literature seeking to categorise this movement as demic migration vs. acculturation. The reality in any human migration is far more complex: the units of migration (individuals, families, communities), as well as the localised tempo and direction of dispersal shifted frequently.

It is the localised migration dynamics of sub-Saharan EIA communities that this paper aims to examine through the archaeological record: understanding the expansion of this cultural package as a series of regional and complex movements, focusing on variations in the tempo of dispersal and arrival times of these traits within smaller geographic areas.

The arrival times of these traits in geographic sub-regions are examined using a Bayesian phase model, where a hierarchical structure is introduced to account for the bias introduced by sample interdependence. This framework is then built on by considering if and how certain factors -- such as temperature, rainfall, geography and river-networks -- resulted in varied frictions to the dispersal and quantifying to what extent these potential drivers explain the observed differences in the dispersal process.

The results build a more detailed description of the localised dynamics of EIA communities in sub-Saharan Africa. Throughout, biases which influence the data -- such as uneven spatial and temporal sampling density -- are acknowledged and measurement uncertainty (calibration curve error and the sample's 14C age error) is accounted for. Computational intensity, and how this can restrict approaches to large archaeological datasets is briefly discussed.

5 A COMPUTATIONAL APPROACH TO THE STUDY OF CHULLPA ARCHITECTURE AND LANDSCAPE DYNAMICS

Gonzalez-Rodriguez, Cristian (University College London)

This presentation aims to bridge the connection between computational archaeology and landscape research within the Andean Plateau, focusing on the multidimensional chullpa phenomenon. Utilising a comprehensive multivariate approach, this study, conducted in the PhD research programme at the UCL Institute of Archaeology, explores the relationship between chullpa architecture, the animated Andean landscapes, and ecological dynamics. Chullpas, understood as aboveground sepulchres with origins around 900 CE, are examined not merely as burial sites but as key socio-political and ecological instruments that articulate royal power, ethical identity, and territorial demarcation.

The investigation employs computational methods, including logistic regression modelling, point pattern processing, and statistical permutation analysis, to explore the deliberate distribution and architectural variability of over 500 chullpa buildings across Perú, Bolivia and Chile. These methods allow for a multivariate understanding of the chullpas' interactions with diverse landscapes, highlighting how these structures adapt to and integrate with local ecological systems. This research emphasises the significance of chullpas beyond their physicality, positioning them as vital components within the Andean socio-ecological system, engaging with waterscapes, visualsapes, and mountainscapes.

By synthesising fieldwork data with computational modelling, the study offers approaches to the chullpas' roles as ritual technologies and their strategic orientations within the landscape. The inclusion of material recordings, ethno-historical data, and radiocarbon dating further complements the analysis, providing a deep temporal and contextual understanding of the chullpas' enduring resilience and adaptability over centuries.

Positioned within this session on "Computational Landscapes" this presentation seeks to contribute to the critical discussion on the application of computational methods in landscape archaeology. It highlights the importance of integrating socio-ecological contexts in computational analyses, thus contributing to the understanding of archaeological narratives through the animated Andean landscape.

6 ANCIENT PATHWAYS, THEORIES OF MOBILITY AND NETWORK ANALYSIS: REDEFINING THE NARRATIVES

Verhagen, Philip (Vrije Universiteit Amsterdam, Faculty of Humanities) - Groenhuijzen, Mark (Utrecht University, Department of History and Art History)

Modelling ancient pathways has become one of the most prolific areas of computational archaeology over the past decade. Compared to only ten years ago, the number of applications as well as the methodological sophistication of pathway modelling has increased substantially, now allowing us to address much more complex questions than just the reconstruction of ancient routes.

In papers by Nuninger et al. (2020a, 2020b) it was discussed how ontologies can be used as a starting point to debate and define the concepts related to ancient movement in a structured way, leading to the formalization of connections (routes) in a diachronic and multi-purpose 'track graph'. This track graph was set up as a conceptual structure, but can be easily implemented in computational analysis. So far, however, its application has been limited to a few unpublished pilot studies.

In this paper, we will explore how the application of the track graph concept can help to understand mobility and transport within the context of the Roman settlement and road system in the Dutch river area, at the frontier of the Empire. In particular, we will show how it can be used to define and explore various, sometimes competing hypotheses on the organisation of rural settlement, military infrastructure and mobility at multiple spatial and temporal scales.

738 RECLAIMING HERSTORY: WOMEN IN MEDITERRANEAN ARCHAEOLOGY FROM THE 18TH CENTURY TO TODAY

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Berlanga, María José (Universidad de Málaga) - Díaz-Andreu, Margarita (ICREA; Universitat de Barcelona) - Ferrara, Bianca (Universita degli Studi di Napoli Federico II) - Pizzato, Fedra (Universita degli Studi di Verona)

Session format: Regular session

The development of archeology in the more than twenty countries around the Mediterranean Sea has been distinct. However, all of them have a common factor: the role of women in it has been minimised or directly silenced. While not unique when compared to other regions in the world, the way women's contributions to the development of our study area have been perceived has been clouded by numerous assumptions. The aim of this session is to critically look at women's involvement in archaeology in the Mediterranean countries from the 18th century until today. The session ambition is to challenge traditional narratives by reassessing women's contributions to the discipline across a wide range of career opportunities. These include some key ones not usually included in traditional historical narratives of archaeology, such as the administration of archaeology in archaeological services, and the museums. Another topic to explore is intersectionality, examining how factors like gender, status, religion, or nationalism/imperialism may have influenced women archaeologists. The connection (or lack of) of these women with the women's movements is a further issue to consider. Moreover, papers looking at the possible interconnectedness between women of different countries are welcome. Papers can focus on a variety of different perspectives: biographies, periods, career paths, area of research. A reflection on the sources needed to bring women out of the history's silence is highly opportune. These may include not only publications, but also documentation stored in archives, photographs, personal narratives and oral history.

ABSTRACTS

1 FOUNDATION DEPOSITS: THE CAREERS OF EMILY PATERSON AND MARY C. JONAS OF THE EGYPT EXPLORATION SOCIETY

Sheppard, Kathleen (Missouri S&T)

Emily Paterson began work with Amelia Edwards of the Egypt Exploration Fund in London in 1888. She never went to Egypt, but her administrative and organizational work formed the foundation of the fledging Fund. For over 30 years, her steadfast influence and expertise made sure that the Great Men like Flinders Petrie and Alan Gardiner could work in Egypt. She organized meetings, corresponded with everyone, edited publications, dispersed money, set up excavation permissions, and so much more. She was the center of British Egyptology. When Paterson retired in 1919, Mary C. Jonas took over her role. Thrown into the deep end in 1922 with the uncovering of Tutankhamun's tomb, she had to organize quickly. She set up meeting rooms, sold tickets, entertained aristocrats and royalty, mediated arguments among Egyptologist from the Mediterranean and across the Atlantic in the United States. Jonas did go visit Egypt, in 1929, to help dispel tension at the Abydos site caused by a man working with Myrtle Broome and Amice Calverley. She retired before Second World War began. Despite the fact that, for over a half century, women sat at the helm of the biggest scholarly organization for Egyptology in Britain, they are hardly known to scholars.

Throughout the span of their careers antiquities laws changed, archaeological methods and theory changed dramatically, the field itself was reborn several times over. This paper will discuss the groundbreaking careers of Emily Paterson and Mary Jonas. In so doing, I will argue that their lives and careers deserve to be placed back where they belong: in a much more central place in the history of Egyptology and as touchpoints to the history of the discipline much more so than any Great Man.

2 A 'BENEFACTOR OF SCIENCE.' MARIA FIORONI, AN (AMATEUR) ARCHAEOLOGIST, MUSEOLOGIST, AND PHILANTHROPIST

Pizzato, Fedra (University of Verona)

Maria Fioroni (1887-1970) belonged to an affluent family of Florentine origin. Her father, a Garibaldi supporter, moved to Legnago, a small town in the province of Verona (Veneto). The family settled in an elegant residence known as Palazzo Fioroni, which still serves as the headquarters of a prestigious cultural foundation. While she is mainly recognized locally as a patron who donated collections that now form the core of civic collections, her role as an amateur archaeologist is often overlooked. Notably, Maria Fioroni continued her prehistory research even during the Fascist era, a remarkable feat in its own right. However, Maria Fioroni played an active role on multiple fronts, combining field research in archaeology with museology and even political and social activism. Her work ranged from establishing one

of the earliest colonial collections to field archaeology, encompassing social and patriotic engagement. Her philanthropic efforts earned her significant national recognitions and honors. Furthermore, a dense network of information exchange, archaeological materials, and iconographic materials revolved around Maria Fioroni, allowing her to fully integrate into the revival of prehistoric archaeology studies in Republican Italy. This paper delves into the case study of Maria Fioroni, shedding light on her uncelebrated role during the Fascist era, and her contributions to the resurgence of prehistoric archaeology during the initial decades of the Italian Republic (1950s-1960s). In doing so, it aims to reevaluate and highlight the agency of women in this complex historical context.

3 PIONEERING WOMEN AT CUICUL-DJEMILA: ROLE AND IMPACT IN XXTH CENTURY ARCHAEOLOGY IN ALGERIA

Sadaoui, Dahia (Archéologie; Université Aix-Marseille)

The aim of this paper is to reflect on the place and involvement of three women at the Cuicul-Djemila archaeological site in twentieth-century Algeria. It will be based on archives generated by archaeological research carried out on the site between 1909 and 1967. First, I will review the identity and career of these three women: Anne Marie Louise de Crésolles (1863-1941), wife and daughter of the site's previous directors, and director of research between 1920 and 1941; Yvonne Allais (1891-1981), historian and director of the site between 1942 and 1957; and Michèle Blanchard-Lemée (1936-2017), author of two thematic studies on Cuicul-Djemila. I will look in particular at what led them to take an active interest in this site, located in an isolated mountainous region with a harsh climate, during periods marked by war. I will then attempt to identify the precise role of each of these women in the field. What were their responsibilities on the site? What was the nature of their interactions with the workers, the institutions involved in the research and the local residents? I will then analyse their documentary output, their working methods, and their impact on the development of archaeological knowledge during this period. Finally, I will attempt to assess the visibility and place of these women within the learned societies of the period, which were predominantly male, and in contemporary academic circles.

4 ANOTHER HISTORY OF ANCIENT NEAR EASTERN ARCHAEOLOGY: THE ROLE OF WOMEN WORKING AT THE LOUVRE MUSEUM (LATE 19TH-20TH CENTURIES)

Rannou, Raphaëlle (Institut National d'Histoire de l'Art; Ecole du Louvre; Tours University)

Where are the women archaeologists? In traditional histories of Ancient Near Eastern archaeology and in biographical dictionaries of academics, the number of women mentioned is tiny by comparison with the number of men. However, when we study the lists of students and graduates in Ancient Near Eastern archaeology at the École du Louvre in Paris from 1881 to the present day, women are very clearly visible from the end of the nineteenth century. What happened to these women graduates? Their names can often be found on the lists of scientific personnel at the Louvre Museum from the 1930s as "chargées de mission".

The aim of my paper is to review the contribution of women to the archaeology of the Ancient Near East by focusing on female museum workers, using the case of the Louvre Museum in the twentieth century.

What tasks were assigned to these women in the museums and in the field? How much are they recognized as archaeologists? What are the factors that integrate and exclude women from the discipline? How does the gendered division of labor affect women's contribution to the discipline? What role do feminist networks and transnational women's networks play in women's careers?

Based on recent studies on the history of women archaeologists, I wish to map out a history of the archaeology of the Ancient Near East using a quantitative approach based on women's and men's careers.

Using museum administrative archives, the press, personal archives, and oral interviews, I wish to compare my quantitative studies with the careers of a few women who have left their mark on the history of Ancient Near Eastern archaeology at the Louvre: Marguerite Rutten, Agnès Spycket and Annie Caubet.

5 ARCHAEOLOGY AS A WORLD-VIEW: ANNAMARIE SCHWARZENBACH AND THE FEMALE ARCHAEOLOGISTS IN THE EARLY 20TH CENTURY

Ferrara, Bianca (Università degli studi di Napoli Federico II) - Giacco, Marialucia (Museo Archeologico Nazionale di Napoli)

In the first decades of the 20th century, in the Antiquities studies significant and radical transformations occurred. Innovative mindsets assert themselves following the results of the great archaeological campaigns in Greece, the East and Italy. The cultural debate, characterized by the comparison with the increasingly widespread positivist instances, materialized a renewal of the theories and methods of archaeological research in its relations with history, philology, linguistics and ethnology. However, common to all new research leanings is the subordinate role reserved for women. The first women who approached archaeological studies, even if in non-decision-making roles, belonged to the

aristocratic class and carried out independent studies, under the impulse of classicism and romanticism, in similar disciplinary fields, concerning the exploitation of ancient languages, cultures and art. In any case, when the scientific data allow us to reflect on the role of women, it must be admitted that some of them played a significant role in the development of the archaeological research.

In this paper a brief summary of the female scholars who, in the first decades of the 20th century, contributed to the progress of the archaeology's methods directly or indirectly; among these female scholars Annemarie Schwarzenbach and her tireless research activity in the rediscovery of Persia must be included. For Schwarzenbach the archaeology and "the recovery of the buried origins" are an excuse to escape, avoiding the lack of a "healthy" constructiveness that the cultural milieu of her time required. She tried to move forward on an unknown path and towards an uncertain knowledge, no longer accompanied by the awareness of the incomparable greatness of the past of which only the "misery of crumbling ruins" remained.

6 THE ARCHAEOLOGICAL ACTIVITIES OF ELEONORA BRACCO IN BASILICATA (1933-1961)

Donnici, Fabio (Università degli Studi della Basilicata)

Although still little known, Eleonora Bracco (Turin, 1905 - Rome, 1977) was a major figure in Italian female archaeology of the last century. After graduating from Turin in 1928, she completed a three-year postgraduate course in Greek and Roman Archaeology in Rome (1930-1932), during which she was also admitted to the Italian Archaeological School in Athens, where she conducted excavations and research from Constantinople to Mykonos, and from Delos to Samos. In 1933, she was appointed director of the 'Domenico Ridola' National Archaeological Museum in Matera, a role she held for 28 years, dedicating herself actively and, in many ways, 'pioneeringly' to the research, protection and enhancement of the archaeological heritage of the entire province of Matera.

The contribution proposed for this session intends to focus attention on the reconstruction of Eleonora Bracco's activities in Matera, with the aim of recovering the importance of her scientific legacy for knowledge of the Matera area from prehistoric times to the Middle Ages. To this end, an attempt will be made to highlight, on the one hand, the depth of her culture and the breadth of her interests, and on the other, the rigorous scientific approach of her archaeological research, which gave the Matera Museum a leading role among museum institutes in southern Italy.

7 SPANISH SCHOLARSHIP HOLDERS AT THE ISTITUTO INTERNAZIONALE DI STUDI LIGURI (BORDIGHERA)

Berlanga, María José (Universidad de Malaga)

There is no doubt that a fundamental research centre in the development of archaeological science in the 1950s was the Istituto Internazionale di Studi Liguri, founded in 1937 by Nino Lamboglia, of which he was director until 1977, the year of his death.

Using stratigraphic excavation methods and ceramic classification, he innovated and inspired archaeological practice and research in the Mediterranean basin.

In this context, it seems important to delve into the initial training stage as scholarship holders of a group of young Spanish archaeologists at this institute.

An important milestone, but not the only one, for the creation of this link with the future Spanish archaeologists was their participation, in the summer of 1951, in the course organised by the Faculty of Philosophy and Letters of the University of Zaragoza and the Institute of Oscense Studies. In this course, entitled Curso de Técnica Arqueológica, held between Canfranc and Jaca between 6 August and 5 September 1951, Nino Lamboglia gave a session on Roman ceramics and archaeology. Two of the twenty-four participants, María Ángeles Mezquíriz Irujo and Gloria Trías Rubiés, were awarded scholarships to train with the master for a few months after the end of the course.

But we know that they were not the only ones who trained with Nino Lamboglia. They were followed by Ana María Adroer, Matilde Font Sariols, Gabriela Martín Ávila, M. Ángeles Mezquíriz, M. Antonia Muñoz Amilibia, Rosario Navarro Sáenz, Mercedes Roca Roumens, Isabel Rodá and Encarnación Serrano.

Understanding the influence that these months of study and excavation outside their own country and at such a young age had on their future careers provides valuable information for understanding their academic and research careers.

8 FEMININE PRESENCE IN ARCHAEOLOGY AT THE CSIC: THE AUTHORS OF ARCHIVO ESPAÑOL DE ARQUEOLOGÍA DURING THE FRANCO DICTATORSHIP (1939-1975)

Fernández, Alba (Complutense University of Madrid)

The "Archivo Español de Arqueología" journal stood as a prominent journal that, operating under the Consejo Superior de Investigaciones Científicas (CSIC), the Spanish National Research Institute, played a crucial role in disseminating

research within the field of Archaeology. The CSIC housed a dedicated center for archaeology known as the Rodrigo Caro Institute of Archaeology. In the historical studies about the CSIC, women have often been overlooked. The internal structure of the organization exhibited a pronounced hierarchy and male dominance, relegating women, especially during the dictatorship era, to secondary roles such as scholarship holders or assistants. Nevertheless, within the institutes that focused on history and archaeology, the Rodrigo Caro Institute notably showed a higher percentage of women, with some sections surpassing the number of men—a phenomenon considered unthinkable at that time.

“Archivo Español de Arqueología” featured many articles authored by these women and other Spanish and foreign archaeologists. This paper explores the roles these women played as authors in the journal, providing context to their careers and examining the potential networks that may have emerged. Through this approach, we aim to bring to light voices that have been silenced, voices that significantly contributed to the advancement of the discipline during the pivotal decades of the twentieth century.

9 CHASING THE SUN - WOMEN ARCHAEOLOGIST IN POLISH RESEARCH IN THE MEDITERRANEAN BASIN

Wozny, Marzena (Archaeological Museum in Krakow) - Werra, Dagmara (Institute of Archaeology and Ethnology, Polish Academy of Sciences)

In the 20th century, Polish archaeologists researched the Mediterranean basin, including Egypt, Greece and the Middle East. Those researches were mainly associated with Professor Kazimierz Michałowski. With that Professor, after which a research centre at the university, a gallery at the National Museum, several streets, and a school have names. However, other researchers, including women, also researched the area. In the ‘glare’ of such a prominent researcher, it was, and probably still is, challenging to ‘shine’. In this article, we want to focus primarily on those behind the acronym “et al.” or, more specifically, on women archaeologists.

Despite numerous and significant achievements in this field, these researchers have not received a deserved place in the history of Mediterranean archaeology. These women pursued their interest in the area of the ancient world’s great civilisations in science in various ways. In the paper, we will present the activities of selected female Polish researchers involved in Mediterranean archaeology differently. They were associated with universities and museums, excavated, developed collections of Mediterranean artefacts, and produced recognised publications. Those ancient historians represented different generations and had different experiences. They realised themselves as university teachers. We will pay special attention to two women: Mieczysława Ruxer and Maria Ludwika Bernhard. Ruxer studied archaeology in Cracow, was one of the first students of classical archaeology in Poland and later became a professor of classical archaeology in Poznan. Maria Ludwika Bernhard studied and became active as a researcher at the University of Warsaw. She collaborated with Kazimierz Michałowski. She led a Polish excavation expedition in Palmyra. For many years, she headed the chair of Mediterranean Archaeology at the Jagiellonian University in Krakow.

10 CONVERSATIONS BETWEEN SPAIN AND CHINA ON THE HISTORY OF WOMEN IN ARCHAEOLOGY: WHAT WE CAN LEARN FROM EACH OTHER

Dong, Tianyi (Departament d’Historia i Arqueologia, Universitat de Barcelona; Institut d’Arqueologia IAUB) - Díaz-Andreu, Margarita (ICREA; Departament d’Historia i Arqueologia, Universitat de Barcelona; Institut d’Arqueologia IAUB)

China and Spain are two countries characterized by very different locations and trajectories. The first is situated in Eastern Asia, ranking as the fourth largest country in the world, and it has had a communist regime for the past seven decades. In contrast, the second is located in the Mediterranean, considerably smaller, and has undergone a transition from a right-wing dictatorship to democracy during the same period. Given these geographical, political and even cultural differences between both countries, is a comparative exercise useful to analyse the history of women in archaeology? This paper will aim to answer this question by reflecting on a series of issues. Initially, we will examine whether concepts and theories applied in one country can be functional in the other, followed by considerations of methodology. We will then compare the political and social context of women in archaeology in both countries to identify commonalities and differences. We will finish the paper by discussing how useful comparative exercises are and what wider lessons we can learn from them.

11 WOMEN AND ARCHAEOLOGY IN SICILY BETWEEN THE MID-20TH AND 21ST CENTURIES

Congiu, Marina (Independent researcher)

The archaeological research conducted in Sicily in the years after the Second World War was strongly characterised by the figures of male archaeologists of great personality, such as Luigi Bernabò Brea, Pietro Griffò, Dinu Adamesteanu, Piero Orlandini, Ernesto De Miro and many others. In a field purely marked by male figures, few female archaeologists were able to make a significant name for themselves until the early 1990s, following the launch of studies on the integration processes of women not only in archaeology, but also in various public and social contexts.

This contribution is therefore intended to highlight the role played by Sicilian women archaeologists in the field of archaeological research and studies between the second half of the 20th century and the present century. At the same time, an attempt will be made to compare the situation of ‘female’ archaeology in Sicily with what was happening in Italy in the same years.

Women, professionals, scientists, contributed, through important excavation campaigns, to the dissemination of the results of their research, which still today constitute milestones in the history of archaeological studies. To give just a few examples, we will mention the excavation campaigns by Rosalba Panvini in Gela and the area around Caltanissetta, by Graziella Fiorentini in Agrigento, the important research work of Paola Pelagatti in Syracuse, the role played by Madelein Cavalier.

12 WRITING THE WOMEN ARCHAEOLOGIST IN ALGERIA: BETWEEN CONTEMPORARY CHALLENGES AND FUTURE ASPIRATIONS

Bourai, Donia (University Center Morsli Abdellah- Tipasa, Algeria)

The woman archaeologist in Algeria embodies much more than a simple researcher of the past’s remains; she is the reflection of a society in motion, defying social and cultural principles to claim her place in a field long dominated by her male counterparts. Its commitment to the preservation of Algeria’s archaeological heritage transcends the boundaries of time and space, offering unique insight into the history and cultural richness of this ancestral land.

In the increased movement of studies through the technological opening, Algeria is confronted with the obligation to assert itself in its research approach and to abolish long-anchored ideals erected under an archaeology shaped by targeted xenogenic reflection. Faced with this challenge, a question arises by itself. What are the chances for Algerian women archaeologists to claim national and international recognition and equal opportunities?

In our presentation, we will address the unique contribution of women in archaeological research in Algeria, the challenges that women in the field face in the face of an inherited, androcentric archeology and, more recently, an out of spite archeology, as well as strategies to promote their participation and recognition in this area. And finally, highlight their stories, their successes, and the perspectives of women archaeologists in Algeria.

739 ANALYSING THE CITY. ARCHAEOLOGICAL SCIENCE APPROACHES TO URBANISATION IN THE MEDITERRANEAN (1000-500 BCE)

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Amicone, Silvia (Archaeometry Research Group, Eberhard Karls Universität Tübingen) - Gleba, Margarita (Dipartimento dei Beni Culturali, Università degli Studi di Padova) - Riva, Corinna (University College London)

Session format: Regular session

The beginning of the Iron Age (12th to late 10th cent. BCE) ushered in a crucial period for the history of the ancient Mediterranean, which manifested in a series of transformative changes, among which was the beginnings of urbanism in the first half of the first millennium BCE (roughly the Iron Age). The development of urban states, spanning from the Aegean to Iberia and from northern Africa to the Alps, generated in turn complex economic system and exchange networks.

Aspects of urban state formation are fundamental for archaeologists, historians, as well as sociologists and economists globally. In archaeology, since Gordon Childe questions have focused on theoretical and methodological perspectives for understanding what cities were and did cross-culturally, and their trajectories.

Yet, despite the enormous potential of natural sciences for understanding the deep past, socio-political change connected to urban growth and its large-scale networks have been little explored in relation to advancements in archaeological science.

With this in mind, the session aims to bring together a broad range of expertise from archaeological science to theoretical perspectives in order to develop interdisciplinary conceptual and methodological approaches to the study of urbanism and its wider implications beyond current narratives.

Key themes will be craft specialization, connectivity, mobility, diet, and landscape change in relation to urbanisation. We welcome studies that make use of materials sciences, remote sensing, bioarchaeology, genetics to explore urbanisation in the Mediterranean.

1 THE MIDDLE POLESINE ON THE THRESHOLD OF PROTO-URBAN TRANSITION: NEW RESEARCH IN FRATTESINA AND VILLAMARZANA (ROVIGO)

Salzani, Paola (Soprintendenza Archeologia Belle Arti e Paesaggio di Verona, Rovigo e Vicenza) - Cardarelli, Andrea (Università Roma la Sapienza) - Cupitò, Michele (Università di Padova) - Bellintani, Paolo (CPSSAE) - de Neef, Wieke (University of Bamberg) - Angelini, Ivana (Università di Padova) - Nicosia, Cristiano (Università di Padova) - Pulcini, Maria Letizia (Direzione Regionale Musei Veneto) - Vicenzutto, David (Università di Padova)

The Middle Polesine region (Rovigo – Veneto – Italy) gains exceptional significance between the 12th and the beginning of the 9th century BCE due to the density of settlements, extraordinary growth of crafts, and exchanges between Europe and the Mediterranean. The “Prima Europa” project, supported by the Cariparo Foundation and coordinated by the Abap Superintendence of Vr-Ro-Vi, involves the University of Padua, Sapienza University of Rome, and CPSSAE of Rovigo in research in Frattesina, Villamarzana, and Campestrin. At Frattesina in Fratta Polesine, known for significant discoveries and excavations carried out in the second half of the twentieth century, recent research and excavations conducted by Sapienza and CPSSAE have yielded important findings. Geophysical and remote sensing investigations have helped define the extent of the settlement on the banks of the Po di Adria and the organization of the settlement according to a regular pattern, originally delimited by orthogonal artificial canals. Excavations have revealed structures delimiting the large village, as well as residential and artisanal structures, confirming the settlement’s role as an important center for production and exchange on an international scale. Between 2022 and 2023, magnetic surveys, intra and near-site coring investigations were carried out in Villamarzana, following which two excavation sectors were established. A section of the settlement’s perimeter and an internal portion of the settlement were identified, revealing a large drainage canal and square structures, both productive and likely residential, confirming the orthogonal housing layout detected by magnetic analyses. The findings so far are attributable to an advanced stage of Late Bronze Age 3 (HaB1). From the residential area excavation, four fragments of Protogeometric pottery have been found, showing comparisons with southeastern Italy. This is an exceptionally significant finding, as it demonstrates for the first time the persistence of relations between the Polesine region and the southern Adriatic.

2 ARCHAEOGEOPHYSICS AND ANCIENT MOTYA'S ARRIVALS, ADMINISTRATION, AND ANCESTORS

Herrmann, Jason (University of Pennsylvania) - Sconzo, Paola (University of Palermo)

It can be argued that ancient urban contexts are where geophysical prospection has made the largest impact in archaeology, as the organization of structures and urban plan can be revealed and linked to socio-spatial phenomena rapidly and without destructive excavation. At ancient Motya (modern Isola San Pantaleo, Sicily, Italy), a major Punic city in the Central Mediterranean, data from extensive magnetic gradiometry, electrical soil resistance, and ground-penetrating radar surveys have allowed us to expand archaeological investigations into yet unexplored sectors of the island site and create a near-complete map of Motya’s urban plan. Analysis of historic records, observations from past excavations, and the results from concurrent controlled surface collection and test excavations have allowed us to discern the timing and nature of many of the architectural and urban elements visible in the results of our multi-sensor survey data, as well as recognize particular construction practices and component materials. With this rich and integrated dataset, we can identify some of the inherited urban traditions upon which the ancient city was founded, as well as trace transformations in the urban plan as the inhabitants of Motya responded to social and political changes over its history. As one of the very few Phoenicio-Punic urban sites that is not covered or destroyed by later phases of occupation, our interpretations are a significant contribution toward broader questions of Punic urban traditions, material identity, and social organization.

3 THE “DIVISION LINES” OF METAPONTO: DECODING TOPOGRAPHICAL ANOMALIES USING LEAST COST PATH

Davidson, Christine (Trent University)

A survey of ancient scholarship and epigraphic evidence regarding the parceling of land in Greek colonial and rural contexts suggests precedent for extensive land division as early as the 8th century BCE. Evidence of an ‘urban grid’ appears in colonial contexts at Megara Hyblaia, Selinous, and Syracuse, with rural applications of similar infrastructure witnessed at sites such as Chersonesos. At these sites roads were established as multifunctional infrastructure, providing both delineation of space and routes of access within the countryside.

Surface survey and excavation in the countryside of the Greek settlement of Metaponto (Basilicata, Italy) reveal a busy extra-urban collection of necropoleis, sanctuaries, and farmsteads. Linear topographical anomalies identified in aerial photography of this region and spanning, at times, dozens of kilometers in length suggest ancient manipulation

of the landscape for a purpose not yet identified with certainty. This paper proposes that a number of these lines represent evidence of land division and travel. Using least cost path (a spatial analysis tool within GIS) to visualize connectivity between farmsteads and rural sanctuaries, this paper identifies locations most likely used for travel and which overlap the anomalous “division lines. These routes would have served as connections between farmsteads and rural sanctuaries of Metaponto in the 5th-3rd centuries BCE and suggest regular use of non-urban sacred spaces by rural inhabitants of the polity. The results of this study suggest that a number of “division lines” represent an extension of the urbanization evident in the city-center. Using a system of roads and canals, the inhabitants of Metaponto applied a standardized delineation of space in the countryside, something which also served to connect farmsteads to nearby sacred spaces.

4 THE RELIGIOUS TOPOGRAPHY OF ARCHAIC THASOS THROUGH GEOINFORMATIC APPROACH

Trippé, Natacha (Université Bordeaux Montaigne-Ausonius; Ecole française d’Athènes) - Kiosak, Dmytro (Université Bordeaux)

The sanctuaries and other sacred places of Thasos are quite well known. From the installation of the colony by Parians in the beginning of the 7th century B. C., the city was dotted with sanctuaries in strategic locations, forming a “religious framework” of the young city around which the public space and residential areas developed. However, there is still a lack of a complete picture of the sanctuaries’ location in the landscape of the island. A systematic study of sources and mapping of available information allowed us to recreate the picture of the emergence and functioning of the temples in their georeferenced position and in a diachronic perspective.

To consider the spatial parameters of landscape-sites interaction and the relation between the particular sites in their chronological context with their surroundings, the least cost path and viewshed analysis were performed using tools of QGIS geospatial software. The sanctuaries of Thasos are ranked according to their viewshed and visibility and clusters of mutual visibility are compared by chronological periods.

5 TRACING HUMAN IMPACT AND LAND-COVER CHANGES IN CENTRAL ITALY THROUGHOUT THE IRON AGE

Antler, Chen (University of Glasgow) - Whitehouse, Nicki (University of Glasgow) - Barratt, Phil (University of Nottingham)

This paper explores how human and environment relationship have developed over the course of the late Holocene on a regional scale, and how this relationship manifested in the transformation of land cover and land use. Focusing on the environmental transformation of Central Italy, we present preliminary results of our investigation into interaction between the local populations and nature through the study of lacustrine sequences. This is part of a broader project exploring the connection between landscape modification and identity, aimed at estimating how the process of shaping new anthropogenic landscapes creates a sense of shared identity among the new local communities, developing and expanding during the Iron Age. The project is based on two models built to evaluate human-environment interactions, first, on a local scale (using a GIS model) and secondly on a regional scale (using a REVEALS mode). This paper will focus on the latter.

Results from the re-analysis of pollen sequences will be presented, from lakes within 100 km from the city of Rome, including Lago di Mezzano, Lago di Vico, Lago Matiganano etc. Using age-depth modeling and the Regional Estimates of Vegetation Abundance from Large Sites model, the paper sheds light on land use practices within the region and presents information on how vegetation responded to interactions and helped to shape the anthropogenic landscape. The issues associated with age modelling and re-use of existing data to study land cover changes and linking these with the archaeological record will also be highlighted, including the challenges and limitations of evaluating landscape transformation and reconstructing chronologies that based on the characteristics of lake sediments and basin systems. Finally, we briefly discuss the significance of this work with respect to the development of Roman local identities, as the landscape was transformed.

6 URBANISM ON THE SUNNY SIDE OF THE ALPS

Gruškovnjak, Luka (University of Ljubljana) - Vojaković, Petra (University of Ljubljana; Arhej d.o.o.) - Prijatelj, Agni (University of Ljubljana) - Grčman, Helena (University of Ljubljana) - Mušič, Branko (University of Ljubljana) - Črešnar, Matija (University of Ljubljana)

Iron Age urbanism is a crucial archaeological research topic dealing with the emergence and characteristics of the earliest cities and processes of centralisation, urbanisation, and even early state formation. Traditionally, Iron Age research in Slovenia has not been concerned with urbanism as data on the internal organisation of central settlements was almost completely lacking. In the wider region, much research on early urbanisation has already been conducted in Etruria, northern Italy and areas north of the Alps, while territories south of the Alps are under-researched and, therefore, represent a significant gap in this narrative.

In this paper, we wish to start filling this gap by presenting research at two extensively excavated prehistoric central settlements in Slovenia, Ljubljana-Tribuna and Pungrt above Ig, located some 10 km apart in central Slovenia. While the lowland Tribuna was established already in the 11th century BC, the Pungrt hillfort seems to have somewhat later beginnings in the 8th century BC.

We will explore the urban attributes of both sites and discuss how they can contribute to the understanding of early urbanism in the wider region. Furthermore, we will explore the importance of micro-geoarchaeological research at early urban sites. Namely, the excavation at Pungrt was accompanied by extensive micro-geoarchaeological sampling, while that at Tribuna was not. By comparing the data gathered at both sites, the paper will demonstrate how micro-geoarchaeological research can significantly improve the understanding of the built environment and the way of life in such settlements.

7 URBAN ECOLOGY AND TERRITORIAL EXPLOITATION IN ARCHAIC ITALY THROUGH MULTI-ISOTOPE RECONSTRUCTION OF PASTORAL STRATEGIES

Trentacoste, Angela (The British School at Rome) - Makarewicz, Cheryl (University of Kiel)

By the middle of the first millennium BC, major Etruscan centres in central Italy possessed the physical attributes classically ascribed to a city, from monumental buildings to organised urban space. Archaeological investigations provide ample testament for the form of these settlements, but how did they function? Settlement hierarchies suggest control over surplus production in an agricultural hinterland and centralised resource extraction, but there is little direct evidence for how and where staple crops and livestock were produced and how their movement to the urban centre was organised: did people and animals flow seasonally across and beyond territories? Were resources drawn preferentially from productive zones or supplied indiscriminately?

This talk presents results from UrbanHerds, a collaborative research project investigating animal management and environmental exploitation in archaic Italy (c. 600–400 BC). Isotopic results ($\delta^{13}C$, $\delta^{15}N$, $\delta^{18}O$, $87Sr/86Sr$) from animal remains from three contemporary Etruscan urban centres offer insight into pastoral strategies and mobility patterns (e.g. transhumance). Study sites represent a range of ecologies and urban trajectories (long/short lived) and thus offer evidence for environmental exploitation and differing strategies of city-landscape interaction across the urban spectrum. Conclusions have implications for urban foodways, the movement of resources, and the nature of territoriality in early urban states.

8 DRESSING THE CITY: TEXTILES AND URBANISATION IN MEDITERRANEAN EUROPE 1000-500 BCE

Gleba, Margarita (University of Padua) - Dimova, Bela (University of Padua)

Textiles are a useful source of information for economic history, because they have often been at the heart of its making. In processes like urbanisation and the Industrial Revolution, textiles have been important means for creating and accumulating wealth, shaping power relations and labour regimes. Thanks to the recent developments in research, archaeology offers a *longue durée* perspective of the textile economy grounded in ever more quantifiable evidence. For the Mediterranean Europe, during the first millennium BC, this evidence comprises hundreds of textile remains and thousands of production tools, as well as images and texts, faunal and botanical data. Scientific analysis and correlation of these diverse sources inform us about regional variation and change over time, supply and demand, economic relations and infrastructure, the mobility of craftspeople, as well as more subtle but salient issues which structured supply and demand, such as what textiles were valued, how textiles were used to materialise identity and difference, and social hierarchies. The paper will summarise the evidence for the role of textiles in the urbanisation of Mediterranean Europe collected by the ERC PROCON project.

9 CRAFTS AND THE CITY: UNVEILING POTTERS' TECHNOLOGICAL TRADITIONS OF ETRURIA AT THE DAWN OF URBANISATION

Amicone, Silvia (Archaeometry Research Group, Eberhard Karls Universität Tübingen; Institute of Archaeology, University College London) - Morandi, Lionello (Department of Civilisations and Forms of Knowledge, University of Pisa; Archaeometry Research Group, Eberhard Karls Universität Tübingen)

During the early Iron Age (late 10th – late 8th cent. BCE), the Mediterranean basin became home to a complex network of seafaring peoples from different parts of the Mediterranean. Dramatic changes in sociocultural complexity occurred around the central Tyrrhenian Sea, particularly in Etruria (central Italy). This area, at the crossroads between the eastern and western Mediterranean, witnessed many important innovations leading to economic and socio-political developments that triggered the transition from villages to the renowned city-states of the Orientalising period (late 8th – early 6th cent. BCE).

Focusing on ceramic production, this presentation aims to shed new light on the technological and related social changes that accompany the transition to urban societies in Etruria and the first development of the Etruscan city-states. To achieve this, our research adopted a comprehensive approach which includes a vast range of scientific analyses to study ceramic technology from a selection of key early 1st Millennium BCE settlements of Etruria. Archaeometric investigations were coupled with systematic geological surveys of the sites' territories, in order to locate and characterise raw material sources that were available to ancient potters.

In our study emphasis has been placed on the technological changes introduced between the end of the early Iron Age and the beginning of the Orientalising period (last quarter of the 8th – first quarter of the 7th cent. BCE), such as the adoption of fast wheel throwing and new pyro-technologies to produce red ceramic coatings, as well as the black ware known as *bucchero*. The adoption of these innovations is traditionally seen as a sign of the emergence of craft specialisation resulting from the deep socioeconomic changes occurring in Etruria at the dawn of urbanisation and cross-cultural contacts with Nuragic, Phoenician and Greek artisan traditions.

10 A 1ST-MILLENNIUM-BC BOOMING ECONOMY? PROVENANCE STUDIES OF TRANSPORT AMPHORAE AT ETRUSCAN VULCI, ITALY

Riva, Corinna (Institute of Archaeology, University College London) - Mise, Maja (Institute of Archaeology, University College London)

The central Mediterranean region experienced a profound transformation in economic dynamics during the middle of the 1st millennium BC, with this trend gaining momentum as Rome expanded towards the second half of the millennium. The city-states of southern Etruria such as Vulci played a pivotal role in shaping the economic landscape of this period. However, despite their undeniable significance, our comprehension of the precise nature and extent of their economic contributions remains obscured. This knowledge gap persists due to the predominant scholarly emphasis on monumental Etruscan sites, from sanctuaries to necropoleis, and the study of fine ware, overlooking the crucial insights coarse ware containers could provide.

To address this imbalance, our study focuses on an ongoing research program centered on Etruscan transport amphorae from Vulci. Through the application of advanced analytical techniques such as microstructural analysis, ceramic petrography, and bulk geochemical analysis, our research aims to shed light on the intricacies of the Etruscan economy. By directing attention to the often-neglected coarse ware containers utilized for transporting agricultural products, we seek to enrich our understanding of the economic dynamics that characterized this pivotal period. This project not only uncovers insights into local amphorae production but also lays the groundwork for implementing long-term strategies to comprehensively study the complexities of the Etruscan economy.

11 PROCESSING THE CITY. DIET, TECHNOLOGY AND INTERACTION IN THE ADRIATIC HUB OF SPINA (NE ITALY)

Mistireki, Aleksandra (University of Berne, Institute of Archaeological Sciences, Mediterranean Archaeology) - Notarstefano, Florinda (Università del Salento, Dipartimento di Beni Culturali, Archeologia Classica) - Zamboni, Lorenzo (Università degli studi di Milano, Department of Cultural and Environmental Heritage, Classical Archaeology)

Recent theoretical advancements and field evidence have contributed to a new understanding of the early urbanisation process in the regions between the Alps and the Mediterranean. The international trade hub of Spina played a crucial role in this framework as a case study of a new foundation in a complex wetland environment, and for its ephemeral, short-lived success.

In addition to field evidence and material studies, archaeological science provides unprecedented data for reassessing crafting traditions, trade networks and daily habits within the multicultural population of Spina.

For example, an international collaborative project analysed dietary trends by applying chemical analyses to organic residues found on pottery vessels. Based on a large sample of 4th century BCE ceramic containers, cooking ware and tableware, the study aimed to investigate their function and use through the application of gas chromatography-mass spectrometry (GC-MS). The preliminary results suggest that most cooking vessels were used to process animal fats or vegetables, while fish consumption did not play a significant role in the diet, as only a few samples contained marine fats. Tableware was primarily used for consuming meat. In addition to wine trade and consumption, some containers appear to be related to the usage of pitch. Pitch was used to coat containers and, as we argue, in relation to building activities such as restoring and maintaining wooden housing structures.

Our objective is to compare these archaeometrical results with other recent natural science and environmental data to investigate the singularity of Spina in the context of cross-cultural and adaptive forms of ancient urbanism.

12 PRODUCING FOR THE CITY? THE INTENSIFICATION OF CERAMIC PRODUCTION IN IRON AGE SW EUROPE

de Groot, Beatrijs (The University of Edinburgh)

The Iron Age saw the emergence of a new mode of ceramic production across different regions of the western Mediterranean. Pottery workshops, marked by the presence of double chambered updraught kilns and the use of the potter's wheel, spread across the Iberian Peninsula and similar innovations took place across Gaul and the area north of the Alps. The shift to producing pottery in dedicated workshops suggest that more specialised and intensified forms of ceramic production were on the rise and such processes are traditionally seen as a key feature of urbanisation. In SW Europe, however, the characteristics of early urbanism are variable and perhaps better captured by the term 'low density urbanism'. Furthermore, in several cases pottery workshops are found in association with relatively small hill-fort settlements instead of larger centres.

In this presentation I will compare and contrast examples from my work on the first wheel-made pottery from across the Iberian Peninsula and southern Germany to address the varying characteristics of craft production, urbanism and production intensification across SW Europe. This work draws upon archaeometric analyses to consider the identity and motivations of people adopting the potter's wheel across the region and find out if and how they might have been 'producing for the city'.

13 THERE ARE SPECIALISTS NOT ONLY IN THE CITIES: CERAMIC PRODUCTIONS FROM THE FIRST IRON AGE IN THE INTERIOR OF IBERIA

Padilla Fernández, Juan Jesús (Universidad de Salamanca)

In Archaeology, studies on cities have always had a particular interest. Above all, they have served to justify the social, economic, and political model that laid the foundations of our Western world after the Enlightenment. In this sense, the concept of civilisation is directly related to creating complex cities and states. The Iron Age of the Mediterranean area is configured as a critical period to understand the past in terms of progress. In this time frame, distances become increasingly smaller, social and economic differences accentuate, and large urban centres emerge responsible for articulating and capitalising on these realities. The generation of this type of discourse in the Iberian Peninsula has traditionally motivated the vision of two contrasting worlds. On the one hand, cosmopolitan societies connected commercially with the Phoenician and Greek spheres flourished around the Mediterranean coastal area, capable of creating the first cities in the West, such as Gadir. On the other hand, inland communities live in small, isolated villages and only have occasional contact with the cultural splendour of the Mediterranean. However, studying the ceramic production processes typical of these inland towns refutes this assumption. Real specialists would live and develop technical gestures linked to kinetic energy control and specific surface treatments identical to those carried out in more southern and coastal areas. The evidence of the power of these technical guidelines serves, firstly, to associate the processes of ceramic specialisation with environments that are not necessarily urban and, secondly, to demonstrate that the ties of cultural reciprocity in Iberia would be more intense than previously imagined.

14 BETWEEN MEDITERRANEAN AND CENTRAL EUROPE: CONNECTIVITY AND TRADE ASSOCIATED WITH BIOLOGICAL PRODUCTS IN THE MIDDLE OF THE 1ST MILLENNIUM BCE

Rageot, Maxime (University of Tübingen) - Sacchetti, Federica (UMR 7299-CCJ (Aix-Marseille University - CNRS - Ministry of Culture))

Around the middle of the 1st millennium BC, the urban phenomenon took hold in the north-western Mediterranean. Stimulated in northern Italy by the Etruscans and in southern France by the Greeks, it led to the development of complex trade networks that spread to central Europe, characterized at this time (6th-5th BC) by the princely phenomenon theorized by W. Kimmig.

Based on the study of the spread of transport amphorae from all over the Mediterranean basin between Marseilles and central-western Europe, this paper will: (i) propose a theoretical model for the exchange of biological and perishable products transported in amphorae; and (ii) present the results of analyses of organic residues from these amphorae.

Our research focuses on biological resources transported and stored in amphorae which were associated with craft, diet and trade activities.

Based on molecular markers, we identified various plant by-products as tars, resins, oils and fruit products and provided new insights into the role of Marseille in trade and possibly redistribution of biological resources between Mediterranean and central Europe.

15 SCENT AND THE CITY: URBAN SMELLSCAPES AT THE OASIS OF TAYMA, NORTHWEST ARABIA

Huber, Barbara (Max Planck Institute of Geoanthropology, Department of Archaeology; University of Tübingen, Institute of Archaeological Science; Centre Européen de Recherche et d'Enseignement des Géosciences de l'Environnement (CEREGE)) - Weigel, Friedrich (German Archaeological Institute, Orient Department) - Hausleiter, Arnulf (German Archaeological Institute, Orient Department)

Throughout history, urban centers have been places, where culture, economy, technology and everyday life converge to shape society. While much attention has been paid to the visible facets of ancient cities, one aspect that often remains overlooked is the olfactory landscape that defined urban life. In antiquity, as in the modern world, cities were not only centers of visual and auditory stimuli, but also repositories of a rich tapestry of scents and smells. They have historically influenced the spatial arrangement of cities and settlements, often relegating malodorous sectors and industrial areas to the outskirts or downwind from populated areas. Moreover, aromatic substances, including incense, spices, and other aromatic materials, have been deeply embedded in the socio-cultural practices of societies during the 1st millennium BCE.

This paper investigates the olfactory dimension of urban life, with a particular focus on the ancient oasis city of Tayma, Northwest Arabia. Positioned strategically along the Incense Road, Tayma played a pivotal role in the transportation of aromatic materials to the Mediterranean, offering a compelling case study for understanding the relationship between scent, urban life and aromatics trade. Employing metabolic profiling techniques such as GC-MS and LC-MS/MS, we analyzed organic residues recovered from incense burners across various locations within Tayma. Our study encompassed different contexts, such as temple complexes, residential areas, and burial sites, revealing the deliberate selection of specific aromatic materials embedded in a multilayered urban smellscape of its own. Additionally, temporal trends in incense material usage are identified, indicating a shift from locally sourced aromatics to a prevalence of frankincense during the mid to late 1st millennium BCE. This biomolecular approach offers a comprehensive understanding of the olfactory aspects of urban life, shedding light on the sensory dimensions that influences the lives of urban inhabitants.

16 HOW TO BE BOTH: INTEGRATING METHODOLOGIES, DISCIPLINES AND SCALES IN THE STUDY OF IRON AGE MEDITERRANEAN URBANISM

Pollard, Dominic (New York University)

This paper offers a theoretical reflection on how to maximise the contributions of archaeological science approaches to the study of Iron Age Mediterranean urbanism. A recurrent issue in studying urban communities is their implicitly multi-scalar nature. Such settlements operate over multiple scales not only spatially (integrating local and more distant landscapes and resources), but also socially (housing diverse populations, organised in intricate economic, cultural, and political networks) and chronologically (comprising an ever-changing built environment, evolving at differing tempos to smaller, less complex habitations). Theorising how ancient urban communities in the Mediterranean developed and evolved across these multiple nested scales, whilst maintaining their unity as an analytical category, remains a thorny and stimulating area of study (one which notably led Horden and Purcell to reject the urban category outright). Ongoing advances in archaeological science have much to offer the study of urban and urbanising communities, which in the Iron Age came to exist on all shores of the Mediterranean Sea. But the results of these methods (be they aDNA or skeletal isotope studies, material science, or spatial analysis utilising remote sensing) themselves typically correspond to only certain temporal, spatial or social scales of past human activity. A key question, therefore, is how the resolution of these various methods can be brought most meaningfully into dialogue with more traditional archaeological methodologies, and current, multi-scalar theorisations of past urban systems. In this paper, I suggest that an alignment should be sought between the analytical scales of archaeological scientific techniques, and the spatial, temporal and social scales at which we theorise urban phenomena, such that each may structure and inform the other, leading to the application of methods best tailored to addressing the key questions of Iron Age Mediterranean Urbanism.

743 ISOTOPIC BASELINES AND BEYOND: EXPANDING ARCHAEOLOGICAL NARRATIVES AND REEVALUATING THE USE OF BASELINES IN ISOTOPE BIOARCHAEOLOGY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Salesse, Kévin (Department of Anthropology, Masaryk University) - James, Hannah F. (Archaeology, Environmental changes & Geo-Chemistry, Vrije Universiteit Brussel) - Kootker, Lisette (Department of Earth Sciences, Vrije Universiteit Amsterdam) - Cheung, Christina (Department of Anthropology, Chinese University of Hong Kong)

Session format: Regular session

Isotopic analysis is now a common tool in archaeological studies, being applied to answer diverse questions about diet, mobility, trade, and landscape use. A fundamental aspect of enabling meaningful comparisons of individual measurements within the broader context of bio- and zoo-archaeological research lies in the construction of comprehensive baseline datasets from modern and archaeological samples (environmental data, faunal or human remains) for a variety of isotope systems (carbon, nitrogen, oxygen, strontium, sulphur). These baselines allow researchers to address different, more complex, and broader research questions, such as the development of isoscapes for elements like strontium, oxygen, and more recently, sulphur, which facilitates the assessment of mobility in ancient populations or the use of faunal data for modelling of past diets. The construction of isotopic baselines is often difficult, time-consuming and expensive, and sometimes samples are just not available, which given their applicability and usefulness, underlines the paramount importance of increased availability of the data for research.

In this session, supported by IsoArch (www.isoarch.eu) a community-driven, open and collaborative database of georeferenced isotopic measures of samples from all time periods and all around the world, we extend a warm invitation to researchers both building and using baseline isotopic data. We seek contributions to further expand the interpretations and narratives achievable through isotope analysis on human, faunal, or material remains from any place or time period. It is crucial to acknowledge that baselines are dynamic and are continuously evolving over time, which allows for the reinterpretation of legacy data. Accordingly, we encourage presentations revisiting past interpretations from isotopic data in light of new baselines. Lastly, we especially welcome presentations that delve into misapplications of isotopic baselines, and presentations that highlight the integration of archaeological information alongside isotopic measurements.

ABSTRACTS

1 BACK TO BASELINES

Snoeck, Christophe (AMGC, Vrije Universiteit Brussel)

Isotope analyses have become standard in bioarchaeological studies, offering invaluable insights into various aspects such as diet, mobility, food sourcing, landscape utilisation, and beyond. A prerequisite for interpreting bioarchaeological isotope data accurately is the establishment of a baseline dataset tailored to each isotopic system (H, C, N, O, S, Sr, Pb, etc.).

These baselines require adequate samples. For carbon and nitrogen isotopes, for example, analyses on zooarchaeological and archaeobotanical remains can provide a base for the potential dietary inputs, and can indicate diet or landscape use. For strontium isotope results, measurements on modern plants or (archaeological) rodents provide a baseline for the local environment for the study of palaeomobility.

Drawing on examples from diverse regions across Europe, this paper will highlight the benefits of using relevant baseline data, while examining the common challenges encountered by researchers using isotopic analyses. Lastly, the presentation will discuss where the field is moving forward, including the application of novel isotopic systems, and the integration of additional details to strengthen the robustness of bioarchaeological predictions.

2 COPING WITH LOESS: ENDEAVORS TO ESTABLISH AN 87SR/86SR BASELINE IN THE LOWER DANUBE RIVER VALLEY

Tafari, Aurélien (Research Institute of the University of Bucharest, ArchaeoSciences Division, University of Bucharest) - Tykot, Robert (Department of Anthropology, University of South Florida) - Lazăr, Cătălin (Research Institute of the University of Bucharest, ArchaeoSciences Division, University of Bucharest) - Salesse, Kévin (Department of anthropology, faculty of Science, Masaryk University) - James, Hannah (Research Unit: Analytical, Environmental & Geo-Chemistry, Department of Chemistry, Vrije Universiteit Brussel; Multidisciplinary Archaeology Research Institute, Department of Art Sciences & Archaeology, Vrije Universiteit Brussel) - Snoeck, Christophe (Research Unit: Analytical, Environmental & Geo-Chemistry, Department of Chemistry, Vrije Universiteit Brussel; Multidisciplinary Archaeology Research Institute, Department of Art Sciences & Archaeology, Vrije Universiteit Brussel)

Soils formed on loess sediments are among the most fertile agricultural lands in Europe. Consequently, they have attracted ancient communities since the onset of the Neolithic. However, it is often assumed that their homogeneity and the vast surfaces they occupy constitute an obstacle to rely on strontium isotopic ratios to study ancient mobility. In addition, while considerable efforts have been deployed to characterize the strontium isotopic signature of the Transdanubian area, only a few studies have used strontium ratios to study past mobility in the Lower Danube River Valley. Thus, it remains uncertain which bioavailable strontium isotopic values should be expected there, which makes it difficult to interpret the results of strontium isotopic analyses on human or animal tooth enamel in this region of the world. This contribution presents our endeavors to remediate to this situation by developing a bioavailable strontium isotopic baseline, based on 60 plant samples collected at 20 different locations in Romania and Bulgaria, as well as the challenges to interpret these results at the light of previous strontium isotopic studies in the area.

3 TOWARDS A STRONTIUM ISOSCAPE FOR POLAND: DATA COLLECTION, CHALLENGES AND POTENTIAL

Dudek, Paulina (University of Gdansk) - Tarasow, Natalia (University of Gdansk) - Michalak, Oliwia (University of Gdansk) - Regina, Kamil (University of Gdansk) - Pospieszny, Łukasz (University of Gdansk; University of Bristol)

The first strontium isotope ($^{87}\text{Sr}/^{86}\text{Sr}$) measurements on Polish environmental samples were made in the 1980s. However, the systematic analysis of human remains using this system only gained traction in the last decade. While these studies offered initial insights into human mobility and provenance, they also gave rise to unanswered questions. Additionally, issues related to sample selection, collection, preparation, data publication, and interpretation have become apparent.

Therefore, establishing local Sr ranges and a national isoscape requires careful evaluation of existing human and baseline sample data. It is crucial to combine Sr values with geological, environmental, and archaeological contexts, along with results from other scientific analysis.

This paper introduces a project that compiles all published strontium isotope results for Holocene human remains in Poland. Our focus is particularly on addressing challenges and limitations related to data cleaning and standardization. Additionally, we aim to discuss the potential of large human remain datasets for calculating local Sr baselines, especially for periods/sites lacking faunal remains or areas too polluted for contemporary environmental samples.

Re-analysing existing data can lead to the creation of new interpretations and narratives. In extreme cases, revisions to previous findings might be necessary, such as concerning community mobility or the origin of identified immigrants. We will showcase how the quantity, quality, and methods of modelling/visualization of data can significantly alter perspectives.

4 EXPLORING DIFFERENT APPROACHES TO ISOTOPE MAPPING AND MODELLING FOR A DYNAMIC STRONTIUM ISOSCAPE – A CASE STUDY OF BELGIUM

Sengeløv, Amanda (Research Unit Anthropology and Human Genetics, Faculty of Science, Université Libre de Bruxelles, CP192, Avenue F.D. Roosevelt 50, 1050 Brussels, Belgium; G-Time Laboratory, Université Libre de Bruxelles, ULB, CP160/02, Avenue F.D. Roosevelt 50, 1050 Brussels, Belgium; Department of Archaeology, Ghent University, Sint-Pietersnieuwstraat 35, 9000 Ghent, Belgium) - Capuzzo, Giacomo (Bagolini Laboratory: Archaeology, Archaeometry, Photography (LaBAAF), Department of Humanities, University of Trento, via T. Gar 14, 38122 Trento, Italy) - Dalle, Sarah (Department of Archaeology, Ghent University, Sint-Pietersnieuwstraat 35, 9000 Ghent, Belgium; Research Unit Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, AMGC-WE-VUB, Pleinlaan 2, 1050, Brussels, Belgium) - James, Hannah (Research Unit Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, AMGC-WE-VUB, Pleinlaan 2, 1050, Brussels, Belgium.) - Sabaux, Charlotte (Research Unit Anthropology and Human Genetics, Faculty of Science, Université Libre de Bruxelles, CP192, Avenue F.D. Roosevelt 50, 1050 Brussels, Belgium; Department of Archaeology, Ghent University, Sint-Pietersnieuwstraat 35, 9000 Ghent, Belgium; Research Unit Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, AMGC-WE-VUB, Pleinlaan 2, 1050, Brussels, Belgium) - Legrand, Emma (Research Unit Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, AMGC-WE-VUB, Pleinlaan 2, 1050, Brussels, Belgium) - de Mulder, Guy (Department of Archaeology, Ghent University, Sint-Pietersnieuwstraat 35, 9000 Ghent, Belgium.) - Mattielli, Nadine (G-Time Laboratory, Université Libre de Bruxelles, ULB, CP160/02, Avenue F.D. Roosevelt 50, 1050 Brussels, Belgium) - Snoeck, Christophe (Research Unit Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, AMGC-WE-VUB, Pleinlaan 2, 1050, Brussels, Belgium) - Vercauteren, Martine (Research Unit Anthropology and Human Genetics, Faculty of Science, Université Libre de Bruxelles, CP192, Avenue F.D. Roosevelt 50, 1050 Brussels, Belgium)

In recent years it has become evident that there is a growing need for a Belgian biologically available strontium (BASr) isoscape, and it has also become clear that one isoscape does not fit all archaeological and forensic questions. This study therefore focuses on exploring various approaches to strontium (Sr) isotope mapping and modelling in order to create a dynamic isoscape for Belgium, with a specific emphasis on its implications for archaeological studies. Belgium serves as a compelling case study, as it allows navigation through diverse landscapes and an examination of the intricate strontium isotopic signatures embedded in and between geological, ecological, and anthropogenic samples.

By employing high-resolution spatial sampling of modern various plants (grass, shrubs, and trees; $N > 600$), detailed strontium isoscapes are created, which capture the spatial strontium isotope heterogeneity of Belgium in different ways. Various modelling techniques, such as Empirical Bayesian Kriging (EBK), domain mapping based on lithologies, and voronoi tessellations, are employed, compared and merged, to obtain a dynamic BASr, which can be tailored to specific archaeological research questions. By comparing these approaches, their respective strengths and limitations are not only highlighted but also the importance of methodological choices in interpreting isotopic patterns are underscored.

The insights gained from this study provide a nuanced understanding of the local and regional variations in Sr isotopes, enhancing the accuracy of archaeological interpretations, where precise reconstructions of past human movements and dietary habits are paramount. In addition, by navigating through the BASr's of Belgium, this research provides insights into the applicability and adaptability of different techniques, offering a roadmap for researchers in various fields of archaeology, who seek to explore and interpret their data of diverse geographic and temporal settings using isoscapes.

5 A NEW BIOAVAILABLE STRONTIUM BASELINE FOR THE BAIKAL REGION

Werens, Karolina (School of Archaeology, University of Oxford; Research Unit: Analytical, Environmental & Geo-Chemistry, Department of Chemistry, Vrije Universiteit Brussel) - Pouncett, John (School of Archaeology, University of Oxford) - Snoeck, Christophe (Research Unit: Analytical, Environmental & Geo-Chemistry, Department of Chemistry, Vrije Universiteit Brussel) - Schulting, Rick (School of Archaeology, University of Oxford) - Weber, Andrzej (Department of Anthropology, University of Alberta)

A new bioavailable strontium isotope ($87\text{Sr}/86\text{Sr}$) baseline was created for the Baikal region of East Siberia. With an ongoing, extensive archaeological investigation of c. 200 prehistoric cemetery sites in this vast area, there is a need for a reliable isotopic model of environmental strontium variation to contextualise human and faunal data. The new isoscape is based on 349 plant samples, including legacy data and 174 new measurements. The distinct geological variability and biodiversity in the Baikal region which translate into high isotopic variability in the environment provide favourable conditions for isotopic studies and method development. This paper compares and evaluates two approaches to modelling isoscapes: spatial aggregation and machine learning, each used to produce and compare effectiveness of geographic assignments based on strontium isotope ratios measured in dental enamel samples. This study showcases how expanding sampling strategy can improve sample distribution and baseline quality. The new baseline and spatial

assignments scripts can also be applied in other fields: forensics, environmental sciences or ecology, to support studies of provenance and mobility in both the past and present.

6 CREATION OF ESTONIAN STRONTIUM ISOSCAPES: CHALLENGES AND SOLUTIONS

Suni, Raivo (Institute of History and Archaeology, University of Tartu (Estonia)) - Oras, Ester (Institute of History and Archaeology, University of Tartu (Estonia); Institute of Chemistry, University of Tartu (Estonia)) - Tõrv, Mari (Institute of History and Archaeology, University of Tartu (Estonia)) - Kriiska, Aivar (Institute of History and Archaeology, University of Tartu (Estonia))

The use of strontium isotopes in archaeological provenance studies, migration and mobility research is a field that has received much attention worldwide in recent decades. Strontium isoscapes have been created for many countries and regions, based on the spread of bioavailable strontium. These have been particularly wide-spread in Scandinavia and SE Baltics, but Estonia with its area of 45,000 km², has so far been a minor player in this game, with coverage from limited areas and single case-studies.

Our paper represent the preliminary results of creating a bioavailable strontium baseline map for Estonia. We build on a more comprehensive approach of combining geological bedrock data with strontium values measured from animal remains, complemented by further statistical and GIS-based analysis. The results are promising and show that despite the small size of the territory, clear isotope lines correlating with geological formations emerge.

We present the challenges encountered during the creation of the strontium isoscapes in Estonia and propose solutions on how to overcome these. We will reflect on the potential impact of post-glacial coastal elevation and glacier-transported crystalline rock fragments from Fennoscandian shield on strontium isotope values, but also the issue of large variability of Sr values from limited geographical regions, discuss the potential influences from agricultural activities, but also impacts due to dietary peculiarities.

7 MOBILITY OR DIET? THE IMPORTANCE OF INTERPRETING BIOARCHAEOLOGICAL STRONTIUM DATA ALONGSIDE ENVIRONMENTAL BASELINES AND ARCHAEOLOGICAL INFORMATION

James, Hannah (Archaeology, Environmental changes & Geo-Chemistry research group, Vrije Universiteit Brussel) - Cortesão Silva, Filipa (Department of Prehistory and Archaeology, University of Seville, Spain; Research Centre for Anthropology and Health, University of Coimbra, Portugal) - Lima, Antonio (Direção Regional de Cultura do Norte, Rua da Igreja de Ramalde, 1, 4148-011 Porto, Portugal) - Cheung, Christina (Department of Anthropology, Chinese University of Hong Kong, Shatin, Hong Kong; Archaeology, Environmental changes & Geo-Chemistry research group, Vrije Universiteit Brussel) - Gerritzen, Carina (Archaeology, Environmental changes & Geo-Chemistry research group, Vrije Universiteit Brussel) - Griffith, Jacob (Archaeology, Environmental changes & Geo-Chemistry research group, Vrije Universiteit Brussel) - Snoeck, Christophe (Archaeology, Environmental changes & Geo-Chemistry research group, Vrije Universiteit Brussel)

Strontium isotope analysis is a common tool in archaeological studies, providing invaluable information on past human mobility and diet. The interpretation of these strontium data requires additional sources of information, such as an environmental baseline built from modern plants to confirm the local strontium signature or archaeological evidence to identify or restrict potential origins and food sources.

This presentation will discuss the combination of strontium isotope analysis ($87\text{Sr}/86\text{Sr}$ and $\delta 88\text{Sr}$) and concentration ($[\text{Sr}]$) on bioarchaeological samples and highlight the necessity of these avenues of additional information, using a Roman case study from the site of Tongobriga in northern Portugal. A modern plant baseline, consisting of 30 sampling sites within 50km of the site and 78 sampling sites across northern Portugal, has been constructed which identifies the local $87\text{Sr}/86\text{Sr}$, $\delta 88\text{Sr}$ and $[\text{Sr}]$ signatures. Strontium analysis on cremated human remains from Tongobriga necropolis (1st century CE) all returned values not consistent with a local origin suggesting either all individuals were non-local or perhaps the consumption of non-local food resources. In this presentation, these two possibilities will be explored. Using the local plant $87\text{Sr}/86\text{Sr}$, $\delta 88\text{Sr}$ and $[\text{Sr}]$, and archaeological evidence for food sourcing from the site, the potential sources of Sr in the diet will be modelled. Lastly, implications for interpreting strontium data without these two avenues of information will be explored.

8 HIGH-RESOLUTION OXYGEN ISOTOPE ANALYSES OF HUMAN TEETH REVEAL CONSIDERABLE INTRA- AND INTER-INDIVIDUAL VARIATION WITHIN AND AMONG GEOGRAPHIC LOCATIONS

Avila, Janaina (School of the Environment, University of Queensland, Queensland, Australia; Griffith Centre for Social and Cultural Research, Griffith University, Queensland, Australia) - Eerkens, Jelmer (Department of Anthropology, University of California Davis, California, USA) - Soficaru, Andrei (Francisc I. Rainer Institute of Anthropology, Romanian Academy, Romania) - Soltysiak, Arakadiusz (Faculty of Archaeology, University of Warsaw, Poland) - Williams, Ian (Research School of Earth Sciences, The Australian National University, Australian Capital Territory, Australia) - Smith, Tanya (Griffith Centre for Social and Cultural Research, Griffith University, Queensland, Australia; Australian Research Centre for Human Evolution, Griffith University, Queensland, Australia)

Scholars endeavour to reconstruct the histories of past peoples using isotopic signatures in bones and teeth, although such approaches have been limited by lifetime and post-burial (diagenetic) changes. Tooth enamel records dietary inputs throughout formation, does not remodel during life, and resists diagenesis, yielding the natural environmental variation of ingested water via isotopic analysis. Sensitive High Resolution Ion Microprobe (SHRIMP) measurements of oxygen isotope compositions ($\delta^{18}\text{O}$) can be related to daily enamel increments to facilitate sequential weekly sampling over years of growth. Studies of wild primates demonstrate that enamel $\delta^{18}\text{O}$ values track concurrent rainfall amounts with good fidelity [1], and recent humans from Southeast Asia revealed strong similarities to modern annual precipitation trends [2]. Here we present > 9000 $\delta^{18}\text{O}$ measurements from 55 human teeth from 13 archaeological sites and 7 unburied human teeth. Weekly samples taken over ~3 years/tooth revealed ~5 ‰ variation (range ~3 – 8 ‰), with more variation in pre-Industrial individuals. The lowest $\delta^{18}\text{O}$ values (11.6-19.8 ‰) were found in sedentary hunter gatherers from Con Co Ngua, Vietnam (6200-6800 YBP). The highest $\delta^{18}\text{O}$ values (17.9-24.8 ‰) occurred in early agriculturalists from Ali Kosh, Iran (9150-9450 YBP). Overlapping $\delta^{18}\text{O}$ values were evident among prehistoric populations in Southeast Asia and in the Near East, as well as modern individuals from Australia, Canada, Hungary, New Zealand and Romania. We caution against the sole use of oxygen isotope compositions for geolocation—particularly bulk samples, as our fine-scaled measurements show large intra- and inter-individual $\delta^{18}\text{O}$ variation, mainly due to seasonal hydrology.

[1] Green D.R. et al. (2022) Fine-scaled climate variation in equatorial Africa revealed by modern and fossil primate teeth. *Proc. Natl. Acad. Sci. USA* 119: e2123366119

[2] Vaiglova P. et al (2024) Past rainfall patterns in Southeast Asia revealed by microanalysis of $\delta^{18}\text{O}$ values in human teeth. *J. Arch. Sci.* 162:105922.

9 SHIFTING SANDS: BUILDING A BASELINE FOR SWANDRO, AN IRON AGE COASTAL SITE ON THE VERGE OF DISAPPEARING INTO THE SEA

Koon, Hannah (Department of Archaeological and Forensic Sciences, University of Bradford) - Spindler, Luke (Department of Archaeological and Forensic Sciences, University of Bradford) - Dockrill, Stephen (Department of Archaeological and Forensic Sciences, University of Bradford) - Bond, Julie (Department of Archaeological and Forensic Sciences, University of Bradford)

The Knowe of Swandro is situated on the shore of the small Orkney Island of Rousay. The site has a long chronology dominated by an Iron Age settlement. Due to ongoing severe coastal erosion, the archaeological features at the site have become truncated. However, careful excavation and sampling of these deposits means it is possible to explore the sequential changing subsistence strategies at the site. Initial findings suggested that a greater and more varied range of animals had been exploited to ensure the long-term survival of the inhabitants. Through the latest faunal and isotopic analyses this paper will discuss animal husbandry practices and the exploitation of marine resources as well as wild mammal and bird species. We will discuss sampling strategies, comparisons with the limited faunal isotope data available for this region, and consider the best approach to creating an isotopic faunal baseline that truly reflects the diet at a site with such varied exploitation of animal protein.

10 THE VALUE OF A WELL-DOCUMENTED ISOTOPIC BASELINE FOR MODELLING HUMAN DIETARY PRACTICES: A HIGH-RESOLUTION CASE STUDY FROM THE EARLY NEOLITHIC

Herrscher, Estelle (CNRS, LAMPEA UMR 7269, Aix-en-Provence) - Tacail, Théo (California Institute of Technology, Pasadena, California, US) - André, Guy (CNRS, LAMPEA UMR 7269, Aix-en-Provence) - Hachem, Lamys (Inrap; CNRS, Trajectoires UMR 8215, Paris) - Hamon, Caroline (CNRS, Trajectoires UMR 8215, Paris)

Thanks to the great quality and abundance of archaeological data on the LBK in the Aisne Valley (Paris Basin, France, 5100-4900 BC) a study of isotopic (C, N, S) dietary biomarkers was designed to characterize the relationship between humans and their surrounding natural and anthropogenic environments and understand how the socio-cultural structure can be reflected by dietary choices, at the individual and family levels. The corpus is based on more c. 300

samples of domestic and wild animals and 49 human subjects (20 immatures, 29 adults) from 9 archaeological sites located along the Aisne valley along a west-east gradient, over a distance of around 70 km.

Incorporating a detailed isotopic baseline frame representative of the natural environment and herd management over 200 years, a high-resolution analysis, specific to each site, was carried out to model human dietary practices according to archaeological criteria (sites, types of structures) and biological criteria (age, sex). Traditional isotopes (C, N, S) suggest varied dietary practices between sites/villages, indicating preferential choices in relation to their location close to the Aisne valley and their economic development. Regardless of sex, the adult dietary behaviors were homogeneous across the region and the sites. Immature individuals, differed from adults, with distinct trends depending on the site, suggesting that their diet was also linked to the social status of the deceased and the economic status of the villages. Finally, we critically discuss the outputs of a first Bayesian inference of the contributions of the dietary sources.

This research is funded by the HOMES project directed by Caroline Hamon (ANR-18-CE27-0011-01).

11 FISH(Y) BASELINES. EXPLORING CHALLENGES OF DIETARY RECONSTRUCTIONS IN ANCIENT ROME THROUGH STABLE ISOTOPE ANALYSIS

Salesse, Kévin (Department of Anthropology, Faculty of Science, Masaryk University)

During the 1st and 2nd centuries AD, Rome supported a population of a million with a meticulously managed food supply. While inhabitants enjoyed a diverse selection of foodstuffs from across the Roman Empire and beyond, the majority of staple foods originated from the city's immediate hinterland or regions with convenient access to the capital. At the very least, this is what historians inform us. But what insights do isotope bioarchaeologists provide us with? During this presentation, we aim to synthesize our understanding of isotopic evidence regarding dietary behaviors in the imperial capital, with a particular focus on the consumption of aquatic resources. We will address the challenges and limitations associated with the existing, albeit relatively limited, data, including issues related to the reliability of baselines and modeling. We will explore these aspects in the context of newly acquired data from individuals buried in Region X of the Catacombs of Saints Peter and Marcellinus in Rome.

745 REMOTE SENSING OF THE CHANGING MEDITERRANEAN, MIDDLE EAST AND NORTH AFRICA REGION

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Rayne, Louise (Newcastle University) - Cigna, Francesca (CNR (National Research Council)) - Tapete, Deodato (ASI (Italian Space Agency))

Session format: Regular session

Landscapes of the Mediterranean, Middle East and North Africa (MedMENA) region are characterised by both long-term processes and transformative events, often across large scales. The bird's eye view offered by remote sensing as well as increasingly powerful computing options and algorithms are now allowing these landscapes to be digitally modelled and investigated. Spaceborne and aerial data including optical imagery, SAR and Lidar are used by many studies to locate previously unknown sites, characterise landscapes and model past land use. Due to the wide global and temporal coverage offered by some of these datasets, monitoring and mapping for heritage management purposes is also increasingly undertaken. Open-source software (e.g. QGIS, Google Earth Engine) and datasets such as Copernicus facilitate comprehensive and democratic uptake of remote sensing applications in archaeology, while high resolution sensors allow detailed and focused analyses. Integration of historical datasets such as declassified imagery stretches back possibilities with time series and can often lead to capture of now-destroyed features.

The MedMENA region now faces significant challenges including climate change, pressures on resources and conflict. These threaten both the survival of archaeological sites and the traditional productive landscapes which have developed over long periods of time. Remote sensing technologies offer some degree of mitigation through preservation by recording as well as demonstration of the functioning and complexities of long-term land use which could inform future adaptation strategies.

This session therefore welcomes papers showcasing the contribution that remote sensing, machine learning, historical imagery and maps currently provide to unveil the impacts of such environmental and anthropogenic changes and challenges. Presentation of outcomes from regional to local scale archaeological studies is also encouraged.

1 HUMANITARIAN MAPPING SERVICE: CULTURAL HERITAGE DURING HUMANITARIAN CRISES

de Gruchy, Michelle (United Nations Satellite Centre (UNOSAT))

The world faces significant challenges including climate change, natural hazards, and conflict, resulting in humanitarian emergencies. When humanitarian emergencies occur, nation states and UN agencies can request assistance from the United Nations Satellite Centre (UNOSAT) to obtain a rapid map of the situation produced by remote sensing or image analysis of satellite imagery, typically within 24 hours, in order to facilitate the prioritization of resources and distribution of aid to the affected region(s). This can, and increasingly does, include rapid mapping of cultural heritage. For longer term humanitarian emergencies, such as an ongoing conflict, nation states may request regular monitoring, including monitoring of cultural heritage. This presentation provides an introduction to UNOSAT's humanitarian mapping service and the International Charter Space and Major Disasters that supports the service, as well as an overview of recent humanitarian emergency case studies involving cultural heritage across the Mediterranean, Middle East and North Africa (MedMENA) region.

2 ASSESSMENT OF THE IMPACT OF THE RECENT STORM DANIEL ON DERNA, EAST LIBYA, USING REMOTE SENSING

Mahmoud, Ahmed (University of Leicester) - Buzaian, Ahmed (University of Leicester) - Al-Kawash, Abduslam (Retired Archaeologist)

Derna is a coastal city located on the north-eastern part of Libya, at the end of a narrow wadi named after the city, c. 70 km east of Cyrene. It is situated in a fertile region with ample water resources. Derna suffered significant devastation as a result of the powerful impact of Storm Daniel, which struck the city early in the morning on the 10th of September 2023. The city's vulnerable geographical location made it especially susceptible. At the height of the rainstorm, a substantial volume of water accumulated behind two already weakened earthen dams constructed along the wadi in the early 1970s. As the storm raged, the two dams eventually collapsed, leading to the release of a torrent of floodwaters causing profound and extensive destruction. This influenced not only the present-day urban area, resulting in severe human loss, but also made a lasting impact on the archaeological heritage.

This paper uses a novel remote sensing technique, EAMENA Machine Learning Automated Change Detection (EAMENA MLACD), that uses cloud computing services i.e., Google Earth Engine, to assess the impact of flash floods on urban areas and heritage sites in Derna. Additionally, high-resolution satellite images, such as MAXAR, have been utilized to accurately evaluate the scale of destruction caused by the storm.

The floods, while causing destruction to modern buildings along the wadi, unveiled remains of fortifications associated with ancient Darnis, which can be observed from the high-resolution satellite images. Evidence of waterproof concrete blocks indicates the implementation of measures to protect the city from floods dating back to the Roman and Byzantine periods. Remains of a pottery kiln were also detected. Furthermore, a partially preserved marble statue reportedly recovered from the debris. All these discoveries serve as a testament to the rich history and archaeology of the city.

3 THE ALCEO PROJECT: DEEP LEARNING MEETS REMOTE SENSING FOR HERITAGE PROTECTION IN THE MENA REGION

Chiricallo, Elena (Istituto Italiano di Tecnologia; Università Ca' Foscari) - Sech, Gregory (Istituto Italiano di Tecnologia) - Salvi, Maria Cristina (Istituto Italiano di Tecnologia) - Giovanelli, Riccardo (Istituto Italiano di Tecnologia) - Poggi, Giulio (Istituto Italiano di Tecnologia) - Traviglia, Arianna (Istituto Italiano di Tecnologia)

Illicit undocumented excavations (looting) present a significant threat to archaeological sites, leading to irreversible damages that have a detrimental impact on archaeology and local communities. Remote sensing surveillance has emerged as the most efficient method for monitoring instances of looting, overcoming the challenges of inspecting inaccessible or hazardous locations. However, analysis of the data is still often conducted through visual inspection of the imagery, leading to potential loss of information and preventing the development of time-effective monitoring systems.

Within the Automatic Looting Classification from Earth Observation Activity (ALCEO) project, we developed a deep learning-based Change Detection method to automatically monitor endangered cultural heritage sites. Through this method, ALCEO automatically detects and segments appearing looting pits between two subsequent image acquisitions. In this way, a time series of very high-resolution satellite optical imagery can be used for monitoring and analysing changes in looting intensity. Three geographic areas of the MENA region, known for being severely affected by the looting phenomenon, have been selected and studied using archived remote sensing data spanning the last two decades. These areas are Ebla and Dura Europos in Syria and Aswan in Egypt.

The results of ALCEO were assessed in a ground truth campaign conducted in Aswan in 2023 and refined through a "human in the loop" approach, which served to improve the reliability of the model and of newly detected features. Model inferences by ALCEO can be used to create risk maps and study the evolution of the number and patterning of looting activities. This can help local and international law enforcement agencies understand the behaviour of looters and, therefore, prevent and anticipate their illicit activities. Moreover, it is a significant step toward a near-real-time monitoring system for cultural heritage preservation in the MENA region.

4 ARCHAEOLOGICAL PROSPECTION AND CULTURAL HERITAGE MONITORING WITH SATELLITE SAR IMAGERY IN ROME (ITALY)

Tapete, Deodato (Italian Space Agency (ASI), Rome, Italy) - Cigna, Francesca (National Research Council (CNR), Institute of Atmospheric Sciences and Climate (ISAC), Rome, Italy)

Space-borne remote sensing has increasingly supported archaeological and cultural heritage applications over the past century, and Synthetic Aperture Radar (SAR) imaging has played a key role in advancing this application field. In this work, SAR data capabilities for archaeological prospection and cultural heritage site monitoring are investigated and demonstrated through two case studies from the wider Province of Rome (Italy). Medium to very high resolution SAR scenes acquired by the RADARSAT-2 and Copernicus Sentinel-1 missions using the C-band, ALOS-1 using the L-band and COSMO-SkyMed using the X-band are exploited to trial the detection of crop marks at (semi-) buried and sub-surface archaeological features in the archaeological landscape of Ostia-Portus. The analysis highlights a progressive increase in the detectability of smaller archaeological features when moving from L to X band, from co- to cross-polarizations, and toward finer spatial resolutions. Big data stacks of Sentinel-1 imagery are also processed with the parallelized Small Baseline Subset (SBAS) multi-temporal Interferometric SAR (InSAR) method to extract ground displacement time series and monitor the stability of cultural heritage assets within the UNESCO World Heritage Site (WHS) of Rome. Several hotspots showing significant land deformation (mainly indicating the occurrence of subsidence) can be identified, such as in the area of Fiumicino International Airport and along the Tiber River alluvium, involving monuments and heritage assets. Land subsidence patterns distributed along the Tiber River course are spatially confined due to subsurface geology and interactions with urban development. In addition to the well-known subsidence patterns within the UNESCO WHS, at Basilica Saint Paul Outside the Walls and Grotta Perfetta valley, Sentinel-1 InSAR results highlight a clear subsidence pattern with rates up to -0.9 cm/year affecting the residential quarter of Valco San Paolo. This work is carried out in the framework of ESA and Chinese MOST Dragon-5 SARChaeology project.

5 UTILISING HEXAGON (KH-9) DECLASSIFIED SPY SATELLITE IMAGERY TO DETECT HISTORIC WATER MANAGEMENT FEATURES IN NORTH AFRICA

Makovics, Jen (Newcastle University)

Since the declassification of the CORONA Program in 1996, US Cold War Era satellite program imagery has become an indispensable tool for remote sensing. The final Cold War satellite program, HEXAGON (KH-9, 1971-1986), was declassified in 2002 with imagery recently released in 2020. HEXAGON Program imagery presents several advantages over CORONA. It offers the highest spatial resolution combined with the most expansive geographic footprint of any Cold War satellite and is of especially high quality in the MedMENA region. In this respect, HEXAGON rivals much of the modern open source and commercial imagery available, in particular because it also provides a snapshot in time that is unattainable through any other means. HEXAGON's high temporal resolution also offers advantages such as the establishment of TAQ and TPM dates. Accurate orthorectification is problematic due to the camera parameters remaining classified, but despite this, the imagery's archaeological research potential is immense.

This presentation will offer a brief overview of recent efforts to orthorectify and utilise HEXAGON imagery in tandem with modern satellite imagery to conduct remote sensing of two North African oases to identify historic water management features. Skoura Oasis in Southern Morocco and Kharga Oasis in the Western Desert of Egypt have both relied upon traditional networks of underground draining galleries (khattara/qanât) to abstract water. Though qanat use in Kharga has nearly disappeared, several khattara still feed and help to maintain Skoura Oasis. These and related features show up particularly well on the HEXAGON imagery. Data gleaned from remote sensing may assist in the understanding of how these oasis communities adapted their hydrologic systems to environmental stressors over the past two millennia, may provide data on the abandonment of water management systems and the oasis, and may also inform future approaches to creating more resilient, water-secure communities in arid locales.

6 MAPPING DESERTIFICATION IN THE MEDMENA REGION

Rayne, Louise (Newcastle University) - Makovics, Jen (Newcastle University) - Irvine, Hope (Newcastle University) - Assi, Lima (Newcastle University) - Hayes-Rich, Emily (University of New Mexico) - Levy, Jackson (Independent) - Bokbot, Youssef (INSAP)

Long-term and complex histories of desertification have led to abandonment of croplands in the MedMENA (Mediterranean, Middle East and North Africa) region. Desertification is now a particularly pressing issue due to the impact of climate change and demands on water resources. In some cases traditional cultivation systems have persisted for long periods and the value of these for informing for future adaptation strategies is increasingly recognised. However, the accurate extent of the ebb and flow of cultivation over time is poorly quantified. This paper will review existing global landcover products. These depict modern or historical croplands or even land degradation but they do not accurately represent the extent of desertification of traditional cultivation systems.

For case studies in southern Morocco, we used open-source satellite data to automatically detect and quantify areas of past desertification, relying on the distinctive reflectance and texture of these abandoned fields to train a machine-learning workflow. In this paper, we will present our methods using Google Earth Engine and the random forest algorithm to classify desertified fields, applied to a data stack comprising a 12-band Sentinel-2 composite and derived tasseled cap components, and a Sentinel-1 VV-polarisation composite. Sentinel-1 and 2 provide resolutions up to 10m, which is sufficient for detecting field surfaces.

Pre-1970s desertification was detected with an accuracy of 74-76% at the case study locations, revealing areas of degraded land abandoned potentially due to a breakdown of irrigation systems. An interdisciplinary approach drawing on archaeological and historical information showed that some of these irrigation and field systems were established in the medieval period and persisted for centuries, before abandonment due to factors including environmental challenges and political and social changes.

7 INVESTIGATING ANTHROPOGENIC AND CLIMATE CHANGE THREATS TO IRAQI ARCHAEOLOGICAL LANDSCAPES WITH SATELLITE IMAGERY

Cigna, Francesca (National Research Council (CNR), Italy) - Tapete, Deodato (Italian Space Agency (ASI), Italy) - Rayne, Louise (Newcastle University, UK) - Makovics, Jen (Newcastle University, UK) - Irvine, Hope (Newcastle University, UK) - de Gruchy, Michelle (United Nations Satellite Centre (UNOSAT), Switzerland) - Jotheri, Jaafar (University of Al-Qadisiyah, Iraq)

Iraq is among the five world countries most vulnerable to climate change impacts. Its cultural landscapes and heritage are exposed to erosion, weathering, abandonment and, eventually, disappearance. An approach combining satellite and on-the-ground observations to investigate anthropogenic and climate change-related processes is being developed in the framework of the Italian National Research Council – UK Royal Society bilateral cooperation programme. The analysis focuses on a wide region spanning between the capital city of Baghdad and the south-eastern sector of the country, encompassing the Ahwar of Southern Iraq UNESCO World Heritage Site, and the Wasit governorate. The analysis workflow capitalises on decades of satellite imagery, including declassified panchromatic data from the United States Cold War Era HEXAGON (KH-9) programme, Copernicus Sentinel-1 Synthetic Aperture Radar (SAR), Sentinel-2 and Sentinel-3 multispectral data, Planet Dove multispectral imagery, plus very high resolution scenes over selected priority sites acquired by commercial optical missions and the COSMO-SkyMed SAR constellation. A standardised image interpretation strategy is adopted to record features representing components of the ancient and traditional landscape of all periods, including tells, forts, canals, water bodies and wells. This includes long-standing landscapes used up until very recently. Landscape changes are captured via Interferometric SAR (InSAR) processing of yearly and monthly pairs of Sentinel-1 and COSMO-SkyMed scenes, and by computing time variations in surface reflectance and vegetation indices (e.g. Normalised Difference Vegetation Index, NDVI) across yearly pairs of Sentinel-2 composites. Country-wide snapshots of sectors impacted by recent dust storms are provided by Sentinel-3 data. The integrated methodology enables generation of satellite-derived products depicting occurred transformations, regional susceptibility and endangered heritage sites. Among the latter, this work showcases 2014-2023 yearly and 2023-2024 monthly change detection maps based on InSAR coherence, spectral and vegetation indices variation, and a regional scale zonation of areas impacted by dust storms occurred in 2022.

8 SPATIO-TEMPORAL CHANGES OF IRAQI WATER BODIES AND MARSHLANDS AND IMPACTS ON CULTURAL LANDSCAPES IN THE CONTEXT OF CLIMATE CHANGE

Azzarone, Eleonora (Italian Space Agency (ASI), Rome, Italy; University of Rome Tor Vergata, Rome, Italy; Telespazio S.p.A, Rome, Italy) - Tapete, Deodato (Italian Space Agency (ASI), Rome, Italy) - Cigna, Francesca (National Research Council (CNR), Institute of Atmospheric Sciences and Climate (ISAC), Rome, Italy)

Recent studies converge on warning about climate change impacts on Iraq's natural resources, including a water shortage crisis. With surface waters projected to dry up within the next 20 years, environmental consequences are

also likely to affect local cultural landscapes and heritage. Indeed, Iraqi archaeological sites and historic settlements, canals and palaeo-landscapes, are often located in proximity to water bodies and marshlands, thus shrink-swell cycles due to drought and flooding caused by extreme events, and consequent surface water run-off and accumulation, may accelerate cultural heritage deterioration, up to severe damage and disappearance. In order to assess the scale of recent impacts, a multi-temporal back-analysis was performed across a 8.000 km² area, spanning from south of Baghdad to Basra. Multispectral Sentinel-2 images were processed to estimate annual changes in water level and marshland surface extent of both permanent and ephemeral lakes (Hammar Lake, Najaf Sea, Hor Al-Shuwaija), artificial reservoirs (Razzaza, El Delmej) and the Ahwar of Southern Iraq UNESCO World Heritage Site. Normalized Difference Vegetation (NDVI), Normalized Difference Water (NDWI) and Moisture Indexes enabled automatic per-pixel image classification, followed by thresholding and, when needed, manual refinement, to assess surface extent changes and spatio-temporal trends of water bodies and marshlands in 2015-2023. The observed divergent behaviour between the analysed bodies highlights a diverse range of situations, and thus different risk levels for heritage assets conservation. The integration with environmental and contextual data, and information from UNESCO reports, confirms the current challenges in preserving historical marshlands and the relationships with anthropogenic activities. This work is carried out during an internship at the Italian Space Agency (ASI) and in the framework of ESA and Chinese MOST Dragon-5 SAR archaeology and the CNR – UK Royal Society “Vanishing archaeological landscapes under anthropogenic and climate change threats” projects.

9 HYMES - THE HYDROGRAPHY OF MESOPOTAMIA. RIVERS AND CHANNELS IN BABYLONIA FROM THE LATE 4TH TO THE 1ST MILLENNIUM BCE

Rutishauser, Susanne (University of Bern) - Novák, Mirko (University of Bern) - Gautschy, Rita (Swiss National Data and Service Center for the Humanities (DaSCH)) - Schrakamp, Ingo (Free University of Berlin; University of Münster) - Zischg, Andreas (University of Bern) - Aloda, Muntadher (University of Bern) - Borkowski, Sebastian (University of Bern) - Červík, Tadeáš (University of Bern) - Dvorak, Sven (University of Bern) - Zbinden, Eveline (University of Bern)

In the late 4th millennium BCE, southern Mesopotamia gave birth to mankind's first urban civilization. This was made possible by favourable environmental, socio-ecological and economic conditions. Given the aridity of the climate in the region, the agricultural set-up depended on irrigation. The interaction between natural processes and human activities led to a hydraulic landscape characterized by a dense network of natural and artificially created canals constituting complex irrigation systems with a variety of hydraulic devices and a corresponding administrative structure. Late 4th to 1st millennium BCE cuneiform texts in Sumerian and Akkadian reflect many aspects of water systems. The data-driven approach of the HyMes project (2024–2027) relies on data mining and formal network analysis to link toponyms and hydronyms mentioned in texts with archaeological data on settlements and remote sensing-based hydrographical network reconstructions. The implementation of data provenance and uniform resource identifiers (URIs) establish external links to existing databases. The outcome is a multi-temporal network of rivers and canals, covering several key periods of Mesopotamian history from the late 4th to the 1st millennium BCE. Each disciplinary dataset will complement the others and help to fill eventual gaps and inaccuracies. Based on this multi-temporal hydrographic network, it will be possible to analyse changes in hydrography and link them with societal evolutions as derived from existing historical and archaeological knowledge and findings. The multi-temporal hydrographic network will then be used to develop a simplified hydraulic model. The model will allow a closer investigation of specific environmental changes such as the increasing aridity on water circulation through the network and foster thereby further analyses on the impact of these environmental changes on civilizations.

10 UNDERTHESANDS: INVESTIGATING ANCIENT IRRIGATION LANDSCAPES IN ARID CLIMATES THROUGH REMOTE SENSING AND DEEP LEARNING METHODS

Bulawka, Nazarij (Institut Català d'Arqueologia Clàssica) - Orenge, Hector (Institut Català d'Arqueologia Clàssica)

The study of ancient irrigation plays a pivotal role in the archaeological investigation of arid landscapes. It covers various topics, including irrigation's role in empires or complex societies, agricultural intensification, communal irrigation practices, and water harvesting techniques. Moreover, each irrigation landscape is unique and requires a particularly adapted set of methods.

This paper outlines the results of UnderTheSands, a project aiming to investigate the application of remote sensing and machine learning methods to the analysis of ancient irrigated landscapes in selected case studies in Iraq, northern Iran, and Turkmenistan. The research integrates HEXAGON imagery, TanDEM-X digital elevation models, and LANDSAT, Sentinel-1, and Sentinel-2 multitemporal multispectral datasets in different parts of the workflow. Levees and paleochannels have been mapped by integrating the result of multitemporal vegetation indices (SMTVI) with Multi-Scale Relief Models (MSRM) calculated within the Google Earth Engine platform. Qanats, a type of underground water distribution system, have been mapped using the YOLOv8 qanat detection model we trained on the black-and-white HEXAGON high-resolution spy satellite images (1971-1986).

The applied methodology allows for a comprehensive understanding of irrigated landscapes. The research investigates the influence of environmental conditions and satellite imagery parameters on the visibility of features such as levees, paleochannels and qanats. Optimal results are achieved by combining several methods, adjusting seasonal parameters, and conducting a comparative analysis of visible features.

11 POST-CONFLICT LANDSCAPES IN EASTERN MEDITERRANEAN: GEOARCHAEOLOGICAL AND AUTOMATED REMOTE SENSING MAPPING OF VULNERABLE ARCHAEOLOGICAL SOILSCAPES IN THE LEBANESE BEKKA VALLEY

Neogi, Sayantani (Institut Català D'arqueologia Clàssica) - Conesa, Francesc (Institut Català d'Arqueologia Clàssica Plaça d'en Rovellat, s/n, 43003 Tarragona, Spain) - Orenge, Hector (Institut Català d'Arqueologia Clàssica Plaça d'en Rovellat, s/n, 43003 Tarragona, Spain)

This paper presents the scopes of the project SIGNATURE working in the Bekaa Valley of Lebanon. This ongoing Marie Skłodowska-Curie research intends to integrate geospatial legacy data coupled with multispectral and radar imagery in a two-fold remote approach to identify and map: 1) historical morphodynamics, to reveal past hydro-geomorphological landforms and short to long-term land use and land cover trends and 2) vulnerable archaeological soils, such as eroded and non-visible mounds, using automated site detection methods. The Bekaa Valley in Lebanon, with its fertile alluvial plains within the Litani and Orontes rivers, has been an attractive land to the populations through millennia. The settlers benefited from the valley orography, the alternate of pasture and agricultural lands and the availability of water sources. As an aftermath of the Lebanese Civil War and the instability resulting from military conflicts, the traditional agronomic landscapes of the Bekaa Valley were severely transformed. Our work will highlight the results from our desk-based assessment on how the Bekaa now offers an optimal scenario to investigate endangered cultural soils through accurate detection, mapping, and prediction of the location of vulnerable archaeological sites and landforms. To do so, we started with the recompilation of legacy data in the form of grey archaeological literature, as well as historical photographic datasets such as CORONA and HEXAGON imagery. The work has continued with the testing and implementation in cloud-computing Earth Observation platforms of automated site detection approaches using long-term satellite constellations, such as the Landsat and Sentinel archival missions.

12 MULTITEMPORAL AND MULTISPECTRAL SENTINEL-2 DATA FOR LANDSCAPE AND PREVENTIVE ARCHAEOLOGY IN THE LOWER VALLEY OF THE CALORE RIVER (BENEVENTO)

Corbo, Antonio (Sapienza University)

In landscapes that have significantly and still continue changing due to urban and infrastructural development, archaeological potential maps and predictive models are essential to unveil surviving archaeology. The availability of high to medium-resolution open-source satellite data offers new opportunities in this respect that are yet to be fully exploited.

The present study is conducted in the district north of Benevento city, southern Italy, and along the lower course of the Calore River in the Telesina Valley. Demonstrative case studies are presented (including excavated archaeological site and others still buried, such as villas, vici, and mansiones) via category of features related to the Roman, Late Antique, and Medieval periods that are characterized based on the spectral behavior as extracted from multi-temporal Sentinel-2 images collected in the period 2015-2023.

Spectral anomalies facilitate the identification and interpretation of new sites of potential archaeological interest, enable a comprehensive study of the area in various ancient epochs, and a better understanding of the human role in the past and current landscape transformation, settlement patterns, and the exploitation of resources and materials offered by the surrounding environment. Our results show how this study can also inform the evaluation and planning of the Municipality Urbanistic Plan (PUC) that the municipalities in the valley are requested to implement.

The chosen context is ideal for the application of this new topographical analysis, because only the eastern part of the area has been studied with traditional methodologies and systematic surveys. Thus the present research is in continuity with previous works, and allows the advancement of archaeological knowledge in the areas of internal Campania.

13 ARCHAEOINFORMATICS: HYBRID APPROACHES AND APPLIED ARCHAEOLOGY

Chroni, Athina (Hellenic Ministry of Education, Religious Affairs and Sports; National Technical University of Athens)

Focusing on the scientific field of archaeology, it is now clear that new technologies claim more and more "space" in matters of geospatial identification and digital georeferencing of archaeological sites, documentation and management in matters of large volumes of multiple types of data, detection and highlighting of relationships, sketching of hypothetical scenarios for the interpretation of archaeological relics, as well as dissemination of scientific-cultural information.

The combination of the sciences of applied archaeology combined with photointerpretation-remote sensing, geoinformatics and archaeoinformatics is proposed as the most fruitful one in the case-study of an area of archaeological interest in southern Greece: excavation data already published (applied archaeology), after photointerpretation-remote sensing laboratory work, can be further studied in a GIS environment, (geoinformatics) in order to digitally reveal their correlation diachronically in various periods of antiquity, thus extracting qualitative and quantitative data (archaeoinformatics) under the perspective of ground control implementation in the area of interest as well as test excavation (applied archaeology).

771 HERITAGE BEYOND CONSUMPTION: A CALL FOR A COLLECTIVE DISCUSSION

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Fiano, Francesca Romana (Università degli Studi di Ferrara) - Di Biase, Federica (Heidelberg University) - Porta, Francesca (Università degli Studi di Bologna)

Session format: Round table (without formal abstracts)

Recently, a series of actions targeting cultural heritage has been promoted by young activists for climate justice. Choosing the symbols of the 'heritage industry' to attract global attention, the activists have posed provocative questions such as: "Are you more concerned about the protection of a painting or the protection of our planet and people?"

No matter our own positioning, the youngest generation is engaging society in a critical discussion about the scale of priorities, including the role of Cultural Heritage. In this context, it is worth pursuing the opportunity of discussing the links between heritage practices and practitioners, and capitalist societies, together with notions of extreme consumerism, heritage commodification and perceptions on these relationalities.

In this sense, a critical collective introspective inquiry might start by evaluating communicative and promotional tools employed within heritage practice. Increased trends in heritage communication have fallen under major marketing trends, encouraging therefore phenomena such as Disneyfication and consumerism. These concepts have already been addressed within the field, yet what this discussion proposes is the exploration of the risks for heritage experts and professionals posed by the society of advanced capitalism, where exploitation is increasingly dramatic.

How do we conceive of a cultural offer avoiding consumerism and the commodification of heritage? Would countering these phenomena prompt the heritage field in becoming an asset for tackling global challenges?

We invite scholars to join a round table discussion on these subjects. Starting with a critical examination on the current state of the cultural offer, we aim to enlighten the boundary between the communication and commodification of cultural heritage and to outline alternative approaches that would allow for heritage to attain an active role in the contemporary society.

772 EMBRACING TRANSDISCIPLINARITY: MULTIPLE WAYS OF SEEING THE PAST THROUGH DIFFERENT ONTOLOGIES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Kristiansen, Kristian (University of Gothenburg and Copenhagen) - Frieman, Catherine (Australian National University)

Session format: Regular session

As researchers of histories of the past, we need ontologies and theoretical frameworks to situate our interpretations. However, these very same ontologies (sometimes viewed as scientific paradigms) also serve as conceptual traps that exclude certain parts of the world from consideration.

Thus, it may be suggested that the past is too complex to be comprehended by (and compressed into) a single ontology/paradigm. We need both cartesian and non-cartesian, binary and non-binary, empirical and interpretative thinking, because all are vital ingredients in past (and present) societies and their wider environmental entanglements. This raises some follow up questions:

1. How should we do this? Can we really reconcile different ontologies, which of course also represent different world views?
2. More mundanely, are we slaves of our terminologies and concepts? All terminologies (from classification to theoretical models) empower and imprison thinking. Their scientific 'raison d'être' is to bring order into chaos to allow comparison and analysis.
3. Does this prevent an integration of the different mindsets? Can our different analytical frameworks be brought into dialogue, given their divergent initial assumptions without violating their meaning?
4. Is it more productive to consider different ontologies as bringing different worldviews to interpretation that need not become integrated?

5. How do we then create an interpretative, transdisciplinary dialogue?

ABSTRACTS

1 WHO GETS TO DRIVE? TRANSDISCIPLINARITY AND THE CHALLENGES OF INTEGRATED APPROACHES IN BIOMOLECULAR ARCHAEOLOGY

O'Connell, Tamsin (Department of Archaeology, University of Cambridge)

Advances in analytical methodologies, particularly in biomolecular analysis, have transformed the information that we can retrieve from archaeological materials. The data yielded is multidimensional, complex and often vast. It typically requires substantial expertise to produce the raw data, then to wrangle it into something manageable. And then it requires interpretation, because the data we produce (genomic, proteomic, isotopic, lipid) are but proxies for the aspects of the past that interest us (origins, kinship, diet, migration, disease).

We can choose to work in silos – each researcher interpreting the data only from their area. Yet that does not leverage the breadth of information we have, nor make for realistic or likely representations.

Questions then arise about how and when and where to integrate our approaches. Such questions are both practical and philosophical. How can we derive interpretations which are consistent with all the observations? Do we combine data or interpretations? What are the implications for our data science approaches? How can we participate in scientific or academic endeavour where our own interests are not paramount? Where one approach may be seen as subservient to others, even if integrated?

Transdisciplinarity is a wonderful aspiration. But it is difficult. I shall reflect on the challenges inherent in biomolecular archaeology as we try to weave the evidence together to produce viable interpretations of the past that are satisfactory and satisfying to all involved.

2 BRIDGING ARCHAEOLOGY AND HUMAN PALEOGENETICS: PROBLEMS WITH EXISTING PRACTICES AND PROSPECTS FOR OVERCOMING THEM

Staniuk, Robert (IoA UCL) - Lee, Victor (Globe Institute, University of Copenhagen) - Timpson, Adrian (GEE UCL) - Kristiansen, Kristian (University of Gothenburg) - Racimo, Fernando (Globe Institute, University of Copenhagen) - Shennan, Stephen (IoA UCL) - Thomas, Mark G. (GEE UCL)

The aDNA revolution in archaeology has often been met with a critical response focusing on the persistent use of simple analytical models, the equating of clusters of genetic similarity with archaeological cultures, and over-simplified interpretations. The postulated panacea for these issues is increasingly collaborative, interdisciplinary and transdisciplinary research, where archaeologists provide more input on the underlying assumptions, data collection, as well as interpretative work. However, this remedy explicitly ignores the already existing network of collaborations between archaeology and paleogenetics. Since archaeology is the discipline that provides the main input in terms of research questions and samples for these investigations, it is worth examining how much archaeological input geneticists incentivize, how the collaboration is reflected in terms of authors participating in different studies, what kind of information is provided by archaeologists, and what limitations these factors imposes on the use of more complex models incorporating both cultural and genetic data.

In this paper we report our results on the statistical analysis of 18 peer-reviewed paleogenetics research papers on European prehistory published between 2013-2023 to discuss the possible drivers of gaps in interdisciplinary research. The investigation is based on the type of research input made by the different disciplines and the quality of reported archaeological metadata. The factors included in the study are: contributions of individual researchers, the ratio of geneticists to archaeologists, the use of separate supplementary files, and the presence/absence of different types of archaeological data associated with the sampled individuals. Based on the results of the analysis, we present tangible solutions for better interdisciplinary research and data publishing protocols.

3 ANCESTRY AND THE GENOME: MOVING BEYOND GROUP-THINKING

Skoglund, Pontus (Francis Crick Institute)

What is ancestry, and what is a genome? Concepts and terminology such as ancestry, population, and migration, have seen increased cross-disciplinary understanding in genetics and archaeology due to continuous dialogue over the past few years, but are still cause for misunderstanding. I will discuss modern concepts of genetic ancestry, and how scientific limitations, such as statistical boosts offered by grouping individuals, can limit an understanding of ancestry that is robust and useful across fields. I will discuss how we can move to an understanding of ancestry that is individual focused, and spatiotemporal, with little need for grouping of individuals by context. I will also discuss how the difficulty of making technical terminology in ancient genomics understandable to archaeologists and curators can impact

arguably the most important mission of ancient genomics: to create future-proof DNA sequence quality data when conducting destructive sampling, allowing future researchers to test older ideas and models.

4 CULTURAL TRANSITIONS AS DRIVERS OF NATURAL SELECTION

Nielsen, Rasmus (University of Copenhagen)

In this talk I will discuss recent advances in methods for detecting natural selection from genomic data and illustrate how these methods can be used to understand how past cultural processes have shaped the current human genetic landscape. Inference of past natural selection provides opportunities for connecting changes in cultural practices with the resulting effects on human biology. For example, the distribution of disease causing genetic variants can often best be understood as a product of past cultural practices and a complex interaction between genetics, culture, and the environment. Recent research on ancient DNA has uncovered a number of examples of this, particularly associated with the Neolithization and the resulting changes in diet and exposure to pathogens, that left a profound footprint on the genomes of modern Europeans. I will also discuss how narratives of past natural selection are shaped by modern biases and at times have contributed to reinforcing racial and gender stereotypes.

5 THE SIGNIFICANT TRANSDISCIPLINARY POTENTIAL OF DESIGN THINKING OF ARCHITECTURE IN ARCHAEOLOGY

Lengyel, Dominik (BTU Brandenburg University of Technology Cottbus-Senftenberg) - Toulouse, Catherine (Lengyel Toulouse Architects)

There are numerous reasons for interdisciplinary collaboration, but a different perspective, a different mindset, is a constant given, so that the probability of a benefit for both sides is highly likely. However, the collaboration between two disciplines that initially take fundamentally different paths, as is the case with archaeology and architecture, requires special consideration. It is not about the usual collaboration in which architecture uses its expertise to illustrate archaeological themes in an atmospheric way, but instead about genuine scientific collaboration in which both sides benefit immediately. In particular, the ontology of both disciplines initially provides little overlap. Yet there are definite parallels. Probably the most important is the interpretation, which is empirically generated in different ways on both sides. In many renowned research projects, the authors have translated the initial assumptions of archaeology into images in the closest dialogue with archaeology in such a way that, with a minimum of additions, new insights have been brought to light solely through this translation of media in the thinking of archaeology. This procedure is very familiar in architecture in the general design process and is based solely on capturing assumptions in drawings, regardless of their complexity, in order to lead them back to the original thought process via visual perception. However, the translation of vague assumptions and uncertain knowledge is the particular expertise of architecture, no matter how vague the design ideas and intentions are. The uncertainty is the same, as is the mindset, and on this basis this lecture aims to present and explain the potential of an extraordinary culture of cooperation on the basis of various projects.

6 STONE TOOLS UNDER A DIFFERENT LIGHT: CONSTRUCTING THE TRANSDISCIPLINARY METATOOL ONTOLOGY AND REFLECTING ON ITS POTENTIAL FOR ARCHAEOLOGY

Peixe, Alexandre (Delft University of Technology) - Hernandez Corbato, Carlos (Delft University of Technology) - Şişman, Burak (Delft University of Technology) - Langejans, Geeske (Delft University of Technology)

Ontologies represent and organise knowledge in many fields, including archaeology. In this contribution, we explore the potential of a multi-disciplinary ontology for stone tool production. Its primary function is enhancing data interoperability, facilitating knowledge sharing, and enabling effective information retrieval. However, during ontology development, one is forced to review and rethink assumptions, and this change in perspective can lead to new questions and insights. Our ontology is being built as part of the Metatool project, which aims to provide a computational model of synthetic awareness to facilitate the invention of tools for artificial agents. The Metatool ontology uses early human tool behaviour as a framework to be enriched with computational neuroscience and robotics models. It layered archaeological concepts as a foundation using literature on the earlier toolmakers and toolmaking. The archaeological evidence had to be reframed from a decision-making perspective that mounts up to a tool instead of departing from its final form. The ontology may also place the raw material at the centre, giving it agency, as it were. The ontology would represent the raw material's properties, such as hardness, durability, and availability, as descriptors and relate them with the techniques employed and the shapes produced. This could provide insights into the reasoning behind functional choices and hint at cultural considerations as drivers of the tool-making practices in the absence of those. A unified knowledge structure can streamline the examination of multiple assemblages, identifying patterns and contextualising them within socio-cultural and technological frameworks. Considering the Metatool ontology, we aim that computational neuroscience and robotics models can simulate scenarios to test the ideas raised by ontology analysis. It could validate insights into how functional properties and adaptive advantages relate to specific tool designs.

7 EVERYTHING ALL AT ONCE – REFLECTIONS ON NON-LINEAR DYNAMICS, MODELLING, AND TRANSDISCIPLINARITY IN SOCIAL ARCHAEOLOGY

Giroto, Chiara (Ludwig-Maximilians-Universität München)

Social interaction and structure is a pivotal field of archaeological behavioural modelling and reconstruction. It is also the field in which the researcher's own perception, worldview, and choices impact the result most considerably. Generally, research is based on traces acquired through material remains, settlement patterns, the environment, and human remains. Whilst having fully embraced approaches of "eclectic theory" many associated questions remain – in their very nature – post-processual. Social interactions and structures are cognitive features of society, subjective, and often symbolic. In pre- and protohistory direct and objectively interpretable evidence is missing. Whilst the use of environmental and spatial data might seem more objective than those derived from material culture it faces the same critique as a processual approach. Any factor chosen to reconstruct society is therefore an interpretation – may it be our own view, that of our community of practice or another field of science. Often ontologies differ and transdisciplinary applications of complex models are difficult.

This paper aims to investigate the potential of eclectic ontologies projected on prehistoric data. Employing non-linear algorithms and embracing chaotic system behaviour as a central part of humanity allows for an "everything all at once" approach that far transcends more traditional holistic approaches. It presents a plan of action to bind osteological analysis, material culture, regional material and spatial data databases – all assessed or generated by a single researcher. The application of classical methodologies in the reconstruction of social structures in combination with non-linear statistics as well as machine learning will be used in order to gain a better understanding if the 'hierarchisation' observed in the Central European Urnfield culture is comparable to the process of autocatalytic cycles – a commonly observed behaviour of complex systems.

8 "SPECIALIST" CAN ALSO MEAN "LOCAL": TRANSDISCIPLINARY ONTOLOGIES INTEGRATING LOCALISED KNOWLEDGE AS A KEY TO ARCHAEOLOGICAL PRAXIS

Frieman, Catherine (Australian National University) - Flexner, James (University of Sydney)

Archaeological methodologies rely on flexible epistemologies and the simultaneous embrace of multiple ontological frameworks. The archaeological record – a landscape, a site, an assemblage, an artefact – is and has always been a natural meeting point for diverse experts and narrators of an intrinsically imperfect and incomplete past. To compile meaning from fragments we work across disciplines in teams of specialists ranging from diggers and artefact experts to lab scientists, linguists, historians, and many others. Moreover, although rarely fully credited, local community members, paid diggers, and Indigenous or local interlocutors have shaped the understanding and interpretation of the archaeological past to an enormous extent. This sort of intense collaboration creates archaeology's characteristic kaleidoscopic knowledge patterns that shift as we shift analyses and collaborators and change form as we change audiences and scales of analysis. Here, we focus on the ways that particular localised ways of knowing contribute to archaeological knowledge, drawing on fieldwork experience in Northern Europe and the Pacific region. We consider the permeability of our communities of practice; we reflect on the sorts of craft pedagogies that build a discipline uniquely able to integrate diverse ways of understanding and reconstructing the past; and, recognising that archaeological knowledge has power in the present and can help us face and reshape an uncertain future, we ask how we can compose teams to study the past so that we can use it to create a better future, including on the ground in the places where we do our research.

9 POLITICS, PARADIGMS, AND POSTHUMANISM: DEFENDING PLURAL REALITIES IN AN UNEQUAL ARCHAEOLOGICAL LANDSCAPE

Schreiber, Tanja (Institut fuer Ur- und Fruehgeschichte Kiel; Institut für Prähistorische Archäologie, Freie Universität Berlin)

In this essay, I challenge the push for reconciling diverse ontologies to foster an "interpretative, transdisciplinary" dialogue, cautioning against subjugating alternative ontologies to scientific paradigms. These paradigms, supposedly objective and apolitical, perpetuate a power imbalance evident in the marginalization and exclusion of certain groups from equal participation in Western academic discourse, highlighting the interconnectedness of "truth" and "power". Attempting to unify different ontologies under systems that discredit most of them in the first place is thus futile.

Contrary to this, certain Western theoretical and philosophical approaches, such as Posthumanism and other relational ontological frameworks, view different positionalities actually as strengths, dismissing the need for a division or fusion. Rejecting dualistic thinking, such as "paradigm vs. ontology" or "binary vs. non-binary," I propose recognizing that science-based and alternative knowledge systems are products of Western scientific worldviews, and not inherently opposed. Hence, the necessity to reconcile seemingly opposed worldviews, which are not actually in opposition, diminishes.

Advocating for the embrace of diversity within archaeological theory and practices, I emphasize the coexistence of science-based and alternative ontologies. This approach highlights our capacity to engage in scientific methodologies while interpreting data through non-Cartesian frameworks. To illustrate, a case study on fortified hunter-gatherer settlements in Siberia, employing a relational framework to interpret quantitative data from a comprehensive big-data study, showcases the compatibility and strength derived from embracing multiple positionalities in archaeology.

10 ARCHAEOLOGY IN THE AGE OF ASSUMPTIONS: RECOGNIZING THE LIMITS OF ARCHAEOLOGICAL PRACTICE AND HOW TO BREAK THEM

Ribeiro, Artur (Christian-Albrechts-Universität)

For decades archaeology has tried to bridge the "gaps" and "fragmentation" within the discipline, such as the gaps between theories and data, the gaps separating the archaeological sciences from the humanities, or the gaps between the more heavily funded and well-researched areas of the world and those regions that lack funding and research in archaeology. In this it has been largely unsuccessful.

These gaps are here to stay and cannot be bridged, and the several attempts to bridge them fail because they are rooted in problems of our own creation. The issue is not that the past is too complex nor that we need multiple paradigms; the issue at hand is more straightforward than appears at face value; we have simply not put enough effort and thought into our interpretations of past phenomena.

A brief conceptual case-study will be employed to illustrate this. Research on demographic decline has been quite popular in archaeology in recent years. Assumptions abound in this research, many of which are still based on outdated Malthusian premises. In archaeology, research on demographic decline relies primarily on narratives of collapse involving food scarcity, spread of diseases, and warfare. However, more often than not, data shows that demographic decline happens without evidence of food scarcity, disease, or war. As the anthropologist Alexei Yurchak has argued, some societies undergo periods of political and economic hypernormalization, where a society refuses to grow and adapt. The idea that past societies normalized ways of living, sometimes leading to demographic decline, is something that has not yet found proper discussion in archaeology, but it is an important discussion, as it has repercussions on our assumptions of how people behaved in the past, over the long-term and as communities.

775 EXPLORING DATES-AS-DATA APPROACHES: THEORETICAL PROMISES AND METHODOLOGICAL PROBLEMS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Van Maldegem, Elliot (Ghent University) - Hoebe, Pir (University of Groningen) - Heaton, Tim (University of Leeds)

Session format: Regular session

The exponential growth in available radiocarbon data and accessible methodology have caused a veritable boom in research which use dates-as-data approaches. Such approaches hinge on the fundamental line of assumptions that the number of radiocarbon dates in a period is proportional to or indicative of the intensity of human activity or population. The most common method of summarizing these radiocarbon dates is through model tested summed probability distributions (SPDs). However there are several limitations inherent to large radiocarbon datasets, such as region- and period specific research focus and taphonomy, as well as methodological issues such as difficulties separating patterns caused by human activity and those caused by the shape of the calibration curve. To address these limitations, researchers have made efforts to enhance the quality of databases by employing chronometric hygiene, binning dates within specific archaeological sites, and to develop more advanced methods, including composite kernel density estimates (KDE) and non-parametric calibration and summation.

Nevertheless, questions persist regarding the way dates-as-data results can be interpreted. Are they able to reflect population dynamics or do they merely mirror availability and research focus? Can we reliably compare different time periods with each other or contrast different regions? What are the scales, both chronologically and geographically, that can offer useful results? Our aim is to look at the nature of radiocarbon dates as a proxy, and to explore complementary methods from archaeology and other disciplines (palaeoecology, geoarchaeology, climate studies, etc.) that could mitigate flaws in dates-as-data approaches.

This session invites papers that go beyond utilizing the principle of dates-as-data and explore the nature of assumptions, explore strategies for identifying and mitigating biases in datasets and the methods employed, incorporate various and complementary proxies, address different temporal and geographical scales, or theorize how results can and cannot be interpreted.

1 SUBMERGED, COVERED OR EXPOSED; ACCESSIBILITY AND REPRESENTATIVITY OF ARCHAEOLOGICAL DATA IN AND AROUND DOGGERLAND (12-7KA CALBP)

Hoebe, Pir (University of Groningen)

Dates-as-data approaches take large datasets of archaeological radiocarbon dates as a proxy for past changes in human activity. Such approaches have huge potential for gaining insight into large spatiotemporal patterns of changes in human activity in relation to external pressures, such as sea level rise, climate change and ecological hazards. Several limitations and methodological issues impede our ability to infer past human activity with these approaches. In the past decades, considerable progress has been made in the improvement of methods and the identification and correction of biases.

Landscape taphonomy is one key issue that requires careful consideration, as it can explain how patterns of archaeological data were influenced by sedimentation, erosion and preservation conditions. Taphonomic corrections have focused on general over-time changes in preservation potential, and the proportionality of landscape types and their preservation potential for archaeological data of a certain age. However, landscape taphonomy is very complex and case-study specific. It is essential that this is further explored, especially in the context of research areas with complex sedimentary histories such as those affected by Holocene sea level rise.

Doggerland, an area roughly the size of England and Wales combined (150000 km²) was submerged beneath the North Sea (12-7ka calBP). Inundation involved erosion and sedimentation, leading to spatiotemporally differential conditions in terms of the accessibility and preservation of deposits, as well as the archaeology associated with these prehistoric landscapes. Inundation modelling greatly improves our understanding of landscape taphonomy by making explicit when landscapes were submerged, with how much sediment they were covered, and which areas were eroded. Such results can provide valuable input for landscape taphonomy corrections or model testing in dates-as-data approaches. This strengthens our ability to parse patterns caused by biases in the dataset from patterns caused by changes in past human activity.

2 MODELING RADIOCARBON DATES AND HUMAN DYNAMICS IN THE VALENCIAN MEDITERRANEAN REGION

Extrem Membrado, Vanessa (Universitat de València) - Pardo-Gordó, Salvador (Universidad de La Laguna) - Aura Tortosa, J. Emili (Universitat de València)

The Iberian Mediterranean region was occupied by different hunter-gatherer-fisher groups throughout the Upper Palaeolithic and Mesolithic. There are around 400 radiocarbon dates for this region and chronologies, more than 200 dates from sites located in the middle of the current Valencian territory, bounded by the rivers Xúquer and Vinalopó. Many of these sites represent a long sequence of human occupation, for which there is a high diversity of archaeological remains and radiometric data, with considerable differences between the cultural phases. Some authors have observed the accumulation of dates around certain cultural phases as evidence of population dynamics and human activities. However, several factors may condition the existence of valid radiometric data for certain cultural phases.

This conference proposes to explore the radiocarbon dates as demography proxy and its comparison with the intra-site activity of les Coves de Santa Maira (Castell de Castells, Alicante). To this end we select several variables such as lithic and bone densities taking account the excavation extension. Thus, the aim is to observe whether the radiocarbon dates reflect the reality of the presence, activity and functionality of the site from the Palaeolithic to the Mesolithic. Finally, we will compare the data provided by the Santa Maira cave with the results of regional dynamics to assess whether they reflect human activity and the eco-dynamics of the Valencian.

3 SIMULATING FREQUENCY DISTRIBUTIONS FOR INDIRECTLY DATED HUMAN BURIALS IN SOUTH AFRICA

Loftus, Emma (Institut für Vor- und Frühgeschichtliche Archäologie, Ludwig-Maximilians-Universität München; Palaeo-Research Institute, University of Johannesburg) - Chase, Brian (Institut des Sciences de l'Évolution-Montpellier (ISEM), University of Montpellier, Centre National de la Recherche Scientifique (CNRS); Department of Environmental and Geographical Science, University of Cape Town) - Lombard, Marlize (Palaeo-Research Institute, University of Johannesburg) - Steyn, Maryna (Human Variation and Identification Research Unit, School of Anatomical Sciences, University of the Witwatersrand)

Changes in human burial behaviours may reflect broad cultural responses to wider archaeological or environmental events. Radiocarbon date aggregation methods, such as kernel density estimation, allow for an assessment of burial frequency through time, for correlation with archaeological and palaeoenvironmental records. However, datasets of directly dated burials are biased in many parts of the world due to ethical concerns over destructive sampling of human

remains. In South Africa, direct dating of human remains of Holocene foraging people (hunter-gatherers) has been more routine and widespread than the dating of human remains from early farming (or Iron Age) contexts, where extant descendent communities may request reburial. Additionally, farming sites can often be closely dated using material culture chronological frameworks from associated finds (e.g., ceramics), rendering direct dates unnecessary. Thus, we find modelled radiocarbon distributions for directly dated farmer burials do not reflect the actual distribution of burials through time. Importantly, this bias is unlikely to be resolved through additional dating efforts, given the ethical prohibitions. We attempt to redress the bias in the human burial dataset using simulated dates based on associated age ranges, and interpret the modelled distributions in light of regional archaeological and palaeoenvironmental events.

4 A NEW APPROACH TO SUMMARISATION: RIGOROUS IDENTIFICATION OF VARIATIONS/ CHANGEPOINTS IN THE OCCURRENCE RATE OF RADIOCARBON SAMPLES USING A POISSON PROCESS

Heaton, Tim (University of Leeds) - Al-assam, Sara (University of Leeds) - Bard, Edouard (CEREGE, Aix-Marseille University; Collège de France)

The reliability of a “dates-as-data” approaches is highly dependent upon our ability to estimate the calendar ages of the discoveries. This is particularly challenging in the case of radiocarbon (¹⁴C) due to the need to calibrate the set of samples you wish to summarise. This calibration introduces considerable uncertainties in the resultant calendar ages which most current approaches to summarisation (e.g., SPDs, KDEs, ...) do not rigorously incorporate.

In this talk, we provide a new, and statistically-underpinned, Bayesian approach to overcome these challenges. We model the occurrence of events (each assumed to leave a ¹⁴C sample in the archaeological/environmental record) as an inhomogeneous Poisson process, estimating the varying rate of samples using reversible-jump Markov Chain Monte Carlo. Given a set of radiocarbon samples, we aim to reconstruct how their occurrence rate varies over calendar time and identify if there are statistically-significant changepoints in this occurrence rate (i.e., specific times at which the rate of events abruptly changes). The resultant posterior estimate of the occurrence rate can be viewed analogously to a “dates-as-data” approach; while the ability to identify specific changepoints might suggest key times corresponding to changes in important external environmental factors.

We will demonstrate our approach on data exploring the expansion of humans, and the parallel disappearance of megafauna, in the Yukon and Alaska in the late Pleistocene and early Holocene: investigating both the timings of such migrations in comparison with the climatic changes known to have occurred during this period, and the potential interactions between humans and the various species in the region.

5 CALCULATING RATES OF CHANGE AND OBSERVING LATENT PROCESSES IN ARCHAEOLOGICAL 'BIG DATA'

McLaughlin, Rowan (Maynooth University)

Detecting past fluctuations in population and economic output by modelling the density of archaeological data is complicated by the issue of bias. This contribution explores this issue using simulation experiments and empirical data from Ireland, and presents some practical solutions to the problem. Firstly, dynamic growth models are expounded as a powerful alternative to ‘absolute’ density (i.e. SPD or KDE) models. Simulations demonstrate how these are less affected by biases. Because such models potentially amplify various forms of noise from the archaeological record, we also explore the limits of this technique. Secondly, we will see how such models can be usefully compared with palaeodietary evidence from stable isotopes palaeoenvironmental proxies. Thirdly, archaeological ‘grey’ literature is mined for qualitative information about bias in the minds of the archaeologists themselves. We then attempt to develop this into a mathematical description of a latent variable that may be present in density estimate models based on archaeological data.

6 BOSERUP OR MALTHUS? DID DEMOGRAPHIC CHANGES CAUSE ECONOMIC INNOVATIONS IN PREHISTORIC SOCIETIES IN THE BALKANS? OR THE OTHER WAY AROUND?

Kolar, Jan (University College London) - Bulatović, Jelena (Gothenburg University) - Riabogina, Natalia (Gothenburg University) - Speciale, Claudia (Institut Catala de Paleoeologia Humana i Evolució Social) - Staniuk, Robert (University College London) - Canteri, Elisabetta (University of Copenhagen) - Agerskov Rose, Helene (Gothenburg University) - Timpson, Adrian (University College London) - Shennan, Stephen (University College London)

The Balkan peninsula was among the first parts of Europe where the novel subsistence strategies – farming and animal herding – spread to from Southwest Asia. Neolithic farmers with Anatolian ancestry and new ways of life spread and their populations increased due to a set of innovations related to the Neolithic lifeways. Although farming and animal herding was a successful strategy for sustaining larger communities concentrated in villages and first urban-like settlements (tells), it also faced several problems (e.g., diseases from zoonosis, soil depletion, lower nutritional value of

food). Neolithic communities continued with further amendments in subsistence strategies - modification of crop spectra, changes in livestock management, higher importance of hunting, land use changes, higher mobility of fields etc.

This paper aims to explore the feedback between population growth or decrease and innovations in subsistence strategies during the Neolithic, Copper Age and Early Bronze Age (7,500-2,000 BCE) in the Balkan peninsula. We will investigate whether the population growth outpaced the agricultural production and innovations, or whether the higher population densities put the subsistence strategies under innovative pressure early enough to sustain the growing populations. This will be possible by using modeling procedures, multivariate statistics and large curated datasets of radiocarbon dates, archaeobotany and archaeozoology coming from hundreds of archaeological sites across the Balkans. Our paper will demonstrate the necessity of complementary data (archaeobotany, archaeozoology) for investigating population dynamics and will shed light on the usability of the dates-as-data approach for demographic research.

7 PREDATOR-PREY DYNAMICS IN RADIOCARBON DATASETS

Marom, Nimrod (University of Haifa) - Wolkowski, Uri (University of Haifa)

Predator-prey interactions have been a central theme in population ecology for the past century, but real-world data sets only exist for recent, relatively short (<100 years) time spans. This limits our ability to study centennial/millennial-scale predator-prey dynamics. We propose that regional radiocarbon databases can be used to reconstruct a signal of predator-prey population dynamics in deep time, overcoming this limitation. We test our argument by comparing the Kullback-Leibler divergence between top predator and prey summed probability distribution curves (SPDs) and randomly-generated SPDs in regional databases of predator and prey radiocarbon data from Pleistocene Beringia (published by Leonard et al. 2007) and the Holocene Judean Desert (published by Lazagabaster et al 2022). Our results suggest that the relation between predator and prey SPDs are not random, and, in the case of the Judean Desert, suggest a historical explanation supported by archaeological evidences. If our conclusions are correct, they could potentially extend the temporal depth of investigation of an important ecological phenomenon.

8 AUTOMATED CHRONOLOGICAL MODELLING OF LARGE QUANTITIES OF 14C DATES WITHIN A BAYESIAN FRAMEWORK

Canteri, Elisabetta (University of Copenhagen) - Rose, Helene (University of Gothenburg) - Kolar, Jan (University College London) - Ryabogina, Natalia (University of Gothenburg) - Timpson, Adrian (University College London) - Thomas, Mark (University College London) - Shennan, Stephen (University College London) - Kristiansen, Kristian (University of Gothenburg) - Racimo, Fernando (University of Copenhagen)

Archaeology is now entering an age of “Big Data”, where archaeological datasets across multiple studies are being combined into larger databases, covering broad geographic regions, and long periods of time. The increasing complexity of agglomerated data is broadening the spectrum of research opportunities, inviting the use of interdisciplinary approaches to help us better explore human (pre-)history. In turn, this calls for methodological approaches that can process large quantities of data in an automated way. Here, we present a pipeline for producing Bayesian chronological models, exemplified using ~700 14C dates collected across ~100 sites with ~125 phases in Western Eurasia, accessed from the Big Interdisciplinary Archaeological Database (BIAD). We automatically calibrate hundreds of 14C dates using the R software. We show how to process the data, run an OxCal model specifically tailored for it, and extract the calibration results in bulk. We use this as a case-study to ultimately understand the expansion of different crops in Western Eurasia during the Neolithic and Bronze Age periods. The use of statistical softwares like R and code that automatically processes data is now becoming a pressing need in archaeology, allowing us to ultimately identify the patterns and processes behind changes in cultural, genetic and social processes of the past.

9 DATING OCCUPATION GAPS IN SOUTH CAUCASUS: SCALE ISSUES AND DATA BIAS

Heit, Ilia (German Archaeological Institute, Eurasia Department)

Around 5000 cal BCE, there is a noticeable decline in archaeological evidence in the South Caucasus compared to the preceding Neolithic period. This cannot be attributed solely to the insufficient state of research on the Post-Neolithic period in this region. In diachronic macroscale studies, such data troughs are often associated with crises and depopulation. Radiocarbon dates are used as proxies to trace demographic processes, and the South Caucasus is a favourable region for such studies, as the volume of AMS dates has grown considerably in recent decades.

But what kind of data set is responsible for such large trends? As we move across different scales and examine settlement declines and disruptions at sub-regional or micro scales, questions arise about how to deal with data gaps, discontinuities, or ‘overdated’ contexts – elements that generate ‘noise’ at the higher level of consideration. How significant is the impact of simultaneous or temporally offset breaks in individual settlements on the broader picture of regional settlement? I will address these issues of scale and data bias by looking at the available Late Neolithic and

Chalcolithic 14C data from sites in the South Caucasus. My current project aims at the Bayesian modelling of the 14C data to temporally anchor phases of settlement and abandonment in the region. In this talk I will investigate whether zooming in and out between regions, subregions and settlements can be used to better understand settlement dynamics and data biases during the 6th and 5th millennia cal BCE.

776 PLASTER A MULTIPURPOSE MATERIAL FOR BINDING KNOWLEDGE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Nilhamn, Bonnie (Helsinki University) - Barouda, Archontoula (UCL Institute of Archaeology)

Session format: Regular session

Plasters have played an important role from the palaeolithic until recent history. The choice of raw materials and applications depended on many factors: traditions, know-how, and resources offered by the environment of the respective era. Their study can give insight into the technology used during different chronological periods. This session explores how new interpretive frameworks and emerging techniques on architectural plasters, plaster objects and plaster ware have increased our knowledge. The session seeks to improve awareness of how plaster technology developed and how plaster was used in various periods and regions. Plaster has been studied using a wide range of technologies, including petrographic analysis (optical microscopy), mineralogical analysis with X-ray Diffraction analysis (XRD), Thermal Analysis (DTA-TG), pXRF, ED-XRF, Raman Spectroscopy, SEM/EDS, GC-MS, FTIR-ATR. Using these archaeometric techniques, we can identify the characteristics of different materials and recipes (binders, aggregates, additives). Plaster production has also been studied experimentally and by studying ethnographic sources and ancient texts. There are many sources for plaster. Not all comprehensible for all. Therefore, it is essential when we study plasters to look for multi-disciplinary approaches, share knowledge with peers, and create cross-links between studied periods, regions, and disciplines. Hence, we invite archaeologists, historians, engineers and researchers of other disciplines to present and compare their studies from all prehistoric and historic periods. We welcome contributions considering all aspects of technology, cultural traditions, raw materials and applications surrounding plaster. Papers may include, but are not restricted to:

Materials science methodologies and new approaches

Experimental archaeology

When and where plaster emerged in different areas.

Raw materials and provenance studies

Plaster recipes and identification of plasters

The role of plaster and mortar within architecture (roof, floor, and wall plasters, cisterns/reservoirs/bins)

Plaster for producing portable objects and plaster ware;

The socio-economic role of plaster technology;

Development of Pyrotechnology.

ABSTRACTS

1 PLASTER - IS MY DEFINITION THE SAME AS YOURS?

Nilhamn, Bonnie (Helsinki University)

In this short introduction paper of our session, I would like to start addressing some problematic issues when discussing “plaster”. Many of us struggle to explain what we mean by “plaster,” especially when talking to people outside our field. We often understand each other within our research group, but the term can be misleading to others. In this paper, I’ll share some challenges and (sometimes hilarious) misunderstandings I encountered while studying Neolithic plaster ware, fka White Ware. These PW-containers may look confusingly similar to early pottery, but they are made from limestone or gypsum, not clay. These portable objects also relate to architectural features like stationary bins, using similar plaster materials, connecting them to other research fields such as building and construction history and wall art. Through this research, I have learned the importance of collaboration and clear communication across different disciplines, as the terminology and analysis methods are diverse. Plaster’s diverse uses and applications make it endlessly fascinating, with much left to explore and share.

2 PLASTER AS AN AID IN DATING CONTEXTS?

Hons, David (Department of Archaeology and Museology Masaryk University at Brno; Department of Archaeology Moravian Museum at Brno) - Golec, Martin (Department of History Palacký University Olomouc) - Mírová, Zuzana (Department of Archaeology Faculty of Arts Charles University) - Bartík, Jaroslav (Institute of Archaeology Czech Academy of Sciences Brno)

Introducing the potential of plaster as a material that can aid in the identification and dating of archaeological situations. Using several examples from different sites and contexts, I will present the different possibilities of using plaster as a deterministic material using portable/table XRF. The measured samples are always powdered. These examples are from several open settlements, cave sites and upland sites from the South Moravia region from the Bronze Age to the earlier Iron Age. Plaster material from one site can be distinguished from material from the same site but from a different period, at least in the lower hundreds of years, according to the data so far. This concept is gradually being verified at other sites, while looking for further possibilities of using the plaster, for more advanced analyses. The aim is to test the possibility of using the grease waste as a determinant for the contemporaneity of archaeological structures, which are often difficult to date accurately.

3 UNCOVERING STORIES HIDDEN IN THE WALLS OF THE BUDEČ ROTUNDA

Tomanova, Pavla (Institute of Archaeology of the Czech Academy of Sciences, Prague) - Valek, Jan (Institute of Theoretical and Applied Mechanics of the Czech Academy of Sciences) - Kozlovce, Petr (Institute of Theoretical and Applied Mechanics of the Czech Academy of Sciences)

Rotunda at Budeč is the oldest fully preserved medieval church in the territory of the Czech Republic. Due to the long history of archaeological research, there has been many hypotheses built up on historical and archaeological evidence about the age, origin, and construction history of the building. Interdisciplinary research of the building materials has been carried out to verify archaeological and historical interpretations, and also to bring new insights into otherwise unrecognised aspects of construction. Recent advancements in radiocarbon dating of mortars provided an opportunity to apply this method on samples from various parts of the structure. The resulting chronological ranges successfully contributed to understanding of the individual construction phases of the church. However, for some locations, the results did not provide sufficiently accurate time ranges. In order to establish a further insight into the data obtained, polished thin-sections of mortar samples were prepared and studied by means of optical microscopy using petrography and cathodoluminescence. These methods were used to characterize the mortars and evaluate the similarities that may be associated with the different construction phases of the masonry. An important aspect was also the assessment of binder related particles which provided hints about the mortar production and processing technologies. The study of the mortar samples also contributed to the identification of the presence of contaminants containing geogenic carbon, and thus helped to refine the interpretation of radiocarbon dating, or conversely, to increase the confidence in some of the dating.

Using the case study of mortars from the rotunda at Budeč, this paper presents the possibilities and limits of traditional archaeological and construction history research, ¹⁴C dating of lime binders and of material analyses, and finally, how all the methods can verify and contribute to each other.

4 HIGHLIGHTS FROM PHYSICOCHEMICAL CHARACTERIZATION OF SOME PLASTERS AND MORTARS FROM THE STAVANGER CATHEDRAL, NORWAY

Gebremariam, Kidane (Museum of Archaeology, University of Stavanger)

Stavanger Cathedral is one of the oldest standing cathedrals in Norway. It distinctively maintains most of its original architecture and is unique being continuously used from its construction in medieval period till today. The Cathedral's official 900th anniversary is scheduled to be celebrated next year. In connection with a restoration and conservation work, some mortar and plaster samples from different periods have been investigated to shed light on the materials and techniques employed. Diverse complementary techniques, optical microscopy (OM), scanning electron microscopy-energy dispersive X-ray spectroscopy (SEM-EDS), X-ray fluorescence spectroscopy (XRF), Fourier transform infrared spectroscopy (FTIR), Raman spectroscopy (RS), thermogravimetry (TG) and X-ray diffraction (XRD) were utilized for the characterization of the binding media, aggregates, and their transformations. Indicators of the impacts of previous environments such as air pollutants are acquired from some of the alteration products. Salt formations associated with interior plasters are also investigated. Physicochemical characterizations using multiple archaeometric techniques, covering compositional, mineralogical, morphological, and microstructural aspects of building materials, have multifaceted benefits. The results of such investigations beyond supporting well-informed conservation interventions, can facilitate archaeological and art historical studies.

5 MINERAL SUBSTRATES FOR WALL PAINTINGS ACROSS THE LATE ANTIQUE LEVANT

Burdajewicz, Julia (Academy of Fine Arts in Warsaw)

This paper presents the results of a research project that was aimed at investigating the execution techniques of Late Antique wall paintings found at archaeological sites of the Levant. The project was prompted by an observation that very few paintings from the period in question survive in good condition, as opposed to their Roman-period predecessors, which often present remarkable durability. It could be assumed that this difference in preservation resulted from the different execution techniques applied; these, however, are rarely investigated in the case of Late Antique wall paintings. Since the preservation of a wall painting greatly depends on the durability of its support, the research focused on the mineral substrates – mortars and plasters. Features such as the thickness of the layers, the type of binder, the type and characteristics of the aggregate/additive, and the binder/aggregate ratio were examined. The results showed that the approaches to the execution of the wall painting substrates in Late Antiquity were very diverse and, thus, far from being as universal as the procedures applied in the Roman period. Nevertheless, a certain consistency in their execution was noted on a local scale. The quality of the Late Antique mineral supports was clearly inferior in relation to those from the Roman period, which certainly explains the typically poor state of preservation of the former. The reasons behind the decline of the technical quality of the wall painting substrates in Late Antiquity should be explored further.

6 GYPSUM PLASTERS AND THEIR PROPERTIES: PRELIMINARY RESULTS OF THE STUDY ON THE PAPHIAN SAMPLES (CYPRUS)

Pizzo, Paola (Institute of Theoretical and Applied Mechanics, Czech Academy of Science; Institute of Classical Archaeology, Faculty of Arts, Charles University) - Válek, Jan (Institute of Theoretical and Applied Mechanics, Czech Academy of Science)

Cyprus is naturally rich in limestone and gypsiferous stones. This plentiful availability of raw materials prompted an equally prolific production of both lime and gypsum plasters. Our project focuses on the plaster industry in the Paphian region in a wide time frame running from the Late Bronze Age to the Early Roman times. This presentation will particularly shed light on the understudied category of gypsum plasters, with particular attention to their production process, raw materials sourcing and functionalities.

We characterized the gypsum binders by using a variety of multiscale approaches, including optical microscopy, x-ray diffraction, thermal analysis, and SEM-EDS. Preliminary results display a high degree of similarity between samples of different sites; the raw materials employed are locally sourced, and they are processed following the same procedure. The resulting mortars produced are employed to respond to similar functionalities, specifically to serve as masonry mortars in the construction phase. Some exceptional samples are also employed as wall plasters, although this functional diversity is not mirrored by any difference in terms of production and characteristics.

7 EXPLORING PLASTER TECHNOLOGIES IN NEOLITHIC MAKRI, NORTHERN GREECE: AN INSIGHTFUL PERSPECTIVE

Barouda, Archontoula (University College London (UCL)) - Quinn, Patrick (University College London (UCL)) - Efstratiou, Nikos (Aristotle University of Thessaloniki)

This presentation reveals the intricate craftsmanship of the Neolithic period through an exploration of plaster technologies at Makri, situated in Northern Greece. As part of the Marie Skłodowska-Curie Innovative Training Network (PlaCe), our research focuses on deciphering the sophisticated techniques employed in plaster production and application at this prehistoric site. Makri stands out as a significant archaeological site in the Greek Thrace region, yielding well-preserved artifacts and structures that provide valuable insights into ancient societies. By analyzing plaster materials and techniques, our study sheds light on the ingenuity and skill of Neolithic craftsmen in this region. Drawing on an interdisciplinary approach, combining macroscopic, microscopic, and chemical analytical methods, our research aims to reconstruct the intricate processes involved in plaster production. Through experimental data and comparative analysis, we seek to understand the cultural, technological, and socio-economic factors that influenced plaster craftsmanship at Makri. This presentation provides a detailed overview of our research, sharing preliminary findings on plaster materials and outlining the broader implications of our ongoing project. By shedding light on Neolithic craftsmanship, intercultural exchanges, and the socio-economic dynamics of early European communities, our study contributes significantly to the understanding of prehistoric cultural development in the wider region.

784 DEMAND FOR SALT: FROM PREHISTORY TO THE EARLY MODERN PERIOD

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Attema, Peter (Groningen Institute of Archaeology) - Sotgia, Agostino (Groningen Institute of Archaeology) - Alessandri, Luca (Sapienza University Rome)

Session format: Regular session

The Archaeology of Salt has a long tradition in Northwestern Europe and the Mediterranean in both the (ethno)archaeological, ethnographic and historical disciplines. As far as the early periods (Neolithic to the postclassical period) are concerned, studies show an emphasis on the changing production modes and trade mechanisms in light of the growing demand for salt caused by population growth. This is the case in the Roman period where in coastal contexts large scale salinae replaced more elaborate modes of marine salt production. Archaeologists lack however a robust insight in the size and nature of salt demand of prehistoric, classical and early medieval societies. Knowledge about these two aspects as well as about the many purposes for which salt was used, might help us interpret the organization and scales of salt production in more detail and to understand what was needed where. This in turn may inform us better on trade mechanisms. For this session we solicit papers that model salt demand in various periods and contexts, deal with types of salt demand in urban and rural contexts or study salt demand in the context of animal husbandry and pastoralist strategies (transhumance). We also invite those who have experience with salt demand in the medieval to Early Modern Period to contribute to this session in order to bridge the archaeological – historical divide in the study of salt demand.

ABSTRACTS

1 SALT ON DEMAND : THE IMPORTANCE OF SALT EXPLOITATION DURING THE IRON AGES IN EUROPE

Millot-Richard, Clara (Paris 1 Panthéon-Sorbonne, UMR 8215 Trajectoires) - Weller, Olivier (Paris 1 Panthéon-Sorbonne, UMR 8215 Trajectoires)

There is no doubt that salt is a crucial raw material in many economic systems. This is especially true of Iron Age economies, where salt was used to make cured meats, animal feed and handicrafts, but also as a store of value and perhaps also as an exchange standard.

The aim of this paper is to study salt production and exchange systems during the Iron Ages (Hallstatt and La Tène) in north-east France and south-west Germany. In these regions, the economic dynamics associated with the exploitation of mineral raw materials are particularly rich in information, due to the concentration of producing and consuming agents. The salt production sites, both in the Seille valley (Moselle) and at Schwäbisch Hall (Baden-Württemberg), are among the best known in a continental context. One of the specificity of salt production during the Iron Ages is the technique of briquetage. It is a very complex and demanding “chaîne-opératoire” with implications on both production and demand of salt. The aim here is to look at salt production on a regional and macro-regional scale, both proven and suspected, highlighting the agents and scales of production and consumption depending on the context. We will adopt both a technical approach as well as perspectives inspired from economic sciences. Comparisons with other production circuits, such as that for iron, will enrich our thinking. Archaeological data on salt production and consumption during the Iron Ages provide wider insights into the economic system.

2 SALT MINING IN CENTRAL ANATOLIA THROUGH AGES

Üncü, Hakki (Settlement Archaeology Department, Middle East Technical University)

Central Anatolia is renowned for its rich salt mines. A three-season survey has been conducted by me to investigate the relationship between archaeological settlements and the salt mines in northern central Anatolia. Those mines are recorded to have been operated during the Ottoman Empire and the Republican period. The results indicate that certain settlements may be directly related to salt production. These settlements, which are located very close to and sometimes within the salt production areas, are generally mounds and sometimes flat settlements. The related archaeological settlements, which yielded dense finds from the Early Bronze Age onwards, generally continued to yield uninterrupted finds until the Iron Age. The salt deposits that make up the survey region, which rest on the southern slopes of the northern Anatolian Mountains are also the core settlement areas of Hatti and Hittite civilizations. Some of the settlements mentioned in various Hittite documents are directly related to salt production. Now all the possible options are clear for the location of those settlements. During the survey, traditional salt production techniques were investigated with an ethnoarchaeological approach, and it was observed that these traditional methods may well have been used in ancient times.

3 SODIUM CHRONICLES... GRAIN BY GRAIN. QUANTIFYING SALT'S DEMAND IN ANTIQUITY

Sotgia, Agostino (University of Groningen)

Salt is one of the most versatile elements available. Its usage spans a multitude of applications, which expanded over time in tandem with advancements in understanding the specific properties of sodium chloride. Primarily, salt serves as a fundamental resource: it directly functions as a sustenance capable of replenishing the mineral salts lost by humans and animals during their daily activities. Moreover, it serves as a crucial medium for preserving perishable foods such as meat or fish, through brining, vegetables like olives become edible. Finally, by adding salt to milk, it can be transformed into hard cheese, facilitating preservation and transportation, notably during the transhumance of herds. The utilization of salt also extends into the sphere of craftsmanship. When added to clay, salt allows for the creation of vessels with superior insulating qualities. Its application is also fundamental in manufacturing processes such as leather tanning, weaving, and metallurgy. Furthermore, the use of salt in fields such as medicine or symbolic activities is documented.

This contribution aims to provide a model for estimating salt demand. Starting from an examination of ethno-archaeological research related to salt utilization, the paper will proceed to quantify salt demand for the cities of Tarquinia and Rome (Central Italy) from the Iron Age to the Archaic period (9th – 5th c. BCE). The selection of case studies, as well as the chronological period, is closely tied to the objectives of the Salt and Power project (<https://saltandpower.gia-mediterranean.nl/>), which investigates salt production, demand and control in Italy during the first millennium BCE. In addition to offering a mathematical model applicable to diverse contexts, this contribution seeks to analyse deeper how the development of urban entities influenced salt demand, potentially leading to a shift from production via briquetage (fire induced salt making in ceramic containers) to salinae (evaporation in salt ponds).

4 UNEARTHING SALT: EXPLORING CERAMIC EVIDENCE FOR SALT PRODUCTION IN A CENTRAL ITALIAN COPPER AGE COMMUNITY

Conati Barbaro, Cecilia (Dipartimento di Scienze dell'Antichità, Sapienza University of Rome) - Marconi, Nadia (Dipartimento di Scienze dell'Antichità, Sapienza University of Rome) - Manfredini, Alessandra (Dipartimento di Scienze dell'Antichità, Sapienza University of Rome)

Salt, essential for human and animal sustenance, has seen increased demand with the rise of herding economies, notably since the Neolithic. Identifying salt usage, production, and distribution markers in the archaeological record is challenging due to its soluble nature, leaving few traces in extraction or containment artefacts. Thus, reliance on indirect indicators is essential. This presentation aims to discuss the hypothesis of salt production within a Central Italian Copper Age community based on pottery evidence.

The archaeological site of Maddalena di Muccia (Marche - Italy) is located at the foot of the Apennine mountains, strategically positioned at a crossroads between the main natural routes linking the Adriatic and Tyrrhenian regions. Occupied during the third millennium BCE, the settlement was inhabited by herders communities. Noteworthy finds include numerous standardized truncated cone-shaped vessels discovered in large fragments within pits, often accompanied by abundant charcoal and cooking slab remains.

These vessels, highly standardized in fabric, shape, size, and manufacturing technique, indicate a non-curated production for specific purposes, followed by intentional breakage. Comparisons with contemporaneous sites in Romania and Bulgaria, where salt production through briquetage is confirmed, support hypothesizing a similar function for Maddalena di Muccia. Ethnographic evidence of domestic salt production in the area, along with toponyms referring to salty waters, further encourages us to continue working around the hypothesis of salt production.

5 CHARACTERISTIC AND MEANING OF 8TH CENTURY UYGHUR SALT MINERS AT THE DAVST UUL SALT MINING SITES IN MONGOLIA

Han, Jinseong (Institute of Korean Archaeology and Ancient History, Kyung Hee University, Seoul, Republic of Korea.) - Hong, Jong Ha (Institute of Korean Archaeology and Ancient History, Kyung Hee University, Seoul, Republic of Korea.) - Ganbold, Ankhsanaa (National Center for Cultural Heritage, Ulaanbaatar, Mongolia.) - Mendbazar, Oyuntulga (National Center for Cultural Heritage, Ulaanbaatar, Mongolia.) - Kang, In Uk (Institute of Korean Archaeology and Ancient History, Kyung Hee University, Seoul, Republic of Korea.)

The Davst ul Salt Mine in Uvs aimag, Mongolia, is a traditional rock salt site that continues to be actively mined today. In 2017, a local resident discovered mummies and wooden-working tools while excavating for salt, prompting a rescue excavation. This excavation yielded a collection of wooden-working tools used in salt mining, bags of salt rocks, and a mummy that had been crushed to death during mining operations. In this presentation, it analyzes the archaeological context of the Davst Salt Mining site in several ways. Firstly, it examines the wooden-working tools utilized in salt mining, categorizing them by type and function. Secondly, it delves into the societal status and role of salt miners during that period. Thirdly, it provides a preliminary assessment of the organization and distribution of salt production

during the Uyghur period. Unraveling the complexities of salt supply and demand in archaeology is challenging. It is hoped that this study will contribute to a deeper understanding of salt production, distribution, and trade during the medieval Mongolian period, as well as within the steppe nomadic societies of eastern Eurasia. Collaboration on scientific analysis is eagerly anticipated to enrich the ongoing discussion. This study is supported by the National Research Foundation of Korea (NRF) grant (NRF-2023R1A2C1006785)

6 MODES OF EXPLOITATION AND TRADE MECHANISMS OF SALT IN MEDIEVAL AND MODERN EASTERN ROMANIA

Asandulesei, Mihaela (Alexandru Ioan Cuza University of Iasi)

The potential of Romania's salt resources within its territory is undeniable, and this has been consistently affirmed in academic circles through numerous national and international events over time.

In the eastern Carpathian region of Romania, the area under study, the presence of salt in both liquid and solid forms is well-documented across various historical periods, tracing back to prehistoric times with the earliest exploitation activities.

The approach to harnessing the natural mineral to meet daily needs or for economic endeavours stems from the efforts involved in the execution of spring catchment systems or from the diverse range of installations dedicated to the intensive extraction of solid salt. These methods are unique to each distinct era and undergo continual development.

The documentation of the presence of the natural mineral in various written or cartographic sources (such as maps, travel diaries, letters, descriptions, public or private documents) from different periods, particularly during the medieval and modern eras, highlights the significant importance attributed to saline substances in the development of human communities from social, economic, and ethno-cultural perspectives.

Our intervention seeks to conduct a retrospective analysis of documentary sources from the medieval and modern periods concerning pre-industrial and industrial exploitations, along with associated legal regulations. Additionally, we aim to explore methods of capitalization within the economic circuit, including trade and exchanges, both within the studied area and in the broader context of Southeast Europe.

Our documentation confirms a significant level of salt exploitation activity in the area under examination during the specified periods, and it also delineates methods of economic capitalization associated with this activity.

7 PREHISTORIC LARGE-SCALE SALT PRODUCTION, TRADE, POWER AND WEALTH IN SOUTH-EASTERN EUROPE

Kavruk, Valerii (The National Museum of Eastern Carpathians)

Prehistoric large salt production in southeast Europe is attested in two sites: Provadia-Solnitsata in north-eastern Bulgaria (inland brine evaporation, Chalcolithic) and Băile Figa (shallow rock salt mining and brine processing, Late Bronze Age) in Transylvania (central-northern Romania). To better understand the nature of this salt production, the paper integrates it into holistic pictures of the Balkan-Pontic-Anatolian Chalcolithic and Bronze Age of the Carpathian Basin.

Salt production in Provadia-Solnitsata during the Chalcolithic was part of a complex and vast system of power, economy and trade that included Eastern Balkans and possibly Anatolia. Salt obtained from this site was supplied mainly to the Balkan Peninsula. In addition, it must have been used for salting food products, including sturgeon and caviar, which were perhaps traded even to Anatolia. The fabulous richness of the Varna necropolis and some other site sites in north-eastern Bulgaria strongly suggest that salt was an essential trigger of the economic, social and political advance of this region during the Chalcolithic period.

During the Bronze Age, Transylvania became the most advanced salt production region of south-eastern Europe. In prehistoric times, the Tisza-Danube Interfluve was home to many lakes and swamps rich in food. To benefit from this resource, local people needed to trade it. This would not have been possible without salt, which they received from Transylvania and the Alpine region. Trade in salt and salted food explains the region's high socio-economic level during the Bronze Age, including the period between c. 1500 and 800 BC when large-scale salt production was carried out in Transylvania.

787 ARTISTS AND CRAFTSMEN. MULTIDISCIPLINARY APPROACHES IN THE ANALYSIS OF THE PRODUCTION OF EARLY MEDIEVAL WALL PAINTINGS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Cassitti, Patrick (Foundation pro Monastery of St. John, Müstair; Albert-Ludwigs-Universität Freiburg, Abteilung für Frühgeschichte und Archäologie des Mittelalters; Otto-Friedrich-Universität Bamberg, Lehrstuhl für Archäologie des Mittelalters und der Neuzeit) - Bordi, Giulia (Università degli Studi Roma Tre, Dipartimento di Studi Umanistici) - Cavallo, Giovanni (Scuola universitaria professionale della Svizzera italiana, Dipartimento ambiente costruzioni e design)

Session format: Regular session

Wall paintings provide valuable information on the culture and history of past societies. Because they are inextricably linked to the buildings on which they have been applied, their study happens at the intersection between Archaeology, Art History, the history of Architecture, and the natural sciences. In recent years, the field has advanced to the forefront of interdisciplinary studies. A wide, international exchange and an integration of knowledge and methods has however not yet taken place.

This session aims to promote collaboration and knowledge exchange between archaeologists, conservators, art historians and scientists working in the field of mural painting research, to present innovative methodologies and technologies used in the analysis and conservation of wall paintings and to encourage a deeper understanding of the cultural, artistic and historical significance of wall paintings through multidisciplinary approaches.

It will achieve this by bringing together researchers and experts from different backgrounds to present different views and approaches to the study of wall paintings as works of art, linked to different figurative cultures, and as products of technical and craft knowledge. A wide range of topics will be addressed, including, but not limited to:

- Analysis of painting techniques.
- Techniques of non-destructive analysis of wall paintings.
- Advances in methods of dating wall paintings.
- Characterisation of materials and provenance studies of pigments and binders.
- Documentation and conservation of wall paintings.
- Comparative analyses of wall paintings in different regions and periods.
- Interdisciplinary collaborations in research on wall painting.

ABSTRACTS

1 MERGING PERSPECTIVES: OPPORTUNITIES AND CHALLENGES IN INTERDISCIPLINARY WALL PAINTING RESEARCH

Cassitti, Patrick (Foundation pro Monastery of St. John) - Villa, Luca (Foundation pro Monastery of St. John) - Cavallo, Giovanni (Scuola universitaria professionale della Svizzera italiana, Dipartimento ambiente costruzioni e design) - D'Erme, Chiara (Scuola universitaria professionale della Svizzera italiana, Dipartimento ambiente costruzioni e design)

In 2022, the research initiative "Forgotten Colors - Rediscovering the Original Polychromy of Early Medieval Wall Paintings in the Raetia Curiensis Region" was initiated with support from the Swiss National Science Foundation. This ambitious project engages nine collaborative partners spanning diverse scientific fields, including archaeology, art history, heritage studies, science communication, digital humanities, material sciences, mineralogy, and physics.

The broad interdisciplinary collaboration not only offers fresh insights into the past but also presents significant challenges in harmonizing methods and synthesizing data across various disciplines. To address these challenges, the project employs a comprehensive approach, integrating microarchaeology alongside concepts and methods derived from Actor Network Theory and Symmetrical Archaeology. This bottom-up methodology entails meticulous examination of evidence and data from individual sites, culminating in the development of theories and descriptive networks through the synthesis and comparison of generated information. Furthermore, visualizations, including physical and augmented reality reconstructions of polychromies from selected sections of paintings, are being crafted.

This paper delves into a detailed exploration of this approach, providing an evaluation of the practical application of the theoretical concepts employed in the research project.

2 UNDERSTANDING THE CAROLINGIAN ARTIST THROUGH A NOVEL WORKFLOW INVOLVING MULTIMODAL REMOTE AND IN-SITU SPECTRAL IMAGING AND SPECTROSCOPIC TECHNIQUES

Liggins, Florence (Nottingham Trent University) - Detalle, Vincent (Centre National de la Recherche Scientifique (CNRS), Paris, France) - Romano, Francesco (CNR, Istituto di Scienze del Patrimonio Culturale (ISPC-CNR), Catania, Italy) - Cassetti, Patrick (Foundation pro Monastery of St. John, Müstair) - Liang, Haida (Nottingham Trent University)

F. Liggins, S. Kogou, C.S. Cheung, A. Vichi, A. Suzuki, V. Detalle, X Bai, M. Botticelli, C. Caliri, E. Ravan, F.P. Romano, C. Tennenini, P. Cassitti, H. Liang

The analysis of historical wall paintings can invite several obstacles, such as scale, complexity, diversity of materials, in substrate, pigment and binder. Locating restorative work can further add complication, especially where the work has been applied in a heterogenous manner. The Benedictine convent of St. John, a UNESCO world heritage site in Müstair, is host to both original Carolingian paintings (8th – 9th Century), and 20th Century restorative work and is therefore a prime example of where multiple methods are needed for large-scale analysis.

We demonstrate a novel workflow for thorough analysis of large-scale wall paintings which starts with a survey using a ground-based high spatial resolution remote spectral imaging system (PRISMS), which can scan entire building interiors at distances of order ~10m, providing 10-band reflectance spectra in the visible to near infrared (VNIR) (450-850nm)[1]. Hyperspectral imaging is also carried out with higher spectral resolution (~nm) covering the VNIR and shortwave infrared (SWIR) (1000-2500nm)[2]. These datasets are processed using in-house developed machine learning methods to provide material distribution maps based on reflectance spectra[2,3] such that further analysis only needs to be performed in targeted areas. Point-based analyses provide necessary complementary information in material identification, in this case ground-based remote Raman spectroscopy[4], close-range Laser-induced Breakdown Spectroscopy (LIBS), X-ray Diffraction (XRD), X-ray Fluorescence (XRF) and Fourier Transform Infrared (FTIR) spectroscopy.

Whilst demonstrating this workflow on the murals in Müstair through an IPERION HS MOLAB campaign[5], we're able to identify pigments from the original Carolingian artist's palette and define to what extent these materials are still distributed across the wall paintings.

[1] <https://doi.org/10.1016/j.isprsjprs.2014.05.011>

[2] <https://doi.org/10.1038/s41598-020-76457-9>

[3] <http://dx.doi.org/10.1186/s40494-022-00765-8>

[4] <https://doi.org/10.1364/OE.27.031338>

[5] Molab Iperion HS: <https://www.iperionhs.eu/molab/>.

3 INSIDE AND THROUGH PALIMPSEST WALLS. SANTA MARIA ANTIQUA AND EARLY MEDIEVAL PAINTING IN ROME

Bordi, Giulia (Roma Tre University) - Pogliani, Paola (Tuscia University) - Pelosi, Claudia (Tuscia University) - Lanteri, Luca (Tuscia University) - Valentini, Valeria (Tuscia University)

The multi and interdisciplinary research group consisting of art historians, restorers and chemists wants to present the research conducted within the European project Enhancement of Heritage Experiences: The Middle Ages. Digital Layered Models of Architecture and Mural Paintings over Time (EHEM), funded by Horizon 2020 - JPICH Conservation, Protection and Use. Case study is the church of S. Maria Antiqua and its extraordinary heritage of stratified murals from the 2nd to the 11th century.

For years, the team has been working on the development of an integrated system for the identification and characterisation of individual painting phases in order to date them.

Starting from the autoptic analysis of the plasters and their mapping on a digital basis, the study of materials and techniques was tackled to support the identification of the distinct pictorial layers using scientific analyses for the characterisation of materials combined with multispectral imaging surveys. The data is being fed into a database and annotation system linked to the 3D model of the monument.

The results of the research conducted on the paintings of S. Maria Antiqua are being compared with artistic production in Rome in the early Middle Ages thanks to the project: Rome and the Others (300-1300). Foreigners in the city between conflicts and integration, funded by Prin 2022-PNRR, started in January 2024.

4 FROM ROCK ART TO MEDIEVAL CHURCHES: THE CONTRIBUTION OF DIGITAL IMAGE ENHANCEMENT SYSTEMS

Croci, Chiara (University of Lausanne)

Developed for the study of rock paintings, the digital image enhancement system DStretch reveals great potential in support of archaeological and art historical research, especially for the study of stratified pictorial surfaces or those in precarious state of preservation.

Within the SNSF project "Rome aux siècles 'obscur'. Les lumières de la communication visuelle, Ve-XIe siècles", directed by Chiara Croci and Irene Quadri at the University of Lausanne, this tool was used to deepen the knowledge of pictorial works of early medieval Rome.

Digital enhancement through DStretch brought to light traces of pictorial scenes now invisible to the naked eye, 'pentimenti' and stratifications, which guided further investigations conducted using multispectral photographic techniques in collaboration with Prof. Eng. Rita Deiana of the University of Padua.

Through a selection of case studies from churches such as San Martino ai Monti, Sant'Adriano al Foro and San Clemente (8th-9th century), this paper aims to illustrate the contribution of digital enhancement as a preliminary tool to identify elements worthy of further investigation to shed light on the technical and conceptual mechanisms of medieval artistic production.

5 LET'S TRY TO MAKE THE FRAGMENT SPEAK - THE WALL PAINTING CYCLE IN THE CLOISTER OF BRANDENBURG CATHEDRAL

Schaedler-Saub, Ursula (HAWK University of Applied Sciences and Arts Hildesheim) - Krause-Riemer, Sabine (HAWK University of Applied Sciences and Arts Hildesheim) - Pursche, Jürgen (HAWK University of Applied Sciences and Arts Hildesheim)

How can we understand, visualize and mediate fragmentary medieval wall paintings? With a still on-going research study on extremely damaged wall paintings funded by Deutsche Forschungsgemeinschaft, we present interdisciplinary collaboration and innovative methods and techniques of digital documentation, visualisation and partial reconstruction, avoiding any harmful physical intervention.

One of our case studies is the wall painting cycle dedicated to the Liberal Arts and the Mechanical Arts, created in the 1440ies in the former Premonstratensian Library in the cloister of Brandenburg Cathedral. After the secularisation of the cloister in 1507, the wall paintings were forgotten. Various changes of use and a succession of renovations led to heavy damages and losses of the paintings. Re-discovered and uncovered in the early 21st Century during an urgent structural conservation, the wall paintings were preserved unretouched. However, the fragments without any restoration require visualisation and mediation.

Our project started with a comprehensive interdisciplinary investigation aimed at understanding the extremely reduced painting cycle in its architectonic, cultural and artistic context. We studied the historical materials and techniques of the paintings and their actual state of preservation with mostly non-invasive techniques. For the visualisation of all painting traces not observable in the visible light, we developed the methodology of the so-called spectral photo-piles which are composed of different rectified spectral images, including UV-luminescence imaging, hyperspectral and multispectral imaging and digital image processing with decorrelation stretch and Principal Component Analysis (PCA). A critical interdisciplinary evaluation and interpretation of the results enabled us to create a scientifically based digital visualisation with simplified partial reconstruction of the painting cycle – a very important contribution for a better understanding of the historical, cultural and aesthetic values of fragmentary preserved wall paintings.

6 TOKALI PROJECT IN CAPPADOCIA. INTEGRATED AND INTERDISCIPLINARY SYSTEM FOR THE KNOWLEDGE AND CONSERVATION OF MURALS

Pogliani, Paola Luisa (University of Tuscia) - Andaloro, Maria (University of Tuscia) - Alberti, Livia (University of Tuscia) - Pelosi, Claudia (University of Tuscia) - TEMUR YILDIZ, Hatice (Nevşehir Restorasyon ve Konservasyon Bölge Laboratuvarı Müdürlüğü) - Kantoğlu, Ömer (Tenmak)

The speech stems from the project, "Rupesrian painting in Cappadocia: knowledge, conservation and enhancement", which the University of Tuscia has been conducting in Cappadocia (Turkey) since 2006.

The work focuses on the knowledge of the numerous murals of Cappadocia (6th-13th century), based on research carried out during the survey in the region, and then from the experience acquired from conservation projects undertaken at two rock-cut churches: the Forty Martyrs in Şahinefendi and the New Tokali in the Göreme Open Air Museum.

The paper aims to present, in particular, the Tokali project that is a collaborative project with the Archaeological Museum and the Regional Restoration Laboratory of Nevşehir.

The project focuses on the knowledge and conservation of the extraordinary painting complex of the New Tokali Church dating from the mid-10th century. As far as knowledge is concerned, the main line of research is to study the pictorial process from conception to realisation. Central to the topic of conservation is the complicated restoration of the paintings, which has been ongoing since 2011.

Knowledge and restoration are the topics that in the Tokali project are organically connected with the characterising aspect of the monument that is the intimate relationship exists between art-historical features of their wall paintings in the context of the rock-cut. This approach is based on an integrated and interdisciplinary system of research and investigation and necessarily demands the collaboration of the historical, humanistic and techniques disciplines together with the hard science (chemistry, physics, geology, agronomy).

In the Tokali project, one important line of our work focuses on the techniques and materials of painting in the context of Cappadocia painting production (database <http://bancadati.museovirtualecappadocia.it/>). The peculiarities of the secco technique and the complex methods of execution will be emphasised through the approaches of autopsy analysis and scientific investigations carried out so far.

7 INTERDISCIPLINARY APPROACHES TO IMPLEMENT ON SITE WALL PAINTINGS CONSERVATION - A CASE STUDY FROM THE CHURCH OF MÜSTAIR

Leandri, Caterina (Stiftung Pro Kloster St. Johann Müstair) - Martinucci, Camilla (Stiftung Pro Kloster St. Johann Müstair) - Emmenegger, Rufino (Stiftung Pro Kloster St. Johann Müstair)

The Convent of Müstair (Switzerland) is a UNESCO site renowned for its wall paintings dating back to the 8th - 13th century, preserved in its main church. Starting in the late 20th century the painted surfaces underwent extensive art historical, technical, and diagnostic research, addressing topics like original technology, conservation history and state of conservation. The outcoming data led to gradual treatment applications, up to the current restoration campaign interesting the east wall of the church, since 2018 concentrated on the central apse.

The paintings characteristics, both original and later added materials, along with complex conservation issues have made the support of scientific systematic methodologies necessary in outlining intervention strategies and formulate their implementation over time.

As usual for medieval paintings, also the Müstair cycle can be seen as an outcome of different cultural heritage management practices performed over time. Some portions were covered and are today barely visible, others were strongly overpainted due to its fragmentary state.

The conservator's challenge lays in ensuring accessibility to various stakeholders while maintaining the objects physical integrity and guarantee long-term preservation. This often requires striking a balance between conservation of the material evidence together with considering monuments significance and context. A multidisciplinary approach with outstanding applications of scientific procedures is therefore crucial in providing support on the sitework, particularly in overcoming limitations of human perception by revealing aspects that otherwise cannot systematically and objectively be formulate.

The long in situ applied research allows for an overview of the evolution of analytical techniques, with particular emphasis on the increasing potential both in terms of reduced invasiveness and precision in addressing the starting questions. The Müstair case study exemplifies the delicate interplay between historical approaches and modern treatment methodologies, highlighting the indispensable contribution of interdisciplinary research to develop informed and effective conservation practices.

8 THE PALIMPSEST OF THE MAGDALEN CHAPEL OF ST. EMMERAM, REGENSBURG - AN ANALYTICAL CHALLENGE

Thalguter, Nadia (Technical University of Munich) - Angelin, Eva (Technical University of Munich) - Mindermann, Simon (Technical University of Munich) - Sessa, Clarimma (Technical University of Munich)

The Magdalen Chapel is part of the monumental church of St. Emmeram in Regensburg (Germany). It shows a unique palimpsest of wall paintings from four simultaneously visible different painting phases.

The oldest wall paintings originate from the middle of the 12th century and depict the life of a penitent, probably Saint Maria Aegyptiaca. The fragments of the second phase, dating from around 1400, show a Man of Sorrows and Christ on the Mount of Olives. At the end of the 15th century, in the third painting phase, standing saints and an angel were painted. The fourth painting, which was probably created in the first half of the 17th century, is a decorative painting with putti and garlands of fruit on a white background.

Nowadays, the fragmentary status of the wall paintings hinders their readability and poses queries about their conservation. A multimodal in situ approach was used to characterize the materials, understand the art techniques, and explore the aging phenomena, thereby ensuring the understanding of this complex artwork.

The paintings were systematically investigated by an interdisciplinary team of conservator-restorers and scientists. They were documented through photogrammetry, technical photography (VIS and UVL) as well as visual observation mapping using metigo@MAP software. Hyperspectral imaging (spectral range 400 - 2500 nm) and macro-X-ray fluorescence were combined with punctual Raman and Mid-infrared measurements for material characterization purposes. Terahertz imaging was tested for the investigation of the stratigraphy of selected areas.

The combination of the investigation done by the conservator-restorer, mapping, technical photography, and analytical results, allowed the assignments of the individual painting phases and relative palette, identification of later interventions, and visualization of hidden layers.

The information gathered using the multi-modal, non-invasive approach will serve to develop a conservation strategy and a new concept for the access and readability of the Magdalen Chapel palimpsest.

9 SURROUNDED BY SAINTS. CONSERVATION AND PREVENTION WORK IN OLD DONGOLA, SUDAN

Skarzynska, Magdalena (Polish Centre of Mediterranean Archaeology UW)

The role of an art conservator has long exceeded the practical aspect of this profession. Preserving the material side of a monument is only one of the conservator's tasks. He became not only a "doctor" but also an "advocate" of works of art, participating in heritage science, developing documentation, appropriate prevention and cooperating with other scientists. These ideas guide conservation work at the archaeological site of Old Dongola in Sudan. Dongola served as the capital of Makuria, one of the most prominent medieval African states. Archaeological research began in 1964 as part of the mission of the Center for Mediterranean Archeology at the University of Warsaw. The institution continues to work on this site under the supervision of Professor Artur Obluski. The research area encompasses the citadel situated on the eastern bank of the Nile and the Monastery of St. Anthony the Great. The Old Dongola site's most significant discoveries include polychrome churches. These interiors feature representations of saints, archangels, the Virgin Mary, and Christ, which are typical of Eastern Christian iconography. Additionally, images of Nubian dignitaries and hierarchs decorate these interiors. The unique local elements woven into traditional Christian iconography make these interiors particularly noteworthy. In addition, the paintings showcase different styles and technologies.

The presentation aims to showcase the conservation care and documentation system implemented at the archaeological site. It will also cover recent conservation work on wall paintings in the NB2 church, the Church of the Archangel Raphael, and the „Throne Hall“. Additionally, it will discuss conservation of current archaeological discoveries, such as the apse of the Great Church of Jesus and the room with king Dawid painting.

10 THE COLOURS OF THE MEDIEVAL WALLS: THE CASE OF SANT QUIRZE DE PEDRET

Cayuela, Begoña (Ars Picta (Universitat de Barcelona))

The international project EHEM (Enhancement of Heritage Experiences: The Middle Ages. Digital Layered Models of Architecture and Mural Paintings over Time) has been an opportunity to delve into an area of study little frequented by historians of medieval art: the colour of medieval walls. EHEM has been developed by a multidisciplinary team with researchers from Italy, Cyprus, and Catalonia.

One of the aims has been to create digital layered models of medieval architecture and mural paintings to provide an improved perception to the public of the original wall paintings and a tool for researchers, restorers, and heritage curators. The goal was to solve certain chromatic issues that medieval mural currently present, but immediately we realized that one major challenge was to establish the most reliable representation system in digital environments of medieval wall paintings.

The hermitage of Sant Quirze de Pedret (Spain) was decorated at two different times by superimposing two layers of wall decoration. After their discovery, the paintings were removed and transferred to the Museum of Barcelona and the Museum of Solsona and were subjected to different conservational procedures. The restoration criteria applied have resulted in notable differences in the current chromatic perception.

In this paper we will discuss the issues faced by the team in the process of recovering the colours of Pedret. It will also review the experience of determining the material characteristics of the frescoes, their chromatic palette from the digital images and grouping them in the digital model to offer a unique opportunity to see the paintings on the virtual walls and to regroup pieces originally of the same fresco that nowadays are disperse. Lastly, but not least, we will reflect on the relevance of this approach to understand the techniques used by the medieval painters of Pedret.

11 THE 11TH-13TH CENTURY WALL PAINTINGS IN CANTON TICINO, SWITZERLAND: A SYSTEMATIC STUDY

Luppichini, Stefania (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC)) - Piqué, Francesca (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC)) - Moretti, Patrizia (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC)) - Caroselli, Marta (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC)) - Lumia, Chiara (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC)) - Schädler-Saub, Ursula (University of Applied Sciences and Arts, Faculty Architecture, Engineering and Conservation, Hildesheim, Germany (HAWK)) - Jean, Giacinta (University of Applied Sciences and Arts of Southern Switzerland (SUPSI_IMC))

Since 2022, the Conservation and Restoration unit of SUPSI-IMC is studying of a series of 11th and 13th C. wall paintings located in churches in Canton Ticino, Switzerland. Among these are S. Maria Assunta in Sorengo, S. Vittore in Muralto, SS. Gervasio e Protasio in Cadempino and the Baptistry of Riva San Vitale. The aim of the study is to characterize the painting technique (materials and methods) and the history of the buildings' construction. The study is supported by grant from the Beate und Hans Peter Autenrieth Foundation.

Through visual examination combined with scientific investigations, the team has identified and documented aspects of the painting technique such as "giornate", incisions and snapped cord, lime-based paint and the use of traditional pigments such as ochres but also precious ones like Lapis Lazuli (Sorengo and Muralto), Azurite (Sorengo and Riva San Vitale), Egyptian Blue (Cadempino), Minio, Biacca and Cinnabar (Sorengo) applied with organic binders (no longer identifiable).

At Sorengo, the combination of archival research with on-site observations, stratigraphic analysis of the elevations of the Romanesque church, the dating of mortars and wood provided in-depth knowledge on the phases of construction.

The study faced the multiple challenges presented by the impact of previous restoration interventions. The churches have undergone architectural modification and, from the 1920s to the 1980s, attempts at recovering the Romanic wall painting schemes.

For each site, the results (graphic documentation and investigations) are organized and managed on a GIS platform.

The presentation will illustrate the extent and the result of the study of the paintings, showing technological and stylistic similarities which give important insights into the cultural and commercial exchanges of this historical period in Canton Ticino.

12 THE DATING OF PYRENEAN ROMANESQUE PAINTING

Guardia, Milagros (Universitat de Barcelona)

The research group ArsPicta of the Universitat de Barcelona, which has been involved in the study of Romanesque mural painting in the Pyrenees region, presents the following proposal:

Under the topic: Advances in methods of dating wall paintings.

The dating of Pyrenean Romanesque painting

Milagros Guardia

Ars Picta

Research Institute for Medieval Cultures (IRCVM)- Universitat de Barcelona

The historical-artistic discourse developed in relation to Pyrenean and Hispanic painting in general has been established based on chronological reference points and the establishment of formal relations between the various pictorial groups. For the latter, in turn, using a figure, that of the "master" who would be the material author of a work and to whom, precisely because of formal relationships, others have been attributed, ultimately inventing a supposed catalog. The formalist method in relation to the work of Romanesque muralists has been repeatedly questioned, though perhaps with little success or, at any rate, with little significance in general studies, and the appropriateness of the term master and the possibility of conserving more than one work by the same team has also been debated.

However, chronological marks have been scarcely discussed, and it is precisely on them that the possibility of establishing a coherent historiographical discourse is based. This is the intention of the communication presented here, precisely to subject to criticism, and to dismantle some of these references of dating of our paintings.

13 MEDIEVAL WALL PAINTINGS STUDIES VERSUS NEW METHODS OF DATATION

Boisseau, Claire (CNRS) - Marzais, Amaëlle (Université Lyon 2)

Over the past decades, technologies involved in medieval wall painting studies had transformed our way of considering it. Now we all use chemical analysis of the murals and their components to specify their dating and their context of production. Since the invention of radiocarbon or dendrochronology, new analysis can now be more accurate based on white lime or whitelead. In the meantime, Art history try to think about new methods to use stylistic details of

the paintings to appreciate their datation. Some of these methods are inspired by archeology, like typo-chronology. All these collaborations bring many benefits to the understanding of murals, but it's still a challenge for everyone. Humanities and new technologies focused on distinct preoccupations. The real benefit in the past was to refocus art history on the materiality, that was not taken in consideration at that days. But, it is clear that the chronological ranges given by carbone 14 are so large (over two or three centuries) that sometimes it is not a help at all to precise the context of creation of a mural. Thanks to examples from mainly French area, the aim of this contribution is to recap the challenge implied by an interdisciplinarity collaboration. It will recap methods and problematic cases exposed on April 2024 at the INHA (Paris) during the Workshop titled "Dater les peintures murales médiévales : approches interdisciplinaires".

789 SHARING, MERGING AND ANALYSIS OF NONINVASIVE ARCHAEOLOGICAL DATA: TOWARDS A MCSA DOCTORAL NETWORK

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: van Leusen, Martijn (Groningen Institute of Archaeology; International Mediterranean Survey workshop) - Campana, Stefano (University of Siena) - Verhegge, Jeroen (University of Ghent; PROSPECT)

Session format: Round table (without formal abstracts)

In the past half century, a massive but underused archaeological data resource has been building up, composed of different kinds of noninvasive observation. From the 1950s onward, fieldwalking surveys and aerial photography have been used to map surface archaeological remains and features over millions of square kilometers; more recently, near-surface geophysics and various types of remote sensing methods including lidar have begun to contribute more 'hidden' archaeological data. Each of these noninvasive approaches contributes valuable and complementary information about the presence, character, and degree of preservation of archaeological remains in the soil, but so far they have been the preserve of mostly separate groups of academic and commercial actors – subdisciplines that have attempted, but mostly failed, to collaborate. The challenge now is to break down the disciplinary and institutional walls between the different research communities, so that different noninvasive data can be shared and integrated for analysis, and can thus have a much greater impact on heritage management across Europe.

This roundtable session aims to bring together prospective partners to develop a proposal for a MCSA doctoral network, aiming to train up a new generation of scholars and heritage managers, not hampered by tradition, for data sharing, merging and analysis. A broad range of academic, professional, and HM partners will be needed, so students not only learn to understand the ins and outs of each noninvasive approach, but also to understand how these are conditioned by geoscientific circumstances and how current obstacles to data sharing and merging can be overcome.

790 THE (COPPER) AGE OF TRANSFORMATION: RESEARCH DEVELOPMENTS ON C. 4500-3500 BC FROM AROUND THE CARPATHIAN BASIN

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Ridge, William (University of Illinois at Chicago) - Tomazič, Iride (University of Michigan) - Čataj, Lea (Croatian Conservation Institute)

Session format: Regular session

For decades, the archaeological record of the Copper Age (including the name) was comparably vague. Primarily known from the introduction of copper metallurgy, formalized cemeteries, and a generally small record of settlements, the Copper Age presents a fundamentally transformative period. The late-5th millennium marks a major shift in sociocultural and demographic trajectories, especially across the Carpathian Basin.

Recent research, with absolute chronology, has greatly advanced the understanding of the Copper Age "package" and has suggested the emergence of macro-regional trends along with a notable amount of regional variation. However, a general lack of interregional synthesis, comparison, and communication, particularly between research traditions from different countries, restricted a fuller understanding of the period.

We invite participants to share their work from all stages of research, including reports from fieldwork from throughout the Carpathian Basin (Hungary, Slovakia, southwestern Ukraine, western Romania, northern Serbia, northeast Bosnia and Herzegovina, northern Croatia, eastern Slovenia, southeastern Austria). A question we would like the participants to address within their paper is "What makes the Copper Age? Some of the topics that we hope to address during this session include, but are not limited to:

-Inquiries of landscape change use.

-Changes in regional settlement and mortuary patterns.

-Variation in material culture across the Carpathian basin and within particular cultural traditions.

-Shifts in economic and subsistence strategies.

By bringing together scholars from various regions and national research traditions, we aim to create a more holistic picture of the Copper Age within the Carpathian Basin. By exemplifying the similarities and differences across the Carpathian Basin between 4500-3500 BC, we aim to explain the changes that distinguish the period from the preceding two millennia.

ABSTRACTS

1 LASINJA CULTURE: REGIONAL DIFFERENCES AND MACROREGIONAL SIMILARITIES

Cataj, Lea (Hrvatski Restauratorski Zavod / Croatian Conservation Institute)

Lasinja is a copper age culture widespread between the Alps, the Dinarides and the Danube River. Because it occupied a large area, several regional types are recognized, such as Balaton-Lasinja, Kanzianiberg-Lasinja and (Bisamberg)-Oberpullendorf. At the same time, similarities in the way pottery was shaped and ornamented can be seen across central and south-eastern Europe.

While investigating Lasinja culture in northwestern/central Croatia, a large sum of data was gathered enabling both micro- and macro-regional analysis of the finds and sites dated to the last centuries of the 5th millennium. Comparing the results of archaeological investigations from more than 80 sites in central Croatia with the published data from continental Slovenia, eastern Austria, Transdanubia, northern Bosnia and eastern Croatia, new insights into Lasinja culture were brought to light.

The paper aims to propose answers to several questions: what are the elements that connect different sites and attribute them to Lasinja culture, why do some regions show more resemblance in their "Lasinja package", in which concurrent cultures can analogies in the archaeological material be traced, how important are the predecessors in the formation of Lasinja culture.

2 NEW RESEARCH ON THE ENEOLITHIC LAKESCAPE OF CARINTHIA (AUSTRIA)

Ries, Marie-Claire (University of Innsbruck, Microarchaeological Laboratory, Department for Archaeologies)

Archaeological studies in Austria's province of Carinthia have been notably underrepresented in the international research discourse. The Alpe-Adria region boasts rich natural (metallurgical) resources and is characterized by bodies of water, including numerous large lakes, peat bogs and the fluvial main axis of the Drava River flowing eastwards to Southeastern Europe. Within this environment, movement of people as well as exchange of objects, ideas and technologies have occurred in the past.

The onset of sedentary life and farming is documented for the 5th and 4th Millennia BCE. Neolithic and Chalcolithic communities associated with the Kanzianiberg-Lasinja culture, as well as groups with pottery exhibiting furrowed incisions, have shaped the local archaeological record. However, our cultural knowledge is limited due to the lack of modern investigations and stratified contexts.

One of the very few pieces of evidence for local settlement activity is the submerged pile-dwelling site in Lake Keutschachersee (a UNESCO heritage site). Exceptionally well-preserved house structures at this site are among Austria's oldest wooden architectural remains. A newly launched project has now taken on the task of answering the question: Where are the other pile-dwelling sites?

The project aims to contribute to this discussion by updating the current site inventories. Evidence is systematically recorded through scientific diving, fieldwork campaigns in wetlands and archival research. Preliminary results, including the analysis of artefacts from a newly discovered case-study site in Lake Wörthersee (Kapuzinerinsel) are presented. The local material culture exhibits strong similarities to well-investigated records from the south and southeast, allowing for a better contextualisation of this crucial key region in pan-European archaeology.

3 VIEW FROM THE EDGE: FORMATION OF COPPER AGE SETTLEMENT SYSTEMS IN THE SE ALPS

Mlekuz Vrhovnik, Dimitrij (University of Ljubljana)

The settlement system of tells and large agglomerated flat settlements collapsed after 4500 BC in the Carpathian basin. Directly preceding this change, we observe the fast expansion of the Neolithic settlement systems into the SE Alps. I argue that this Late Neolithic expansion in the periphery is the shape of things to come in the core area of the Carpathian basin. The historical development of the SE Alps in the fifth millennium BP is related to the broader social, demographic and cultural changes in the Carpathian basin; it is an active response. While this process is traditionally explained as a succession of Neolithic Lengyel and Copper Age Lasinja cultures, I argue it is a single process that reflects the dynamics in the core areas. In the aftermath of these changes, a different lifestyle emerged, characterised by a more dispersed settlement system and generally smaller settlements. Last but not least, if developments during

the fifth millennium in the SE Alps and the Carpathian basin are part of the same historical unfolding, the perspective from the periphery also gives us a fresh view of the core area.

4 ENEOLITHIC POPULATION OF THE LASINJA CULTURE IN EASTERN CROATIA - SETTLEMENT, MORTUARY PRACTICE AND UTILIZATION OF SPACE

Rajkovic, Dragana (Archaeological museum Osijek) - Balen, Jacqueline (Archaeological Museum in Zagreb)

The lecture will discuss recent research on Lasinja culture in the area of the Croatian part of the Baranja region. Authors would like to present recent investigation in the area, conducted in a last five years. Baranja is a region located in a favourable geographical position bordered by two important communication routes that in the past both connected and separated it from the surrounding area of the Pannonian Plain, namely the Drava and Danube rivers, to which it owes its specificity. Thanks to the abundance of water, diverse animal life, fertile soil and natural shelters in its hilly part around Banovo Brdo, Baranja has been an attractive place for permanent residence and settlement by almost all archaeological populations throughout the past, which is best evidenced by the number of recorded sites, of which there are over a hundred.

In the Eneolithic period, some general changes happened in the economy and the way of life, compared to the previous Neolithic period. Although agriculture is still very dominant, increasing of the cattle breeding leads to the construction of a new short-term seasonal settlements. The time of the middle Eneolithic was marked by the Lasinja Culture (4300-3950 BC) and the sites of this culture were investigated at the several locations in the area of Croatian part of Baranja, especially in vicinity of Beli Manastir (Branjin Vrh, Sudaraž, Širine, Šumarina, Staro Selo).

Interesting data about the appearance of the Lasinja culture settlement stand out in particular at the Branjin Vrh site while sporadic graves of the Lasinja culture were discovered at the sites Staro Selo and Branjin Vrh.

5 PICKING UP THE PIECES: ZOOARCHAEOLOGICAL AND ARCHAOMETRIC ANALYSES OF FRAGMENTED BONE FROM THE FIRST LASINJA-CULTURE SITE IN LIKA, CROATIA

Zavodny, Emily (University of Central Florida)

To date the site of Stari Grad (4235-4050 cal BC) in Otočac, Croatia is the only known Lasinja culture site south of the Kapela mountain range. Faunal remains from ongoing excavations, then, provide a singular opportunity to identify and characterize Copper Age husbandry practices in the Lika region for the first time. However, only 50 pieces of bone and teeth have been recovered so far and, given the highly fragmented state of the material, visual identification methods alone are difficult if not impossible. This presentation reports results from both traditional zooarchaeological and newer archaeometric studies aimed at maximizing the information possible from this small but important assemblage. For example, Zooarchaeology by Mass Spectrometry (ZooMS) was used to double the total number of identifications and additional light isotope (carbon, oxygen, nitrogen) analyses were conducted to recreate human-animal interactions. Together these results are the first step towards understanding not only the lifeways of this particular Copper Age community, but also how the Lika region itself might be integrated into the larger archaeological narrative of this period.

6 BOLERÁZ, BADEN OR STARE GMAJNE? FIRST SETTLEMENTS FROM THE SECOND HALF OF THE 4TH MILLENNIUM BC IN NORTH-EASTERN SLOVENIA

Kramberger, Bine (Institute for the protection of cultural heritage of Slovenia)

Northeastern Slovenia comprises the regions of the western Pannonian Plain, therefore the development in prehistory here was always closely connected with the contemporaneous development in the Carpathian Basin. So far, we have succeeded to define the settlement from the middle of the 5th millennium BC, which we find to be close to the Late Lengyel Culture, and numerous settlements from the last third of the 5th millennium BC (Lasinja Culture) and the first half of the 4th and mid-4th millennium BC (Furchenstich horizon and the Protoboleráz phase or Retz-Gajary Culture), which show that the area was settled dense during these chronological horizons. In this paper, however, we present first evidence on the settlements from the following chronological horizon. It could be defined based on the results of rescue excavations, the revision of the discovered material culture and the results of ¹⁴C AMS analysis. We can conclude that the finds and settlement features with ceramics from the second half of the 4th millennium BC are similar to that of Boleráz phase and Baden culture, as well as from the settlements of so-called Stare gmajne group in the Ljubljansko barje (Ljubljana moor). So far, four archaeological sites have been identified, all located on the edge of the Drava plain (Slivnica 1B, Zgornje Radvanje - Habakuk, Lavše near Šikole and Borl Castle). It can be also noted that at individual sites - even those that were investigated on a larger scale - only few pits from this time horizon have been discovered, which indicates a less intensive settlement activity or less dense settlement in the second half of the 4th millennium BC in comparison to other periods, both within individual multi-period sites, as well as in northeastern Slovenia as a whole.

7 THE TIME HAS COME TO BE GONE: SETTLEMENT PATTERNS AND DEPOPULATION DURING THE COPPER AGE IN EASTERN HUNGARY

Ridge, William (University of Illinois at Chicago)

The centuries after c. 4500 BC were a time of significant social and cultural transformation on the Great Hungarian Plain. Metal technology spread widely during this period and the first large, extramural cemeteries in the region were established. Moreover, the tells and large settlements that had characterized the Late Neolithic were abandoned, and the landscape was instead populated by hundreds of small, often short-lived settlements. The vibrant and regionally discrete Late Neolithic traditions (Tisza, Herpály, and Csőszhalom) were replaced by the materially homogenous traditions of the Early Copper Age (Tiszapolgár and Bodrogkeresztúr) that extended across the Plain and surrounding areas. However, after c. 4000 BC, the activity on the Plain appears to have significantly declined, with very few sites belonging to the Middle Copper Age (Hunyadihalom and Proto-Boleráz).

In this paper, I examine the settlement patterns associated with this cultural trajectory in the well-studied region of the Körös River Basin in southeastern Hungary. The settlement patterns in the Körös region demonstrate a massive decline in the number of sites through the Early and Middle Copper Age that suggests a process of depopulation. Incorporating survey, excavation, radiocarbon dates, and environmental data collected over the last two decades, I examine the changes in settlement dynamics to explain possible shifts in sociocultural organization and demography. These patterns are compared and contextualized with other surrounding regions in order to draw broader conclusions across the Carpathian Basin during 4500-3500 BC.

8 THE GREAT HUNGARIAN PLAIN IN THE MIDDLE COPPER AGE: NEW RESULTS OF THE RESEARCH ON THE HUNYADIHALOM CULTURE

Hegedus, Zsuzsa (Hungarian National Museum National Institute of Archaeology; Eötvös Loránd University Institute of Archaeological Sciences)

The Middle Copper Age of the Great Hungarian Plain between 3900 and 3700 calBC is associated with the Hunyadihalom culture, which unfortunately still remains relatively under-researched. The main reason for this may be the fact that although it was recognised as a separate social entity with unique pottery style in the 1960s, only a few of its sites are known. Furthermore, these sites are not large cemeteries with spectacular artefacts or affluent burials, as in the preceding Early Copper Age, but rather settlements, generally comprising only a few pits. The most prominent exception is the Tiszalúc–Sarkadpuszta settlement, excavated by Pál Patay between 1974 and 1990. The 2005 publication of this complex, palisade-surrounded settlement of timber-framed houses still fundamentally shapes our understanding of the culture. However, given the new research results and the advance of methodological possibilities of the past two decades, it is imperative to summarise and revise our knowledge.

In this research, I mainly focus on the study of individual communities from different sites, deducing their traditions, their way of life, and the way they organised their social relations, through the discernible tendencies in their pottery use. Exploring the patterns and subsistence strategy observed in settlements of varying intensities and structures is essential for interpreting the dynamics of social groups expressing a shared identity through the use of distinct pottery. With this approach focusing on everyday life, we have the opportunity to fit the piece of Hunyadihalom culture into the metaphorical puzzle that is the Copper Age of the Carpathian Basin.

9 THE ERA OF CHANGES - STUDIES ON THE MIDDLE AND LATE COPPER AGE TRANSITION IN THE CARPATHIAN BASIN

Fábián, Szilvia (Hungarian National Museum) - Marton, Tibor (HUN-REN Research Centre for the Humanities, Institute of Archaeology) - Csippán, Péter (Institute of Archaeological Sciences, Eötvös Loránd University, Budapest Hungary) - Priskin, Anna (Déri Museum, Debrecen) - Daróczi-Szabó, Márta (Budapest History Museum) - Rajna, András (Ferenczy Museum Centre, Szentendre)

The end of the 5th millennium brought several sociocultural and demographic changes, followed by the formation of an extensive network of social interactions among communities in the 4th millennium, and these stable-like periods led to the spread of several technologies and wealth, which best represent the appearance of metal objects such as heavy copper tools and gold ornaments. This epoch is exceptional and well-known for innovations during the 4th millennium. A part of a currently ongoing National Research, Development and Innovation Office Fund project (NKFIH K129332) focuses on the change at the end of the Middle and the beginning of the Late Copper Age, in which several fundamental transformations can be detected. The environment surrounding human societies and its living and non-living elements constantly changes. Natural scientists have developed several models, such as the adaptive cycle model, based on the similarity of these processes. In recent years, archaeological studies have used this latter method to understand the long-term changes and transformations in the human past, described as specific processes like collapse and resilience. In our presentation, we would like to give an overview of the period mentioned above using this

approach to try to reconstruct changes in the usages of the natural sources, the exchange network, the settlement pattern in-site and regional levels, as well as the material culture and the ideology.

10 LIVE AND LET DIE - BURIALS AND STRUCTURED DEPOSITS AT THE BEGINNING OF THE LATE COPPER AGE (3800-3500BC)

Rajna, András (Ferenczy Museum Center) - Fábián, Szilvia (Hungarian National Museum)

In general, we can say in prehistory, that finds from burials can be interpreted as reflections of the image of contemporary society. The late Copper Age of the Central Carpathian basin, especially the northern part of the region between the Danube and the Tisza rivers has become better known through research in recent years.

Cemeteries with a large number of graves, burials within settlements have been widely published from the Middle Copper Age cultural units as well as the Late Copper Age Baden complex. However, the ritual life of the cultural unit defined as “Protoboleráz”, the initial phase of the Late Copper Age connecting these periods has been little researched.

In our presentation, we would like to present the changes in the role of the structure of burials and their relationship to the settlements. Through these features discovered here, we try to interpret the transformation of the social system at the end of the Middle Copper Age and the beginning of the Late Copper Age (3800-3500BC).

11 RE-EVALUATING THE TIME DOMAINS OF THE CARPATHIAN BASIN

Brummack, Sven (Freie Universität Berlin)

Direct radiometric dating has contributed to an ongoing and fundamental paradigm shift in the construction of chronological reference systems away from iso-phenomenological approaches towards iso-chronologies. Many established reference systems have been constructed with iso-phenomenological concepts, where the material was ordered based upon analogy and then illuminated by stratigraphic sequences (Schier 2014: 423–425). Analogies often failed to produce accurate results, particularly if attempted either over vast distances or directed towards material which was rare (Raczky 1995). Stratigraphic information was found to be suitable for sequential ordering of groups and have long since been employed in this function by archaeologists drawing on Steno’s law of superposition, original horizontality and original continuity (archaeologically defined by Harris 1979). Following research on Varna-I (Higham et al. 2007), archaeological groups are now arranged iso-chronologically instead, tying the material to the distribution of the absolute data retrieved from them. With the help of high-resolution radiometric data, it becomes clearer to what extent the established chronological systems need to be modified. To a considerable extent, the current discussion concerns the periodization of the Copper Age in the Carpathian Basin. It was noted that calibrated dating intervals of Bodrogkeresztúr graves from Rákóczi falva did not differ from the Tiszapolgár samples retrieved from Hajdúböszörmény-Ficsori-tó-dűlő, leading researchers to claim a contemporaneous relationship (Raczky, Siklósi 2013), and to question the periodization of the Copper Age. Overall, this interpretation has not remained without contradiction (Brummack, Diaconescu 2014) and has since been reviewed again (Siklósi, Szilágyi 2016; 2021). This research sums up the recent advantages in south-eastern Europe and expands upon the work from previous analysis through access to more dates, enhanced age models made possible by detailed understanding of archaeological deposition. Exemplifying data were drawn from burial and settlement sites to show the effect age modelling has in furthering our understanding of periodization.

793 LITHIC RAW MATERIALS LITHOTHEQUES: OPEN ACCESS AND INTEROPERABILITY INITIATIVES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Terradas, Xavier (Spanish National Research Council (CSIC-IMF)) - Delvigne, Vincent (Centre National de la Recherche Scientifique, UMR 8068 TEMPS) - Gómez de Soler, Bruno (University Rovira i Virgili; IPHES- CERCA) - Soto Quesada, María (Universidad Autónoma de Madrid) - Tuffery, Christophe (Ministère de la Culture)

Session format: Regular session

International research on lithic raw material provenance has led to the development of lithotheques or reference collections of rocks and minerals. Over time, a great diversity of institutions and studies has contributed to create these collections to document their own research and the specific regional lithological contexts. Its creation has allowed a better knowledge of possible supply areas, providing crucial data for a better understanding of mobility, exchanges and human behaviour throughout prehistory.

Today, these lithotheques should assist us in achieving new goals related to greater contextualization and representativeness of source areas exploited in the past. The management of collections and their associated data is a crucial

element for these purposes. In this sense, the recording, contextualization, description and analyses of lithic raw materials must be carried out using standardized methods, going beyond the scope of each lithotheque and allowing the exchange of this information to potential users anywhere. However, consensual workflows, common protocols, digital and open-access platforms and infrastructures facilitating unrestricted and immediate shared data management, and therefore scientific inter-operability, are still globally scarce. Different initiatives are now working in this direction but international cross-border cooperation still remains a challenge.

The creation of open-access tools on lithic raw materials availability enables effective international collaboration based on FAIR principles. They represent a key tool to encourage the sharing of scientific results, optimizing researches carried out and offering long-term data preservation spaces. Understanding open access platforms as a crucial tool in the future of archaeological sciences, the aim of this session is to create an international forum that fosters the knowledge of different tools, methods, data, and approaches developed globally to promote free accessibility, collaboration and transparency as main pillars of the research community and a wider target audience interested on our research.

The organizers would like to acknowledge the dedication of Xavier Mangado (University of Barcelona) and Solène Denis (CNRS-UMR 8068) to the organization of this session, as well as their generosity in refusing to be included among the 5 organizers, in accordance with EAA standards.

ABSTRACTS

1 THE GDR "SILEX", A FOUR-YEAR REVIEW OF OPEN ACCESS EXPERIENCE

Tuffery, Christophe (Ministère de la Culture et UMR 8068 TEMPS) - Beauvais, Pierre-Antoine (CNRS, UMR TEMPS 8068 University of Cape Tow et UMR TRACES 5608) - Binder, Didier (CNRS et Université Côte d'Azur, UMR CEPAM 7264) - Bostyn, Françoise (Université de Paris 1) - Collin, Jean-Philippe (Université Libre de Bruxelles CReA-Patrimoine) - Defranould, Elsa (CNRS et Université Côte d'Azur, UMR CEPAM 7264) - Fernandes, Paul (Paléotime et UMR TEMPS 8068) - Gibaud, Alix (Inrap et UMR LAMPEA 7269) - Guiavar'ch, Mikael (CNRS et UMR CReAAH 6566) - Delvigne, Vincent (CNRS et UMR TEMPS 8068)

Started in 2019, the Research Group (GDR) "Silex" is a consortium of about fifty researchers from various institutions interested in the diagnosis and transfer of siliceous raw materials during Prehistory. The research is structured around three complementary axes:

1. questioning the reliability of different analysis methods (axis 1);
2. enriching the data corpus through the use of harmonized tools (axis 2);
3. reflecting on the archaeological implications induced by methodological transformations over the last 15 years (axis 3).

A transversal axis concerns publication and communication strategies with the aim of making data as accessible as possible.

For these works, it was necessary to harmonize the vocabulary, build data recording tools, and develop exchange and visualization platforms. Inventory files of about fifteen lithotheques and the results of surveys conducted by GDR members since 2019 are now directly shared online under a free license specific for France (Etablab 2.0) compatible with the CC-BY license. This publication is based on a server and a mapping application (ArcGisOnline) and a data warehouse (Nakala). The whole system enables georeferenced and descriptive data and associated images at different scales to be shared. Today, the data chain from their production to their publication, is a structured process, which enables to answer to the questions and constraints of archaeologists. The whole system allows both the enhancement of old data and the implementation of new surveys and characterizations data. The handling of these tools is facilitated through initial training sessions organized annually and follow up by various GDR members in charge of data validation. As a true collaborative platform, the proposed tool allows for the pooling of work at each one's place, in a spirit of data sharing and protection and in compliance with FAIR principles.

Other co-authors: S.RENAULT, F.-X.LE BOURDONNEC, M.IMBEAUX, A.PASQUALINI, A.TOMASSO, C.LEANDRI.

2 IMPLEMENTATION OF A DIGITAL INFRASTRUCTURE FOR ARCHAEOLOGICAL LITHOTHEQUES IN SPAIN

Terradas, Xavier (Spanish National Research Council (CSIC-IMF, Barcelona)) - Soto-Quesada, Maria (Universidad Autónoma de Madrid (MIAS-UAM)) - Gómez-de-Soler, Bruno (IPHES-CERCA, URV (Tarragona)) - Tarrío, An-doni (UPV/EHU (Vitoria)) - Mangado, Xavier (Universitat de Barcelona (UB-SERP)) - Duarte, Elsa (Universidad de Oviedo) - Herrero-Alonso, Diego (Universidad de León) - Domínguez-Bella, Salvador (Universidad de Cádiz) - Domingo, Rafael (Universidad de Zaragoza) - Ortega, David (Spanish National Research Council (CSIC-IMF, Barcelona))

During last month's we have been developing a thematic network funded by the Spanish State Research Agency, focused on establishing the databases and digital infrastructure to gather, share and make available to the scientific community all the data and information related to Spanish archaeological lithotheques. These scientific collections of rocks are located in the institutions that host the 12 participating research groups, distributed throughout Spain. The proposal has been focused on the study of siliceous rocks since they were the raw materials most frequently used to produce tools in prehistoric times until the appearance and generalisation of metallurgy.

In a first phase, we have carried out an internal survey to obtain detailed knowledge of the current state of all the lithotheques included in the thematic network. This survey demanded information on their collections, territorial scope, recording of units, outcrops and samples, associated documentation, accessibility to the samples and related information, among many other aspects. We consider that the comparative study of all these aspects represents an updated state of the art in this field of research in Spain. In this contribution we will present the first conclusions on this issue, detecting our strengths as well as those points that require more attention from the network.

Undoubtedly, this approach will contribute to outline the immediate development work packages of the network, establishing the basic requirements to start building the databases that in the near future should constitute the core of the digital infrastructure that will allow the integration of the data from the different working groups. All these actions will guarantee the publication and free access of the network's data in accordance with international Open Science and FAIR Data requirements and standards.

3 CREATING ONLINE DATABASES OF LITHIC COLLECTIONS. TWO CASES FROM POLAND - VARIOUS CHALLENGES AND APPROACHES

Werra, Dagmara H. (Institute of Archaeology and Ethnology, Polish Academy of Sciences, Warsaw, Poland) - Woźny, Marzena (Archaeological Museum in Krakow, Poland) - Sudoł-Procyk, Magdalena (Institute of Archaeology, Nicolaus Copernicus University, Toruń, Poland) - Bułwka, Sylwia (Institute of Archaeology and Ethnology, Polish Academy of Sciences, Warsaw, Poland) - Sokólska-Majchrzak, Anna (Institute of Archaeology and Ethnology, Polish Academy of Sciences, Warsaw, Poland)

Since the pandemic, digitalisation and free open access to different databases have become standard. First of all, it concerns publications, books and archive documents. And now it is time for archaeological artefacts! In this presentation, we would like to present and compare two virtual archaeological databases. The first is Atlas of Rocks, a part of Open Resources in the Digital Repository of Scientific Institutes. The second one is the Archaeological Atlas of Małopolska. Both were created in scientific institutions based on scientific materials.

Nevertheless, they present different approaches to data and archaeological materials. The first one, Atlas of Rocks, is strictly scientific and presents lithic materials from Poland and neighbouring countries. In creating this Atlas, we considered the generally prevailing trends and developed adequate universal terminology. The database contains basic information about the raw material, such as its name and place of origin, metric data, a description of macroscopic features or more detailed data on deposits. Every example is visible in detailed photographs and 3D models.

The main goal of the second Atlas is the popularisation of archaeological heritage. This database is the first popular science portal that is a knowledge repository of the archaeological heritage of Małopolska. It was created in the Archaeological Museum in Kraków. This portal is a compendium of knowledge on the region's archaeological heritage and unique discoveries at nearly 400 archaeological sites in the southern part of Poland. This repository is not strictly a lithotheque; however, the lithic materials create a considerable part of this database.

Creating an online lithotheque is a challenge, both in scientific, organizational, and technological approaches. We would like to present our observations and experience.

4 LITHIPHES: A NEW SPACE TO SAFEGUARD AND CONSULT GEOLOGICAL SAMPLES AT IPHES-CERCA (TARRAGONA, SPAIN)

Brià, Judit (Institut Català de Paleoecologia Humana i Evolució Social (IPHES)) - Gómez de Soler, Bruno (Institut Català de Paleoecologia Humana i Evolució Social (IPHES))

With the passage of time, collections expand with materials from outcrops and archaeological settlements thanks to researchers and institutions developing their research projects. This process implies an enormous quantity of information and materials that if are not processed and stored correctly run the risk of being lost forever. As a solution, at the IPHES-CERCA research Institute we present LithIPHES, our state of the art lithoteque designed to organize geological samples, currently focused on chert, and cater to the needs of IPHES-CERCA researchers following the FAIR principles.

LithIPHES consists of three main parts: the data base, the core of the lithoteque, where all information available is stored; the physical sample collection categorized according to the data base; and finally, a map collection with the geographical information of all registered samples. As a live project, we are working on improving the existing elements while developing new tools to expand LithIPHES and make it a reference for other lithoteques thanks to new technologies such as 3D printing, an online visor and open science projects.

With these tools at our disposal, our desire is to help researchers with an easy and fast way to access the materials, to facilitate interdisciplinary research with other institutions, and to guarantee the preservation of the geological samples from IPHES-CERCA projects for the future.

5 ARQUEOLIT - AN OPEN ACCESS LITHOTHEQUE IN PORTUGAL

Jordão, Patricia (UNIARQ-FLUL) - Soares, Sofia (LNEG) - Pena, Teresa (LNEG)

The establishment of a rock database used as raw material throughout human history is highly important in encouraging the systematic realization of provenance studies in archaeology. This will shorten the first stages of the Petroarchaeological Protocol – sample collection and description – speeding up the process of correlating archaeological and geological samples, and simplifying the provenance study itself.

In Portugal, as a result of the provenance studies of siliceous raw materials carried out since the last decade of the 20th century, many samples were collected. However, these remained attached to each research project, with partial publication of the petrographic, mineralogical, and geochemical characterization.

This paper intends to present the joint efforts of LNEG - Portuguese National Laboratory of Energy and Geology and UNIARQ – Centre for Archaeology of University of Lisbon to build an archeological lithotheque - ARQUEOLit.

LNEG, as a National Geological Service, already has a Litoteca that compiles core samples obtained during years of geological surveys and mineral exploration, although this collection is not focused on archaeological raw materials, particularly flint, which was a key resource in prehistoric times.

The LNEG's experience with the UNIARQ's specialization in the study of siliceous resources led to the creation of a raw materials lithotheque, beginning mainly with flint samples as an outcome of research projects carried out in the past years, to support archaeological research and to contribute to the understanding of how siliceous raw materials were obtained and managed in Prehistory.

The ARQUEOLit aims to adopt a harmonized protocol at different stages of the data treatment, from collection to online publication, in accordance with FAIR principles, arguing that open access platforms are a crucial tool in the future of archaeological sciences. Thus, the ARQUEOLit will be linked to the existing European Cartosilex database cartographic platform for consulting georeferenced data.

6 THE OPENLIT PROJECT: A FIRST STEP FOR AN OPEN ACCESS LITHOTHEQUE OF ITALIAN KNAPPABLE ROCKS

Lo Vetro, Domenico (Dipartimento SAGAS, Università di Firenze; Museo e Istituto Fiorentino di Preistoria) - Bertola, Stefano (Dipartimento SAGAS, Università di Firenze) - Carletti, Elena (Dipartimento di Scienze dell'Antichità, Sapienza Università di Roma) - Conforti, Jacopo (Dipartimento di Scienze della Terra e Geoambientali, Università di Bari Aldo Moro) - Ferrero, Arianna (Dipartimento SAGAS, Università di Firenze) - Moscone, Daniele (Institute of Pre- and Protohistoric Archaeology, Kiel University) - Pizziolo, Giovanna (Dipartimento di Scienze Storiche e dei beni culturali, Università di Siena) - Santo, Alba (Dipartimento di Scienze della Terra, Università di Firenze) - Sappaluto, Luigi (Dipartimento di Scienze della Terra e Geoambientali, Università di Bari Aldo Moro) - Eramo, Giacomo (Dipartimento di Scienze della Terra e Geoambientali, Università di Bari Aldo Moro)

A few regional projects in various European countries have recently been launched for the characterization of lithic resources including the creation of geo-referenced lithoteques that have been designed according to shared scien-

tific protocols. Italy is still lacking such tools for systematizing research in the field and enhancing our knowledge of knappable materials.

OPENLIT research project aims to build up the core of the first Italian open access lithoteque, a reference collection of knappable rocks based on a multi-parametric GIS-based database. The goal of this project is to develop a standard analytical descriptive system for defining knappable rocks, based on laboratory testing, and to make it available to the scientific community through an open access repository aimed at data sharing and dissemination.

The first step in achieving this goal consists in organizing a large set of information on knappable rocks available to prehistoric communities in Italy. Various lithoteques of knappable rocks from different Italian regions are currently stored in Italian University labs. These lithoteques have been assembled over time by several researchers with different methodological approaches and are not always accessible to scholars and students.

Starting from cherts, OPENLIT will provide the scientific community with a powerful, open and implementable research tool aimed at depicting the availability of knappable rocks in some key-territories in Italy. The open access repository will host the shared lithoteque and the geo-samples mapping as part of a WebGIS platform. For the first time data will be analysed at a national level with a shared approach combining different methodologies. Macroscopic, petrographic and compositional characterization of selected geological chert will provide target values to establish reference groups for further comparisons with prehistoric collections from both the Italian peninsula and neighbouring territories.

7 SHARING CHERTS: THE LAEX-UAM PILOT EXCHANGING EXPERIENCE

Soto, Maria (Universidad Autónoma de Madrid) - Castañeda, Nuria (Universidad Autónoma de Madrid) - Torres Navas, Conchi (Instituto de Historia - CSIC) - Baena, Javier (Universidad Autónoma de Madrid)

Lithic raw materials analyses in Prehistory encompasses multidisciplinary approaches ranging from prospecting, sampling, petrographic and geochemical characterization requiring open, accessible, and transparent initiatives to avoid research duplicity and ensure reproducibility and replicability practices.

The Experimental Archaeology Laboratory (LAEX-UAM) is a teaching and research facility focused on promoting the knowledge of hunter-gatherer's technologies and lifeways. The involvement in different international projects, experimental networks, and transference programs boots our compromise with inter-operability initiatives and FAIR principles.

The LAEX-UAM also hosts a relevant collection of knappable materials from geological outcrops exploited since the Lower and Middle Palaeolithic in the central region of the Iberian Peninsula. Outcrops and chert petrographic characterization have been developed through different research projects (AEI and FEDER funding), and a pioneering national exchanging initiative has been launched to enhance the recognition of these lithologies within a regional and large-distance ranges.

This pilot exchanging program with 30 universities and research institutes is based on the shipment of: 1) centimetric cortical hand samples of different lithologies and provenances; 2) uncovered petrographic thin sections; 3) the corresponding petrographic characterization; and 4) an institutional letter explaining the scope of this novel initiative.

Our plan was to explore the recognition of these lithologies through macroscopic and mineralogical characterization, aiming at launching a collaborative procedure through enlarging institutional reference collections, and stablishing a collaborative network that facilitates the detection, classification and assignation of these materials and their possible exploitation exceeding traditional knowledge and geographic niches.

The program is presented as a successful tool, and the positive received responses exhibit the need of systematic recording, shared workflows, accessible data and exchanging programs of hand samples. With this aim, the team is involved in a recent national Research Network project to promote digital tools and effective collaboration that optimize efforts and resources on lithic raw materials research.

8 LITHIC RAW MATERIAL DEPOSITS IN ISTRIA, CROATIA - A LITHOTHEQUE IN THE MAKING

Šprem, Katarina (Independent researcher)

Istrian peninsula, the westernmost part of Croatia, is mostly made up of carbonate surface deposits with siliceous rocks cropping up in several places throughout the peninsula. For the purposes of the provenance analysis of lithic raw materials in prehistory of the Istrian peninsula, we surveyed known chert deposits and sampled them to create a micropetrographic database. The Istrian chert is diagenetic, meaning the limestone has been silicified into chert, which can be seen by ghosts of the primary structure observed during petrographic analyses. The problem with Istrian chert is that it appears along a line of Cretaceous (mostly Cenomanian) limestone and its visual characteristic are mostly the same, with a few exceptions. There are also secondary deposits of chert with unknown parent rock, but also diagenetic in nature. How to differentiate visually similar but geographically different cherts? Some geochemical analyses we conducted show interesting geochemical footprints of two deposits and the potential of this kind of analysis in differentiating between them. This presentation will explain the logistical steps behind the project to create the lithotheque,

as well as present some chert samples and deposits. We will also display some of our plans for the advancement of the project and eventual open access status.

9 LUSOLIT FROM THE SHELF TO THE WEB: AN ONLINE LITHOTHEQUE FROM SOUTH PORTUGAL
Belmiro, Joana (ICArEHB, Universidade do Algarve) - Bicho, Nuno (ICArEHB, Universidade do Algarve) - Cascalheira, João (ICArEHB, Universidade do Algarve)

Lithic raw materials played a critical role in the survival and cultural organization of past human groups, making them central elements in understanding mobility, raw material acquisition, and exchange networks. Identifying changes in these patterns over time is essential for comprehending how different groups adapted and reorganized their material culture. Southwestern Iberia is a key region for studying human behavior through time, as it served as a refuge for hunter-gatherer communities during the Upper Paleolithic climatic shifts and was continuously inhabited during recent Prehistory. This is evident in archaeological sites such as Vale Boi, an eco-cultural niche with one of the region's most complete Upper Paleolithic sequences (c. 32 ka to 15 ka cal BP).

Evidence also suggests that from the Upper Paleolithic to recent prehistory, lithic raw materials were exchanged by both hunter-gatherers and agricultural communities in the Iberian Peninsula, as cherts from southwestern Portugal have been identified in collections from other regions of Portugal.

To characterize lithic raw material procurement and usage in south Portugal and explore potential social networks between southwesternmost Iberia and other regions in the Peninsula, establishing a reference collection accessible to the scientific community is paramount. The LusoLit project, initiated in 2016, aims to achieve this goal.

This paper presents the results of previous and ongoing systematic prospection works in the Algarve region, along with the macroscopic, petrographic, and geochemical characterization of geological chert and chalcedony samples. This effort resulted in the creation of a regional online reference database, accompanied by a well-defined analysis methodology. The comprehensive database currently contains visual and descriptive information on regional cherts and chalcedony, allowing for their free online and offline accessibility, and fostering future collaborations and scientific transparency.

10 THE BEGINNING OF A LITHOTHEQUE IN SOUTHERN CHILEAN PATAGONIA?
Arecheta, Constanza (Universitat Rovira I Virgili) - Sierpe, Victor (CEHA)

Southern Patagonia is a macro region shared between Chile and Argentina, which has a great variability of lithic raw materials, with a large number of primary and secondary sources. To date there is no lithotheque available that can illustrate the lithic landscape of the region. The study of raw materials in the extreme south of Chile has not been widely investigated and less in an inter-site format. Sierra Baguales is located in the province of Última Esperanza in the region of Magallanes (Chile), which is a great place to start this research. It contains multiple procurement sources of all kinds and evidence of resource exchange from distant sources (250 km away). In this space we have human presence that allow us a unique study, not only because they remained as hunter-gatherer communities until contact with different European societies. It is also, because in that contact there were opportunities for ethnographic studies, which allow us to have one more method to understand the use of lithic resources. Adding the information from sources of lithic raw materials, ethnographic studies and archaeological evidence, we would like to answer, how did hunter-gatherer groups use lithic resources in the Sierra Baguales area during the late Holocene? Therefore, not only starting a regional lithotheque, but also deepening the knowledge we have of the resource procurement by human groups in Patagonia.

11 GEOLOGICAL AND GEOCHEMICAL RESEARCH IN THE CREATION OF AN OPEN-ACCESS DATABASE: A CASE STUDY FROM BULGARIA

Gurova, Maria (National Institute of Archaeology, Bulgarian Academy of Sciences) - Andreeva, Polina (Geological Institute, Bulgarian Academy of Sciences) - Stefanova, Elitsa (Geological Institute, Bulgarian Academy of Sciences) - Bonsall, Clive (University of Edinburgh)

Bulgaria has many primary and secondary flint outcrops that were, or could have been, exploited for toolmaking in prehistory. Previously, raw material provenances and distributions were inferred from visual and/or petrographic observations of flint. This and the abundant data on prehistoric chipped stone assemblages invited a re-assessment of two proxies: i) their significance for understanding human mobility, and cultural and economic transitions in prehistory and ii) the methods and techniques of research.

Over more than a decade there have been notable advances in Bulgaria in raw material studies using macro- and micropetrography combined with geochemical (LA-ICP-MS) analysis of raw material samples and flint artefacts. Based on four systematic field surveys to identify and record raw material outcrops, we selected 64 geological samples for comparison with 166 artefacts from archaeological sites. All stages of our analytical procedure – from fieldwork to

the combined analytical results and database creation were meticulously documented. The results of this research have been presented in open-access publications and constitute a coherent corpus of analytical data that could be integrated into future academic initiatives to create a more comprehensive digital lithotheque.

This paper outlines our achievements in raw material provenance studies and the correlation between geological samples and artefacts, revealing the potential vs actual use of each raw material outcrop. Our team is open and available for future collaborations with the wider raw material-oriented research community.

12 SMARTPHONE IMAGING AND SILICEOUS RAW MATERIAL CHARACTERISATION: CROSS-REFERENCING DATA TO BUILD A REFERENTIAL COLLECTION IN EASTERN IBERIAN PENINSULA

Ramacciotti, Mirco (PREMEDOC Research Group, Department of Prehistory, Archaeology and Ancient History, University of Valencia.) - Gallelo, Gianni (PREMEDOC Research Group, Department of Prehistory, Archaeology and Ancient History, University of Valencia.) - Diez Castillo, Agustín (GRAM Research Group, Department of Prehistory, Archaeology and Ancient History, University of Valencia) - García Puchol, Oretó (PREMEDOC Research Group, Department of Prehistory, Archaeology and Ancient History, University of Valencia.)

In the last decades, the application of analytical techniques for the characterisation of lithic materials has consistently supported provenance studies and raw materials identification. The new challenges in this area of research are linked to the development of effective methods based on non-invasive approaches which permit to obtain useful data on large assemblages by means of portable devices. However, the development of a standardised protocol to build referential databases is a real challenge due to different variables, involving available labs facilities and instrumentation, laboratory procedures and individual skills. Nevertheless, smartphones as analytical tools can consistently contribute in the standardisation of a protocol to build reliable and accessible libraries, being widespread, easily portable and user-friendly devices.

In this paper, we test a methodological proposal on a referential collection of siliceous rocks in the framework of the projects conducted by our team in the Eastern Iberian Peninsula, linked to the study of raw materials supply strategies of the last hunter-gatherer inhabitants of Cueva de la Cocina. Finally, we are exploring the potentials of smartphone imaging as an effective, cheap and fast method to characterise large lithic assemblage, and as part of a standardised protocol for the collection of shareable data, including the use of other techniques such as portable X-ray fluorescence spectroscopy.

794 OLD EXCAVATIONS AND FINDS, NEW DATA AND INTERPRETATIONS: THE USE OF ARCHIVES IN CURRENT ARCHAEOLOGICAL RESEARCH PROJECTS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Schlanger, Nathan (Ecole nationale des chartes, Paris; UMR Trajectoires - 8215) - Cataldi, Maddalena (Ecole française de Rome) - Hofmann, Kerstin (Romano-Germanic Commission of the German Archaeological Institute) - Plutniak, Sébastien (Citeres Lab, CNRS, Tours) - Rosner, Chloé (Institut national d'histoire de l'art; UMR TEMPS 8068)

Session format: Regular session

The history of archaeology is a growing field of investigations which provides a range of studies and insights based on rigorous historical methodologies, drawing on archival materials, and organised into a veritable community with its research programs and widespread publications.

Besides providing new knowledge on the practices and theories of archaeology worldwide, these empirical (archive-based) investigations have also focused attention on the production, conservation, dissemination and re-use of a range of documents produced by past archaeologists in the course of their excavation or collection activities. In turn, this has generated renewed interest in the archives of archaeology, be it in order to better understand the scientific, cultural and social implications of the discipline, or to make practical use of archival materials as a source of evidence and interpretations about the past.

This session aims to address both these conceptual and pragmatic dimensions of the archives-based history of archaeology. Contributors are invited to address issues such as:

- 1) the scientific use of archival information: how, in our age of open science and (digital) data-reuse, are the results of past research integrated in the current production of knowledge?
- 2) the organisation of archive-based research projects: who leads such projects, and what division of labour between archaeologists, historians or archivists are at stake?
- 3) publication policy: to which audiences (scientific, laypeople) and in what publications are presented the results of projects combining new and old archaeological data?

More generally, we welcome papers addressing broader methodological or theoretical issues concerning the use of archives for the history of archaeology.

ABSTRACTS

1 COMBINING THE OLD WITH THE NEW FOR A MORE REFLECTIVE FUTURE

Hofmann, Kerstin (RGK - Romano-Germanic Commission DAI) - Rösler, Katja (RGK - Romano-Germanic Commission DAI)

In recent decades, the history of science has shown that scientific knowledge can be dependent on socio-political conditions, personal networks, technical innovations, research practices and places etc. Due to these insights, research on the history of archaeology is thriving and archaeological research is becoming more reflexive. At the same time, the digital turn and the WWW encourage transdisciplinary research as well as new forms of access to and presentation of information.

In several collaborative projects, the RGK is accessing archives with different research questions and uses new digital technologies for this purpose. In addition to the traditional history of research, the research on knowledge production is becoming increasingly important. After a brief overview, we would like to illustrate this with the newly approved long-term academy project *disiecta membra*. It aims to identify, catalogue, link and evaluate a corpus of dislocated building elements of roman stone architecture in Germany as well as research related historical and praxeological topics. The long project duration of 24 years offers the rare opportunity to develop tools for the digital linking of newly collected object data with old archive information, but also to reflect on changing knowledge practices. A positive side effect will be the indexing and analysis of the content of selected holdings from the archives of the RGK and other institutions. This is of particular relevance, as the archives of archaeology are often scattered and difficult to access. Our research data on actors and practices will be published in the dynamic biographic information system *Propylaeum-VITAE* to promote further research in the history of archaeology. Using case studies, we will present our work with and on archival material. Furthermore, we would like to discuss whether the combined consideration of old and new data, practices and analyses can contribute to a more reflective future.

2 KNOWLEDGE CONSTRUCTION IN AND WITH THE ARCHAEOLOGICAL ARCHIVE

Ward, Chloë (Ludwig-Maximilians-Universität, University of Munich)

The aim of this paper is to consider the construction of archaeological knowledge within, and using, archives. Using case studies derived from fieldwork in Sudan and Egypt, and drawing upon archival theory and interdisciplinary approaches to archival research, this paper will consider how the processes of archival documentation produce, transform, and construct archaeological knowledge.

A major focus will be the ERC *DiverseNile* project in northern Sudan, where past research is being integrated with ongoing archaeological fieldwork; in particular, a survey conducted between 1970 and 1975 which was published as a series of reports. While invaluable, these reports hint at extensive additional information which remains unpublished. Unfortunately, for a variety of reasons, this material is not currently accessible; however, we can still consider its role in the production and publication of archaeological knowledge. This includes the way information was initially collected, which drew upon previous archaeological research while simultaneously developing a bespoke recording style and methodology. By attempting to apply methods developed as part of my previous experience of archival research – primarily archival records from a 1921–1922 excavation in Egypt – I explore the ways in which we can still engage with, and integrate, information from what is effectively an archival ghost but remains an important source of evidence and interpretation nonetheless.

By looking at the archive as a subject in its own right, rather than merely a source of information, it is possible to engage with fundamental aspects of both the production of archaeological knowledge and the history of archaeological research, thereby also facilitating a reflexive exercise on current practices. A crucial consideration is also how to effectively integrate the results of past archaeological research with new data while ensuring these are accessible to future researchers.

3 LILLA JORED A CHIEFTAIN BURIAL? - RECONSTRUCTION AN EARLY 19TH CENTURY EXCAVATION

Eboskog, Mikael (Bohusläns museum) - Nyqvist, Roger (Bohusläns museum)

The presence of gold almost always affects the narrative that we call history. One example is Lilla Jored's grave in Bohuslän from 4th century AD and which was excavated in 1816. Several gold objects were found that came to dominate the image of the tomb and its story, that of a burial of a prince influenced by the Roman Empire. The other findings

and the actual circumstances of the investigation in 1816 fell into oblivion. The official story conveyed today via an exhibition at the National Historical Museum and on national television is still focused on the same interpretation.

In our project, we want to understand both why and how the grave was dug, but also the connection between the different finds recorded at the site. Interestingly, despite the gold finds, the actual place become lost (rediscovered 1925). Our investigation shows that the official picture has major flaws. The archival material shows, for example, that the gold finds used in the main narratives were submitted two years after the investigation and cannot be linked with certainty to the grave. Around the excavated grave there are also several over-ploughed graves and possibly some of the gold may come from one of these.

The Lilla Jored project is both a history of archaeology and of knowledge that clearly shows how a passed down narrative and the dissemination of knowledge about a place can be changed by critically processing the various archived documents. Unfortunately, the tendency for our archives and repositories to be largely unused is within the current knowledge production in Sweden, regardless of the age of the archive material. Which affects how we can access the older documents in the future, but also how our contemporary archived material will be accessible and, above all, do we save sufficient documentation?

4 CREATING COMMON GROUND. SWEDISH ARCHIVE RESEARCH ON THE PAST FOR THE FUTURE

Wallensten, Jenny (Swedish Institute at Athens) - Hansson, Ulf (Swedish Institute in Rome) - Frejman, Axel (Uppsala University; Swedish Research Institute in Istanbul)

In 2019, the Swedish research institutes at Athens, Rome and Istanbul initiated a project to create a digital platform gathering archive material from over 100 years of Swedish archaeological research in the Mediterranean area. The platform, named *Common Ground*, initially aimed at being a powerful tool in an early research phase for scholars wishing to locate archaeological material in local museums and storerooms, has underway developed into a digital archive of great interest in itself. It provides not only information about where to find certain objects, and a smooth way of gathering quantitative information about material categories, but researchers can also access field diaries, plans, sketches letters and photographs, thus allowing studies in the history of archaeological research and ideas, for example. Non-official participants in fieldwork become visible, for example the wives of the main excavators, who also contributed to the success of a field campaign, but who were not necessarily mentioned in official documents. Furthermore, the archives of the institutes have become accessible in a way that assures the safety of original documentation.

In this paper, we address the importance of making legacy data otherwise kept at several places and in different countries coming together to enrich current research and the interesting perspective that opens when non-Swedish scholars study Swedish research in an historical perspective. Moreover, we discuss choices made as regards the intended audience (our platform will have different layers of access, going from detailed storage information for a few targeted specialists to information of interest on a general level), as well as the potentially difficult collaboration between archaeologists and IT-specialists and its potential backsets.

5 RAW MATERIALS CIRCULATION DURING THE EBA IN THE SANDOMIERZ UPLAND. DATA OF THE "PAR" PROGRAM IN THE NEW TECHNOLOGICAL REALITY

Budziszewski, Janusz (Institute of Archaeology UKSW) - Szubski, Michał (Institute of Archaeology University of Cardinal Stefan Wyszyński in Warsaw)

In the late 1970s, the Polish archaeological community launched a program for the comprehensive documentation of archaeological sites called the "Polish Archaeological Record" (PAR). The implementation was based on a standardized method carried out by small teams conducting field surveys within artificially designated spatial units (37x41 km²). The country's territory was divided into approximately 8,500 units, referred to as the PAR Areas. The recording of information was formalized on specially designed cards, which became a mandatory form of documentation. Fieldwork was conducted using maps at a 1:25,000 scale.

The culmination of the program occurred in the late 1980s and early 1990s. Over the course of two decades, work was conducted on nearly 90% of Poland, documenting around 500,000 archaeological sites. These results serve the heritage authorities well in their daily practice. From the beginning, attempts were made to use the obtained data in settlement research. However, after initial fascination, it became apparent that the huge amount of data and methodical problems during fieldwork significantly limited analytical possibilities.

Currently, PAR data is being digitized by the National Heritage Institute and partially made available to researchers. By focusing on selected, well-surveyed areas, one can ask specific research questions. The presented case study is limited to the loess-covered area of the Sandomierz Upland, covering an area of approximately 1140 km². This area includes 35 PAR sheets and was investigated in the years 1987-1999 mostly by one research team. With basic knowledge about the reliability of past work, we investigate the circulation of a Turonian flint, known as the "Ożarów flint" among the early Bronze Age communities. Settlement information and findings of loose artifacts allow GIS spatial

analyses regarding the likely paths of people's movement and distribution of specific flint in the specific microregion during the specific time frame.

6 ARCHIVAL RESEARCH ON SHIPWRECKS IN TAIWAN'S WATERS: ITS CONTRIBUTION TO UNDERWATER ARCHAEOLOGY SURVEYS

Chen, Pin-Wen (Texas A&M Univeristy) - Lee, Chi-Lin (Tamkang University)

This paper emphasizes the critical role of archival research in underwater archaeology. Using historical research methodologies, such as data collection, sorting, verification, and analysis, one of the project updates the database of shipwrecks in Taiwan's waters and generates hotspot maps for potential underwater cultural heritage. It incorporates historical materials related to the Sino-French War from the French National Library (Bibliothèque nationale de France), the French Naval Archives (Service historique de la défense), the Dutch East India Company, and other Taiwanese historical materials from the 16th to the 19th centuries. Taiwan's strategic maritime location and the treacherous waters near Penghu Island, which have many recorded shipwrecks, emphasize the importance of this research. So far, 101 underwater targets have been discovered near Taiwan, with twenty identified as underwater archaeological sites, and six recognized as significant shipwrecks. The study categorizes and analyzes shipwreck historical research results based on location, cause, and ship type. This method helps identify the shipwreck and its historical era, placing it within a broader historical context. The paper reflects on the challenges and opportunities of conducting most archival research online during the Covid pandemic. It also discusses the potential for open database access for academic researchers and the public, advocating for a more inclusive approach to sharing knowledge about underwater cultural heritage. Through a comparative review of various projects, the article contributes to the ongoing discussion about the importance of archival research in deepening our understanding of underwater cultural heritage.

7 THE BASILICA IULIA PROJECT AND THE ARCHIVE OF LAURA FABBRINI (1960-1964): QUESTIONS OF WORKFLOW, METHOD, AND DATA TRANSPARENCY

Bozza, Sara (CNR - Istituto di Scienze del Patrimonio Culturale) - Galli, Marco (Sapienza Università di Roma) - Ismaelli, Tommaso (CNR - Istituto di Scienze del Patrimonio Culturale)

The discovery of the Basilica Iulia in 1851-1852 was the starting point of the modern archaeological research in the Forum Romanum; however, after its complete excavation by P. Rosa (1870-1871), the monument remained aside from the main research interests, till the extensive investigations carried out by Laura Fabbri (1960-1964). Her significant archive, composed of plans, hundreds of photos, and many excavation diaries, is the object of a multidisciplinary project, aimed at enhancing the information potential of the old excavations, which had remained unpublished. The in-depth analysis of textual, graphic and photographic records together with new architectural and geophysical survey and the multidisciplinary study of archaeological materials allowed a significant improvement of our understanding of the context as well as a thorough reconstruction of its chronological phases.

First, the contribution focuses on the archive documentation as a primary source for the history of archaeology, in order to reconstruct the research interests and approach of Fabbri, a neglected figure of the Italian post World War II archaeology, whose method appears significantly aligned to the most up-to-date stratigraphic experience of that time. Secondly, the paper presents the workflow developed within the Basilica Iulia Project as a case study to reflect on the best practice in the re-use, actualization and dissemination of archaeological legacy data. The developed workflow aimed at connecting the 1960-1964 information on stratigraphic units, architectural structures, and archaeological materials to the current research method, based on multidisciplinary approach and digital techniques, such as the 3D model of the excavation areas. Finally, crucial methodological questions related to the recognizability of sources, the authorship of old and new data and interpretations, thus the transparency of the archaeological research, are discussed.

8 BROWSING LEGACY MATERIAL: THE CASE OF THE ARCHIVES OF THE FRENCH MISSION AT ENKOMI (CYPRUS)

Meneghetti, Francesca (Cyprus American Archaeological Research Institute)

Thanks to its archaeological riches, Cyprus has been the target of archaeological explorations since the end of the 19th century. The first half of the 20th century, in particular, saw an increase in the number of foreign archaeological missions working on the island. Dug by British, Swedish, French and Cypriot missions, the Late Bronze Age site of Enkomi is an example of this phenomenon. The archaeological discoveries of the four expeditions brought to light a key site for studying the Late Bronze Age Cypriot economy, society and material culture. Since Enkomi lies in the northern, occupied part of the island, it is inaccessible to further field investigations. Thus, scholars are left to work with legacy data from previous archaeological missions that are mainly poorly published or unedited.

The paper focuses on the work of the French mission initiated in 1934 by C.F.A. Schaeffer. The French worked at Enkomi until 1973, unearthing large parts of the site and large quantities of material. Despite the best efforts of the missions' members, the results of the French excavations at Enkomi remain largely unpublished. As part of a larger, long-term project aimed at investigating and publishing the material of the French mission at Enkomi, the paper presents the challenges and the preliminary results of the study of the archives of C.F.A. Schaeffer and related legacy material.

9 BACK TO THE SIXTIES ! NEW INVESTIGATIONS ON JEAN PERROT'S EXCAVATIONS AT THE NEOLITHIC SITE OF MUNHATA (8TH-6TH MILLENNIA BC)

Bessenay, Julie (UMR 5133 ArchéOrient) - Vieugué, Julien (UMR 8068 TEMPS)

Excavated from 1962 to 1967 under the supervision of Jean Perrot (1920-2012), Munhata is considered as a major settlement for better understanding the late stages of the Neolithisation process in the southern Levant. Despite its importance, this site remains largely unpublished. Since 2020, new investigations have been carried out on Jean Perrot's excavation archives as part of two successive projects respectively funded by the French National Agency for Research (<https://cerastone.cnrs.fr/>) and the Shelby White and Leon Levy foundation (<https://whitelevy.fas.harvard.edu/munhata-and-second-neolithic-revolution-near-east>). We first gathered, sorted and described the field documentation in close collaboration with the archivists of the Maison des Sciences de l'Homme Mondes (Nanterre, France) before digitalizing it in order to put it online. We then started to analyse the stratigraphic data from these documents (photographs, plans, notebooks, locus and catalogue files...) with the aim of reconstructing the long-term occupation sequence at the site of Munhata. This archives-based approach is combined with a re-examination of the artefacts discovered in the 1960's and an achievement of new radiocarbon dates. Such an integrated study will allow us to track the history of the Neolithic village of Munhata that will be published in a comprehensive monograph and, beyond, to contribute to various debates about the Neolithisation process in the Near East.

10 ANCIENT, ARCHIVAL, AND MODERN SOURCES COMBINED WITHIN THE PTOLEMAIC PATHYRIS PROJECT (EGYPT)

Skalec, Aneta (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences) - Ejsmond, Wojciech (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences)

Three kinds of data, that is ancient, 19th-20th century, and modern ones, form a unique case of complementary sources allowing a reconstruction of an Egyptian provincial town in the 2nd century BCE.

The town of Per-Hathor, known in Greek as Pathyris, was located 28 kilometres south of Luxor, in the Gebelein micro-region. The town is very important for papyrologists as it played the role of a district capital from approximately 186 BCE to 88 BCE. About 1300 Greek and Demotic documents were found in the ruins of the town in the 19th-20th centuries, making it a unique site to understand life in provincial Upper Egypt in Ptolemaic times (305-30 BCE). Despite significant visibility in the papyrological source material Pathyris is very little known from an archaeological perspective since the remains of the town mostly vanished during the 20th century. The town was explored in the late 19th and early 20th centuries by numerous scholars, but the results of their field activities were never published to a satisfying extent. The importance of Pathyris for understanding Ptolemaic Egypt became apparent much later when the texts were published. Current archival surveys revealed unpublished documentation from excavations in the form of sketches and photographs, which can be paired with the results of current field prospection to fill the gap in our knowledge.

The available sources allow for very-needed research on the urban layout and domestic architecture of Pathyris. During the presentation, we will discuss how archaeological and geospatial data from old and current fieldwork can be combined with topographical information contained in Greek and Demotic papyri, to reconstruct the appearance and functioning of the town. We will also present how we are planning to link all those sources within a 3D town visualisation which will be available both for a scientific and laypeople audience.

11 ARCHIVES TELL THE TRUTH - RECONSTRUCTING THE HISTORY OF ARCHAEOLOGICAL AND CONSERVATION WORK AT THE TEMPLE OF HATSHEPSUT IN EGYPT

Kasprzycka, Katarzyna (University of Warsaw, Faculty of Archaeology)

The temple of Queen Hatshepsut at Deir el-Bahari in Egypt is an object of constant interest of many scholars since 1893, when Édouard Naville on behalf of the Egypt Exploration Fund unearthed the northern part of the temple, which was under debris from ancient times. In the excavated part of the temple he first found the so-called Northern Chamber of Amun. In later years the temple was examined by various institution, including the Metropolitan Museum of Art in New York, Service des antiquités de l'Égypte, and Polish-Egyptian Archaeological and Conservation Mission. Despite of this uninterrupted period of research, many myths and questions have grown up around the temple,

especially around The Northern Chamber of Amun, which have not been solved until today. Archive documentation has helped to change this.

Some problems to be dealt with were: do all the blocks from the fully reconstructed entrance to this chamber truly come from it, who was responsible for building them into the wall and when, what was the original type of roof of this chamber - flat or barrel-vaulted? The archive material was extremely useful in finding answers to these questions. These included excavation journals kept in Archives of Édouard Naville in Société d'Égyptologie Genève, photographs stored in the archives of Musées d'art et d'histoire de Genève, or the archives of the Egypt Exploration Society. A careful examination of this whole material as well as additional various photographs allowed to find good answer to the above-mentioned questions, so this paper aims to share the results achieved through the analysis of archival material remaining from the former work at the temple of Queen Hatshepsut.

12 LE BLOT 40 YEARS LATER: AN EXAMPLE OF FUZZY LOGIC IN ARCHAEOLOGY

Vincent, Delvigne (CNRS, UMR 8068 TEMPS) - Bruno, Bosselin (no rattachement) - Jacques, Virmont (no rattachement) - Jean-Paul, Raynal (CNRS UMR 5199 PACEA)

Unearthed in 1934, the Blot site (Cerzat, Haute-Loire, France) stretches discontinuously over more than 100 meters at the foot of a tall basalt cliff. Informed of its existence by Prof. Mayet, J. Combié conducted a six-meter-deep survey from 1956 to 1958, before H. Delporte, J.-P. Dugas, and J. Virmont began extensive excavations in 1966 until 1982. They uncovered several deposits containing Upper Paleolithic artifacts, divided into about a hundred levels. The archaeological corpus includes an exceptional set attributed to the Protomagdalenian (cf. final Gravettian), divided into several phases and structured in such a way that the existence of a "hut" was proposed.

On the occasion of the monographic publication work on the site, more than 40 years after the end of the excavations (2020-2024), we digitized the entire collection of field notebooks, allowing for the visualization and spatial processing of objects (n = 48810 points) through a GIS (QGIS v3.14). Beyond its cartographic aspect - and in the tradition of the work carried out at the Blot in the 1970s - this tool enabled the automated construction of object profiles (sagittal and frontal) which, in turn, allowed for a reconsideration of the archaeological value of the level subdivisions.

Considering the geometry of the nappe de vestiges - understood as areas of object concentration - and their comparison with observations recorded in the excavation archives, shows that at the Blot 1) the recognition of levels is based on subjective characteristics forcing us to think through "fuzzy logic" and 2) that the interpretation of the deposits is fundamentally linked to the school of thought in which the excavators are enrolled. Following the presentation of the (re)construction work of the archaeo-stratigraphy, this communication will present the epistemological consequences of our approach by discussing the notion of "level" in archaeology.

13 DE STEFANI'S ARCHIVE AS A PORTRAIT OF THE EUROPEAN HISTORY OF ARCHAEOLOGY IN THE SECOND HALF OF THE XIX CENTURY

Gabrielli, Angelica (University of Verona)

Stefano De Stefani was a ministerial excavations inspector in the Verona area during the second half of the 19th century, and his private archive has been recently donated to the city's State Archive. De Stefani's archival documentation includes correspondences, notebooks, iconographic and topographic tables, and photographs related to significant archaeological discoveries of the era. The ongoing investigation employs a methodological approach encompassing archival, historical, and archaeological analyses. The research methodology commences with a comprehensive examination and transcription of archival material, contextualizing them within the scientific research milieu of the time and drawing parallels with contemporary investigations. This paper concentrates explicitly on the preliminary analysis of correspondences, exploring their connections to influential figures in historical archaeology and their relevance to major archaeological excavations during that period. In the first part, the methodology involves a geographical and chronological analysis of the extensive network of over 157 correspondents. The correspondence includes autograph letters from renowned authorities such as Evans, De Mortillet, Cartailhac, Wollaston Franks, Hirschfeld, Munro, De Nadaillac, Pauli, Schreiber, and Wilson. It also features letters from leading Italian archaeologists and palethnologists, including Pigorini, Castelfranco, Orsi, and Chierici. Instead, the second part explicitly focuses on reusing archival materials to supplement current excavations. Finally, the paper aims to exploit the archival sources in the history of archaeology by studying De Stefani's documentation as a reflective portrayal of the scientific and academic landscape in Italy and Europe during the second half of the 19th century and as a source for actual research projects.

14 INVESTIGATING ELAEUS, FROM THE TRENCHES TO PRESS

Lebée, Thomas (Louvre Museum) - Kardianou, Alexandra (Louvre Museum)

The necropolis of Elaeus, at the tip of the Thracian Chersonese, was fortuitously excavated by French troops under fire during the 1915 Gallipoli campaign. Despite these peculiar premises, qualified archaeologists were affected to the improvised dig, while operating along military actions and with the minimal amount of resource. Finds were sent by the

army to Paris and despite the publicity of the excavations, their subsequent thorough reports and a few campaigns in the following years, the Elaeus material draw little attention afterwards.

During the next stage of their life, as museum pieces, these artefacts were exposed to the risk of invisibilization inside a tremendous collection, but digital tools used for collections management contribute currently to their analysis and ultimately to their dissemination among both scholars and the general public. Moreover, the study of the unpublished excavation diary sheds new lights on this corpus excavated in extraordinary circumstances. A publication will soon make available these additional insights to the public, benefiting from the result of years of documentary work and previously unknown materials.

The intended communication aims to use this project in order to illustrate the variety of data that can be gathered from archives, but also the difficulties to identify a documentation scattered beyond ordinary sources for Antiquity scholarship. It will also address how such first-hand documentation, now objects of study in their own rights, may enhance further study on archaeological materials and their lost immediate context.

15 ADMINISTRATING AND SHAPING ARCHAEOLOGY IN BRITISH MANDATE PALESTINE IN LIGHT OF THE ARCHIVES OF THE DEPARTMENT OF ANTIQUITIES ARCHIVES

Rosner, Chloe (Institut national d'histoire de l'art)

Nowadays, archives play a key role in the work of archaeologists and historians of archaeology. This paper is less concerned with the content of the archives of archaeology but rather with their history from the production of documents to their archiving. This presentation aims to highlight the benefits of understanding archaeological archives as objects in their own right, and less as sources, for tracing the history of the discipline. It also seeks to emphasize that the archives of archaeology must be understood in their broadest sense, to initiate a renewed history of its practices and administration. To this end, this presentation will focus on the history of the archives of the British Mandate Department of Antiquities officially founded in British-ruled Palestine in 1920. We will look at the documents produced by this department, as well as the many stages and players involved in their production and archiving, and the issues at stake. This will enable us to examine how this department functioned, administered, and shaped archaeological practice and the heritage it unearths. The broader aim of unraveling these issues is to contribute to the history of archaeology in British-ruled Palestine, particularly its political and social facets.

16 WHOSE WORK? TELLING NEW STORIES WITH ARCHAEOLOGICAL ARCHIVES AT THE HARVARD ART MUSEUMS

Clerkin, Caitlin (Harvard Art Museums)

What role can archaeological archives play in the galleries of art museums? This paper offers a case study, presenting a recent temporary display at the Harvard Art Museums that brought archival material into the galleries in order to offer a new, humanized narrative about archaeological excavation and heritage to public audiences.

On view from December 2022 to June 2023 as part of the museums' regular program of rotating displays, "Whose Work? The Modern Workers of Ancient Samaria-Sebaste" presented the excavation of ancient Samaria-Sebaste (modern Sebastiyeh, occupied West Bank, Palestine) as the story of early 20th century Palestinian and Egyptian archaeological workers, who are typically uncredited in Western archaeological and art histories, through display of archival photographs, payroll records, and excavated finds. The installation drew on the excavated finds from the 1930s Joint Expedition to Samaria-Sebaste stewarded by the Harvard Art Museums and the Harvard Museum of the Ancient Near East (HMANE) and on the excavation archives from the 1908-1910 Harvard Expedition to Samaria held by the latter museum.

This installation was one of several recent gallery interventions that centered people, both ancient and modern, in interpreting ancient objects, in lieu of a primarily art historical message.

Excavation archives (and the research potential therein) allowed us to tell a story "peopled" by real, named individuals. We hoped this installation would prompt visitors to ask who (and whose work) lies behind other objects they see in museum galleries—whether ancient craftspeople, modern artists' workshops, or excavators—and in what context they played a role. As museums seek to tell more equitable stories about the inequitable past of both archaeological and museum practice, this case study suggests that archaeological archives have a role to play in "reframing" narratives for public audiences.

ARCHAEOLOGICAL ARCHIVES AND LOCAL COMMUNITIES: HOW CAN HISTORY OF ARCHAEOLOGY INFORM HERITAGE PRACTICES

Baran, Mustafa Kemal (Koç University)

While there has been a growing scholarly interest in the history of archaeology, this has typically been confined to understanding the socio-political history surrounding the discipline or addressing practical questions of archaeologists regarding their fieldwork. By aiming to open up new research directions for archival work in the history of archaeology, this paper will explore how research in archaeological archives can inform contemporary heritage management and public archaeology practices which often prioritize present and future planning without engaging in critical historical research. It will do so by investigating the role and contributions of local communities in the history of archaeology in Turkey drawing on archival documents authored specifically by these communities. These documents are currently housed in various archives in Germany, US, and Turkey.

This paper aims to shift the perspective and construct a narrative primarily based on documents authored by local communities, in contrast to the historiography of archaeology, where local communities are often contextualized through archaeologists' field notes and voices.

Furthermore, this paper will scrutinize the voices and personalities found in these archives within the context of historiography of archaeology in Turkey, and it will re-examine the politics of archives, archiving, and archival research in archaeology and heritage from a critical perspective. Additionally, it will evaluate the potential of a wide range of methodologies that can integrate the history of archaeology into contemporary heritage practices in Turkey. It will explore collaborative approaches to historical research and producing knowledge with local communities as part of a broader public engagement scheme in heritage sites.

BEST PRACTICES ON ARCHAEOLOGICAL 3D DATA MANAGEMENT: METHODS AND APPROACHES TO CAPTURE, GENERATE, AND DISSEMINATE 3D INFORMATION IN ARCHAEOLOGY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Hollaender, Julian (State Office for Heritage Management Baden-Württemberg) - Dilena Quintana, Miguel Angel (Universidad Complutense de Madrid (UCM)) - Skole, John (Arkeologerna; The National Historical Museums of Sweden) - Papazoi, Elli (Institute of Classics / University of Graz) - Thiery, Florian (Leibniz-Zentrum für Archäologie - LEIZA)

Session format: Regular session

Over the last 15 years, digital methods have been well-established in all documentary stages of archaeological research. As is known, each excavation develops integrally in a three-dimensional setting, hence the relevance of digitally gathering each component of the whole volumetric information. This includes the 3D capturing and modelling of excavation sites and recovered artefacts or structures that emerge via different approaches like Light Detection and Ranging (LiDaR), 3D (laser), programmatically combined procedures, scanning or photogrammetrical techniques, e.g. Structure from Motion (SfM).

However, much of that spatial data is lost through the misapplication of documentation practices, the informatic guidelines and a missing Research Data Management (RDM). Crucial discussions around consistency and reproducibility in diverse software environments regarding these 3D methodologies, or their respective capacity for long-term storage and findability, accessibility, interoperability, and reusability (FAIR) faculties are ignored or left aside. In addition, the metadata modelling for these processes is still in its very early stages. Therefore, these discrepancies can impede different teams from comparing and disseminating the computerised results.

For this purpose, collaborative efforts, both in creating common documentation standards, free open source software (FOSS) and FAIRification tools and developing future-proof archiving instances have been made by various worldwide initiatives. However, they require a decidedly global perspective and acceptance.

We aim to bring together archaeologists and researchers concerned with the above-stated issues and work with all archaeological periods and digital technologies. We encourage them to present their views on this matter to debate about standardised methodologies capable of capturing, generating, archiving and disseminating archaeological 3D digital information.

1 3D DOCUMENTATION AND MODELLING IN ARCHAEOLOGICAL FIELDWORK - CURRENT APPROACHES, WORK-FLOWS AND DATA STANDARDS AND THE GOALS OF THE NFDI4OBJECTS-CONSORTIUM

Hollaender, Julian (Landesamt für Denkmalpflege / State Office for Heritage Baden-Württemberg) - Höke, Benjamin (Landesamt für Denkmalpflege / State Office for Heritage Baden-Württemberg) - Lang, Matthias (University of Bonn / Bonn Center for Digital Humanities) - Pallan Gayol, Carlos (University of Bonn / Bonn Center for Digital Humanities) - Berger, Steffen (Landesamt für Denkmalpflege / State Office for Heritage Baden-Württemberg) - Abele, Jonas (Landesamt für Denkmalpflege / State Office for Heritage Baden-Württemberg)

NFDI4Objects is a German multidisciplinary consortium within the federal National Research Data Infrastructure (NFDI). The consortium unites researchers and practitioners whose work focuses on the material heritage and is dedicated to the challenges of modern research data infrastructures. Within their daily work, the primary documentation of findings and observations during fieldwork, in excavations or surveying, generates and structures key data for further steps of scholarly investigations and heritage management. During the last 15 years 3D documentation methods of various kinds, e.g. image based modelling, structured light or laser scanning, have become integrated into these processes on various levels. They changed not only scholarly approaches and hermeneutics but led to a steep increase in generated and stored data and heightened awareness about the need of future-proof and sustainable digital data management. One of the first objectives of NFDI4Objects in the field of 3D primary documentation was to conduct a broad survey, including multilayered questionnaires, to catch the status quo across archaeological researches and practitioners. This paper therefore aims to present and discuss the results of this survey and its implications on planned further steps in addressing the aforementioned challenges. The international perspective will help the community to harmonize its efforts in the light of international FAIR data exchange and sustainable data standards and management.

2 3D MODELLING AND 3D COMPUTED TOMOGRAPHY SCANS IN POST EXCAVATION INVESTIGATION

Knoll, David (Landesamt für Denkmalpflege Baden-Württemberg) - Chen, Zhuoru (Landesamt für Denkmalpflege Baden-Württemberg)

In 2023 a new project named „Pilotprojekt Inwertsetzung Ausgrabungen“ (PIA) was established at the State Office for Cultural Heritage Baden-Württemberg and aims to publish the findings of preventive excavations in Baden-Württemberg in order to implement the Valletta Treaty. By doing so, PIA is currently working with various 3D data, e.g. the recordings of archaeological objects by structured-light 3D scanners or photogrammetry (SfM). In addition, the investigation of blocks by means of computed tomography scan is being established as a core capability within the project. This paper aims to deliver an interlinked overview of these different methods in use with a special focus on their usability and attached workflows in the archaeological investigations in order to issue traditional publications as well as new forms of digital dissemination. Our approaches and results will help to understand and improve the necessary workflows to achieve the implementation of the Valletta Treaty over the borders of Baden-Württemberg in order to make the findings as compliant as possible to FAIR-data principles.

3 3D-DIMENSIONS MATTER: HOW TO RECONSTRUCT, VISUALISE AND ANALYSE ARCHAEOLOGICAL CONTEXTS BY USING THREE-DIMENSIONAL APPROACHES AND DIGITAL STRATEGIES

Dilena Quintana, Miguel Angel (Universidad Complutense de Madrid) - Álvarez-Alonso, David (Universidad Complutense de Madrid) - Cerrillo-Cuenca, Enrique (Universidad Complutense de Madrid) - De Andrés-Herrero, María (Universidad Complutense de Madrid)

Archaeological excavations are destructive processes where few elements survive after the extractive tasks. These subtractions can hinder the exhaustive analysis of the entire volumetric context since distances, dimensions, positions, inclinations, and orientations disappear.

Such an obstacle becomes particularly evident where sedimentation buries human occupations chronologically close. These circumstances arose at the Spanish shelter Abrigo del Molino (Segovia), a late Mousterian site in the central part of the Iberian Peninsula.

Yet, innovative methodologies embracing three steps: restoring, visualising and analysing the 3D digital excavation, can settle this spatial challenge.

First, reconstructive techniques allow for spatial database generation. Such a dataset contains both components: the 3D model of each artefact found in the excavation and the entire spatial context (archaeological and stratigraphic surfaces). Photogrammetrical and programmatically combined procedures generate a 3D model database employing standard formats.

Second, techniques that create mixed-reality implementations for viewing the site. Such applications employ the aforementioned 3D models to display them interactively in situ through mobile devices. Therefore, on the excavation, we can associate the virtual finds with the tangible context from which they were extracted (digital and physical reality coexist, creating fusions).

Third, the exhaustive statistical analysis manages to group the archaeological 3D models using mathematical techniques -clustering methods-. This examination tries to encounter associations by using the discernible attributes of each artefact registered on the 3D database and their spatial distributions in the digital excavation, which allows for the classification of the buried elements.

The passage between these three distinct phases in different digital settings must consider critical issues about compatibility, transportability, consistency and reproducibility of data in such specific software environments.

The final result includes groups of finds, which statistically show a high level of correlation between the artefacts they contain. Such clusters could delineate single occupations or chronologically close occupations with similar characteristics.

4 HORDES OF 3D DATA: A FREE OPEN SOURCE SEMANTIC SYSTEM FOR DISSEMINATING A LIDAR LIBRARY OF THE MONGOLIAN ARCHAEOLOGICAL LANDSCAPE

Fisher, Michael (Max Planck Institute of Geoanthropology; Institute for the Study of Ancient Cultures, University of Chicago) - Hiatt, Cyrus (Farallon Geographics)

The Mongolian Archaeology Project: Surveying the Steppes (MAPSS) combines remote satellite sensing with ground truthing and drone survey in order to rapidly document and assess the conditions of, and risks to, the immovable cultural heritage of Mongolia, a nation whose rural populations and pastoral economies are quickly transitioning to urban growth and industrialization. Using LiDAR sensors on mobile phones and tablets, MAPSS and its local collaborating partners generate 3D models of the myriad archaeological features visible across the Mongolian landscape. These include ancient kurgans, petroglyphs, stelae, and statuary. Additionally, the project's drone mapping program produces 3D imagery of the landscape itself.

MAPSS deploys an instance of the Arches FOSS semantic graph database platform in order to store and disseminate archaeological business data, metadata, and paradata. With over a hundred 3D models and dozens of DEMs, the challenge has become how to integrate high-volume, high-velocity 3D data without succumbing to the pitfalls of unstructured Big Data storage. In collaboration with Farallon Geographics, MAPSS has designed and developed a widget for the Arches platform that enables in-app viewing of 3D models and capture of key metadata. Arches graph modelling allows semantic embedding of these data across different graphs for flexible integration of the 3D image library with site and feature information. This paper will describe the methods for 3D data capture and how they are integrated within the overall MAPSS methodology, as well as the semantic tools it uses to store and share these data over the web. It furthermore considers some of the continuing challenges in capturing and displaying 3D imagery, such as double-embedding, and proposes ways to use these datasets for research and the protection of the physical features themselves.

5 DIGITAL MINIATURES: PROSPECTS AND LIMITATIONS OF 3D DOCUMENTATION OF BRONZE AGE AEGEAN SEAL IMAGES

Andreovits, Tatiana (Institut für Klassische Archäologie, Universität Heidelberg)

Seals are miniature artefacts made of stone, metal, clay, bone, and ivory, equipped with means that allow them to be worn on the body. They display engraved motifs and produce relief images when pressed into soft materials, acting as communicative media. More than 10,000 seals and sealings from the Bronze Age period have been discovered in the Aegean Islands and Greek mainland. The Corpus der minoischen und mykenischen Siegel (CMS) at the University of Heidelberg houses modern impressions and casts of the vast majority of them. This presentation delves into the use of 3D digital and computational tools on Minoan and Mycenaean seals and sealings. A high-resolution portable light scanner was used to 3D scan a selected assemblage of 133 modern impressions from the CMS archive, as well as 47 original seals and sealings from the National Archaeological Museum in Athens, the Heraklion Archaeological Museum, and the Archaeological Museum of Messara. The selected assemblage included clay sealings, steatite, agate, jasper, and carnelian seals, as well as modern silicon and plasticine impressions and casts. The diverse materials had a significant impact on the scanning and post-processing procedures, thereby affecting the quality of the digital models. The proposed paper highlights the observed differences resulting from the implementation of digital technologies in various materials. Acknowledging the lack of standardised methodologies for the 3D documentation of

seals and sealings, the presentation aims to discuss the prospects and limitations of applying digital and computational methodologies to micrographic objects. Additionally, it aims to address the challenges faced in accurately capturing the intricate details and textures of miniature objects using digital technologies and explore potential solutions and advancements that can improve the overall quality and reliability of 3D documentation for seals and sealings.

6 RECONSTRUCTING THE PAST USING 3D METHODS. THE CASE OF THE CULT GROUP AT LYCOSURA

Dimopoulou, Sotiria (Archaeologist)

The aim of this paper is to demonstrate how modern digital technology can facilitate a direct connection between the past and the future for visitors to archaeological sites. It is based on my doctoral thesis at the University of Münster, which focused on the Hellenistic cult group at Lycosura in Arcadia, Peloponnese. It also explores a possible 3D project that aims to represent the colossal statues in the dark cella of the Temple of Despoina and contribute to a digital reunion of the fragments which are exhibited in the National Archaeological Museum of Athens and the Museum of Lycosura. A 3D visualization and a tour inside the temple make it possible to experience the mysterious atmosphere and observe the colossal group. An application allows you to enter the dark cella and view the group from different angles at the touch of a button. It will also be shown how modern technology can enable people with visual and hearing impairments to have direct contact with both the cult room and the statues of Lycosura, since it will be possible, to obtain information - also in sign language - about the group, the mythical tradition of Despoina, the symbolization of the attributes with the help of colors, light and optical sensors (example of the Deaf Space). For the visually impaired, a tactile programme could enable them to 'feel' the attributes, (torches, snakes, scepter), in their colossal size. The aim of this 3D reconstruction is to stimulate interest in the interpretation of ancient ritual traditions and to provide an opportunity for individuals to experience and participate in the mysterious and sacred.

7 STANDARDIZATION AND CHALLENGES IN POINT CLOUD ALIGNMENT: LASER SCANNING IN ROMAN OSTIA

Ogawa, Takuro (Kyushu University) - Hori, Yoshiki (Kyushu University)

Since 2012, measurement surveys using laser scanners in Ostia have been carried out by a Japanese research team, with particular emphasis on completing measurements of both the exteriors and interiors of 90% of the excavated buildings. The foundation of this city-scale big data is constructed from point cloud data generated by terrestrial laser scanners and GNSS geodetic points through RTK positioning, providing detailed measurements that cannot be obtained through aerial LiDAR or SLAM. Based on these measurements, 3D data information is supplemented as needed, tailored to the characteristics of the subject matter, using OPT scanners, SLAM-style LiDAR, and high-resolution photogrammetry with mirrorless SLR cameras.

The reproducibility of data from terrestrial laser measurements largely depends on the alignment process. The analysis of point cloud data obtained through laser scanning primarily focuses on the differences between point clouds or between point cloud data and mesh data. Particularly in analyses that use basic geometric shapes, the employment of RANSAC ensures the reliable reproducibility of stable research data. In recent years, the ability to handle point cloud data from various types of scanners has been extended not only to commercial software but also to free software, making it important in the construction of interdisciplinary research environments to archive unedited point cloud data (raw data) in a state that is always usable and sharable.

This paper aims to reveal the challenges in standardizing the documentation of point cloud data by verifying synthesis results with multiple terrestrial laser scanners (Z+F Imager 5016, Leica C10, FARO Focus 3D, Leica BLK360) and various commercial and free software, drawing on the extensive data and experience acquired during actual measurements in ancient Roman cities.

8 DIGITALIZING ARCHAEOLOGICAL MONUMENTS IN 3D - CAPTURING THE IMPERIAL ROMAN BATHS OF TRIER IN HIGH DETAIL

Bauer, Steffen (Heidelberg University; Interdisciplinary Center for Scientific Computing, Heidelberg University) - Prien, Roland (Heidelberg University; Heidelberg Center for Cultural Heritage)

Within the scope of the project "Transforming Cultural Heritage in 3D" a group of archaeologists, mathematicians and sociologists work on the potentials and implications of the digitization of Cultural Heritage. As example for best practice, the project aims to digitize the Imperial Roman Barbara Baths (Barbarathermen) in Trier, which were the second largest bathing complex in the Roman Empire in the second century AD and are now part of the UNESCO World Heritage Site "Roman Monuments, St. Peter's Cathedral and Church of Our Lady in Trier".

The currently accessible remains extend over 15000 square meters and are captured with a resolution of a point distance in the millimeter range over a period of two to three years. The effective combination of laser scanning, photogrammetry and structured light scanning requires the adaptation and further development of existing workflows.

Research data management takes into account this growing amount of data over time and attempts to use existing digital infrastructures according to FAIR principles. For raw data and digital reconstructions, suitable metadata schemas and ontologies are evaluated.

Due to the extent of the reconstruction, the number and extreme heterogeneity of the metadata, annotations are essential. The annotations and the visualization of the large reconstructions are based on the same abstract hierarchical model and allow both to be linked beyond individual points to entire areas. The technical implementation with common web viewers is carried out with the development of an extension of a widely used data format (glTF).

The overarching research is dedicated to a theoretical and practical analysis of the transformation processes associated with the digitization of Cultural Heritage in the form of 3D models. A central component is the implementation of a best-practice lighthouse project in the field of knowledge transfer, which includes the digitization and digital dissemination of the Barbara Baths.

9 TAKING THE LONG ROAD

Færch-Jensen, Jeppe (Museum Sydøstdanmark)

In 1976 the foundation for an iron age road leading to a crossing of Tryggevælde Å, near Varpelev, Eastern Zealand in Denmark was found and excavated. The roadbed was constructed of large oaken timbers, some rammed into the ground, and others placed horizontally and locked over the posts with mortises and tenons. Back then, it was concluded, that the timbers were originating from nearby longhouses. Most of the timbers were salvaged and brought home for conservation, although a substantial part ended up resting in a large waterfilled basin for almost fifty years.

In 2012 the basin was rediscovered, and the timbers taken out for examination and re-evaluation, but it was not until 2023 that actual actions were taken, and the waterlogged timbers surfaced again for 3D scanning with a structured light scanner.

Now we have excellent digital replicas of all the unconserved timbers (while we are still searching the magazines for the conserved ones). The timbers themselves hold numerous opportunities to further research in dendrochronology, and technologies such as isotope research and micro-DNA also might be available for tree-ring material in the future.

But the first step of this project, which I will present here is more basic and has a twofold aim. Firstly, examining the conclusions as to whether the timbers were in fact reused from condemned longhouses by digitally reconstructing the roadbed as it stood upon excavation. Secondly, by doing so, evaluating the strength of the virtual reconstruction as a method for the enhancement of archaeological epistemology.

The method involves digitization of old excavation plans using QGIS, 3D models of the single timbers made with an Artec EVA scanner, and a lot of manual labour to place the 3D models of the timbers according to the plan in a 3-dimensional virtual environment using Rhino 7.

10 RECONSTRUCTION OF HISTORICAL GOTHENBURG, THEORY AND DIGITAL PRACTICES

Ekholm, Niklas (Arkeologerna -SHM) - Ramirez, Teobaldo (Arkeologerna -SHM) - Lindahl, Mikael (Arkeologerna -SHM) - Erkell, Miriam (Arkeologerna -SHM) - Skredsvik, Andreas (Arkeologerna -SHM) - Edqvist, Johanna (Arkeologerna -SHM) - Nannmark, Ester (Arkeologerna -SHM)

One of the most important infrastructure projects in the city of Gothenburg Sweden started in 2018 with the construction of the "West-Link" (Västlänken). A new underway rail tunnel is planned to pass through the city affecting important archaeological remains from the first foundation of the city in 1621.

The fieldwork included documenting the archaeological remains in such a way that several objects and buildings would be possible to reconstruct virtually. The archaeological remains were real-time digital documented in the data program Intrasis, a combined database, GIS software and laser scanning. In addition, photogrammetry with SFM camera and drones were used to enable an accurate recreation. The method used in the creation of 3d-models and virtual environments has been done with the software Blender and Unreal Engine.

Our project is mainly to be used within public outreach, but it has also been helpful in visualise and analysing the archaeological data. We see great possibilities for the model to be used as an additional tool to be used side by side with traditional GIS software to create a more immersive spatial analysis. As the model recreates not just the architectural features, but also the landscape in form of hydrological and geomorphological characteristics, it opens the possibilities to be used in teaching and research by other disciplines in social and natural sciences alike.

As our goal is for our reconstruction to live on after we are finished with the project. It should be able to be revisited at a later stage and tweaked based on any new information available at the time. The data and models therefore need to

be available to access and integrate in new projects. Therefore, we have focused on accessibility with as few obstacles as possible. The data, regardless of the software, needs to be available for further investigations.

799 ELEVATING THE ELDERS: (RE)CENTERING OLDER ADULTS IN BIOARCHAEOLOGY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Bethard, Jonathan (University of South Florida) - Buckberry, Jo (University of Bradford) - Silva Carvalho, Carlos (University of Bradford)

Session format: Regular session

Over the last several decades bioarchaeologists working in contexts around the world have made great strides in understanding the past through the contextualized study of human skeletal remains recovered from archaeological sites. Despite the numerous ways in which bioarchaeological studies have enhanced what we know about past communities, the identification and interpretation of older adults has been underrepresented in bioarchaeological scholarship. Among the reasons why this reality exists are because methodological shortcomings have been identified and bioarchaeological researchers have been stifled by an inability to confidently assign individual age estimates beyond the fifth decade. As a result of this trend, few studies have examined how and why the human lifespan has changed over time. Additionally, the inability to identify older adults in the archaeological record has left a void in the literature and numerous questions related to the role that elderly individuals played in their communities remain unanswered. Despite these limitations, numerous scholars have devoted considerable energy to changing the narrative about elderly individuals in past communities, through both their theoretical and methodological contributions. Drawing inspiration from this emerging body of literature, we invite scholars working on questions related to older adults across time and geography to share their perspectives in this symposium. We welcome contributions focused on social theory related to older adults, methodological contributions focused on improving the identification of older individuals in the archaeological record, or case studies from any temporal period or region where the identification of elder individuals helped improve the understanding of an archaeological context.

ABSTRACTS

1 ABSENT ELDERS? BIOARCHAEOLOGY AND THE IDENTIFICATION OF ADVANCED AGE

Bethard, Jonathan (University of South Florida)

Despite decades of progress through the development of sophisticated theoretical frameworks and rigorous methodological advances, bioarchaeologists still struggle to identify and interpret the ways in which elderly individuals were visible in the past. In part due to the complexities of human aging, coupled with myriad taphonomic realities, bioarchaeologists have struggled to identify the later stages of the human life course. These biases have hindered bioarchaeologists from answering important questions about human longevity, and most importantly, kept bioarchaeological scholars from understanding how older individuals participated in and were viewed by their communities. Despite these limitations, a variety of novel contributions have started to improve our ability to better understand old age in the past. The goals of this presentation are threefold: 1) review recent contributions calling for an (bio)archaeology of old age; 2) present a content analysis of published bioarchaeological studies that include age cohort data; and 3) present a case study highlighting the problems of age estimation and the identification elders drawn from an archaeological context in Transylvania.

2 AGE, ACTIVITY, AND ADAPTATION: BRIDGING MACROSCOPIC AND MICROSCOPIC INSIGHTS INTO ENTHESEAL CHANGES IN THE UPPER LIMBS OF THE ELDERLY POPULATION

Schendzielorz, Sofie-Kristin (Centre for Anatomy and Human Identification (CAHID), School of Science and Engineering, University of Dundee) - Gómez García-Donas, Julieta (Centre for Anatomy and Human Identification (CAHID), School of Science and Engineering, University of Dundee)

Enthesal changes are alterations in the attachment sites of ligaments and tendons to bone and have been traditionally linked to mechanical stress and activity levels. These changes have been observed in different skeletal elements and populations, and the variability and extent of these changes are still to be completely understood. This paper aims to explore the relationship between age, activity, and adaptation by investigating Enthesal Changes in the upper limbs of elderly individuals, integrating both macroscopic and microscopic approaches to unravel the complex interplay of factors potentially influencing enthesal changes.

This research will utilize a sample of adult human humeri obtained from the Centre for Anatomy and Human Identification, University of Dundee. Macroscopic assessment of muscle attachment sites will follow standardised protocols, while microscopic analysis will involve histomorphometric parameters related to cross-sectional geometry and

remodelling rates. Statistical analysis will be applied comparing the association between macroscopic and microscopic data testing for the interaction of any other potential confounding factors.

The present research aims to investigate activity-induced reorganization at fibrous entheses through a novel approach that combines the macroscopic and microscopic examination of the enthesal changes. Moreover, the investigation of the relationship between the changes and other factors such as sex and advanced age will provide further insights into the effect of hormonal changes and degenerative changes. Exploring connections between enthesal change and activity will validate the “muscle hypothesis,” analysing different traits of enthesal change to identify potential differential etiologies.

3 IDENTIFYING OLDER ADULTS IN COMMINGLED SKELETONS USING TRANSITION ANALYSIS 3

Bolster, Alyssa (Brown University) - Jeanlouis, Hannah (Independent Researcher) - Gregoricka, Lesley (University of South Alabama) - Ullinger, Jaime (Quinnipiac University)

In bioarchaeology, paleodemographic investigations are fraught with obstacles, particularly when attempting to estimate adult age. Arguably, this difficulty is only amplified when studying commingled and taphonomically damaged skeletal assemblages. In this paper, we present results of adult age estimation in commingled skeletons using both traditional and novel methods. We employed Suchey-Brooks (with Hartnett modification) and Transition Analysis 3 (TA3) to estimate adult age frequencies from Umm an-Nar tombs Unar 1 (2400-2200 BCE) and Unar 2 (2300-2100 BCE), located in the modern-day Emirate of Ras al-Khaimah, United Arab Emirates. Seeking to test how method choice impacted adult age estimates, we observed skeletal age indicators on pubic symphyses, proximal femora, and proximal and distal humeri.

Results indicated that traditional and novel methods differed significantly in the categorization of young, middle, and old-age adults. TA3 identified more middle and old adults in the same skeletal assemblage when compared to Suchey-Brooks, with some individuals surviving well into the oft-cited 50+ years of age category, and even as high as 70 or 80 years old. These new estimates influence our understanding of survivorship in Early Bronze Age Arabia, pushing back against preconceived notions of high young adult mortality based on previous adult age estimates. These results underscore how the often-implied absence of older-age individuals, due to the limitations of traditional methods, can have an impact on bioarchaeological interpretations more broadly. Older individuals were present in Early Bronze Age Arabia and lived to older ages than we previously understood. This will affect our understanding of the life course, including exposure to pathogens and skeletal degeneration from daily activities. It also asks us to expand our understanding of community membership and the ways in which older individuals functioned within the group.

4 “THE FINAL ACT IN THE PLAY OF LIFE:” INTERDISCIPLINARY PERSPECTIVES ON AGING IN THE ROMAN WORLD

Bews, Elizabeth (University of South Florida)

As the average age of almost every population around the globe steadily increases, we are confronted with universal concerns surrounding aging, including geriatric illness, senility, and the role of the elderly in society. As we seek to better understand the aging process and its consequences, it is only natural to reflect on the experience of age and aging in the past. While there is a plethora of evidence that many Romans lived well into old age, sometimes over the age of 100, there have been comparatively few bioarchaeological studies that engage with the concept of growing old in the Roman world. Bioarchaeological studies centered on aging in the Roman period concentrate on bone microstructure (Cho and Stout 2011; Beauchesne and Agarwal 2014, 2017), diachronic changes in longevity (Petry 2019; Redfern and DeWitte 2011), and age related aspects of social identity (Gowland 2007; Moore 2010). While some of these studies draw upon non-osteological evidence, like funerary data, they largely neglect the plethora of old age-related information derived from Roman textual, epigraphic, and visual evidence. Indeed, outside of bioarchaeology there are vibrant discussions regarding Roman demography, life expectancy, and what it meant to be elderly in the Roman world (Parkin 1992, 2003; Scheidel 2001; Cokayne 2003; Saller 1994; Harlow and Laurence 2002; Hopkins 1966). This paper seeks to address how these various lines of evidence help us to understand what it meant to be ‘old’ in the Roman world. It also endeavors to explore whether bioarchaeologists can incorporate this information into their techniques for identifying ‘old’ individuals in the Roman archaeological record.

5 INTERFACING WITH OUR ELDERS: AGING AND HEALTH AT PETRA, JORDAN

Perry, Megan (East Carolina University) - Propst, Akacia (McMaster University)

The evaluation of senescence in human skeletal remains has been hindered by the lack of clear age classes over 50 years of age. The use of new techniques has greatly increased our ability to identify the elderly in the archaeological record and better understand the senescent period in antiquity. The use of cementochronology, for instance, has extended skeletal age-at-death estimations into senescence. This method was used for age estimations of skeletal individuals from the largely commingled assemblages dating from the late 2nd century BC to the late 1st century

AD from the Nabataean capital city of Petra, Jordan. Twelve out of 66 of the individuals represented in the study were identified as being 60 years of age or older. These individuals were buried within 5 different tombs located on the North Ridge at Petra and represent a previously invisible portion city residents. The contexts that included these elderly individuals were reassessed to better understand their life history and treatment after death through observations of osteoarthritis, trauma, and LEH and evidence of mortuary behavior. In addition, future avenues of research to better understand their longevity within this ancient city will be discussed.

6 FRAILITY AND RESILIENCE IN THE METROPOLIS: EMBODYING OLD AGE IN MEDIEVAL LONDON

Yaussy, Samantha (Department of Sociology and Anthropology, James Madison University) - Marklein, Kathryn (Department of Anthropology, University of Louisville; Center for Archaeology and Cultural Heritage, University of Louisville) - DeWitte, Sharon (Department of Anthropology, University of Colorado Boulder; Institute of Behavioral Science, University of Colorado Boulder) - Crews, Douglas (Department of Anthropology, The Ohio State University; College of Public Health, The Ohio State University)

Although viewed as an evolutionary conundrum, post-reproductive human lifespans extending beyond the fifth decade represent important and productive periods for individuals and communities. With improved methods allowing estimates of age even for the oldest adults, bioarchaeologists are better equipped to explore experiences among geriatric individuals in historic populations. In addition to better understanding experiences during older age in specific contexts, examinations of pathological conditions in later years offer insight into survival (resilience) and mortality (frailty). Consequently, among older individuals in the same skeletal collection, we can uniquely explore: the osteological paradox (i.e., the frailest individuals potentially exhibiting fewer skeletal lesions appearing “healthy” because they died before a skeletal response to physiological insults); and the morbidity-mortality paradox (i.e., females experiencing more negative health issues during their lives yet outliving males).

Here we consider skeletal and dentoalveolar conditions in older (45+ years) individuals from medieval London, as evidence of frailty and resilience. Using a new methodology integrating cumulative phenotypic (e.g., skeletal frailty index) and hazards-based approaches, we constructed 5-biomarker (enamel hypoplasia, periosteal new bone formation, osteoarthritis, cribra orbitalia, femoral length) frailty and resilience indices for adult individuals from four medieval London cemeteries. Frailty indices reflect biomarker expressions (presence, absence, or severity) associated with elevated mortality/lower survivorship, whereas resilience indices include biomarker expressions associated with lower mortality/higher survivorship. In a subsample of 43 adults aged 45+ years (19 estimated females and 24 estimated males), we observed significant differences in frailty and resilience between sexes, despite no significant difference in age distributions. On average, older males exhibited higher frailty (2.33) and lower resilience (1.71) than females (1.68 and 2.32, respectively). Results suggest a female-male morbidity-mortality paradox, as observed in modern populations, occurring in this subsample of older individuals in medieval London. These indices also provide physical embodiments of old age in this urban setting.

7 “IT MATTERS NOT HOW LONG WE LIVE BUT HOW”: BECOMING OLD DURING THE INDUSTRIAL REVOLUTION IN ENGLAND AND WALES

Buckberry, Jo (University of Bradford) - Crane-Kramer, Gillian (State University of New York at Plattsburgh)

Identifying our elders in bioarchaeology remains a challenge. While new methodological developments are opening-up the potential of accurately identifying the age of the oldest members of archaeological communities, we continue to struggle with the catch-all ‘45+’ age category. Comparisons with demographic records highlight the discrepancies in our data, caused by methodological and preservation biases. Although there is hope for the future, what can be gleaned from extant osteological data? This paper will explore the documentary and skeletal evidence of health during the industrial revolution, highlighting the challenges and potential of this often-overlooked age group.

We collated data from the annual report of the Registrar General for 1837-8 (n=335055 deaths) and osteological data collated from 18 cemetery excavations (n=4157 skeletons). As expected, infants, young children and old adults are underrepresented in the skeletal assemblages: while 32.3% of documented deaths were individuals aged 45 or older, only 19.9% of skeletons were aged as 45+. These mature adults will have survived multiple acute illness and have markers of chronic disease on their skeletons. As expected, these individuals had higher prevalence rates of periosteal reactions, fractures, osteoarthritis, osteoporosis, DISH, gout and fractures, which are all cumulative over the life course, or clinically associated with increasing age. The decline in crude prevalence of caries, periapical lesions and enamel hypoplasia probably relates to high rates of antemortem tooth loss, whereas lower rates of treponemal disease, TB and visceral rib lesions probably suggest these conditions are associated with, or could lead to, a younger age-at-death. Interestingly, residual rickets was identified more commonly in older adults than younger or middle adults, suggesting childhood vitamin D deficiency was not associated increased frailty. It is harder to interpret the fall in prevalence of cribra orbitalia – is this due to lesions remodelling, increased frailty or a combination of the two?

8 BEYOND NUNS AND GRANDMOTHERS: INTERSECTIONAL AGING AND THE ROLE OF ELDER FEMALES IN MEDIEVAL PRUSSIA

Gaddis, Katherine (University of Nevada, Las Vegas) - Gruenthal-Rankin, Ariel (University of Hawai'i-West O'ahu)

As with so many groups before them, older adults have been historically underrepresented in bioarchaeological literature. Despite recent theoretical and methodological advancements, our understanding of the role that older adults played in past societies and the experience of aging in the past remains vague. From an intersectional perspective, age is part of the larger picture of lived experience, which includes proximity, or lack thereof, to structures of power and status. When discussing aging and old age in past societies, it is necessary to frame these concepts within the context of both individual identity and historical context. This task is particularly difficult when primary historical accounts are limited or nonexistent. Such is the case for the Old Prussian populations of the Baltic region (modern day Northeastern Poland, Lithuania, and Latvia). Written accounts of the Old Prussians, who had no formal written language, are limited to records left by the Teutonic Order. Virtually all of these records focus on the role of elder males and their sons due to the importance of land control and inheritance under colonialism. Virtually nothing is recorded about the lives and experiences of elder females in medieval Prussia.

Here we present osteobiographical accounts of elder females from the Medieval Prussian cemetery at Beżławki (Northeastern Poland), contextualized via archaeological data and feminist medievalist writings. In doing so, we aim to shed light on the embodied experiences of aging females and add intersectional nuance to our understanding of life during and after colonization and conversion to Christianity in medieval Prussia.

9 AGE ESTIMATION AMONG ELDERLY EUNUCHS: A CASE STUDY FROM LINGLONG LANE CEMETERY IN BEIJING, CHINA

Du, Dejing (University of South Florida)

A primary goal of bioarchaeology is to understand the past through the contextualized study of human skeletal remains recovered from archaeological contexts. Today bioarchaeologists are interested in questions focused on intersecting aspects of identity, especially those which are understudied or best known from nonarchaeological or historical sources. For example, bioarchaeologists have rarely had the opportunity to examine contexts where bodily transformations to living people directly impacted how those individuals moved through their societies during life.

Eunuchs, as significant figures in the ancient Chinese court serving the emperor and members of his family, were typically men who had been castrated and thus rendered infertile. However, despite being a large and spanning group over time, bioarchaeological studies face challenges in age estimation of eunuchs.

A key question revolves around whether this male demographic, deprived of testosterone, enjoyed longer lifespans compared to ordinary men. Yet, traditional age estimation methods fail to provide age ranges for individuals over 50 years old, and the delayed closure of epiphyses further complicates the estimation of eunuchs as a distinct group.

Therefore, this study focuses on 137 human skeletal remains from the eunuch cemetery in Linglong Lane, Beijing. Utilizing the TA2 for age estimation and integrating historical literature, this research aims to provide evidence for addressing age estimates of eunuchs as a group, particularly regarding elderly individuals among them.

10 THE ANOMALOUS INTERMENT OF AN ELDERLY, BAROQUE ERA (1700S) SZEKLER-HUNGARIAN NOBLEWOMAN

Zejdlik, Katie (Western Carolina University) - Bethard, Jonathan (University of South Florida) - Nyáradi, Zsolt (Archaeology Department, Haáz Rezso Múzeum, Odorheiu Secuiesc, Romania)

Bioarchaeological interpretations of elderly individuals have proven difficult given the physical ambiguity of identifying osteological features and their correlations with chronological age. Additionally, cultural constructions of age have not adequately considered how older adults functioned in their societies and few archaeological contexts have complementary historical sources that corroborate their findings. The case study presented here explores several of these questions by presenting the burial of an elderly female recovered from the Ferenczy family crypt at the Papdomb archaeological site in present-day Harghita County, Romania. The Ferenczy family were influential, Szekler-Hungarian nobles who helped maintain the church they were buried in. Three individuals were recovered from a clearly defined, crypt feature during the 2014 excavation. Two males had been placed side by side in an extended and supine position with their heads to the west and feet to the east. One of the males had a preserved coffin lid with a nail pattern that read "Fere" and "1743", which aligned with known regional history. An elderly female had been placed in flexed position with a north to south orientation at the heads of the two noblemen. Her cardinal orientation and body positioning are unusual within the broader context of the cemetery and have been observed in less than 1% of the 935 burials so far recovered. A biological profile was generated and the TA3 software package suggested that she possibly lived into her eighth or ninth decade. Though limited to a single osteobiographical case study, the interpretation of this elderly noblewoman enables us to better understand aspects of advanced age in this Szekler context.

802 FROM PREHISTORY TO POST-MEDIEVAL TIMES: PERSISTENCE AND CHANGE IN ARTISANAL PRODUCTION ACROSS THE MEDITERRANEAN

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Berrica, Silvia (Escuela Española de Historia y Arqueología de Roma EEHAR-CSIC, Italy) - Morgado-Roncal, Leyre (University of Granada) - Carrera, Francesco (Soprintendenze archeologia, belle arti e paesaggio)

Session format: Regular session

The Mediterranean region has played a pivotal role in the development of human civilization, witnessing the rise and fall of numerous ancient cultures and empires. Throughout history, artisanal production has been a significant driver of economic and cultural growth in this region, persisting with remarkable resilience despite the ever-evolving socio-political context. This session aims to explore the persistence and changes in artisanal production from Prehistory to Post-Medieval times, shedding light on the continuity and adaptation of traditional crafts and techniques.

By bringing together scholars and researchers specializing in archaeology, art history, anthropology, and material culture studies, we seek to foster interdisciplinary discussions. The goal is to generate a multi-proxy and diachronic understanding of the evolution of artisanal practices across the Mediterranean. In doing so, the role of artisans as cultural mediators, and agents of innovation will be highlighted.

We encourage papers and case studies that deal with any kind of craft (pottery, metal, glass, bone, jewellery, etc.) and its production processes from Prehistory to Post-Medieval times. Communications on methodological and theoretical approaches to the Archaeology of Production are also welcomed.

This holistic examination of artisanal production, ultimately, aims to contribute to a broader understanding of the enduring cultural heritage of the Mediterranean region. By recognizing the inherent value of traditional craftsmanship and its dynamic relationships with societal, political, and economic forces, we can better appreciate the significance of artisanal production. Not only as a vital component in shaping our collective past, but also as an informing tool to envision our future.

ABSTRACTS

1 TABLET-WEAVING IN THE 1ST MILLENNIUM BCE: CRAFTSMANSHIP, CASE STUDIES, AND INTERPRETATIONS

Saunderson, Kayleigh (University of Vienna; Natural History Museum Vienna)

While the textile technique of tablet weaving was also utilised for practical purposes, the unique patterning possibilities made them especially popular as a decorative element during the Iron Age, as can be seen with finds from e.g. Hallstatt, Dürrnberg, Hochdorf, and Verucchio. The technique might already have its origins in the Bronze Age, though it is difficult to identify the technique based on textile finds, and possible tools are often difficult to identify with complete certainty. This contribution aims to explore the theoretical formation of the techniques of tablet weaving, along with the chaîne opératoire of production, who produced these products and who they were produced for, and the various uses of tablet-woven ribbons during the first millennium BCE in Central and Southern Europe. Furthermore, some case studies shall be presented, such as a newly found (2022) tablet-woven ribbon from the salt mines of Hallstatt, Austria, as well as experimental archaeological approaches regarding this technique and the uses of the reconstructions in public communication.

2 WEAVING RELATIONSHIPS: EXPLORING CONNECTIONS IN THE MESSARÀ PLAIN BEYOND THE DARK AGES

Toscano, Flavia Maria Chiara (Universität Heidelberg)

The transitional period between the Bronze and early Iron Age Crete experienced significant cultural-social change and no single pre-existing system can have remained totally intact. Regionalism is one of the most evident aspects of this phase, and through studies conducted over the years, patterns of the archaeological record have been outlined, emphasizing this aspect across the island. The Messara Plain stands out as one of the most interesting areas, with its long history centered on sites such as Phaistos, Kommos, and Haghia Triada which are among the few that have yielded archaeological evidence for the phases of the Dark Ages. The new social dynamics affected domestic production and with this work, we intend to present the results obtained from the study of textile tools in the Messara. Sites like Phaistos offer an extraordinary opportunity to shed light on the evolution of a widely practiced craft from its earliest stages. Based on textile-related materials such as loomweights and spindlewhorls, it has been possible to establish a chronological-typological classification and trace a functional evolution attributable to the internal choices of domestic groups. Modern methodological tools, such as space syntax analysis and the perspective provided by Household

Archaeology, enable a comparison between settlements from Late Minoan III C (12th cent.B.C.) to Proto-Geometric period (9th cent.B.C.). The ultimate goal of this presentation is to highlight a relational system between different households characterized by labor differentiation with a special focus on Phaistos area. This approach facilitates understanding the labor economy, distinguishing activities based on the complexity of required knowledge for product realization. Furthermore, by comparing different sites, it helps discern the types of activities occurring within households or if provisioning was diversified in any way.

3 IN THE BEGINNING OF TEXTILE CRAFT: THE SIGNIFICANT CASE OF THE CHALCOLITHIC SETTLEMENT OF LOS MILLARES (SE, SPAIN)

Basso Rial, Ricardo (University of Alicante) - Dorado Alejos, Alberto (University of Granada) - Pau, Claudia (University of Granada) - Spanedda, Liliana (University of Granada) - Molina González, Fernando (University of Granada) - Cámara Serrano, Juan Antonio (University of Granada)

Textile production is one of the oldest artisanal processes of humanity. Its origin in many areas of Europe and the Mediterranean dates back to the early stages of Late Prehistoric times. However, the perishable nature of most of its tools and of the textiles themselves has made it difficult to record in archaeological excavations and has conditioned its study and interest in its research, especially in Spain. Although in recent years this has begun to change, with an increasing number of studies dedicated to textile production in prehistoric contexts, little interest has so far been shown in tracing the beginnings of this activity on the Iberian Peninsula.

The aim of this contribution is to begin to resolve this situation by evaluating the extensive body of evidence related to textile activity at the archaeological site of Los Millares, a settlement in the southeast of the Iberian Peninsula considered to be one of the most important Chalcolithic centres in the Western Mediterranean between 3200 and 2200 BCE. The different interventions carried out at this site since the end of the 19th century, but above all in the last decades of the 20th century, have made it possible to document a large number of textile tools that show the importance that this craft may have had from the end of the 4th millennium onwards. It is also one of the few archaeological sites where textile remains have been preserved with which to explore the raw materials and techniques used. All of this allows us to make a first approximation to the chaîne opératoire of this craft activity and its organisation in the settlement, as well as to begin to assess its significant role in the economy of the Copper Age communities.

4 CHALCOLITHIC CRAFT ON THE CLIFF? CERAMIC PROVENANCE AND TECHNOLOGY AT THE HIGH-ALTITUDE SETTLEMENT OF LES MORERES (ALICANTE, SPAIN)

Serna Martínez, Israel (Instituto Universitario de Investigación en Arqueología y Patrimonio Histórico (INAPH), Universidad de Alicante) - García Atiénzar, Gabriel (Instituto Universitario de Investigación en Arqueología y Patrimonio Histórico (INAPH), Universidad de Alicante) - Del Pino Curbelo, Miguel (Departamento de Ciencias Históricas, Universidad de Las Palmas de Gran Canaria) - Buxeda i Garrigós, Jaume (Departament d'Història i Arqueologia, Universitat de Barcelona)

Les Moreres (Alicante, Spain) is a fortified high-altitude settlement dating from the second half of the 3rd millennium BC. This context is representative of the social and material changes that took place in SE Iberia in this period, with an incipient social elite interested in the control of the territory and in the communication and exchange routes.

The pottery assemblage at Les Moreres exhibits a remarkable functional diversity, showcasing a meticulous technical prowess inherent in its production. This is evident in the deliberate technological choices made across the manufacturing process, which are undeniably intertwined with the various domestic functions served, including cooking, storage, and transportation needs. The configuration of the trousseau also reveals the role that factors such as growing social competition and certain forms of food consumption must have played in the design of these objects. It is within this context that the development of some more carefully crafted designs, such as symbolic ceramics or bell-beakers vessels, is framed. Additionally, possible imports from other peninsular and extrapeninsular sites would need to be considered, adding to the initial (and elusive) evidence of long-distance material exchange networks in the Mediterranean basin.

To enhance our understanding of the production processes, the influence of social and material factors in decision-making, and the inherent mobility in ceramic group assemblages like the one found at Les Moreres, this paper presents the results of the integrated analysis of 35 samples, comparing typological and archaeometric information. The techniques employed are XRD, XRF, SEM and thin section optical petrography.

5 THE QUARRYING OF GRANITE IN GALLURA IN THE NURAGIC ERA. THE CASE OF THE GIANTS' TOMB OF SU MONTE S'ABE

Carrera, Francesco (Soprintendenza Nazionale per il Patrimonio Culturale Subacqueo)

Gallura, a vast area of north-western Sardinia, is characterized by important granite outcrops which have influenced the populations settled here since the Neolithic.

But it is from the end of the Copper Age and even more so in the Bronze Age that granite working took on a fundamental role in the creation of the great monuments that still dot this region today, from the megalithic walls, to the allée couverte tombs up to the tombs of giants and monumental nuraghi.

It is right next to these monuments that the granite processing areas were identified, characterized by a system significantly different from those known from the Punic period to the present day. In particular, the quarry area relating to the giants' tomb of Su Monte S'Abbe in Olbia will be presented where, thanks to the signs left in the rock and some tools found, it was possible to reconstruct the entire system of quarrying and transport of the blocks, of the slabs and the large curved stele that made up the exedra. Finally, the techniques identified in Gallura will be compared in order to propose a first chrono-typology of the quarrying techniques of this particular rock on the basis of the traces identified in the territory.

6 ARTISANS AND ARTIFACTS: A POST-HUMANIST EXPLORATION OF ETRUSCAN POTTERY

McCabe, Michael (Leiden University)

This article examines artisanal practices in early Iron Age Italy, focusing on the production of pottery by the Etruscans and cross-craft production techniques. Using post-humanist and New Materialist perspectives, the article delves into how these artisanal practices evolved over time, highlighting artisans' critical role as cultural intermediaries and innovators while incorporating the non-human actor and ontological reality.

This study uses archaeological, historical, and anthropological approaches to explore how humans and non-human factors interacted to shape pottery production among the Etruscans. It highlights how Etruscan artists, positioned within a network of social and cultural connections, navigated material, environmental, and technological factors to create pottery that had both practical uses as well as symbolic and aesthetic meanings. Using a post-humanist approach, this analysis goes beyond the human-centred perspective and recognises the role of materials, tools, and the environment in shaping artisanal practices. It explains how the actions and intentions of humans interacted with these non-human elements, leading to innovative new constructions.

The abstract emphasises the importance of studying the evolution of artisanal practices over the longue-durée, which includes examining shifts in techniques, styles, and socio-cultural contexts especially regarding periods of change. This detailed analysis reveals Etruscan pottery production's dynamic and contingent nature and helps us understand the complex interactions between artisans, materials, and cultural landscapes. This research aims to contribute to a better understanding of Iron Age Mediterranean artisanal practices, highlighting the role of both human and non-human factors in shaping cultural evolution.

7 COINS AND CRAFT: TEXTILE VESTIGES AND THE CRAFTSMANSHIP BEHIND IN THE ROMAN PROVINCES OF HISPANIA, NORICUM, AND PANNONIA

Morgado-Roncal, Leyre (University of Granada (Spain)) - Grömer, Karina (Natural History Museum Vienna)

In Roman Archaeology, textile studies have been traditionally approached through written and iconographic sources. In the last decades, this has been changing and Roman period textiles are studied also with an interdisciplinary approach, including fibre or dyestuff analysis and many more. It is also important to study the contexts of the textiles found (the graves, settlements, and hoards) and such understanding of the archaeological textiles in situ.

We would like to provide an overview of a less known phenomenon: textiles attached to Roman coins with examples from different Roman provinces (Hispania, Noricum, and Pannonia). Therefore, we hope to draw the attention to a textile function that was less studied so far, with comparison findings from different regions of the Roman Empire. Moreover, the focus will also be in the craft behind: the production processes and its artisans. Consequently, the manufacture of textiles in the Roman World will be addressed, including some hints on known values and prices of certain textile products to return to the main case study: coins and textiles.

8 THE CONTRIBUTION OF ANCIENT REPRODUCTIONS IN ARCHAEOLOGY OF PRODUCTION: THE CASE STUDY OF TWO AMPHORAE FROM THE GRUPPO DI VANTH

Zubajová, Marina (Department of Archaeology and Museology, Faculty of Arts, Masaryk University) - Paolini, Roberto (Independent researcher)

Two almost identical red-figure amphorae from the Gruppo di Vanth (inv. n. 2647 and 2645), dated to the last quarter of the 4th century BC, were discovered in a dismal state. Both amphorae were missing the entire foot and a large part of the neck. Of the original handles woven from three strips of clay, only one has survived, and even that only partially. The bodies of the vessels decorated with a red-figure frieze have been preserved almost completely. The frieze depicts a journey to the underworld: we see a deceased, two male demons, probably the rulers of the underworld, Persephone and Hades, the demon *vanth* and Kerberos. Amphorae are restored and exhibited in the Etruscan Museum "Claudio Faina" in Orvieto. They are known in terms of iconography, but no one has ever deeply studied their "materiality" and thus what their original overall form was, or how they were created and painted. A stylized reproduction of one of them was created in 2023 (inv. n. 2647). The author is the specialized craftsman Roberto Paolini, who is an expert in ancient techniques regarding the production and painting of ancient reproductions, collaborating with universities and museums internationally. The authors provide a reconstruction of the missing parts based on the study of similar objects. These findings were included in the created reproduction of the amphora in the form of decorative plastic elements and partly also parts of the figures on the painted frieze. The authors would like to present these new proposals for the reconstruction of the appearance of both amphorae. In addition, the technology of the production process and the painted decoration of the reproduction of the amphora will be reflected in the contribution.

9 EXPLORING SECONDARY GLASS PRODUCTION IN ROMAN AQUILEIA: AN EXTENSIVE ARCHAOMETRIC STUDY TOWARDS NEW EVIDENCE

Molinaro, Sabrina (Center for Cultural Heritage Technology - Istituto Italiano di Tecnologia; Università Ca' Foscari di Venezia) - Zanini, Roberta (Center for Cultural Heritage Technology - Istituto Italiano di Tecnologia) - Giummolè, Federica (Università Ca' Foscari di Venezia) - Traviglia, Arianna (Center for Cultural Heritage Technology - Istituto Italiano di Tecnologia)

An assemblage comprising 430 glass shards, selected from a larger group of shards recovered during field-walking survey near Roman Aquileia (NE Italy), has been subjected to thorough examination to elucidate the presence of indigenous glass production in this region during antiquity. Dating back to the period spanning the 1st century BC to the 4th century AD, these shards serve as crucial testimonies in establishing a still debated historical narrative. The primary aim of this investigation is to substantiate the conjecture that Aquileia held a significant role in the manufacturing of glass in antiquity, encompassing the crafting of original glass, recycling processes, and the production of artifacts distinguished by unique colorations.

The chemical composition analysis of glass samples was conducted through laser ablation inductively coupled plasma-mass spectrometry (LA-ICP-MS) and this endeavor represents the most extensive analysis ever undertaken on ancient glass fragments utilizing this technique. This technique facilitates the precise quantification of major, minor, and trace elements, providing essential data for exploring provenance, establishing compositional groups, and occasionally offering insights into the chronological context of the samples. The majority of the examined items (chunks, working residues, and artifact shards) displayed noteworthy compositional similarities, strongly indicating the prevalence of glassworking activities in the region. Comprehensive analyses revealed the coexistence of both recycled and primary glass. Notably, the compositional data for raw primary glass indicated both the Syro-Palestinian and Egyptian regions as sourcing areas, confirming the role of the Roman city of Aquileia as a central hub in the intricate network of trade of the past. Moreover, specific colored glass fragments exhibited compositions typical of glass produced during the 1st or 2nd century AD. This finding suggests the use of specific furnaces and manufacturing procedures, suggesting the possibility of a highly specialized local production in Aquileia during that period.

10 SURVIVAL OF ANCIENT CERAMIC FORMS IN MODERN TIMES

Zarco Martínez, Eva (Universidad Nacional de Educación a Distancia)

Certain industries, developed in the Iberian Peninsula since ancient times, can be and are studied from their ceramic containers. The packaging is, in the cases we present, representative of both a specific production and commercial routes that show a demand supplied from the peninsular territory.

Already in Roman times, there was a standardization of packaging, so that certain typologies could be directly related to the export of specific products. This premise is supported by the numerous studies related to amphora epigraphy that analyze the complex production and logistics process of the Hispanic product. In this historical stage, the typological standardization of containers dedicated to the transportation of oil tends towards the ovoid shape for the optimization of production and transportation of the product. The presence of these containers is widely known in the Testaccio of Rome, but also in the limes of central and western Europe.

The ovoid shape that prevailed in Roman times, surviving for approximately five centuries, can be observed again in the 15th century, in the Sevillian *botijuelas* or Spanish olive jars. These containers of food products have similar characteristics to Roman amphorae not only in their shape, but also in the production areas and starting point of trade routes that repeat patterns from antiquity.

11 METALLURGICAL PRACTICES IN LATE ANTIQUE ROME: BETWEEN CONTINUITY AND CHANGE

Bison, Giulia (University of Leicester)

The last decades of excavations and research have deepened and broadened our knowledge of the archaeology of production in Rome between Late Antiquity and the Renaissance, revealing a city which, despite the vicissitudes it underwent, remained a lively centre of production and trade.

In particular, the late antique period shows aspects of marked continuity with the imperial times, but also numerous profound changes that mark a break with the past, while preparing the transition to the early Middle Ages.

Three recently excavated metallurgical sites illustrate these aspects and shed new light on the metallurgy practised in Rome between the 5th and 7th centuries: these highlight a continuity in the way metals were worked, while the use of the sites where the workshops were established shows a marked difference from previous periods and a remarkable ability to adapt spaces to production needs. These discontinuities provide a useful starting point for exploring the political, economic and social factors that underpinned certain phenomena of Rome's life during this period.

At the same time, the artisans who were still active in the city played a fundamental role, guaranteeing the continuity of metalworking technologies and practices and maintaining dynamic relations with the social body the *Urbs*.

My paper will therefore focus on the analysis of the metallurgical evidence that is the subject of my research, combining the data that emerge with some reflections on the various actors and factors at play in this period of Roman history, trying to place them in a broader historical context.

12 CRAFT ACTIVITY IN THE EARLY MEDIEVAL PERIOD. BREAD MAKING IN RURAL AREAS IN IBERIAN CENTRAL PLATEAU

Berrica, Silvia (Escuela Española de Historia y Arqueología de Roma EEHAR-CSIC, Italy)

Bread making in rural areas of the Iberian Central Plateau is the focus of this study. The research delves into the distinct settlement hierarchies that were present in the Central Iberian Peninsula during the Early Middle Ages, specifically examining the categorization and organization of settlements in the region.

During the Early Middle Ages, distinct types of settlements existed in the Central Iberian Peninsula, each varying in size, function, and social structure. Craftsmanship played a significant role in distinguishing the differences between these settlements, particularly evident in the bakeries found in rural areas and large towns. These bakeries offer insight into new perspectives on productive activities during the early Middle Ages, shedding light on the social and economic dynamics of towns in the Central Iberian Plateau.

This research contributes a fresh perspective from the field of Archaeology of Production, with a focus on the economic aspects of peasant life in the region.

13 PRODUCTIVE ACTIVITIES AS INDICATORS OF POLITICAL AND ECONOMIC CHANGES IN THE AMITERNUM TERRITORY

Forgione, Alfonso (Università dell'Aquila)

The archaeological investigations of the episcopal complex in Amiternum, located near the city of L'Aquila, have revealed at least 3 structures interpreted as bread ovens located in two distinct and symmetrical areas of the ancient episcopal complex. These structures, consisting of three stove bases with a diameter of approximately 1 meter, were constructed with bricks and fragmented roof tiles placed directly on the flooring, which also showed evident signs of redness. One of these installations still preserved a fragment of the elevation of the stove made of compact clay soil.

In association with these floors, at least two large grain pits and a series of aligned post holes were found, which were functional to the wooden installations used for production and storage. After the discontinuation of the productive area, the structures were intentionally demolished, and the foundations were reused as flooring, supplemented by flat and compact layers of muddy soil that uniformly covered the entire area and leaned against the existing structures.

The particular morphology of the installations and the presence of grain pits and post holes confirm the hypothesis that these installations were bread ovens for the secular and religious community of the territory.

The ovens, found within the side aisles of the place of worship after the infill of the arches that separated them from the central nave and their subsequent defunctionalization, can be chronologically placed between the end of the 9th and the first half of the 10th century. This period coincided with significant planovolumetric transformations of the

entire complex as a consequence of one of the major earthquakes that struck the L'Aquila territory. It is also possible that during this period, the episcopal seat became a point of reference for nearby settlements.

14 EAST VERSUS WEST: THE ORIGINS OF THE Umayyad STYLE IN THE ART OF STUCCO TECHNIQUE

Georgieva, Siyana (Univesità di Padova; Università Popolare della Toscana)

By 750, the Umayyad dynasty had gained control of a vast territory stretching from Kyrgyzstan to Spain. The technique stucco was a distinctive feature of Sassanian architecture. The studies that form the basis of our understanding of the complex issues related to Early Muslim art have focused on the sources of architectural stucco details, the meaning of themes and forms in their new context, and the transition of motifs from East to West. The aim of this research is to explore the identity of the group or groups of artists who sculpted the stucco decoration in the Umayyad palaces. Additionally, it aims to investigate the interaction between various artistic traditions and the challenges faced by the sculptors, which resulted in the creation of a new style. The method used aims to isolate the purely stylistic aspect from the motifs and models of the compositions. The work assumes that artists borrow themes, motifs, models, and even entire compositions from one culture, while their basic style is rooted in another tradition, the one in which they were trained. Comparative analyses of the stylistic details of carving, as well as the alterations made in the compositions, could help distinguish between the sources of the motifs and models and the origins of the artists involved in the execution of the decoration. This work employs detailed analysis with a current approach to provide a more accurate and complex picture of the processes involved in the construction of the Umayyad palaces. The study focuses on four late Umayyad palaces: Khirbat al-Mafjar, Mshatta, Qasr al-Hayr West, and Madinat al-Zahra. These sites were chosen for their richness and the relatively developed style of decoration with the stucco technique across the Mediterranean. East versus west?

15 THE PRODUCTION OF LEATHER IN THE NASRID KINGDOM OF GRANADA: CHARACTERIZATION AND CHRISTIAN TRANSFORMATIONS POST-CONQUEST

Garrido López, Jorge (University of Granada)

Leather-working was one of the most important productive activities, in terms of division of labour, number of employees and commercial derivation from al-Andalus in general and the nasrid territory in particular. However, our knowledge of the production process of this material is very limited and always based on extrapolations from other spaces and chronologies. In this communication, I propose to present in a broad and general way the main aspects that characterize the production of nasrid leather, with the aim of delving into the elements of change that have been identified after the castilian conquest, such as the social organization of labour, reorganization of productive spaces with respect to the new conception of urban framework imposed by the christians, new tanning techniques and their commercial derivation.

To carry out this work, I will mainly rely on the information provided by the archaeological record generated in the various urban interventions in the territory occupied by the nasrid emirate of Granada, confronting and enriching them with the information from the textual sources available for this particular period, both chronicles and archival documentation.

16 TRADE AND CERAMIC EXCHANGE IN THE SOUTHEASTERN IBERIAN PENINSULA DURING THE 15TH AND 16TH CENTURIES

Sánchez Castillo, Carmen (University of the Basque Country) - García Porras, Alberto (Universidad de Granada) - Iñáñez, Javier (University of the Basque Country)

The southeastern region of the Iberian Peninsula, particularly the area of Almería (Spain), underwent numerous political, economic, and social transformations during the 15th-16th centuries. The conclusion of medieval Islamic presence on the Iberian Peninsula, marked by the disappearance of the Nasrid kingdom, represents a pivotal moment of change. It is characterized by the convergence of elements transitioning to the modern world and the replacement of one society with another based on entirely different social and economic parameters.

These changes had a direct impact on trade, as evidenced by preserved written documentation and the understudied material manifestation of ceramics. In this study, we will assess the current state of research and propose its exploration through archaeological and archaeometric methodologies. Our goal is to recognize consumption patterns, identify the production cycle, and reconstruct exchange and distribution routes. This approach aims to enhance our understanding, through material evidence, of the dynamics of transformation that this society underwent.

803 DYNAMICS OF OWNERSHIP AND TRANSFORMATION OF URBAN SPACES IN THE ROMAN ERA

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Sánchez de la Parra-Pérez, Santiago (Universidad de Valladolid) - Rodríguez Gutiérrez, Oliva (Universidad de Sevilla) - Boucard, Jordan (LUGDUNUM - Musée & Théâtres romains)

Session format: Regular session

Too often, the ancient city is approached as a "still photo", where the most monumental, homogeneous or best known phases of research are the most important. In this way, dynamics that are probably very frequent in everyday urban life, such as changes of ownership, annexations, boundaries, abuses by private individuals in the occupation of space, etc., go unnoticed. Some surviving legal sources show the concern for urban planning and order, while archaeology documents some of these processes.

In this way, the analysis of the urban framework of a Roman city can be approached from a structural point of view, tracing its configuration through multiple sources of information. Furthermore, the composition of the civic nuclei can be studied by analysing the elements that made them up, defining the spaces according to their ownership and purpose.

This session aims to bring together people who study the processes of change in Roman city spaces from the perspective of archaeological, legal, epigraphic and textual criticism studies. We want to share our experiences in different fields of research and sources of information, so we encourage the presentation of both case studies and reflections on the main issues intrinsic to this subject. We welcome papers that address topics such as land ownership, the transfer of property, the disaffection of real estate or the transformation of the use of plots of land in Roman urban contexts. Our intention is to create an interdisciplinary discussion environment in which to present, among other themes, the tools available to define the purpose of land, the structural transformations of a specific building or of multiple spatially related urban spaces. We are also interested in the analysis of textual, epigraphic and legal sources that contextualise and frame the evolution of a given urban framework.

ABSTRACTS

1 THE LEGAL AND ADMINISTRATIVE CONTEXT OF DONATIONS, PURCHASES, AND SALES OF URBAN LAND IN THE ROMAN WEST (1ST-3RD CENTURIES AD)

Sánchez de la Parra-Pérez, Santiago (University of Valladolid)

The choice of land was one of the main issues to be considered in any public construction project in Roman times. This phase took place at the beginning of process and was made public after the promulgation of the decurion decree, which established the administrative bases of the project. It had to conform to the various property rights existing in Roman times (publicum, sacrum and privatum), which regulated and limited the type of structures to be built according to the category of plot. In turn, the *ius superficiei* defined the right of ownership and possession of the parcels and the buildings located on them. In this contribution we will review the legal context of Roman public building through the epigraphic and literary documentation available in Hispania and North Africa during the 1st-3rd centuries AD, paying special attention to the euergetic donations of local benefactors. The elites commonly offered cities private land for the construction of public structures. In particular, we will reflect on the meaning of the formula "*solo empto ab republica*," which directly refers to the legal ownership of the land. Its specific meaning has led to the publication of several articles that have not offered a unanimously accepted solution by the scientific community, providing an ideal opportunity to contextualize the dynamics of property from a legal perspective in the Roman city.

2 BETWEEN PUBLIC AND PRIVATE: DEDICATIONS AND STATUARY HONOURS OF INDIVIDUALS IN PUBLIC SPACES OF ROMAN CITIES OF HISPANIA

Cases Mora, Noelia (Humboldt Fellow Universität Hamburg)

Within the Roman city, dedications and statuary honours placed in forums and other public spaces had to be authorised by the local *ordo*, a permission made explicit with epigraphic formulations such as *l(ocus) d(atus) d(ecreto) d(ecurionum)* or *accepto loco ab ordine*. The reasons for these homages were varied and could arise from the initiative of the local senate, civic groups or individuals, as well as being financed by any of them. According to Roman legislation, the donation by private individuals of monuments placed in a public space meant that they became public property, so any modification or restoration belonged to the city's jurisdiction (Dig. 42, 5, 29; 43, 24, 11, 1).

In this context, it is particularly interesting to note the possible location of pedestals with statues dedicated to divinities in forums and other relevant spaces of the city, although their main purpose was to remember or honour

individuals. They have often been misidentified as funerary monuments, since the use of formulas such as *in honorem et memoriam* have made it possible to discern that the individuals remembered had already passed away. The purpose of this paper is to explore how and what consideration was given to these spaces, that were publicly owned but ceded to private individuals for their “self-representation”. In this regard, one of the most suggestive hypotheses refers to the frequency with which many of these divinities were qualified with the epithet *Augustus*. This allusion to imperial power could have been used as a means to obtain the authorisation of the local senate to the use of public space by these private individuals.

3 THE CONSTRUCTION SITES FOR TRANSFORMING PRIVATE BUILDINGS INTO PUBLIC MONUMENTS: TRANSFORMATION SITES AND REUSE

Boucard, Jordan (Lugdunum. Theatre et musées romains de Lyon)

The archaeology of construction and its study themes now provide new keys to understanding archaeological sites. Among these, the stage of site preparation and the conversion of a building, as well as questions related to reuse, can be studied. During the High Empire, a frequent but understudied phenomenon is worth noting: the transformation of private buildings into public buildings. Urban space is a place in motion, and destruction / construction / reconstruction sites were omnipresent. We propose here to study the dynamics of transforming private buildings into public monuments through the lens of the construction site. An operational chain can be defined, taking into account the potential for reuse. There are numerous archaeological examples, and the in-depth study of some of them provides new answers regarding the progress of the construction site. This is notably the case with the *Mithraeum* at Ostia or the sector of the pseudo-sanctuary of *Cybele* in Lugdunum, etc.

4 ONE NARRATIVE FITS ALL? REVIEWING ROMAN URBAN DEVELOPMENTS IN MID-IMPERIAL ITALY

Goetz, Lisa (Classical Archaeology, University of Augsburg, Germany)

How did Roman urban centres change in Italy in the second century AD? Traditionally, positive images of growth, wealth, expansion, and prosperity are often drawn. And deviant developments that do not fit into the supposedly flourishing urban era of the Roman Empire quickly fall into negative categories. As discussed in recent studies, such a linear urban narrative, which remains within limited interpretations and binary, simplified concepts, does not do justice to the heterogeneous situation in archaeological and historical urban research. Considering the different urban developments at the local level and in micro-contexts, this paper will examine several case studies of Roman urban centres in mid-Imperial Italy. Conflicting developments ranging from new to ruinous scenarios raise the question of how urban changes are recognized, explained, and interpreted. For answers, the modern perception of urban culture and the impact of traditional research history on the conceptualization of urban image(s) are addressed. Alongside extensive research of urban geographical and economic parameters, recent debates on urbanity in cultural and ethnographic approaches highlight the diversity of change, by reviewing local challenges, individual solutions, and the city as locus. This paper will therefore explore archaeological remains of adaptations in material culture as well as in architectural and social spaces and reflect on ideas of continuity, functionality, and crisis in ‘minor’ urban centres on the Italian peninsula. Beyond an unchanging urban image, a variety of modifications and transformations are emphasized as integral processes that allow for a better understanding of the adapting urban developments and culture in mid-Imperial Italy. The paper aims to contribute to the discussion on the persisting narratives of Roman urban culture in second century Italy, opening up additional perspectives on old concepts and new approaches to the study of local urban changes.

5 OWNERSHIP, FINANCIAL INVESTMENT AND LANDSCAPE IMPACT OF TWO GREAT MONUMENTS: THE CLAUDIUM IN ROME AND THE PROVINCIAL FORUM IN TARRACO

Domingo, Javier (Pontifical University of the Holy Cross) - Pensabene, Patrizio (Sapienza Università di Roma)

We present two monuments that we have studied in the past - the *Claudianum* in Rome and the *Provincial Forum* in Tarraco - but now from a different perspective: taking into account the change of ownership of the plots on which they were built and their landscape impact.

It is true that the data we have about their ownership conditions are very limited. Even so, we know that in *Celio* there were several *domus* owned by the *Claudians*, which we can assume passed to the imperial patrimony. This would explain the construction here of a large cult enclosure dedicated to *Claudius*. In this case, we would be facing the transition from private ownership to imperial ownership.

In the whole of Tarraco, we only know that in the acropolis there was a military camp, a fact which suggests that the area was a state property: it is true that the numerous excavations carried out in the upper part of the city have not provided data about possible constructions preceding the provincial enclosure, but we do have a wall of the 2nd century BC that, due to its monumentality, could have been part of a public building. At the same time, on the slope of

the hill where the circus was later built, there was a workshop for the production of architectural terracottas, which was subsequently dismantled. We would therefore be facing the transition from private ownership to public ownership.

We present both buildings together because they share the commonality of a significant economic investment, but with different origins: in the case of Rome, state-funded, and in Tarraco, funded by provincial elites.

Regarding the landscape impact, although we have more data for the late period, this allows us to hypothesize how both complexes were perceived from their origins in the 1st century AD.

6 EXPLORING THE EVIDENCE FOR CHANGING PROPERTY OWNERSHIP: CASE STUDIES FROM THE EXCAVATIONS OF HOUSES AND SHOPS AT POMPEII AND THARROS

Ellis, Steven (University of Cincinnati)

The aim of this presentation is to consider the extent to which we can identify changes in the ownership of urban property - especially that of Roman houses and shops - via archaeological excavations into their phases of development. The case studies are drawn from the University of Cincinnati's excavations of a variety of properties at the *Porta Stabia* neighborhood in Pompeii, as well as from the excavations of various neighborhoods across the Punic-Roman city of Tharros, Sardinia. Whereas urban investment and ownership is often, and reasonably, attached to changes in the architectural configuration of singular and neighboring properties, the focus here is on exploring other indicators. The archaeological evidence from the excavations at Pompeii and Tharros points to a range of signifiers for changes to property ownership, with some commonalities across and between the different cities. The examples include: the terracing of the landscape associated with property investment; ritual activities, whether in the cultic material deposited into pits cut into the floor, or in the replacement of household shrines; and the reorganization of underground drainage infrastructure. Some of the examples do not just signify changes in ownership or new divisions between neighboring properties, but also demonstrate the sharing of infrastructure and resources between owners. Also, the rate of structural and spatial development of various properties, from one phase of occupation or activity to the next, is considered as a potential indicator for the transition of ownership.

7 OWNERSHIP DYNAMICS IN BAELO CLAUDIA (PROV. BAETICA) THROUGH ARCHAEOLOGICAL EVIDENCE

Rodriguez, Oliva (University of Seville)

The archaeological evidence allows us to identify dynamic changes in land use, with divisions of former buildings, annexations, invasion of public space, etc. Although we have no direct material information, it is more than likely that these modifications involved regulated administrative actions related to property or, failing that, illegal abusive uses. *Baelo Claudia*, in the south of *Baetica*, is today a depopulated area that has been uninhabited since the 6th century AD and has been excavated and investigated for more than a century. Much of its urban centre has therefore been exhumed and well-published. This makes it a particularly suitable case study for tracing these interesting dynamics of urban transformation. Of particular interest is what has been documented in recent excavations in the southeast angle of the forum, where a large building erected at the beginning of the Imperial period was partially demolished in order to construct a new one. The excavations carried out in the industrial salting quarter have also documented the closure of a gate of the city wall and the partial invasion of a road.

This contribution will therefore deal with different examples of urban transformation documented in the city which allow us to reflect on the effective existence of a dynamic real-estate life, in accordance with the rules established by the municipal authorities. This contrasts, once again in *Baelo*, with the Late Antique phase of occupation, from the 5th century AD onwards. At that time, new building initiatives were documented on ancient constructions, although they already seem to respond to a more spontaneous operation and not controlled by public authorities. In fact, it serves to reflect on the forms of collective organisation at this time, the existence of administrators with responsibilities in the community or the validity of the rules of application for the common running.

8 EXPLORING THE CHANGES OF THE URBAN SPACE OF LUCUS AUGUSTI. REVISITING SANTO DOMINGO SQUARE

Folgueira Rios, Francisco (Universidad de Santiago de Compostela) - Martins, Manuela (UAUM/Lab2pT) - Machado, Diego (UAUM/Lab2pT)

Lucus Augusti was one of the three cities founded by Augustus in the North-West of the Iberian Peninsula, with the aim of reorganizing the territory after its effective conquest in 19 B.C. Over it is at present the city of Lugo, where in 1986 archaeological activity began among multiple difficulties. To the problems of urban archaeology, we must add the peculiarities of Lugo, which lacks databases, in which the archaeological documentation generated by this activity is poured. This makes it difficult to investigate the available resources, which in turn complicates the revision of the historical discourse, generated after the first excavations carried out at the end of the twentieth century. Because of

this, the evolution of the Roman city is perceived in a schematic way, through these created models, which tend to emphasize the idea of a monumental and immobile city, without paying attention to the data that might contradict them. As a result, excavations are sometimes carried out in an attempt to confirm these models, forcing the interpretation of the remains to adapt to them.

By reviewing the available archaeological information, and through a methodology that emphasizes the analysis of changes in land use, construction, remodelling or abandonment of buildings, we will try to present a more complex idea of the urban evolution of Lucus Augusti. In this way, focusing on the specific case of the 1986 excavation of the Plaza de Santo Domingo, we intend to approach the daily dynamics that would take place in this area of the city, in addition to trying to certify whether with this methodology, we can reuse interventions that previously only offered us a still photo, to better understand the urban changes occurred in the Roman city.

9 **RESHAPING URBAN LANDSCAPES: INSIGHTS FROM AESO (ISONA I CONCA DELLÀ, CATALONIA, SPAIN)**

Garcés, Ignasi (Universitat de Barcelona) - Cau, Miguel Angel (Universitat de Barcelona; ICREA; Associate researcher, Center Camille Jullian, MMSH, CNRS/Université Aix-Marseille; Institute of Archeology of the University of Barcelona (IAUB)) - Mas, Catalina (Universitat de Barcelona; Institute of Archeology of the University of Barcelona (IAUB)) - Martín, Borja (Universitat de Barcelona) - Bermúdez, Xavier (IPAT-Serveis Culturals; Museu de la Conca Dellà) - Belmonte, Cristina (IPAT-Serveis Culturals; Museu de la Conca Dellà) - Arcos, Roser (IPAT-Serveis Culturals; Museu de la Conca Dellà) - Reyes, Teresa (Museu de la Conca Dellà)

The Roman city of Aeso, situated beneath the contemporary town of Isona in the Catalan Pre-Pyrenees (Lleida, Catalonia, Spain), underwent archaeological excavations towards the end of the previous century, with recent efforts by our research team rekindling this exploration.

Between the 2nd and 1st centuries B.C.E., the Iberian settlement was replaced by a new city spanning approximately 4 hectares, planned in accordance with Roman urban design principles, while retaining its Iberian name. This endeavour was not isolated but rather part of a broader series of legal, military, and administrative transformations undertaken by the Roman state in the northeastern region of Hispania Citerior. The most prominent remnants from that period include a robust walled enclosure, which served as the foundation for the initial urban layout and orientation.

A period of significant prosperity ensued during the reigns of the Flavian and Antonine emperors, as evidenced by the city's abundant epigraphy, before succumbing to a profound crisis—a fate common among smaller Roman cities in the area. From an urban planning perspective, archaeology has confirmed that this flourishing period led to an expansion of the urban landscape, particularly evident at the southern periphery. Remarkably, this expansion not only incorporated new areas but also introduced a novel urban layout, leading to the dismantling of sections of the city walls and to the destruction of some of the main streets.

Consequently, inquiries arise regarding the correlation between these transformations, the city's legal status, and its alignment with the tumultuous transition from the Republic to the Empire. This study aims to blend an examination of legal sources reflecting the disaffection of the public use of urban spaces with an archaeological analysis comparing Aeso to other cities across the Iberian Peninsula that expanded their enclosures, thereby facilitating a comparative exploration of the adopted solutions.

10 **ARCHITECTURAL TRANSFORMATIONS AND OWNERSHIP DYNAMICS OF COMMERCIAL BUILDINGS: THE SHOPS IN LUGDUNUM AND VIENNA (FR) AS A CASE STUDY**

Lepee, Marine (Laboratoire ArAr-UMR5138, Maison de l'Orient et de la Méditerranée, Lyon; Université de Lille, Laboratoire HALMA-8164)

Retail spaces played a significant role in shaping the urban landscapes of Roman cities, including their plots and street networks. Archaeological data from the colonies of Lugdunum and Vienna, which were important trade centres in the Rhône Valley and Roman Gaul, provide a rich corpus of shops dating from the 1st c. BC to the 3rd c. AD. These shops were either integrated into buildings and completed their facades, such as houses and public buildings, or formed the ground floor of multi-storey buildings and commercial squares.

As part of a PhD thesis completed in 2023, a diachronic and multi-level analysis of their remains was carried out, with particular attention given to the architectural and planimetric transformations that the buildings underwent over time. The aim of this paper is to analyse the rhythms of reorganisation and reconstruction, including expansion or contraction, division into neighboring units, encroachment and other related processes, as well as the processes of abandonment and change of use affecting both the shops as individual rooms and more widely the commercial buildings in which they are located. It is also important to consider the dynamics of the surrounding urban area, which may be the cause or consequence of these developments.

What do these structural changes reveal about the evolution of the ownership and the management of shops, apart from their impact on the organization of retail and urban traffic? How do these transformations reflect changes in investment strategies in commercial architecture in these two colonies over the centuries? To establish the link between architectural and ownership issues, archaeological sources from selected sites in the study area will be combined cautiously with legal and epigraphic sources from the Roman world, that could shed light on how shops were run.

11 **OWNERSHIP IN A ROMAN POLIS REAL ESTATE DYNAMICS AND URBAN LANDSCAPE TRANSFORMATIONS IN THE MID-IMPERIAL ATHENS**

Cecconi, Niccolò (Sapienza. Università di Roma; Scuola Archeologica Italiana di Atene)

After the Roman conquest of Greece, the identities of the Greek cities were transformed by the intervention of central power, civic institutions, and local families. Even Athens, as a *civitas libera et foederata* of the province of Achaia and from the Antonine age onwards as the capital of the Panhellenic federal league (Panhellenion), underwent significant interventions that modified the landscape and functions of civic spaces. Certain property and ownership dynamics can be linked to some of these transformations. Three significant contexts will be the focus of the paper to shed light on this.

1) Thanks to archaeological, epigraphic, and literary sources, we know that in the residential area south of the Acropolis there were some houses of the family of Herodes Atticus and that this district was enlarged by Herodes in the 2nd century CE.

2) An inscription found at the Agora (IG II2 2776), dating back to the 2nd century CE, mentions some private land around the Akademia. Some archaeological evidence can be connected to these properties.

3) Hadrian's Library and the so-called 'Pantheon' were built on a late Hellenistic residential area. To build these luxurious buildings, it was necessary to demolish the previous houses and relocate all the owners to other areas of the city. A similar operation can be referred to the southeastern part of the city, where the completion of the Olympieion and the construction of a new residential quarter required the destruction of some buildings and of classical city walls.

These events may also be related to the appointment of a *curatores rei publicae* by Antoninus Pius to supervise the completion of the constructions begun by Hadrian.

804 **MAKE DOLIA GREAT AGAIN - COMPARATIVE PERSPECTIVES ON ANCIENT CLAY-JAR WINEMAKING**

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Komar, Paulina (University of Warsaw) - Van Limbergen, Dimitri (Ghent University)

Session format: Regular session

In today's wine scene, clay-jar winemaking is a discrete phenomenon, mainly confined to the Caucasus (Georgia, Armenia) and a few artisan winemakers in Mediterranean Europe (Greece, France, Italy, Spain, Portugal) and South America (Peru, Chile). In Antiquity, however, such jars were standard equipment in winemaking facilities spreading from the Caucasus to the Iberian Peninsula. They were the 'karas' of the Armenian Urartu Kingdom, the 'pithoi' of the Greeks and the 'dolia' of the Romans. Surprisingly however, current research on ancient wine has largely ignored the role of these containers in ancient wine production and economy, and their influence on ancient wines' sensory properties remains poorly understood.

With this session, we aim to re-establish the role of clay jars in ancient wine studies by concentrating on aspects of their making and on their effects on wine fermentation and storage. To this purpose, we intend to bring together a holistic and comparative group of researchers working on ancient and contemporary clay jar winemaking in the Mediterranean, the Caucasus and beyond. We are particularly interested in talks dealing with clay jar typologies and forms, geographical and chronological distributions, and archaeometric studies of clay composition and vessel contents; especially if such work leads to insights into processes of wine fermentation and organoleptic evolution.

ABSTRACTS

1 **CALCULATING THE VOLUME OF DOLIA EMBEDDED IN COUNTERS OF TABERNA IN POMPEII** **Zhao, Xinyan (Kyushu University) - Hori, Yoshiki (Kyushu University) - Ogawa, Takuro (Kyushu University)**

In the context of archaeological excavations within the Roman Empire, in addition to the wine workshops and vessels dedicated to wine transport, a diverse array of dolia has been found in various contexts, including the examples embedded in counters of taberna. These dolia, suggested by existing literature, were likely instrumental in offering a diverse range of flavored beverages. Additionally, numbers of amphorae, traditionally used for wine distribution, were

found alongside these dolia. While there is an association between these dolia and wine reprocessing and distribution, the scarcity of archaeological evidence presents challenges in conclusively determining the specific types of dolia linked to wine. Furthermore, the use of traditional measurement methodologies for dolia that are embedded in architectural structures is difficult. Hence, the challenge in this study revolves around precisely evaluating the shapes and volumes of those immobile dolia. To determine the purpose and function of the embedded dolia, one needs first to measure the shape and to calculate the volume usually from detailed drawings of evidence, but often gave up on hand-measurement. This research utilizes 3D visual technology to scan the interiors of these dolia embedded in counters in Pompeii, resulting in high-precision 3D models, and restoring the original form of the dolia through fitting operations.

The volume could, especially, serve as a key metric for assessing the relationship between dolia and wine. This involves the first utilization of 3D model in measuring dolia volume embedded in counters in 14 houses in Pompeii, conducting comparative analyses with amphora volume. Combining these elements allows for a better understanding of the connections between various types of dolia used in taberna. Also, it provides new data regarding their shapes and volumes. The methodologies employed for data acquisition and visual archaeological analysis in this study can serve as valuable references for similar research pursuits.

2 DOLIA FROM LUSITANIA: EXPLORING CHRONO-TYOLOGIES AND CONTENTS

Bombico, Sonia (CIDEHUS - University of Évora) - **Andrade, Daniel** (CHAM - NOVA University Lisbon; CIDEHUS - University of Évora) - **Quaresma, José Carlos** (CHAM - NOVA University Lisbon) - **Abrunhosa Pereira, Pedro** (CITCEM - University of Porto) - **Oliveira, César** (HERCULES - University of Évora) - **Carneiro, André** (CHAIA - University of Évora)

In this paper, we will present the results of the research conducted within the framework of the VILUS project—an initiative aimed at characterizing and typifying the dolia of Lusitania through a systematic study of ceramic collections from various archaeological contexts. The 2023 fieldwork encompassed the scrutiny of dolia collections from the Roman cities of Mirobriga, Conimbriga, and Salacia, materials sourced from fish salting factories in Sines, and dolia from rural sites such as the villa of Horta da Torre (Fronteira), the villa of Santa Catarina de Sítimos (Alcácer do Sal), and agrarian and rural sites in the municipality of Ponte de Sor.

The analysis of different archaeological contexts—urban, rural, and coastal—coupled with a comprehensive literature review, enabling us to draw specific conclusions. Firstly, trends were observed towards the predominance of types with introverted thickened or introverted glans rims and inverted pyriform bodies (types 2 and 3), particularly in southern Lusitania. The chronologies of the contexts allow an attempt at defining a chrono-typology, although the data suggests a rather long-term use of the containers. On the other hand, an inventory of dolia production centers in the province was compiled, and distinct fabrics were identified by region. Epigraphy, especially numeral graffiti, provides data on the capacity of the containers. Finally, we will present the results of organic residue analysis in pottery, offering intriguing insights into the contents of the dolia, typically associated with the production and storage of wine and olive oil.

3 UNVEILING THE POTENTIAL OF PREHISTORIC WINEMAKING: THE EFFECT OF VESSEL SHAPE ON THE PERFORMANCE OF SPONTANEOUS FERMENTATION PHENOMENA

Harutyunyan, Mkrtych (Linking Landscape, Environment, Agriculture and Food (LEAF) Research Center, Associated Laboratory TERRA, Instituto Superior de Agronomia, Universidade de Lisboa) - **Granja-Soares, Joana** (Departamento de Ciências e Engenharia de Biosistemas (DCEB), Instituto Superior de Agronomia, Universidade de Lisboa) - **Chandra, Mahesh** (Linking Landscape, Environment, Agriculture and Food (LEAF) Research Center, Associated Laboratory TERRA, Instituto Superior de Agronomia, Universidade de Lisboa) - **Asryan, Arman** (College of Science and Engineering, American University of Armenia) - **Oliveira, Joana** (Faculdade de Ciências da Universidade do Porto (FCUP)) - **Freitas, Víctor** (Faculdade de Ciências da Universidade do Porto (FCUP)) - **Loira, Iris** (Departamento de Química y Tecnología de Alimentos de la Universidad Politécnica de Madrid (ETSIAAB-UPM)) - **Morata, Antonio** (Departamento de Química y Tecnología de Alimentos de la Universidad Politécnica de Madrid (ETSIAAB-UPM)) - **Cunha, Jorge** (Estação Vitivinícola Nacional (EVN)) - **Malfeito-Ferreira, Manuel** (Linking Landscape, Environment, Agriculture and Food (LEAF) Research Center, Associated Laboratory TERRA, Instituto Superior de Agronomia, Universidade de Lisboa)

The earliest archaeological evidence of wine comes from ceramic vessels of the Transcaucasian ‘Shulaveri-Shomutepe’ or ‘Aratashen-Shulaveri-Shomutepe culture’ (SSC/ASHSh: c. 6000–5200 BC). Western European bell beakers (BB: c. 2500–2000 BC) did not show residues consistent with wine. Knowing that wild grapes populated both habitats, the absence of wine during the Bell Beaker period remains to be explained. The main goal of this work is to test whether the vessel’s shape could influence the performance of spontaneous fermentation, specifically regarding the production of volatile acidity. In addition, wine yields and phenolic composition were determined for wild grapes in

comparison with six red varieties *Vitis vinifera* L. subsp. *sativa*, chosen as a function of their genetic relatedness with the wild counterpart (Vinhão, Marufo, Branjo, Melhorio, Castelão and Aragonez).

Two types of vessels were used: (i) borosilicate glass beakers (4–5 L) to imitate BB pottery style; and (ii) Erlenmeyer flasks (5 L) to imitate SSC/AshSh vessels. Fermentations occurred spontaneously and wines were analysed for their conventional physical-chemical parameters, spectrophotometric indexes, and yeast species at the end of fermentation.

V. sylvestris grapes showed the lowest berry weight and juice yields while wines showed high total acidity and colour intensity when compared to the cultivated varieties. *Saccharomyces cerevisiae* dominated at the end of all spontaneous fermentation, in all types of vessels and conditions. Most of the wines fermented in Erlenmeyers showed higher ethanol and lower volatile acidity than those fermented in beakers, either in red or white wine style fermentations. Therefore, the shape of the vessels influenced the performance of fermentations, probably due to the different exposure to air, leading to vinegary ferments more frequently in open-mouths than in conical-shaped flasks. These results provide a hypothesis based on fermentation performance, for the absence of wine produced in the Iberian Peninsula until the arrival of Phoenician settlers.

4 THE ROMAN ‘DOLIUM’ EXPERIMENT: FROM THE ORIGINAL ARCHAEOLOGICAL VESSELS TO THE MODERN REPLICAS

Martín i Oliveras, Antoni (Universitat de Barcelona) - **Parés Sansano, Bruno** (Cella Vinaria Project) - **Matés Porcel, Josep** (Cella Vinaria Project)

The ‘dolum’ is one of the most common pottery elements that appears in the excavations of Roman settlements, whether they were urban ‘domus’; ‘villae rusticae’; farms for intensive cereal crop cultivation; centres specialising in wine-growing and olive oil production; infrastructures for production, storage, distribution, and transport (‘horrea’, ‘cellae vinariae et oleariae’); Roman tanker-ships; or establishments for the sale and consumption of the contents of the ‘dolia’ (‘tabernae’, ‘cauponae’, ‘thermopolia’ etc.).

Despite this, the ‘dolum’ has been one of the vessels least studied by scholars, perhaps due to its “gross” structural manufacturing and its functional condition as a large pottery container for the collection and storage of agricultural products considered more as an integral part of production and processing facilities than as a container itself.

The main purpose of this paper is to present the whole documentation and manufacturing processes of replicas of Roman ‘dolia’ from the four originals located at the archaeological site of Veral de Vallmora. Today, these are presented in restored condition ‘in situ’ in the ‘Cella Vinaria’ Archaeological Park in Teià (Maresme, Barcelona, Spain). These containers have a similar body shape, differing mainly in their general dimensions and in the type of rims. They belong chronologically to Phase 1 of the site, corresponding to the first wine-growing estate whose full operational period is the 1st century AD.

The objective is show all the processes of documentation and manufacturing of these replicas, from the metrological and digital photogrammetric study of the original archaeological vessels enabling a 3D theoretical model of the ‘dolum’, which in turn has served as a sample for making the different elements of the replica container by the master potter, to the drying and firing processes, transport, and installation in the original archaeological context located at the site in the so-called northeastern ‘Cella Vinaria’.

5 MAKING, USING, AND REPAIRING DOLIA FOR WINE

Cheung, Caroline (Princeton University)

Dolia (singular dolium) were the largest type of pottery in the ancient world that could hold hundreds to as much as three thousand liters. They primarily stored wine during its production on agricultural estates, but also in shops and bars. Their shape and size facilitated wine fermentation, and they were legally considered architectural elements of a wine cellar. As expensive and valuable vessels, dolia were also prized for their utility and could be used for long periods of time. Well made dolia, with the proper upkeep, had the potential to be used for long periods of time. Although dolia could be robust vessels, the way they were produced also made them susceptible to damage such as cracking, which was often remedied in order to extend their utility. Many dolia repaired in antiquity shed light on different techniques and materials craftsmen used in order to mend the wine vessels. Agricultural texts also note the importance of regularly cleaning and coating the vessels before adding new batches of wine. This paper considers the impact of the long lives of dolia (including their production, upkeep, and repairs) on ancient wine, as well as the ways storing wine affected how dolia were made and maintained.

6 ON THE ORIGINS OF ROMAN WINEMAKING IN EARTHENWARE VESSELS

Van Limbergen, Dimitri (Ghent University; Università degli Studi di Verona)

Dolia defossa – earthenware vessels buried in the ground up to their rims to store and ferment wine – are perhaps the most characteristic and visual element of Roman winemaking estates. They have been found in wine cellars all over the western Roman world, especially in Italy, Portugal, Spain, and southern France, sometimes in very large quantities. The widespread use of these vessels attests to the existence of a skilled, specialized wine industry, aimed at making good wines by storing the must in purposely made clay jars, whose shape, size, and material properties all contributed to balanced fermentation and aging.

But where did the technique come from? While the Roman evidence certainly stands out in terms of quantity, the use of such vessels in winemaking was already a millennia-old practice at the time, going back at least 4000 years to the Caucasus region. In this talk, I will trace the origins and development of winemaking in earthenware vessels, from Georgia and Armenia, through Iran and Turkey and the time of the Urartian Kingdom (9th-7th century BC), and across the Archaic and Greek Classical world. Clay jars so reveal themselves as a highly specific, ingenious key component of ancient viniculture, and one perfected by the Romans in the first two centuries of our era.

7 CLAY-JAR WINE PRODUCTION NOW AND THEN – A COMPARATIVE PERSPECTIVE

Komar, Paulina (University of Warsaw)

Greek pithoi and Roman dolia were standard ceramic containers for wine fermentation. The practice of fermenting and/or maturing wines in big clay-jars usually buried in the ground that started from at least the Neolithic period (as evidenced by the Areni Cave, Armenia) has preserved until today, especially in the Caucasus area and the Iberian Peninsula. In recent years it has gained remarkable popularity and the experiments with the so-called “amphora wines” has been made in almost every wine-producing region (including Poland!).

Nevertheless, only traditions from Georgia, Armenia, Greece, Spain and Portugal can easily be traced back to antiquity. These traditions, however, differ in details from one another, for example with the use of resin (antiquity) or bees-wax (Georgia) for sealing fermentation jars, adding or not salt of seawater to wine (Greece and Rome) or with pouring olive oil on the surface of fermenting must (the Iberian Peninsula). Not to mention differences in wine terroirs, vine varieties and clay types of the fermentation jars. This presentation will use both classical sources as well as interviews with today’s wine producers. It will concentrate on differences in wine making processes in order to establish how they affected the fermentation and hence wine tastes.

8 THE PITHOI OF THE RURAL SETTLEMENT OF JAZZO FORNASIELLO (APULIA, VITH - IVTH CENTURY BCE): ARCHAEOMETRIC INSIGHTS INTO PRODUCTION PROCESSES

Muntoni, Italo (Soprintendenza ABAP BAT-FG, Ministry of Culture) - Eramo, Giacomo (Dipartimento di Scienze della Terra e Geoambientali, Università degli Studi di Bari “Aldo Moro”, Bari, Italy) - Lambrugo, Claudia (Dipartimento di Beni Culturali e Ambientali, Università degli studi di Milano) - Lojacono, Agnese (Dipartimento di Beni Culturali e Ambientali, Università degli studi di Milano)

This talk will focus on the archaeometrical analysis of the pithoi used to storage wine and produced in Peucetia between the VI and the IV century B.C. The study was carried out on the archaeological materials from the rural settlement of Jazzo Fornasiello near Gravina in Puglia (Bari), located in the inner Peucetia, in the Bradanic area, excavated by the University of Milan since 2009 under the supervision of the Soprintendenza Belle Arti e Paesaggio for the metropolitan city of Bari. The numerous pithoi fragments found in the site clearly indicate that these vessels play a key role in the economic growth and in the settlement systems in the rural economy environment. Chemical analyses performed at the University of Milan confirm their use for winemaking.

The archaeometrical studies, conducted in collaboration between the University of Milan and the University of Bari Aldo Moro, include optical microscope (POM) and scanning electron microscopy (SEM-EDS), petrography on thin section and mineralogical bulk analysis (XRPD) of sixty samples. This analysis has allowed to know the compositional, textural and microstructural features and to identify the raw materials and the technological choices employed in the different chronological phases and in the distinct types of pithoi attested.

A specific study has been carried out on a pithos, recovered in situ by the excavators, whose profile is entirely preserved. A section of the whole profile has been cut to fully understand the production process of the vase and the method of forming and firing.

The talk will show how for the first time this analysis clarifies the hard process of making pithoi, which had to involve a specialized know-how, from the collecting of raw material to the firing process, bringing a new light on the interpretation of the importance of huge storage jars in the Peucetian settlements.

811 BRIDGING THE WALL BETWEEN PREHISTORY AND THE PRESENT: COMMUNICATION AND INCLUSIVENESS IN THE REALMS OF SCIENCE, HERITAGE AND EDUCATION

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Silvestri, Letizia (Soprintendenza Capitolina ai Beni Culturali (Casal de’ Pazzi Museum); Università degli Studi di Roma; Durham University) - Cura, Sara (School of Communication and Media Studies)

Session format: Regular session

Prehistoric archaeological evidence is widespread throughout Europe and the Mediterranean region. Despite its prevalence, themes, sites, remains, and museums related to human prehistory are often perceived as distant not only chronologically but also conceptually by the general public.

Efforts by cultural heritage professionals, academia, the education sector, and science communicators aim to reconnect prehistory with society. Prehistory is at the crossroads of many scientific fields studying community transformations and adaptations throughout time and space, and can unveil many possibilities to bridge to the past with present dilemmas and challenges, such as climate change, loss of biodiversity, sustainability, cultural evolution and diversity over a long time, integration, migrations, as well as care and solidarity.

From the engagement in public archaeology events to the use of ever more refined communication and edutainment approaches in research centers, museums, and heritage sites; from the creation of dedicated educational programs on Prehistory for teachers and students to the development of prehistoric-themed science communication contents on mass and social media, the strategies to make Prehistory better known, attractive, and appreciated are countless.

Furthermore, by doing so, we not only uphold the value of our discipline and heritage but also contribute to scientific literacy, intellectual and cultural development, to face misinformation and pseudoscience, to a deeper understanding of the world and its challenges, and the involvement of citizens in decision-making processes concerning their heritage.

Throughout this communication process, it is crucial to prioritize inclusion and diversity, while having the capacity to reach all individuals, regardless of gender, age, physical and mental condition, social status, economic status, geographical location, or educational level.

This session seeks to explore the challenges and ways in which the world of human Prehistory successfully reconciles with the public through communication, with particular reference to projects focused on inclusiveness and engagement with diverse audiences.

This session is co-organised by Juan Gibaja, Berta Morell, Marta Portillo (Institució Milà i Fontanals (IMF-CSIC), Spain), Patrizia Gioia (Independent Researcher, Ex Soprintendenza Capitolina ai Beni Culturali (Casal de’ Pazzi Museum), Italy), Gerard Remolins (ReGiraRocs SLU, Recerca, Conservació i Difusió del Patrimoni Cultural i Natura dels Pirineus, Spain), Jordi Serangeli (University of Tübingen, Senckenberg Centre for Human Evolution and Palaeoecology, Germany), Andrea Serodio Dominguez (Grupo de Estudos de Arqueologia, Antiguidade e Território. Universidad de Vigo, Spain), Gian Luca Zanzi (Soprintendenza Capitolina ai Beni Culturali (Casal de’ Pazzi Museum), Italy).

ABSTRACTS

1 PALAEOOLITHIC ON DISPLAY: MUSEUMS FOCUSING ON PALAEOOLITHIC SITES IN THE IBERIAN PENINSULA AND THEIR OUTREACH STRATEGIES

Serodio, Andrea (Universidade de Vigo) - Méndez-Quintas, Eduardo (Universidade de Vigo)

The record of human presence during the Palaeolithic time in the Iberian Peninsula is known worldwide. Temporally it covers the whole range of development of this period, displaying even the earliest examples, on a continental scale, of the first human presence.

Following the importance and variety of known sites (cave or open-air sites or rock art stations), there is currently a relevant number of centres and/or museums focused on their dissemination. However, the thematic distribution of these centres, their scope and importance are asymmetrically distributed. Currently, most of the Iberian centres are focused on rock art sites, mostly in caves, and with a geographical distribution linked mainly to the Cantabrian coast. There are important exceptions, such as the Foz Côa-Siega Verde key-sites in the Duero basin, but their distribution is very uneven. Outside this age range and site of types, there are not many centres/museums existing today. Among them, the “Atapuerca System” stands out, which due to its size and scope is the best developed proposal for the dissemination of the most ancient stages.

The main objective of this communication is to analyse the dissemination strategies followed by these centres to raise awareness of the Palaeolithic among different types of publics.

2 ARCHAEOLOGICAL PARKS AND EDUCATION: THE EDUPARQ PROJECT

Lopez-Mondejar, Maria Leticia (University of Santiago de Compostela)

In recent decades, many studies and experiences have highlighted the enormous educational value of archaeological heritage, especially that of prehistoric times. Such heritage facilitates experiential learning and offers innovative opportunities to address transversal skills and content from the earliest stages of education. This presentation aims to present the EduPARq project currently being developed at the Faculty of Educational Sciences of the University of Santiago de Compostela (A Coruña, Spain). The project analyses, among others areas, the educational value of Prehistoric Archaeological Parks located in Galicia (Spain). These spaces represent contexts of great potential from the didactic point of view, as they include the presence of itineraries for visits, which foster connections with the environment and outdoor education, as well as education in landscape and for sustainability. The project aims to highlight the didactic interest of these parks, as well as to explore the extent to which the use of heritage education models that integrate content and context, linking archaeological heritage and landscape, can enhance the understanding and acquisition of new learning in elementary education students, such as citizenship skills or ecological awareness.

3 STRATEGIES OF DISSEMINATION IN MIDDLE PALEOLITHIC ARCHAEOLOGY: SITES, COMMUNITIES AND STRATEGIES IN RURAL CONTEXTS

García Basanta, Andrea (Departamento de Prehistoria y Arqueología, Universidad Autónoma de Madrid, Ciudad Universitaria de Cantoblanco, Madrid, Spain) - Morales, Juan Ignacio (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain; Departament d'Història i Història de l'Art, Universitat Rovira i Virgili, Tarragona, Spain; SERP, Departament d'Història i Arqueologia, Universitat de Barcelona, Spain) - Romagnoli, Francesca (Departamento de Prehistoria y Arqueología, Universidad Autónoma de Madrid, Ciudad Universitaria de Cantoblanco, Madrid, Spain)

It is often perceived that dissemination of archaeological studies holds less importance than the archaeological research itself. Furthermore, the exploration of methods for scientific dissemination is scarce. Despite the increasing prioritization of knowledge transfer, reflected in funding requirements that demands a plan for dissemination strategies, the real impact of dissemination is rarely the focus of research. Moreover, the analysis of the social impact of archaeological research is still difficult to be quantified and systematized. We are developing new strategies to (i) analyze social impact of Paleolithic archaeological research, and (ii) improve the direct relevance of archaeology, contributing to social, cultural, and economic positive impact in local communities. In Middle Paleolithic archaeology in Spain, new dissemination methods, beyond conferences and open days, have been hardly implemented. As a result, knowledge about the behavioral complexity of Neanderthal societies is mainly unknown to the public, making archaeological research mostly irrelevant in research policy.

In this paper, we present preliminary results and future lines in Neanderthal sites, located in the peripheral area of Barcelona (Spain), where we are developing novel strategies of knowledge transfer, based on Public Archaeology theory and methods, and the analysis of their impact. The sites selected have become a reference in Neanderthal studies, and present perfect contexts to develop and test new dissemination strategies for their location, the quality of the material record, and the multidisciplinary research developed. Most visitors to the sites are local residents, mainly belonging to two age groups: adults and schoolchildren. Our approach aims to (i) reinforce their links with the Paleolithic heritage through activities for the understanding and appreciation of the sites; (ii) bring Paleolithic archaeology to the classrooms with educational projects; and (iii) improve the value of Neanderthal archaeology creating analytical tools to test and enhance the social impact of research.

4 THE MEMORY OF THE HERD

Martín, Patricia (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili) - Alías, Andrea (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA)) - Berihuete, Marian (Universitat Autònoma de Barcelona) - Gabucio, Maria Joana (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili) - Gibaja, Juan F. (Institut Milà i Fontanals (IMF-CSIC)) - Marín, Patricia (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA)) - Messana, Chiara (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili) - Sopesens, Javier (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA)) - Vergès, Josep Maria (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili) - Vilardell, Roser (Museu Etnogràfic de Ripoll)

Mediterranean pastoralism has evolved, rooted in the territory, over millennia. Shepherds and shepherdesses have an extensive knowledge of traditional practices, currently they carry out their activity with few changes, with respect to how the first prehistoric farmers would have done it. For this reason, they provide important information for the interpretation of the analysis of livestock breeding in prehistoric times.

Our dissemination and citizen science project La memoria del rebaño (The memory of the herd) is structured around shepherding in the Iberian Peninsula and has three main objectives: 1) To gather information on the traditional practice of shepherding through the integration of shepherds and shepherdesses in the scientific process. 2) To highlight this traditional heritage among the youth. 3) To empower the forgotten sectors in scientific dissemination, specially those related to the rural world: the elderly and shepherds and shepherdesses.

To achieve these objectives, we have developed an ethnoarchaeological study with shepherds and shepherdesses, as well as educational workshops in primary and secondary schools and talks and workshops in rural senior centres.

The ethnoarchaeological study focuses on conducting open-ended interviews with shepherds and shepherdesses. While educational workshops are structured around a role-playing and collaborative card game in which children put themselves in the place of Neolithic shepherds and shepherdesses. The objective is for the children to reflect on the value of the shepherd's trade, the changes and continuities throughout history and the significance of archaeology as a source of information.

Finally, the workshops in senior centres have a more open structure and are based on an initial call asking them to bring objects or photographs from their past. From this, an environment of trust and exchange of knowledge and experiences is generated.

5 BREAKING BARRIERS: INCLUSIVE OUTREACH IN ARCHAEOLOGY FOR CHILDREN AND TEENAGERS UNDERGOING CANCER TREATMENT AND PEOPLE DEPRIVED OF LIBERTY

Quevedo-Semperena, Izaro (Institut Milà i Fontanals-CSIC; Aranzadi Zientzia Elkartea) - Remolins Zamora, Gerard (Regirarocs, SL) - Gibaja, Juan (Institut Milà i Fontanals-CSIC) - Mozota, Millan (Ministry of Agriculture, Fisheries and Food, Spain) - Morell, Berta (Institut Milà i Fontanals-CSIC) - Portillo, Marta (Institut Milà i Fontanals-CSIC) - Moreno, Jose (AFANOC)

This presentation aims to show innovative science outreach initiatives that deliberately target historically overlooked social groups. Specifically, we will share insights from two distinct outreach projects focusing on children undergoing cancer treatment and individuals incarcerated in penitentiary facilities. Our primary emphasis is on a pioneering archaeological science outreach endeavor, designed to amplify engagement within traditionally excluded communities from scientific dissemination.

We will delve into the outcomes of collaborative efforts with "Casa dels Xuklis" (AFANOC, Barcelona), a temporary residence supporting children, adolescents, and their families during cancer treatment, as well as three prisons in the Catalonia region. Our project introduces a range of interactive workshops uniquely tailored to meet the specific needs of these diverse audiences. Activities include simulated excavations and laboratories, educational games, and talks that have been carefully curated to measure interest in archaeology within these groups.

Preliminary findings indicate a distinctly positive influence on the comprehension and enthusiasm for archaeology among children, adolescents, and prisoners alike. Noteworthy observations encompass heightened motivation, enhanced quality of life, and improved emotional well-being. These outcomes have garnered praise from families, volunteers, and prison staff, recognizing their valuable contributions throughout the outreach initiatives. The importance of establishing a meaningful connection with the external world has proven pivotal in enriching the learning experience for all involved, underscoring the transformative impact on the interaction of participants with science with the aim of promoting reflection, self-awareness and critical thinking.

In summary, our archaeological science outreach project targeting traditionally overlooked communities has yielded inclusive and distinctive experiences. We remain steadfast in our commitment to champion accessible science for everyone, aspiring to inspire fellow professionals to undertake similar inclusive outreach projects in diverse communities, with a particular emphasis on reaching the most vulnerable population.

6 LANDCRAFT(ING) - PRACTICES OF INTERACTION AND SOCIALIZATION OF CULTURAL HERITAGE IN THE CÔA VALLEY REGION (PORTUGAL)

Comendador Rey, Beatriz Pilar (Group of studies in Archaeology, Antiquity, and Territory, University of Vigo) - Carvalho, Bárbara (Centre of studies in Archaeology, Arts and Heritage Sciences, University of Coimbra.) - Bacelar Alves, Lara (Centre of studies in Archaeology, Arts and Heritage Sciences, University of Coimbra.) - Sackett, Hannah (Independent researcher)

LandCRAFT- The socio-cultural contexts of Late Prehistoric art in the Côa valley is one of the most recent research projects being carried out in the Côa valley World Heritage site. 25 years after its classification by UNESCO and the battle to save the world's largest open-air Palaeolithic art site which, amongst strong political controversy, mobilised the country in favour of its preservation at the expense of building a dam, the Côa valley keeps challenging all those involved in cultural heritage studies to find innovative ways of establishing a dialogue between science and the public. This is particularly critical in low-density and rural territories, distant from political decision-making centres.

The practice of a community-oriented archaeology was at the foundations of the LandCRAFT project, following the concern to find the most favourable approaches to promote the involvement of local communities and visitors in Public Archaeology events related to the investigation of rock art.

A number of methodological proposals applied in practices of dissemination and socialization of cultural heritage were assessed and adapted to the specificities of the Côa valley region. Their implementation triggered a set of symbiotic processes that raised the awareness of the human and cultural values of this territory, to the processes of resistance and change but also to the imagining of future prospects. Above all, our work revealed a primordial and timeless reality: as in all genuine encounters, practices of socialization of cultural heritage are a continuous and mutually transformative process that requires, from the self and the other, dedication and everlasting care.

7 LET'S ROCK - A STONE AGE PODCAST PROJECT: COMMUNICATING PREHISTORY THROUGH PODCASTS

Cura, Sara (Escola Superior de Comunicação Social; ICArEHB, the Interdisciplinary Center for Archaeology and Evolution of Human Behaviour.)

Prehistory is a social and human science that seeks to understand the richness of human experiences – their uniqueness, similarities, achievements, and failures – over time and space. The discipline encompasses Physical and Natural Sciences, Social Sciences, and the Humanities in its techniques, methods, and interpretative narratives. We believe that its communication enriches people's lives. It was in this spirit that Let's Rock – a Stone Age podcast was created in 2022. At that time, there were no specific archaeology podcasts in Portugal, and the advantages of the podcast format made the project relevant and ensured its continuity. The chosen format was interviews with researchers whose careers were built from the beginning of the 21st century.

The podcast has 13 episodes, with an average duration of 1 hour, available on Spotify and Soundcloud, and has 3,000 full plays.

The topics are:

- Specific Prehistory research of each interviewee: Paleolithic Art, Geoarchaeology, Zooarchaeology, and Museology, among others.
- Development of scientific careers: successes, difficulties, and strategies.
- The relevance of science communication in Prehistory.

Promotion is done on social media: Facebook, LinkedIn, and Instagram. The podcast had a media presence with interviews with the podcast host and other news in the national press. It was the subject of a workshop in a Training School of the COST project Integrating Neandertal Legacy: From Past to Present (iNEAL).

The balance is quite positive; however, the podcast does not grow in audience, and the questions are:

- Lack of interest in the topic?
- Inaccessibility of the contents (too much science)?
- Are episodes too long?

Weak promotion strategy due to lack of time, skills, and resources?

This communication aims to present the podcast project and discuss its effectiveness and relevance within Prehistory science communication and best practices for divulgation and promotion.

8 PREHISTORY, PUBLIC PERCEPTION, AND PODCASTS

Siebrecht, Matilda (EXARC; Streichardt und Wedekind Archaeologie) - Boyle, Tristan (Archaeology Podcast Network)

The representation of prehistory in popular media is restricted by the limited data available to prehistoric archaeologists, in comparison to the relatively well-documented later time periods of history. While history shows, books, films, and podcasts are able to delve into a deep well of evidence and make resounding claims with definite conclusions within a relatively short timeframe, the more elusive realms of prehistory require a significantly more nuanced discussion, which can be restricted by the time allowances of the media form itself. For example, longer-form content such as popular non-fiction books allow the full extent of prehistoric discussions to be presented. However, such media can still be inaccessible for a modern audience, especially considering the focus in present society on engagement through digital media, and the emphasis on short-form content for a public with busy lives and a short attention span. Science communication channels such as social media have proved an extremely efficient and approachable platform for the dissemination of archaeological knowledge, but the short-form content of these platforms often do not allow prehistory researchers to portray the full breadth of their interpretations without resorting to simplified conclusions that are open to misunderstanding. One form of media that combines the best of both these worlds is that of podcasting, which allows researchers to engage in a discussion that can do justice to their topic, through a platform that is both

inclusive and accessible to all. Podcasts are freely available to everyone, can be accessed through multiple methods, and allow audiences to engage with the topic in a way that is convenient to them. In this presentation, we highlight the advantages and disadvantages of using podcasts to portray prehistory, using the case study of the Archaeology Podcast Network.

9 TRACING COMMUNICATION AND INCLUSIVENESS PATHWAYS IN CULTURAL HERITAGE: INSIGHTS FROM ITALIAN HUMAN PREHISTORY AND THE CASAL DE' PAZZI MUSEUM-SITE

Silvestri, Letizia (Sovrintendenza Capitolina ai Beni Culturali; Università di Roma - Tor Vergata; Durham University) - Zanzi, Gian Luca (Sovrintendenza Capitolina ai Beni Culturali) - Gioia, Patrizia (Independent Researcher (formerly Sovrintendenza Capitolina ai Beni Culturali))

Cultural heritage must be accessible and inclusive, and its communication should be scientifically accurate yet understandable and tailored to diverse audiences. The more distant the times, cultures and lifeways, the greater the difficulties in conveying and comprehending the value and meaning of a heritage site.

This is particularly true in the case of human prehistory, which, when communicated effectively, can offer numerous points for reflection on current issues due to its many thematic connections with the present.

The Casal de' Pazzi Museum, a Pleistocene deposit-museum on the outskirts of Rome and unique in its kind, aims to achieve these goals by experimenting with increasingly different and impactful inclusive and communicative strategies. The need for comparison, updating, dialogue, as well as the search for new ideas and stimuli has made it essential to carry out a comprehensive analysis of similar realities in the Italian panorama. This study started from the source of information most closely related to the concept of modern communication, i.e. the data reported on the websites of about 200 Italian prehistoric heritage sites and museums spanning between the Pleistocene and the Bronze Age.

This allowed for a critical analysis of information reported online, including aspects such as opening hours, initiatives with the territory and local/non local socio-cultural realities, the quality of the websites themselves, online and on-site accessibility, ticket costs, the attitude towards experimentation and new dissemination methods, etc. Heritage sites and museums with particularly informative websites were chosen as comparative case studies, also through interviews with curators/directors; the same was done with sites whose websites seemed particularly lacking in information, in order to compare the web/social appearance with the actual situation and understand the reasons for such discrepancies. The considerations generated from this critical analysis will be presented and discussed with other participants in the thematic session.

10 CONNECTING PREHISTORY TO CONTEMPORARY: SOME EXPERIENCES FROM FOUR TUSCAN MUSEUMS

Parisi, Marcella (Civico Museo Archeologico di Camaiore; Museo di Storia Naturale dell'Università di Pisa) - Bonato, Marzia (Civico Museo Archeologico di Camaiore) - Dini, Angela (Museo di Storia Naturale dell'Università di Pisa) - Bonaccorsi, Elena (Museo di Storia Naturale dell'Università di Pisa) - Chelini, Maddalena (Museo e Istituto fiorentino di Preistoria) - Cuda, Maria Teresa (Museo Civico per la Preistoria del Monte Cetona)

In the Italian context, Prehistory hardly enjoys a prominent position in the dissemination of archaeology to the general public. However, more than other periods, this is a particularly versatile tool for conveying content of various kinds, especially in the education context. The prehistory narrative offers, in fact, various views to deepen and develop many of the agenda 2030 themes.

To face these challenges, four Tuscan museums have developed innovative independent paths based on the same principles: the Civico Museo Archeologico di Camaiore, the Museo di Storia Naturale dell'Università di Pisa, the Museo e Istituto Fiorentino di Preistoria and the Museo Civico per la Preistoria del Monte Cetona.

Through their activities, each of these cultural institutions promotes a deeper knowledge of Prehistory, while trying to develop its themes within issues of contemporary relevance. Such efforts not only facilitate the dissemination of scientific knowledge but also encourage citizens' participation in education about sustainability, heritage and its conservation.

In this contribution, some examples of good practices with a strong social impact carried out by these four museums will be presented. Within these activities, the focus on the needs of different publics and the reference to issues that also affect our daily lives represent two key points. By focusing on both global themes and a more strictly territorial dimension, it is therefore possible to promote greater knowledge of prehistory and its importance.

There is no doubt that a participatory and in-depth narrative of this period of human history makes it possible to face the challenges of the present in a more conscious manner, orienting society towards a more sustainable future.

11 OLD SMYRNA EXCAVATION HOUSE AS A CONTEMPORARY ADDITION ON ARCHAEOLOGICAL SITE

Sönmez, Ahu (Dokuz Eylül University) - Tanaç Zeren, Mine (Dokuz Eylül University)

İzmir, which has hosted many civilizations throughout history with its fertile lands and natural harbor, has today many immovable cultural assets. One of the most important cultural asset is Old Smyrna, which gives its name to İzmir and is preserved within the modern urban fabric. The ancient city is included in the UNESCO WHL as a connection point in İzmir's 8500-year history within the scope of "The Historical Port City of İzmir". Today, Old Smyrna, which has a mission of raising qualified scientists and raising awareness of the local community in addition to the scientific studies that have been going on for nearly a century, needs comprehensive contemporary additions. Studies on cultural heritage carry missions such transferring them to future generations, and making them a part of their lives by establishing their connection with society. In this context, an excavation house complex has been designed for Old Smyrna, which includes work and laboratory spaces for scientific studies, accommodation and storage units, as well as experimental archaeology studies, a children's education area and a seminar hall.

Many modern cities host archaeological heritage sites. Although the contemporary additions have been implemented considering national or international policies, they often do not have a unity of ideas and design. This study aims to reveal the process of determining the criteria taken into consideration during the design phase of the new excavation house designed for Old Smyrna. To determine the criteria, cultural heritage sites that have been included in the UNESCO WHL and protected within the modern urban fabric, such as the ancient city of Old Smyrna, and host similar activities were examined. The examples within the archaeological sites were evaluated, and design criteria were established, considering their architectural characteristics and technical features as well as their social facilities and relations with the society.

12 SHAPING STRATIGRAPHY: DEMYSTIFYING ARCHAEOLOGICAL CONTEXTS THROUGH DISPLAY AT VÉSZTŐ-MÁGOR

Lingle, Ashley (University of York) - Seifert, Jerrod (University of Oslo) - Gyucha, Attila (The University of Georgia) - Riebe, Danielle (The University of Georgia) - Duffy, Paul (Christian-Albrecht University of Kiel) - Ridge, William (University of Illinois Chicago) - Parkinson, William (The Field Museum)

This paper presents the unique preservation and engagement strategy for the archaeological site of Vésztő-Mágor, Hungary, addressing the challenges of bridging the gap between human prehistory and the public. The prehistoric site, covering over 3500 years of human activity, utilises a display-in-context approach to engage people with the past. This involves a holistic blend of scientific research, traditional earth building, and robust public engagement efforts, guided by principles of inclusivity and community benefit.

Heritage practitioner agency drives the inclusive practice, emphasizing the site as a conduit for fostering community connections and redeveloping site significance to ensure sustainable engagement. Contextual displays ground the archaeological remains in their historical and cultural context, transcending the chronological and conceptual distances perceived by the general public. A dynamic program works to draw in a range of visitor types from regional, national, and international contexts. Through co-created display efforts, the community becomes an active participant in the preservation and presentation processes. This collaborative approach ensures that the archaeological site becomes a shared space, with the community deriving cultural and educational benefits, fostering a deeper understanding of historical narratives.

Scientific research, informed by real-time environmental monitoring data, provides a dynamic and adaptive conservation strategy. This evidence-based approach ensures the sustainable conservation of Vésztő-Mágor while incorporating contemporary scientific methodologies. The preservation strategy incorporates traditional earth building techniques, contributing to the authenticity and contextual display of the archaeological site. By recreating the architectural ambiance of the prehistoric era, this approach fosters a deeper connection between the public and the site, making it more accessible and relatable.

The success of the strategies developed for the site lie in their holistic and inclusive nature, where environmental monitoring, traditional earth building, and public engagement efforts intertwine. This blended approach not only ensures the physical preservation of Vésztő-Mágor but actively engages audiences.

13 THE REFLECTION OF PREHISTORY IN THE FINE ARTS, WITH PARTICULAR REGARD TO PUBLIC SCULPTURE IN HUNGARY

Ernyey, Katalin (Government Office of the Capital City Budapest, Heritage Department)

The purpose of the paper is to present as complete a database as possible, and to analyze one or two examples in detail, which reflect the motivation, purpose and effect of the fine art work. At the EAA Conference in 2022, Budapest with the title 'Archaeology on the street' I already raised the importance of the role of public statues (building decorations)

in the socialization of archeology and in bringing archeology and archaeological results to as many people as possible. Now, knowing the general background, I am focusing on the works related to prehistoric times, through one or two interesting examples I would like to show the motivation for such works, how authentic they are from a professional point of view, and what role they play in the local community. The paper is based on different sources: community-based on-line database of public works of art, own collection and on-site examination.

14 SCHÖNINGEN AND THE PATH TO THE UNESCO WORLD HERITAGE TITLE

Serangeli, Jordi (Universität Tübingen; Senckenberg Centre for Human Evolution and Palaeoenvironment) - Haßmann, Henning (Niedersächsisches Landesamt für Denkmalpflege) - Conard, Nicholas (Universität Tübingen; Senckenberg Centre for Human Evolution and Palaeoenvironment)

The exceptionally well-preserved archaeological site complex of Schöningen in Lower Saxony has preserved 300,000-year-old stone, wood and osseous finds, as well as indicators of climate and environment. Among the most important finds are the Schöningen spears, which count among the oldest long-distance weapons known. Schöningen offers a unique insight into the cultural evolution of humans and the ecology of an untouched natural environment.

A visit to the Schöningen Research Museum and the ongoing excavations provides visitors with all kinds of information. These include a focus on early human lifeways and the cultural evolution, as well as how the climate developed between the ice sheet and the warm periods. The museum activities around these Lower Paleolithic sites consciously pursue the goal of leading visitors to reflect about the Prehistory and the Present. Exhibits focus is on the issues of how we live, move and eat, as well as responsibility for the use of natural resources.

Schöningen offers numerous topics for bridging the wall between prehistory and the present and can contribute to the debate about current and complex issues such as climate change, the decline in biodiversity, the increase in waste and the use of weapons. The exhibits examine unifying aspects of our shared human history and contextualize observations about the past in the discourse of the challenges humanity faces today.

The uniqueness of this site has persuaded the state of Lower Saxony to nominate Schöningen for the status of a UNESCO World Heritage Site.

A comparison with other similar museums and projects in Germany should contribute to the ongoing discussion of the relevance of our Paleolithic past when examining the challenges we face in the present.

15 EXPERIENCING LOCALITY, IDENTITY, AND HERITAGE WHILE INVESTIGATING A PREHISTORIC SITE IN NORTHERN FINLAND

Modarress Julin, Mirette (University of Oulu, Finland)

Ancient heritage can be an emotional and quite personal notion. How it is understood depends on many variables including social and economic background, and even age of the viewer. Commonly, heritage process that people can take part in, define, use, and enjoy the heritage of their ancestors is an ideal to be strived for. Ways to engage with the past remains and in archaeology are numerous, among others: site-visits, lectures, and museum tours. For some it can be metal detecting for ancient objects. Though metal detecting can be considered as dubious, it has gained some popularity in Finland. One inclusive and interactive way to participate is by volunteering in archaeological fieldwork.

In this paper, I discuss people's attitudes towards archaeological heritage, research, and expectations for results through a case study of the excavations in the prehistoric site of Kiurunkangas, located in Sievi, Northern Finland. Under examination is how people perceive the archaeological sites of their locality, and how do they convey it. Results suggest a keen interest of locals in archaeological heritage and its examination. An educative approach, while keeping an open vision by engaging in dialogue with interested stakeholders has been tried and tested.

16 CHANGING OUR PERCEPTIONS. HOW CAN WE RETHINK OUR WAY OF DOING ARCHAEOLOGY?

Foresi, Federica (Museum Vestsjælland; University of Siena)

It is often difficult for archaeologists to think outside the box. We are rarely encouraged to do so and we are often hesitant to play with creativity because we perceive a risk of losing our credibility within academia. It generally seems easier, and safer, to follow paths already paved, instead of risking failure and potential ridicule.

However, it could be argued that creativity is a fundamental part of the archaeologist's role in the dissemination of information. "Creativity is not a talent, it is a way of operating," famous English actor John Cleese once said. As we move further into the twenty-first century, it should become our way of operating. We must try to find creative ways to communicate with the public, to stimulate curiosity or provoke reactions. In order to do this, we must start to look at things differently ourselves.

For instance, we could think about how people who understand concepts better when they are expressed visually could be shown information, perhaps in the form of a comic strip. Alternatively, we could consider how our perception of exhibition design would change if we had to experience the exhibition without the use of sight.

I will illustrate my argument through a project that I am currently working on - a comic book about the prehistoric bog body known as the Tollund man and I will discuss the use of the hands-on approach in prehistoric archaeology exhibition design context.

These examples will show the importance of the archaeologist's emotional awareness in taking decisions that change the course of a project's direction. The outcome of a given project will always be influenced by not only the emotional impact it is expected to have on the public, but also by the impact it has on the archaeologist who is designing it.

814 MATERIALISING MEANING. CENTERING THE ROLE OF SOCIAL INTERACTIONS IN ARCHAEOLOGICAL STUDIES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Benzonelli, Agnese (University of Cambridge) - Klesner, Catherine (University of Cambridge) - Orfanou, Vana (Ludwig-Maximilians-Universität München) - Franjic, Ana (KU Leuven) - Brysbaert, Ann (Leiden University; Netherlands Institute at Athens)

Session format: Regular session

With this session we seek to stimulate discussions on the broader implications of materials research in archaeology, and share diverse methodological and theoretical approaches and perspectives exercised across the discipline. Even though investigation of the smallest fragment can produce new knowledge about the past, material studies become more impactful when they incorporate archaeological narratives. Here, we take upon the increasing integration of science and archaeology over the last decades to create a platform for discussing enquiry-driven archaeologically contextualised research in order to contribute to a more nuanced, rounded view of past people's lives. The study of materials is conducive to understanding details of social differentiation and transformation, labour organisation, and the mechanisms and implications of long-distance exchange of both materials and knowledge, all of which unravels important worldviews of past societies. Recent transformative research in the field has resulted precisely from multi-disciplinary and multi-material studies that investigate technological development, innovation, cross-craft and cross-cultural interactions.

We welcome contributions that explore, but are not limited to: 1) cross-craft interactions; 2) innovation; and 3) knowledge transmission in material culture investigations. We encourage the integration of methodological and theoretical frameworks that are applicable in multiple case studies and hence more prone to cross-cultural application and comparison.

We wish to highlight the role that materials played in the weaving of the social fabric and the importance of comprehensive material studies that stem from social inquiry in archaeology. We hope that this session will provide ideas for impactful enquiry-driven archaeomaterials research, through examples of collaborative efforts or innovative approaches, which will foster the development of a more comprehensive investigation of material culture.

ABSTRACTS

1 TOWARDS A SKILL-BASED ANALYSIS OF CRAFT ORGANISATION AND CROSS-CRAFT INTERACTION: A CASE STUDY FROM NARIÑO, COLOMBIA

Benzonelli, Agnese (University of Cambridge) - Klesner, Catherine (University of Cambridge) - Martinon-Torres, Marcos (University of Cambridge)

The material culture from Nariño, Colombia, (ca 400-1600 CE) is distinctive for its flat, strongly geometric designs with radial symmetry, negative decoration, and highly polished surfaces. These attributes are most recognisable in decorative pottery vessels, textiles, and enigmatic metal discs recovered from burial tombs in the altiplano region. Cross-material transfers are obvious in the shared decorative motifs featuring prominently in different media. However, we lack focused research on the extent to which techniques, textures, and know-how may have been shared too. These are important dimensions that may provide insight into the organisation of production.

By examining object decorations, morphology, composition and technology for both ceramic vessels and metal disks recovered from Nariño, Colombia, we aim to holistically reconstruct the chaînes opératoires of these intricate technologies and identify instances of shared skills, technology, and knowledge.

We investigated complete vessels (n=114), ceramic sherds (n=93) and metal fragments (n=51), we characterised object morphology (3D GMM), composition (pXRF, LA-ICP-MS, and Raman spectroscopy), and identified technological attributes (high resolution digital microscopy and SEM-EDS), reconstructing production pathways for the ceramic and gold objects independently. Through comparisons of the objects' chaînes opératoires, we highlight steps and traits that provide insights into the variable skill sets, individual makers, and communities of practice. By identify-

ing elements of the technological systems that are shared between media we explore the co-evolution and resilience of craft production in heterarchical systems.

2 CROSSING PATHS. PEOPLE-CRAFT INTERACTION IN GREEK AND ROMAN STONE WORKING. INSIGHTS FROM MARBLE AND DECORATIVE STONE VASES

Perna, Simona (Institut Català d'Arqueologia Clàssica (ICAC))

This presentation examines the dynamics of people-craft interaction in ancient Greek and Roman stone working, focusing on the production of stone vases during the 5th - 4th centuries BC and 1st century BC to 1st century AD. Through a closer analysis of these artifacts, it is possible to uncover a convergence of techniques, highlighting instances of innovation and knowledge transmission within the craft.

Despite the richness of these objects as potential sources of insight, classical stone vases have often been overlooked in discussions regarding ancient stone carving and cross-craft interaction. The paper's starting hypothesis proposes that these vases represent the epitome of material culture and human agency, providing a unique lens through which to examine the cognitive processes underlying transformative technology and conceptual ideologies in Classical antiquity.

By scrutinizing classical stone vases, this paper aims to shed light on various aspects of ancient society, including social differentiation, craft organization, and mechanisms of long-distance exchange of materials and knowledge. Through an interdisciplinary approach encompassing archaeological evidence, material analysis, and historical context, it seeks to elucidate the multifaceted nature of people-craft interaction in the ancient Mediterranean societies.

This research contributes to a broader understanding of the role of material culture in shaping ancient societies, emphasizing the significance of classical stone vases as tangible manifestations of cultural exchange and socio-economic dynamics. Reevaluating the importance of these artifacts is set to enrich current discussions on ancient craftsmanship, cross-craft interaction, and the socio-cultural factors driving technological innovation in antiquity. Moreover, by contextualizing these artifacts within their broader social and historical contexts, we gain a deeper understanding of the interconnectedness of craft production, consumption patterns, and identity formation in the ancient Mediterranean landscape.

3 RECONSTRUCTING CROSS-CRAFT INTERACTIONS BETWEEN LATE ROMAN GLASS CARVING WORKSITES

Meredith, Hallie (Washington State University)

Late Antique archaeometric data is key to the reconstruction of social interactions between industries (cross-craft) in glass. Archaeological and economic evidence has confirmed that a number of late Roman (fourth-seventh century CE) industries incorporating glass production each had separate work sites. Glass makers produced raw materials independently from glass blowers shaping objects and engravers carving/finishing glass. Representing three industries, they were all interdependent. At Kom el-Dikka, Alexandria, for instance, a finishing worksite for glassware was identified in the same complex as a shop, while a furnace for shaping glass was found across the road. There is also archaeological evidence of recycling as an independent retail trade, such as at Sardis, Turkey, potentially representing a fourth glass industry. A very significant archaeometric study (Brill and Whitehouse 1988) demonstrates that two-colour (dichroic) vessel glass was strategically reused in the production of flesh tones for architectural glass panels. What has not been adequately explored as of yet is how such practices have significant implications concerning cross-craft interactions between glass engravers likely representing complementary specialities. Focusing on the related engraving techniques of diatreta (also known today as "cage" cups or openwork vessels) and opus sectile glass carving as evidence, this paper demonstrates that glass production in the late Antique Eastern Mediterranean was an example of cross-craft involving aspects of specialised collaboration among interdependent glass producers. Importantly, inter-industry relations existed not only in terms of resources but fundamentally of skills. Cold-worked carving in various media suggests that relatively large-scale late Roman urban production was more likely defined by the transferrable skill set of carving itself as opposed to any particular material. This paper's contribution lies in incorporating vital archaeometric evidence that enables the reconstruction of social interactions between late Roman engravers with greater nuance and differentiation thereby deepening our understanding of specialisation in this period.

4 JEWELS CREATED FROM DIRT: AN INVESTIGATION INTO THE SOCIAL CONTEXT BEHIND GLASS MANUFACTURING IN LATE BRONZE AGE EGYPT

Mitchell, Sarah (Newcastle University; Archaeological Research Services Ltd.)

Glassmaking in Late Bronze Age Egypt has been a generally neglected area of study until recently. This study aims to understand the manufacturing process of Late Bronze Age glass ingots, particularly blue glass, through the experimental reproduction of Egyptian glass. Alongside the reproduction of Egyptian glass, experimental investigation into

the replication and use of different furnace types was also conducted. Modern electrical and wood-fired furnaces are utilised in varying locations to perform experimental glassmaking. The study also investigates the use of a separator in the manufacturing process, which would allow for the glass ingots to be easily separated from the crucibles. Various materials such as oil, pure lime, and crushed oyster shells are used as a parting layer in the glass crucibles; both the lime and oyster shell layers are successful in separating the ingots from the crucibles after firing. This study also aims to further understanding of cross-craft interaction between glassmaking and other pyrotechnologies such as metallurgy. Metallurgical crucibles are examined and comparisons are drawn between them and crucibles that were used for glass manufacturing. Desk-based research of glass workshops excavated at sites such as Amarna, Qantir and Lisht has also been conducted to understand the skills that may have been needed in order to produce glass on an industrial scale. The experiments in this study suggest new avenues for research focussing on the manufacture of coloured glass ingots and the interactions between glassmaking and other technologies in Late Bronze Age Egypt.

5 FROM THE 'NITTY-GRITTY' OF CERAMIC ANALYSIS TO A COMMUNITY OF PRACTICE PERSPECTIVE: A VIEW FROM THE BRONZE AGE AEGEAN

Hilditch, Jill (University of Amsterdam)

In a recent paper by Pollard and Liu discussing provenance studies, the importance of recognising and reconstructing “the sequence of human activities” (2023, 97) applied to raw materials was underlined. Indeed, for the past twenty years or more, this concept has formed the core of much archaeomaterials research using the *chaîne opératoire* concept. Pollard and Liu’s paper also emphasised that ‘repetitive and consistent human actions’ (2023, 103) during production are the key for successfully integrating social and material approaches to material culture. One way to investigate these repeated human actions with materials is the community of practice theoretical framework, which centres the social dynamics that drive the learning and (repeated) performance of such actions. This framework offers a valuable means for archaeologists to move from tangible archaeological remains to intangible social interactions, providing a way to integrate increasingly complex archaeomaterials datasets with broader archaeological narratives.

This paper will explore a ceramic perspective on social interactions, in particular how specific knowledge on material provenance and *chaînes opératoires* or production sequences can be given wider meaning through considering potting communities of practice. Using examples of Bronze Age ceramic artefacts from multiple projects within the Aegean, this paper will discuss integrating the ‘nitty-gritty’ of ceramic analysis within a broader methodological approach to considering interaction and exchange from the archaeological record.

6 MATERIAL IDENTITIES OF THE INDUS TERRACOTTA-MAKING COMMUNITIES

Lahiri, Sutapa (University of Calgary)

The present paper examines the Indus terracotta industry from the Mature phase of the Indus period (2600-1900 BCE), known for its diverse material culture. Despite the rich material culture of this era, there has been limited research on the manufacturing techniques, cross-craft technology, and knowledge transmission involved in producing Indus terracottas.

In this presentation, I will examine the terracotta assemblages from two Indus settlements in the Ghaggar basin in Northwestern India dating to the Mature Indus period (2600-1900 BCE). The study provides the first comparative study of terracotta technological styles using the *chaîne opératoire* approach to determine the technical choices made by the Indus terracotta-making community. The findings of this study suggest that there was a range of technological choices made across various terracotta artifacts, such as figurines, toys, personal adornments, and terracotta cakes. Furthermore, it also implies the possibility of different groups involved in the production of terracotta, as well as the presence of cross-craft techniques during the mature or urban phase of the Indus civilization. These findings provide valuable insights into the technological knowledge transmission processes and the diversity of terracotta production during the Mature Indus period.

7 POTS = POTTERS. COMMUNITIES OF PRACTICE VIA MINUTE VARIATION APPROACH

Harush, Ortal (The Hebrew University)

The concept embodied in “Pots equal People,” which explores the correlation between pottery and human societies, has sparked lively debates among researchers over an extended period, primarily associating this expression with the presumed relationship between ethnic groups and pottery. Despite facing robust criticism, the connection between pottery and ancient societies remains a pivotal theme in archaeological ceramic studies. A suggested transformation of the equation from “Pots equal People” to “Pots equal Potters” aims to offer a more nuanced understanding of the cultural and anthropological aspects of ancient societies, with a specific one on the role of potters within their communities. In this context, the current paper adopts this modified equation, with a specific focus on micro-morphology—a detailed methodology designed to thoroughly explore variations within a single ceramic type. The underlying premise is that a meticulous examination of sub-typological variations, employing a minute variation approach through

a three-phase analysis, will enable the identification of production units, assessment of production intensity, and establishment of connections with distinct communities of practice.

8 CERAMIC PRODUCTION AND COMMUNITY AT ARCHAIC AND CLASSICAL ELEON IN CENTRAL GREECE

Sadarananda, Janelle (Skidmore College; University of Pennsylvania) - Bertram, Haley (University of Cincinnati)

While archaeomaterials research can provide insight into specific details of individual objects, like the provenance of raw materials and the techniques of production, the power of this research lies in answering broader social questions about people’s lives and interactions in the past. In this paper, a votive assemblage from the site of Eleon in Boeotia, Greece, provides a case study for community involvement in production and dedication of pottery and figurines at a local sanctuary during the Archaic and Classical periods (600-450 BCE). Our holistic study employs ceramic petrography to investigate changes in production practices over time, in combination with archaeological evidence for changing dedicatory and ritual practices. We explore the relationship between producers of the religiously significant and regionally unique Boeotian Kylix Ware vessels (BKW) and the producers of terracotta figurines found dedicated at Eleon’s sanctuary. Based on petrographic and macroscopic analysis, we propose that in many cases the producers of BKW and those of figurines were one and the same. In weaving together the material stories of these locally-specific objects, we are able to delve into the idea that producers of ceramic dedications were members of the same community as the dedicators, and were likely dedicators themselves. Our study is grounded in theories of the *chaîne opératoire* and technological style, as well as ritual modes of production in small-scale societies. By considering the entanglement of producers and consumers in the ritual landscape at Eleon, we aim to provide a model for scientific analytical investigations of community production and use of religious objects.

9 A COMMUNITIES-OF-PRACTICE APPROACH TO TRACE THE SOCIAL CHANGE DURING THE EARLY CHALCOLITHIC IN EASTERN ROMANIA

Matau, Florica (ARHEOINVEST Center, Institute of Interdisciplinary Research, Alexandru Ioan Cuza University of Iasi, Romania)

This paper aims to examine the skills and expertise developed by the Early Chalcolithic potters located in eastern Romania from 5050-4600 cal BC. The objective is to assess their abilities to produce standardized and elaborate objects and identify the transmission mechanisms that led to social complexity. The study considers ceramics as the result of a wide range of conscious choices made by the potters regarding the materials they select and process in various ways. These choices are a result of a learning process acquired and passed on via social relationships. The various sequential choices made by the potters are determined by their enrolment in a community of practice that represents a group of participants acting in a similar learning environment and shared practice.

The study will use the *chaîne opératoire* methodology to investigate the learning and cultural transmission system developed within the Early Chalcolithic communities. To determine how communities of practice acted within the pottery production chain, the theory of artefact design will be applied to target the high and low-visibility attributes revealed by macroscopic observations and petrographic investigations.

10 PARTY OR THERAPY? POSSIBLE FUNCTIONS OF ANATOLIAN EBA RITUAL PITS ACCORDING TO GC-MS ANALYSIS OF ORGANIC RESIDUES OF SOME POTTERY

Türkteki, Murat (Bilecik Şeyh Edebali University) - Tarhan, İsmail (Konya Selçuk University) - Türkteki, Sinem (Bilecik Şeyh Edebali University)

In the last quarter of the 3rd millennium BC, inter-regional interaction intensifies in the Anatolian peninsula due to organised trade networks. An “elite” class dominating the trade and administrative management of settlements becomes apparent. Luxury goods and their imitations, mostly attributed to this class, become widespread among the societies of the period throughout the Mediterranean basin from east to west. The most important of these are the depas, which is a very characteristic form and is usually described as a double-handled drinking vessel, and the so-called “Syrian bottle”. Parallel to this, some rituals also become widespread in this period. Ritual pits containing complete vessels, figurines and precious artefacts are represented by a large number of examples in many sites where the period is recorded. In addition to contextual assessments to understand their function, analysis of the organic remains inside the pots provide evidence for possible predictions. This study, which includes the first analysis of organic remains on depas and bottles to date, allows us to make some suggestions about the intended use of these forms and why the pit ritual was performed.

11 EXPLORING ALTERNATIVE STRATEGIES FOR EUROPEAN BRONZE AGE METALWORK CHEMICAL ANALYSIS AND INTERPRETATION: TRENDS IN COPPER AND ARTEFACT SPACE

Matthews, Steven (Groningen Institute of Archaeology, University of Groningen; Deutsches Archäologisches Institut (DAI)) - Bray, Peter (Department of Archaeology, University of Reading)

The 'Chemical-Space' approach to copper-alloy artefact analysis aims to provide an open, multi-variate system for visualising trends and patterns in chemical data. As well as production and source, emphasis is also placed on metal circulation, down-the-line transmission, and recycling. Due to its open nature, it can be widely applied to chemical analyses assemblages from any period or place. Within the European Bronze Age the authors and their collaborators have traced patterns within chemical classes across chronological time-space frameworks. This has provided a renewed focus upon a wider range of technological processes and intra-regional variation, and offers an alternative to models which posit centralised control of production, and prestige goods exchange.

Hindering progress, however, is a lack of similar development in the classification of the artefact-base upon which metallurgical studies draw. Classification continues to be viewed as a niche methodological activity, rather than a vital field of theoretically-informed research, producing important analytical data. As a result, the traditional output of these activities, 'types', are taken as immutable, unchanging categorisations, encouraging an essentialist belief that they comprise real historical phenomenon. Consequently, compositional groups are simply compared with the typologies for various metalwork kinds, with no selection for relevance of traits or trends within them. At worse, comparisons are reduced to the simplest level of artefact categorisation ('dagger', 'sword', etc.) reducing the visibility of regional variation.

If the potential of the Chemical-Space approach is to be fully exploited, we require a shift from taxonomic to analytical classification, focusing on question-based classes which embrace the study of variation rather than homogeneity. Here we explore alternative narratives for transmission and change in Atlantic metalworking during the Later Bronze Age, based on a new analysis of the history of grip-tang sword evolution in Western Europe, combining new approaches in analytical archaeology.

12 METAL PRODUCTION IN THE 2ND MILLENNIUM BC EURASIAN STEPPE: CASE STUDIES FROM THE CENTRAL AND EASTERN KAZAKHSTAN

Calgaro, Ilaria (Institute of Archaeology UCL) - Radivojević, Miljana (Institute of Archaeology UCL) - Altaweel, Mark (Institute of Archaeology UCL) - Doumani-Dupuy, Paula (School of Sciences and Humanities, Nazarbayev University, Nur-Sultan, Kazakhstan) - Yermolayeva, Antonina (A.Kh. Institute of Archaeology, Almaty 050010, Kazakhstan)

The 2nd millennium BC Eurasian Steppe witnesses a surge in metal circulation, still paired by few data on recipes and technology behind metal production. Hence, local-scale analysis of metal debris emerges as a powerful tool for interpreting the role of metalmaking among Bronze Age communities of the Steppe. We present new data on metal production technology from three 2nd millennium BC sites of Kazakhstan, which span the regional Middle to Final Bronze Age: Taldysai and Myrzhyk (Central Kazakhstan), two workshops, and Koken (East Kazakhstan), workshop and burial site. The analysed collection includes ores, archaeological and experimental smelting debris, crucibles and metal artefacts.

We identified two metal production lines transmitted over 400 years at Taldysai (MBA-LBA): copper and arsenical copper. Copper metal was obtained by co-smelting local copper oxides and sulfides in a single step. Experimental smelting in a replica of the archaeological pit furnaces by using local copper oxides with low sulfur supports this interpretation. Arsenical copper production is exhibited through co-smelting of copper and arsenic-rich ores in two steps: (i) desulfurisation, (ii) iron removal. Myrzhyk (LBA-FBA) provided evidence for local production of arsenical copper. Copper oxides with moderate arsenic content were documented alongside slags, although their origin is still contentious. Most interestingly, Myrzhyk yielded pit furnaces comparable to those in Taldysai. Materials from Koken (LBA) showed in-situ production of copper metal again from copper oxides. Here, local copper production is paired by numerous tin bronze grave goods, which suggest contacts with the Altai mountains.

Local-scale analyses of metal production debris allow to distinguish centres that shared and transmitted technological models and traditions (Taldysai and Myrzhyk) and connector sites at the crossroad between the steppes and their margins (Koken). By and large, this will contribute to a better understanding of Bronze Age technological and economic developments across the Eurasian Steppe.

13 POTTERY PRODUCTION AS INDICATOR FOR KNOWLEDGE TRANSMISSION AND SOCIAL INTERACTIONS DURING THE SO-CALLED GREEK 'COLONIZATION' IN ITALY (8TH-6TH CENTURIES BC)

Charalambidou, Polyxeni (Xenia) (Vrije Universiteit Amsterdam)

The "Pots and Pans" research (coordinated by the undersigned; full title "Pottery production and consumption as indicators for the contributions of Greek migrants and local inhabitants to the so-called Greek 'colonization' in Italy") explores artisanal mobility, interplay and knowledge transmission in pottery production and consumption at the time of the Greek migration and diaspora phenomena to southern Italy and Sicily (8th-6th centuries BC). The focus of the investigation is on ceramics that were used during the early stages of the Greek colonization movement; pottery played a crucial role in the early subsistence economy, in the newly created funerary and cultic domain, in the economic and cultural exchanges with the indigenous populations of Italy.

This paper first introduces the "Pots and Pans" methodological framework, with the aim to contribute to the discussion for an increased and more comprehensive investigation of material culture. The presentation highpoints some of the project's results, to confer the value of archaeomaterials research in achieving and understanding of the formation of new realities when communities come into contact. By combining a range of science-based methods (macroscopic, petrographic, chemical and SEM analyses), we gain insights into the wide-ranging routes of knowledge transfer as well as the multiple production/technology practices which can also enable us to achieve a deeper understanding of social and economic relations between mother-cities, colonies and native communities. Both the incomers' and the indigenous traditions of manufacture are highlighted, as these aid the understanding of cultural practices in both the migrant and local populations, cross-cultural borrowings and interactions, changes that may have occurred with the arrival of the Greek migrants within the domains of material culture.

14 METALS IN A CHANGING WORLD: MATERIAL INSIGHTS INTO SOCIAL TRANSFORMATIONS AT THE END OF THE BRONZE AGE IN GREECE

Orfanou, Vana (Ludwig-Maximilians-Universität) - Aktipi, Konstantina (Ephorate of Antiquities of Achaia) - Batziou, Anthi (Ephorate of Antiquities of Magnesia) - Borgna, Elisabetta (University of Udine) - Jones, Olivia (West Virginia University) - Kleitsas, Christos (Ephorate of Antiquities of Ioannina) - Konstanti, Katerina (National Archaeological Museum in Athens) - Lemos, Irene (University of Oxford) - Degryse, Patrick (KU Leuven) - Stockhammer, Philipp (LMU Munich; MPI for Evolutionary Anthropology Leipzig)

When the established Mycenaean palatial systems collapsed around the 12th century BC socio-political crises in the eastern Mediterranean, they brought with them irreversible transformations that defined the end of the European Bronze Age. Fundamental questions about the social impact of these transformations remain with implications for fully understanding diachronic human responses to significant environmental and cultural stressors. This study examines metallurgical materials (objects, by-products, and technical ceramics) from the Greek peninsula dating to before and immediately after the crisis years to evaluate how social collapse interfered with cultural processes as expressed in metallurgy. Elemental, isotopic, and microscopic analyses provide new data on the nature and provenance indication of raw materials, as well as the processing of metal resources following primary smelting such as during metalworking, reuse / recycling, circulation, and deposition. Materials from key sites covering much of mainland Greece provide new insights into technological choices of communities with links to the north, east and west of the peninsula. Results directly inform ongoing academic debates about the nature of the Mycenaean collapse and will open new pathways for future research on materials and humans, and for the study of societies in crisis.

15 FINDING MEANING ALONG THE WAY: WHAT NETWORK PERSPECTIVES ON RAW MATERIALS HAVE TO OFFER

Kerig, Tim (ROOTS CAU Kiel) - Hilpert, Johanna (University of Cologne) - Serbe, Benjamin (CAU ROOTS Kiel)

Within a network science approach, we investigate large-scale exchange systems in Eurasia and Africa (8000–1 BC). We concentrate on raw materials. Raw material connects the source to demand in a distant location, regardless of whether this demand is for the supply of abundant goods, such as small tools, or for a few highly valued diplomatic gifts.

We will show, how network related assumptions and imputations are necessary for an understanding of the meaning of materials and how the network perspective can change the meaning of those objects.

With Network Alignment, we aim to identify overlapping subnetworks of different raw materials ("communities") and evaluate the global alignment of multiple exchange networks to explore interactions between different actors. Consequential, material-specific bridges and gaps between different regions can become apparent, highlighting the social interaction between different actors. As network alignment is so far used in context of biological interaction networks, this paper investigates the potential for archaeological applications.

Exploring the combination of hundred-thousands, even millions of different finds of sourced raw material helps to a deeper understanding of prehistoric exchange systems.

The Big Exchange project is funded by the federal state of Schleswig-Holstein. The project receives funding by the German Research Foundation (DFG) under Germany's Excellence Strategy – EXC 2150 – 390870439.

16 POTTERY STYLE AS AN INDICATOR OF INNOVATIVENESS IN CENTRAL EUROPE IN THE 5TH-4TH MILLENNIUM CAL BC

Szilágyi, Márton (Eötvös Loránd University, MTA-ELTE “Lendület” Momentum Innovation Research Group) - Solnay, Eszter (Eötvös Loránd University, MTA-ELTE “Lendület” Momentum Innovation Research Group; Paris 1 Panthéon-Sorbonne University, Doctoral School of Archaeology; UMR 8215 Trajectoires) - Siklósi, Zsuzsanna (Eötvös Loránd University, MTA-ELTE “Lendület” Momentum Innovation Research Group)

The fact that clay is a material that is easy to shape and is accessible to almost all prehistoric communities makes pottery not only the most abundant find type but also the most variable one in the archaeological record. Stylistic variations of pottery are commonly seen as a projection of identities such as social groups or individual self-expression. The geographical boundaries of styles are commonly understood as social boundaries. However, stylistic variations and boundaries can also be evidence of innovativeness and/or access to novelties. Innovation and pottery often come up together in the context of pottery-making technologies, but the changes in pottery styles are rarely understood as an indicator of accepting, refusing, or simply accessing new stylistic ideas. As pottery and the know-how of pottery making is accessible to almost every prehistoric community, it can also be an arena for creativity. However, one can only be creative and open-minded as much as their community and its rules allow it.

We can see in the archaeological record in Central Europe, more precisely in the Danube Basin from Bavaria to the Carpathian Basin, that the pottery styles in 4500-3600 cal BC are very variable on the one hand, and similar to each other on the other hand. Some characteristics are present in almost all areas while others are exclusive to a certain geographical zone. Many stylistic elements, such as certain pot forms, are inherited from earlier times and others, such as decoration technics and motifs, are creative innovations that spread (sometimes alongside technological knowledge) from one place to another. Our contribution will give a brief insight into our methods of how we try to reconstruct past communities' attitudes towards stylistic innovations using a large GIS-based comparative stylistic database combined with multivariate statistics.

17 TRACKING BRONZE PRODUCTION IN THE CARPATHIAN BASIN THROUGH THE MIDDLE/LATE BRONZE AGE TRANSITION THROUGH TECHNICAL CERAMICS: CURRENT RESULTS

Brown, Lauren (University College Dublin, School of Archaeology) - Amicone, Silvia (Archaeometry Research Group, Eberhard Karls University of Tübingen; Institute of Archaeology, University College London)

The circulation of craft knowledge and its function as a social actor have long been major themes of archeological study. However, it is only recently that the effect of “significant” social change on the transmission of knowledge has been explored beyond ideas of loss and decreased complexity. These more nuanced discussions incorporate themes of choice, resilience, and transformation within cultural practices.

This work aims to understand the effect of significant social change on the transmission of knowledge through the lens of bronze craft. Changes in the technology and organization of production are tracked through the comparison of technical ceramic, technical properties, spatial layout, and social setting of bronze production pre- and post- 16th c BC in the Carpathian Basin.

To examine this topic, a catalogue of all settlements in the study region with evidence of bronze craft is compiled. These sites are identified through the presence of , technical ceramics used for metal production (i.e. crucibles, moulds, cores, and pyrotechnical installations) is compiled. . Material analysis is to be carried out on ceramic samples come from the case study sites of Pecica (Romania), Feudvar (Serbia), Rabe (Serbia), and Şagu (Romania). Samples of domestic and architectural ceramics are included in the analysis investigate cross-craft interaction.

All ceramic samples are to be analysed using ceramic petrography, X-ray fluorescence, X-ray diffraction, and scanning electron microscopy. These methods are used to identify the paste recipes and production processes of each ceramic type. The data gained will be used to address themes of knowledge transfer, accumulation, loss, invention, innovation, and cultural and technical choice between. This information will then be discussed in sensory and cognitive contexts with the implementation of modern studies of teaching and learning.

18 EVERYTHING OLD IS NEW AGAIN: EARLY MEDIEVAL GLASS RECYCLING: TECHNOLOGY, MUTABILITY, AND RESOURCEFULNESS

Lucas, Vic (Institute of Archaeology, University College London)

In the last decade, recycling has become a ubiquitous presence in papers published on the chemical analyses of glass of the first millennium CE. It is becoming increasingly clear that recycling to greater or lesser degrees played a key role in the production of glass objects, and was a firmly embedded part of glassworkers' practice.

However, there has been a tendency to approach recycling as a monolithic practice, with many papers simply noting evidence for recycling without any great consideration of the complexity or nuance of the specific human actions and decisions that led to the chemical signatures we lump together as “recycling”, nor the specific social and economic contexts in which such recycling practices were taking place.

The early medieval period offers an excellent opportunity to attempt to untangle some of this complexity, as analyses have indicated a glassworking system that was heavily reliant on recycled material.

This paper will present analyses of early medieval (7th - 10th century CE) window and vessel glass from five key sites in Britain. It attempts to identify a variety of recycling practices across different types and colours of glass, and to contextualise these practices as part of the wider landscape of trade and exchange, and the roles of secular and ecclesiastical power in the 7th - 10th centuries. As well as considering wider implications for how we discuss recycling across materials more generally.

818 CURRENT STATUS AND THE FUTURE OF DIGITAL ARCHAEOLOGY IN THE EASTERN MEDITERRANEAN

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Moullou, Dorina (Hellenic Ministry of Culture; Hellenic Open University) - Farinetti, Emeri (Roma Tre University; Italian Archaeological School at Athens) - Moutsiou, Theodora (University of Cyprus) - Ozguner Gulhan, Nimet Pinar (University of Zielona Gora, Institute of Architecture and Urbanism) - Babucic, Nikola (University of Hamburg)

Session format: Regular session

The Greek Chapter of the Computer Applications & Quantitative Methods in Archaeology (CAA-GR), which involves a wider research community from the Eastern Mediterranean area, invites scholars, researchers, academics, and professionals to explore the current and future state of digital archaeology in the Eastern Mediterranean.

Speakers and participants will have the opportunity to exchange knowledge and experiences on digital archaeology in the Eastern Mediterranean and will envision future directions. A strong focal point in the discussion will be on how the digital practice can cross boundaries and facilitate international collaboration. The intention is to establish a cross-border collegial environment where scholars share their experiences, highlight problems and offer potential solutions, knowledge transfer and know-how.

Participants from Greece, Cyprus, Turkey, and neighboring regions will share experiences and discuss digital scholarship levels in educational institutes, challenges in adopting curricula, managerial issues, and resource allocation strategies.

Colleagues from foreign archaeological missions will highlight their experiences managing digital projects in the Eastern Mediterranean, addressing integration challenges and unforeseen issues.

Presentations by scholars from the state sector will delve into the impact of digital transformation on archaeological projects, focusing on national policies, project evaluation, and the adoption/rejection of digital tools by archaeological services.

Ethical and legal concerns, surrounding digital archaeology in the Eastern Mediterranean including data creation and ownership, cultural heritage preservation, and responsible data-sharing practices, will be addressed.

The discussion extends to how digital archaeology projects engage the public, and promote cultural heritage preservation, by means of virtual exhibits, interactive educational resources, and community involvement in digital initiatives.

Please submit your proposals for presentations, papers, or case studies that align with the themes outlined above. Your insights and experiences will contribute to a robust discussion and the advancement of digital archaeology in this culturally rich and historically significant region.

1 ERIMI-PITHARKA ARCHAEOLOGICAL PROJECT: APPLICATION OF DIGITAL TECHNOLOGIES

Zeman-Wisniewska, Katarzyna (Uniwersytet Kardynała Stefana Wyszyńskiego w Warszawie) - Recht, Laerke (University of Graz) - Wiśniewski, Mariusz (Ministry of Culture and National Heritage, Poland)

Erimi-Pitharka is an archaeological site, located in the Kouris Valley of south-central Cyprus and dated to Late Cypriot IIC-III A (ca. 1300-1150 BCE). The current research project started in 2022 and is focused on exploring the character of Pitharka in terms of economy, subsistence and societal development, and to investigate its role in the settlement and mortuary landscape of the Kouris Valley, both spatially and chronologically. From the beginning of the project, both in the field and afterwards, a range of digital technologies are employed, and this paper will present their application. The project started with non-invasive prospection, using LiDAR data and Ground Penetrating Radar (GPR); the preliminary results of this were already taken into consideration during the first field season. It was followed by employing drone photos to create a Digital Terrain Model (DTM) of the site. The project employs immediate digital recording in the field and in the post-excavation process. Using a form-built and custom-made database in the Epicollect5 system, all data concerning archaeological contexts are captured directly during excavation with tablets and smartphones; similarly, special finds and ceramics are entered with their context in the field, and additional information added after washing, processing and drawings and photographic documentation. Photogrammetry (SfM) is employed as a primary high resolution method of single context recording, used daily and applied immediately in the field, during every stage of the excavation process. These modern technologies are a vital part of the Erimi-Pitharka project, not only facilitating workflow and making data more available, but also helping to create a deeper understanding of the archaeological site.

2 APPLICATIONS OF DIGITAL ARCHAEOLOGY IN DOCUMENTING AND UNDERSTANDING OF GERÇİN HÖYÜK, GAZIANTEP

Özgüner Gülhan, Nimet Pinar (University of Zielona Góra) - Demir, Timur (Gaziantep University)

Gerçin Höyük, located within the borders of Gaziantep province, has been the focus of earlier short-time visits and investigations. The recent systematical archaeological work has begun at the site in 2022. This new phase of studies focuses on digital archaeological applications that took place at various scales at the site to put the site in its context. Thus, part of the current research focuses on past and recent formation processes that took place at the site with the aid of traditional and modern remote sensing and GIS studies.

Especially within the early 20th century, the landscape surrounding the site has changed tremendously. Former wetlands at and around the site were dried as part of governmental programs. This drastically altered the surrounding landscape, as they turned into agricultural fields, gradually modifying the borders of the mound, and erasing other nearby mounds. This also led some parts of the site to be buried with earth dug out from the drainage canals. Strong wind erosion and looting activities also have an impact on the site. Unfortunately, the site also got affected by the 7.7 magnitude earthquake disaster that took place on February 6, 2023, as it is located only 32 km West of Sofalaca, the epicenter of the earthquake. Thus, we employ digital image processing of high and moderate-resolution satellite data to investigate changes in the landscape as well as to measure the impact of the earthquake at the site. As part of this research, we discuss the advantages of modern digital techniques and how they can be supported by traditional methods in documenting site formation processes.

3 ADVANCING EXCAVATION MAPPING: INTEGRATING TERRESTRIAL PHOTOGRAMMETRY, LIDAR, AND UAV DATA FOR THE ROMAN BATH COMPLEX IN RAFINA, ATTICA, GREECE

Ragia, Lemonia (Hellenic Open University, Patras, Greece) - Moulou, Dorina (Ephorate of Antiquities of East Attica, Athens, Greece; Hellenic Open University)

The utilization of Unmanned Aerial Vehicles (UAVs) has surged in recent years, demonstrating versatile capabilities across various domains including mapping, object detection, urban planning, archaeology, and geology. However, due to the quick data acquisition and development of algorithms for fast and real-time data processing, UAV-generated data often culminates in producing two-dimensional models. Concurrently, Lidar (Light Detection and Ranging) technology, with its established reputation for generating precise three-dimensional models, continues to be extensively employed for data acquisition. Additionally, terrestrial photogrammetry has emerged as a valuable tool, providing detailed imaging of objects within excavation sites that are not visible from aerial perspectives.

This study proposes an inclusive approach that merges UAV, terrestrial Laser scanning, and photogrammetry technologies. Focused on the excavation site of the Roman Bath Complex in Rafina, Attica, Greece, this methodology aims to create a comprehensive three-dimensional point cloud capturing both surface and subsurface features. Terrestrial photogrammetry enhances this approach by providing detailed imaging of objects within the excavation

that are not visible from aerial perspectives, while UAVs offer top-down data acquisition capabilities. Laser scanning further enriches the approach by providing highly accurate and precise measurements of surface features and structures. Integration of these datasets, alongside precise georeferencing through ground control points measured with total station and GNSS systems, facilitates the creation of reliable, high-fidelity three-dimensional photogrammetric models.

Furthermore, leveraging these integrated technologies allows for the identification of critical features within the excavation, including areas obscured by shadows or affected by other light phenomena. This comprehensive approach enables enhanced archaeological interpretation by providing intricate details in both horizontal and vertical dimensions, thus aiding in the identification and interpretation of spatial objects crucial to understanding the site's cultural and architectural context.

4 A VIRTUAL JOURNEY TO ANCIENT EPHEBUS USING XR AND AI

Denker, Ahmet (Professor) - Demirtas, Deniz (Researcher) - Ulas, Ecem (Researcher) - Gungordu, Selen (Researcher)

The core motivation for this work arises from the significant challenges brought about by the pandemic and subsequent lockdowns. These circumstances have underscored the imperative of virtual access to cultural heritage sites. The integration of Artificial Intelligence (AI) and Extended Reality (XR) with 3D digital reconstruction provided a unique opportunity to rebuild and experience Ephesus that is the home to many noteworthy landmark structures, including the Temple of Artemis – one of the Seven Wonders of the World.

In the fateful and convincing reconstruction of ancient Ephesus, extensive research encompassing a comprehensive data analysis and detailed examination and comparison of historical datasets played a pivotal role. Subsequently, the technologies to assist in reaching the objective were explored. Our research trajectories on Cultural Heritage (CH), Extended Reality (XR) and Artificial Intelligence (AI) have been fused. While XR has opened avenues for transporting visitors through time and creating the sense of being there, AI provided innovative tools that enhance visitor engagement with the ancient city, and allowing them to experience the site as it existed in its heydays. User experience was extended even by facilitating interaction with the city's historical inhabitants. Avatars were inserted into scenes, serving with the help of AI as guides to accompany visitors and providing them with an interactive experience, thereby enriching the overall visitor engagement.

The outcome of this project is a grabbing reconstruction, a captivating animation and an educational, immersive virtual journey to Ephesus, providing a sense of presence and immersion previously unattainable. This time journey to the past was made possible by harnessing the power of 3D reconstruction, AI, and XR technologies.

5 GAMETABLE NETWORK: UNVEILING THE PAST, EMBRACING THE FUTURE THROUGH AI-DRIVEN ARCHAEOLOGICAL RESEARCH

Moullou, Dorina (Hellenic Ministry of Culture; Hellenic Open University) - Crist, Walter (Leiden University) - Penn, Timothy (University of Reading) - Piette, Éric (Université Catholique de Louvain – UCLouvain)

Games, as a subject of study, span diverse disciplines, often in isolation. In computer science and mathematics, games stand as testbeds for pioneering methodologies, shaping state-of-the-art techniques in economics, engineering, and AI. Simultaneously, archaeologists, historians, and anthropologists explore the motivations underlying human play, dissecting its social implications on both individual and societal levels. Games have not only been instrumental in pedagogical development but are gaining recognition as integral components of humanity's intangible cultural heritage. However, this recognition is tinged with a poignant realization: much of the world's game heritage has been lost, overshadowed by colonialism, imperialism, and commercialization.

Against this backdrop, the paper introduces the GameTable Network, an EU-funded COST Action overcoming disciplinary divides. The network's research integrates AI techniques, archaeology, and gaming research, into a cohesive framework. In doing so, the network aspires to rekindle the essence of games not only as mere entertainment but also as repositories of cultural richness and historical narratives. The aim is not only to uncover the mysteries of the past but to acknowledge and rectify the gaps hindering a holistic understanding of games.

Our objectives span from reconstructing historical games to advancing AI methodologies, from fostering educational programs to embracing community involvement in digital initiatives. Key challenges include innovative approaches for studying, reconstructing, and preserving heritage games, reconstructing missing rules in incomplete games, simulating play at a human level, applying AI to study historical games, developing novel methods to identify unrecognized games measuring their evolution across space and time, developing pedagogical tools, and leveraging GameAI in a culturally diverse way, all crucially contributing to the study of heritage games.

Through this interdisciplinary lens, our aspiration is to enrich scholarly dialogue within the Eastern Mediterranean, Europe and beyond, advancing our collective understanding of the historical and cultural dimensions embedded in games through AI-driven research.

HANDS-ON CLASSROOM AND FIELD APPROACHES TO DIGITAL ARCHAEOLOGY: FROM A SPECIAL TOPICS COURSE TO TECHNOLOGY-FOCUSED FIELDWORK

Bishop, Savannah (Koç University)

At this point in time, Digital Archaeology is a mature and constantly evolving part of the field of Archaeology. From GIS to digital repositories, 3D scanning to virtual reality, and numerous other digital tools and technologies, Digital Archaeology is an interdisciplinary approach to studying and understanding the past. Given this prominence, the question arises, how are students learning to use these technologies? Further, how can we envision the future of digital archaeology together with the students who will be its architects? This paper examines these questions within the context of the Eastern Mediterranean through two hands-on applications: the "Digitizing the Past" course (ARHA 350) I teach at Koç University in Istanbul, Türkiye, and the Southern Phokis Regional Project (SPRP) fieldwork I coordinate with students in Antikyra, Greece.

ARHA 350 focuses on hands-on learning through different laboratory facilities: Archaeology (ARHA & KUDAR), Mixed Reality (KARMA), and Manufacturing and Automation (MARC). In this first iteration of the course, I aim to provide a history of digital scholarship while fostering critical thinking through its application. These applications include 3D scanning, photogrammetry, AR & VR, and 3D printing. Similarly, SPRP combines traditional and cutting-edge technologies through a partnership between the Yale University Peabody Museum and the Boeian Ephorate of Antiquities. The project defines its presence in Greece as international, inclusive, and interdisciplinary. This is the first year a small group of undergraduate students will join the project. They will engage with numerous digital tools, among them 3D scanning, photogrammetry, drone survey, GIS mapping, and AI.

Both contexts illustrate students' reflexive engagement with digital archaeology, informing future digital pedagogy based on their experiences, and providing novel insight into entry-level learning of digital tools and techniques. This discussion is intended to address the outcomes, challenges, and impact of current digital learning within the Eastern Mediterranean.

819 NETWORK OF EUROPEAN IDENTITIES ? THE IRON AGE BETWEEN ALPS, PANNONIA AND BALKANS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Potrebica, Hrvoje (University of Zagreb, Faculty of Humanities and Social Sciences, Dept. of Archaeology; Center for Prehistoric Research) - Grömer, Karina (Natural History Museum Vienna)

Session format: Regular session

The area between Alps, Balkans and Pannonia seems to be a key area for the understanding of the communication network that emerged in the Iron Age connecting Central Europe and the Mediterranean. Intensity of constant cultural mediation between the Central Europe and Mediterranean concentrated in this area, where three cultural areas interact, making it crucial for the understanding much wider processes of creation and change of identities on European scale.

Applying interdisciplinary research to material culture and organic remains from this period and area allows insight in behaviour and social dynamics of Iron Age communities with much higher resolution than conventional archaeological methods. We will here focus on the interdisciplinary study of three basic categories: food, textiles and metals. Identifying specific choices related to food sources and processing techniques can shed light on different identities within a same community or inside different local communities sharing the same landscape or geographical area. Textile traditions define large-scale cultural zones. The study of the distribution of metal objects, combining typology as well as compositional data, may provide the definition of networks between local centres, matching general cultural traits and local identities. By combining the results of interdisciplinary methodology and traditional research, we will test and perhaps modify current paradigms on the identity of Iron Age communities. We hope to go beyond and challenge standard definitions of Iron Age identities based on traditional notions such as "cultural groups" and (later) "ethnicities".

We invite all contributions based on a scientific approach to the Iron Age in the area between Alps, Pannonia and Mediterranean, especially those related to food, metals and textiles. We will also welcome papers discussing definitions of the Iron Age identities based on differences and similarities in processes of production, use, and distribution of food, metals and textiles.

ABSTRACTS

1 CONTRASTING GENETIC IMPACTS OF EASTERN MIGRANTS ON EARLY IRON AGE COMMUNITIES IN HUNGARY AND TRANSYLVANIA

Papac, Luka (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany.) - Egri, Mariana (Institute of Archaeology and Art History, Cluj-Napoca, Romania.) - Mötsch, Angela (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany.) - Lamnidis, Thiseas (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany.) - Gál, Szilárd (Mureş County Museum, Târgu Mureş, Romania.) - Rustoiu, Aurel (Institute of Archaeology and Art History, Cluj-Napoca, Romania.) - Schiffels, Stephan (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany.)

Ancient DNA from Iron Age nomads across the Eurasian steppe, including individuals from "Scythian" contexts, has revealed their varied genetic origins and high genetic diversity. However, little is known about their genetic impact and legacy on European communities. By analysing genomes of "Scythian" Age individuals from Transylvania (n=67, unpublished) and Hungary (n=7, previously published), we find ~40% eastern admixture in Transylvania but 0% in Hungary. In contrast to the trans-Eurasian migrations to the Pannonian Basin in the Avar period, the eastern ancestry in Transylvanian "Scythians" largely came from "Scythian" communities in neighbouring Moldova and Ukraine, which admixed into the pre-existing Balkan genetic substratum. In addition to eastern ancestry, we find multiple genetic outlier individuals from central/northern Europe and southern Balkans buried in "Scythian" contexts, implying a dynamic admixture process associated with the formation of these "Scythian" communities. From Transylvania, we reconstruct several families from "Scythian" burial contexts up to three generations deep, most consisting of members with and without eastern ancestry, documenting real-time admixture between locals and eastern migrants. Among these is also a case of siblings buried 11km apart. However, this eastern ancestry did not persist after the "Scythian" period, with subsequent "Celtic" Age associated individuals (n=6) carrying primarily the pre-existing local ancestry with limited evidence of additional central European or eastern gene flow.

2 BEYOND DEFENSE: EXPLORING THE ROLE OF IRON AGE RAMPARTS IN NORTHERN CROATIA

Ovcaric, Franka (University of Zagreb, Department of Archaeology, Zagreb) - Drahotusky-Bruketa, Luka (University of Zagreb, Department of Archaeology, Zagreb) - Potrebica, Hrvoje (University of Zagreb, Department of Archaeology, Zagreb)

The Iron Age witnessed a resurgence of urbanization characterized by the construction of extensive earthworks, particularly ramparts. Traditional interpretations have focused on their defensive function, but recent scholarly discussions propose alternative social explanations. This paper presents an integrative interpretation, arguing that while these structures were indeed built for defense, their social symbolism is equally significant. We contend that the symbolism of ramparts extends beyond defense to the profound impact they had on the landscape, creating a lasting impression of control. Unlike other monumental architecture, the symbolic importance of ramparts lies in their recreation of the natural landscape. This study differentiates Iron Age earthworks from other structures in continental Croatia, emphasizing the enduring symbolic influence they exert on the landscape even after two millennia. While acknowledging the established notion of "social" construction in the Iron Age, our approach aligns with and expands upon previous discussions. We posit that the defensive aspect of ramparts is integral to their symbolism, intricately connected to the transformative changes they brought to the landscape.

Landscapes serve as tangible anchors for the priorities and assumptions of those who shape and utilize them. Our paper adopts a prehistoric cultural geography approach to examine the transition from late Bronze to Iron Age landscapes in two regions. Through analyzing construction processes, functionality, and the significance of landscape features from cultural, economic, and symbolic perspectives, we explore how prehistoric societies structured daily activities, transformed the appearance of the landscape, and invested it with cultural meaning. In this prehistoric system, the ideological landscape intersects with both social and symbolic landscapes, utilizing the symbolic to justify and enforce social positions. The landscape, essentially, becomes a dynamic arena for the expression of social narratives, revealing intricate connections between ideology, society, and the physical environment.

3 ÁRTÁND BETWEEN REGIONAL UPHEAVAL AND INTERREGIONAL IDENTITY

Soós, Bence (Hungarian National Museum)

The ostentatious assemblage discovered near Ártánd (eastern Hungary) is one of the most important and most perplexing finds of the Early Iron Age in the Carpathian Basin. The sheer amount and the outstanding quality of the items plainly suggest that the assemblage is closely associated with a prominent elite group. Due mostly to the bronze hydria of Greek origin, the prominence and uniqueness of the assemblage have already been discussed several times. This paper endeavours to explore the wide-ranging contacts of the Ártánd find and evaluate how these links could have shaped as well as displayed the identity of the owner of the items. The deposited artefacts seemingly originate from

a wide range of geographic regions and cultural backgrounds. Similarities and differences between how and in what kind of contexts these items were used and deposited in their native setting and in the case of the Ártánd assemblage might allude to the extent to which owners of the ostentatious items were ready to adopt not just the objects but the ideas and customs attached to them and identities in general. In addition, the paper discusses how these non-local elements could have led to confusion, bewilderment or even tension in a local setting, especially, in an age of social and cultural shifts. The proposed paper discusses what unique assemblages tell us about identities in archaeological settings and how the Ártánd assemblage might be interpreted in on a local and interregional scale.

4 EARLY IRON AGE FOODWAYS IN THE MIDDLE DANUBE REGION: AN ARCHAEOBOTANICAL ANALYSIS OF PLANT REMAINS FROM KALENDERBERG AND VEKERZUG SETTLEMENTS

Ranum, Caleb (University of Alabama; Constantine the Philosopher University in Nitra)

A foodways approach to the archaeological record seeks to understand past cultures by examining the daily activities associated with all dimensions of food production, processing, preparation and consumption. The quotidian practices associated with creating and consuming food function to teach and reinforce both individual and group identities related to ethnicity, gender, and social status. The rules about what is considered edible, what constitutes a meal, how it should be prepared, and how it should be served delineate roles within a community and exclude those who have different culinary practices.

This paper will provide early results from my dissertation research on plant foodways in the Middle Danube Region during the Early Iron Age, with a focus on uncovering Eastern Hallstatt identity via local culinary practices. As one of the first major archaeobotanical studies in the region, the primary goal is to identify the ingredients used in local Kalenderberg cuisine by analyzing archaeobotanical remains from four settlement sites. Additional research at two Vekerzug culture settlement sites provides an insight into the foodways of the archaeological cultures east of the Danube that are often assumed to have been more nomadic. By researching the foodways of these two archaeological cultures I aim to provide a basic understanding of local cuisines during the Early Iron Age and allow for a comparison to identify culinary markers of identity that differ between Kalenderberg and Vekerzug settlements.

5 TUMULUS GOMILA - A NEW CONTRIBUTION TO THE KNOWLEDGE OF HALLSTATT BURIAL CUSTOMS IN CENTRAL EUROPE

Šoštaric, Renata (University of Zagreb, Faculty of Science) - Kožul, Mirjam (University of Zagreb, Faculty of Science)

The Gomila tumulus at the Jalžabet site (near Varaždin), from which the analyzed archaeobotanical samples come, has a diameter of about 65 m and a preserved height of about 8 m, and is one of the largest prehistoric burial mounds in Central Europe. It belongs to the first half or middle of the 6th century BC, the last stage of development of the Martijanec-Kaptol cultural group, that is, the eastern Hallstatt cultural complex. Some of the most famous princely graves of the eastern Hallstatt cultural complex originate from that time, such as the tumuli in Strettweg (Austria) and Kaptol (Croatia), and the Kröllkogel tumulus in Kleinklein (Austria).

From 75 samples of sediments from the Gomila tumulus, a total of 5234 plant remains were separated and determined, of which 91% were carbonized, while the rest (noncarbonized) were interpreted as recent contamination. The most numerous finds are large-grain cereals, which make up almost 90% of the determined taxa. Unfortunately, due to the poor condition in which they were preserved, a very high proportion of findings belongs to the Cerealia group. In addition to cereals, very small amounts of lentils (*Lens culinaris*), hazelnuts (*Corylus avellana*), acorns (*Quercus* sp.) and weed admixtures were found. A comparison of the archaeobotanical results of the Gomila tumulus with other previously published findings of plant remains from Iron Age tumuli, primarily in Croatia, shows great similarities, as cereals are mostly the most common grave goods, with few additions of nuts and/or fruits.

6 FORGE IRON WHEN IT'S HOT

Vojakovic, Petra (Centre for Interdisciplinary Research in Archaeology (CIRA), Department of Archaeology, Faculty of Arts, University of Ljubljana; Arhej d. o. o.) - Gruškovnjak, Luka (Centre for Interdisciplinary Research in Archaeology (CIRA), Department of Archaeology, Faculty of Arts, University of Ljubljana) - Prijatelj, Agni (Department of Soil and Environmental Science, Biotechnical Faculty, University of Ljubljana; Centre for Interdisciplinary Research in Archaeology (CIRA), Department of Archaeology, Faculty of Arts, University of Ljubljana) - Burja, Jaka (Institute of Metals and Technology) - Šetina Batič, Barbara (Institute of Metals and Technology) - Toškan, Borut (Institute of Archaeology, Research Centre of the Slovenian Academy of Sciences and Arts) - Tolar, Tjaša (Institute of Archaeology, Research Centre of the Slovenian Academy of Sciences and Arts) - Brajkovič, Rok (Geological Survey of Slovenia) - Črešnar, Matija (Centre for Interdisciplinary Research in Archaeology (CIRA), Department of Archaeology, Faculty of Arts, University of Ljubljana)

The spread of iron and iron metallurgy throughout Europe caused one of the major technological changes that characterised the Iron Age and has importantly affected many other spheres of life. Despite this widespread phenomenon, archaeologists rarely discover primary iron ore processing sites, and even less frequently blacksmiths' workshops, while slag is present at almost every Early Iron Age site in the south-eastern Alpine region (i.e. present-day Slovenia). The iron ore rich region made iron production not only an important source of prosperity, but also a source of trade with the neighbouring regions.

For the purposes of this presentation, we would like to discuss one of the Late Hallstatt period buildings from Pungrt hillfort in Central Slovenia. The Building 24 was located on the lowest terrace of the settlement next to a 2m-wide gravel road that runs along the inner face of the monumental 3m-wide stone rampart. It was timber-framed with stone foundations and consisted of three rooms. Micro-refuse analysis of the building revealed that the south-western room, which would have been interpreted as a purely domestic setting based on macro-observations during excavations, was a blacksmith's workshop. Distribution patterns of hammerscale – micro-debris produced during the forging of iron – indicate the locations of the smithing hearth and anvil, while other micro-refuse provides insights into the materials, foods, fuel and possibly even the location of furniture used by the blacksmith.

7 METALLURGY AND RITUALS INTERTWINED: EXPLORING THE LATE HALLSTATT IN SVETI KRIŽ, CROATIA

Mavrovic Mokos, Janja (University of Zagreb, Faculty of Humanities and Social Sciences, Department of Archaeology) - Šejić, Laura (University of Zagreb, Faculty of Humanities and Social Sciences, Department of Archaeology, PhD student) - Drahotusky Bruketa, Luka (University of Zagreb Faculty of Humanities and Social Sciences Department of Archaeology, PhD student)

In 2023, the first discovery and excavation of the potential ritual structure from the Late Hallstatt era unfolded at Sveti Križ in Croatia. This 2x1 m rectangular building, fortified by stone walls and supported by four pillars at the corners, strongly implied the existence of a roof. A rich assortment of archaeological artifacts graced the interior, encompassing animal bones, stone tools, spindle whorls, and an array of metal objects. Notably, the unearthing of a substantial number of fibulae hinted at connections reaching into northern Italy and along the eastern coast of the Adriatic. Moreover, a bone artifact adorned with intricate decorations, featuring opposing zoomorphic sides, and a shark's tooth sourced from the Pannonian Sea, were also among the retrieved items. Building upon the fibulae discoveries, the structure's dating extends from the 6th to the 5th centuries BC. Of particular interest, the eastern wall of the building seamlessly abuts the plausible western wall of a smithy, which itself aligns with the same historical timeframe. Inside the smithy, several important indicators of iron ore processing were found for the first time on the site. The evidence of ore processing is the large amount of slag, along with a semi-finished product of an iron socketed axe, suitable for further processing. These findings found in one place, within a closed context, represent irrefutable evidence of metallurgical activity. Within the Late Hallstatt settlement, in close proximity to both the potential ritual edifice and plausible smithy, an unusual deposit of limonite was uncovered. This discovery stands out as metallurgical activities traditionally occurred beyond the settlement boundaries. The comprehensive analysis of organic residue and zooarchaeological data will try to offer profound insights into this extraordinary and exceedingly rare Late Hallstatt context.

8 IRON AGE METAL PROCUREMENT AND ALLOYING PRACTICES : ARCHAOMETALLURGICAL ANALYSES ON COPPER-BASED OBJECTS FROM SLOVENIA, CROATIA AND BOSNIA-HERCEGOVINA

Mehofer, Mathias (Vienna Institute for Archaeological Science, University Vienna; Human Evolution and Archaeological Sciences, University Vienna) - Potrebica, Hrvoje (University of Zagreb, Faculty of Humanities and Social Sciences, Department of Archaeology)

In this paper we will present the first results of a recently funded CSF project with the title "Creation of European Identities – Food, Textiles and Metals in the Iron Age Between Alps, Pannonia and Balkans (project no.: IP-2020-02-2371). It focuses on use of metals, textiles and food as indicators of prehistoric identities in the Iron Age. The first systematical archeometallurgical analyses aimed to examine the wide-ranging exchange pattern of communities located at contact zone between Alps, Pannonia and Balkans. It included prestigious sets of weapons (helmets, axes and swords) and specific types of costume elements (multiheaded pins).

A set of 98 copper-based objects covering the time span of the 8th to the 4th century BC, was sampled. The chemical composition was analysed by energy dispersive X-ray fluorescence analyses (ED-XRF) and the stable lead isotope ratios of the copper metals by a High resolution -Multicollector-Inductively Coupled Plasma Mass Spectrometry (HR-MC-ICP-MS) at the Curt Engelhorn Centre of Archaeometry, Mannheim.

Within this lecture the analytical results will compared to previously published results of copper ores, slags, ingots and artefacts from the European region to examine the copper exchange systems. The preliminary results show, that tin bronzes and leaded bronzes are present. The element patterns indicate that in the metal objects fahlore-dominated copper is prevailing with chalcopyrite-based metal still present in low quantities. This in good accordance with previous research results for Central Europe, which describe a noticeable increase in fahlore dominated copper from Ha B onwards. While the tin concentration decreases since the Late Bronze Age, lead becomes an important alloying agent in the younger periods. The generated archaeometallurgical database will allow for in-depth analyses of the Iron Age copper exchange and to examine the metal procurement of these metal using societies over a long period.

9 MULTIHEADED PINS IN THE IRON AGE - COSTUME AND STATUS

Potrebica, Hrvoje (University of Zagreb, Faculty of Humanities and Social Sciences, Department of Archaeology) - Mavrović Mokos, Janja (University of Zagreb, Faculty of Humanities and Social Sciences, Department of Archaeology)

In the Eastern Hallstatt area multiheaded pins were perceived as prominent part of male costume. However, distribution of this type shows that they were present in large area of Central and South-eastern Europe from Este Culture in northern Italy to the Danube with very few examples found north of that river. In most of the cases they were part of grave inventories of the 8th and 7th century BC. However, closer insight suggests that these objects were not just functional part of male costume but rather insignia of special status, at least in some groups. That would explain their distribution across boundaries of different cultural groups and presumably costumes. Based on that and on the fact that not all male graves included these objects, this paper will argue that multiheaded pins were distinctive and universally recognizable markers of identity. However, the identity they reflected was not of specific cultural group or individual community related to specific kind of costume, but of special class of people, probably warrior elite. In the area south of the eastern Hallstatt there were two types of similar objects. In necropolis of Sanski Most whole series of bronze pins usually with two spherical heads were discovered exclusively in female graves around head. Although similar in shape they differed ifrom Central European multiheaded pins in everything else (chronology: at least two centuries later, position on the body: hairpins vs. costume ornaments, gender attribution: female vs. male). Interestingly in Donja Dolina which should be site of the same cultural group very specific type of multiheaded pins (Donja Dolina type) had probably same position on the body and gender attribution as Hallstatt ones, with somewhat later chronology but still earlier than Sanski Most. These pins were probably also markers of the same identity as their Hallstatt counterparts.

10 AUSTRIAN-SLOVENIAN CONNECTIONS: CASE STUDIES FOR IRON AGE TEXTILES FROM SLOVENIAN AND AUSTRIAN SITES

Groemer, Karina (Natural History Museum Vienna) - Saunderson, Kayleigh (University of Vienna) - Lau, Ronja (Ruhr University Bochum)

In the last decades, textile archaeology was among the fields of research in archaeology, that was fostered in the course of large international, interdisciplinary and innovative research projects. Lately, the Digital Atlas from the COST Action EuroWeb visualised how far we have gone with collecting basic data, and the abundance of publications on archaeological textiles from Europe also demonstrates the high level of standardisation of methods, innovative approaches and integration of the latest interdisciplinary methodologies.

Also within the project "Creation of European Identities – Food, Textiles and Metals in the Iron Age Between Alps, Pannonia and Balkans" and the activities at the Textile Research Group at the Natural History Museum, new data was gained during research on Austrian and Slovenian collections.

New Case studies will be presented, such as Hallstatt period textiles from Slovenia (Vace, Magdalenska Gora), and the textiles from Latène period cemeteries Walpersdorf, Leithaprodersdorf, Göttlesbrunn, Kuchl and Ratzersdorf. Those finds will be set into context in comparison with statistical data from archaeological textiles from Austria and Slovenia and their implication on our understanding of organic materials from Iron Age grave finds.

11 LEATHERWORKING ARTIFACTS IN FUNERARY CONTEXTS OF EARLY IRON AGE EUROPE. A CASE STUDY FROM SOUTHERN NECROPOLIS OF PADOVA (NORTH-EASTERN ITALY)

Pollon, Nicola (Alma Mater Studiorum - Università di Bologna)

The recent analysis of a burial group from the Iron Age necropolis of Palazzo Emo Capodilista-Tabacchi in Padova has uncovered a cremation burial (grave 336), dated to the late-7th century BCE, standing out for its unique artisanal set. These tools are likely associated with leatherworking, as indicated by parallels in the archaeological record and in traditional crafts. The assemblage comprises an iron knife, a whetstone, a bronze needle, an iron awl, two additional bone needles, and two bone artifacts possibly identified as a folder and stitch markers. This toolkit might have been employed for braiding and sewing leather strips. The bone needles can also be used in crafting wool and thick vegetal fibers. Leather braiding has connections to the manufacturing of various objects, including belts, implements for furniture/carts, and elements of horse harnesses. The latter possibility gains significance from the presence of a distinctive decorative motif on a single-handled cup within grave 336, featuring two opposing horses surrounding a disk realized with attached bronze nails. This motif is quite rare in Venetic necropolises, and it typically occurs both in Padova and Este in graves with knives, awls, or needles. This association prompts inquiry into how and why leatherworking was symbolized in funerary contexts and whether, in certain instances, it could be linked to the production of horse harnesses or other items associated with elite consumption. To explore this hypothesis, an investigation into the recurrence of comparable artisanal indicators and their potential association with horse motif decorations or elements of horse harnesses has been undertaken. This investigation primarily encompasses Early Iron Age Veneto, extending to the central-eastern and south-eastern Hallstatt Alpine regions. The purpose of this paper is to stimulate reflection on the role of leatherworking in the funerary representation of both elite and non-elite groups in Early Iron Age Europe.

12 IMMIGRANTS OR INFLUENCERS? CHANGES IN THE IRON AGE COMMUNITIES IN BELA KRAJINA, SE SLOVENIA

Grahek, Lucija (Institute of Archaeology, ZRC SAZU) - Nemeček, Nataša (National Museum of Slovenia) - Gleba, Margarita (Dipartimento dei Beni Culturali / Università degli Studi di Padova)

Archaeological research from the 19th and 20th centuries shows that the Dolenjska and Bela krajina region in south-eastern Slovenia flourished in the Early Iron Age (Hallstatt period) due to its geostrategic position - situated between the Alps, Pannonia, the Balkans and the Adriatic - and the abundance of easily accessible iron ore. The societies living around the Kolpa River in Bela krajina, played a significant role in the formation of the Dolenjska cultural group. During the Late Hallstatt period, local societies began to expand beyond their core centres, and this is traditionally attributed to the northward expansion of the lapodic tribes. The lapodic culture is believed to have significantly influenced Bela krajina during the Late Iron Age. Simultaneously, and during the same period, local societies adopted the attire and material culture associated with the Celtic Taurisci tribe. New research, however, challenges the validity of traditional definitions of individual societies based solely on typo-chronological analyses of finds and proposes a re-evaluation of the old data.

The presentation will cover the interdisciplinary approaches used to gain insights into prehistoric communities using new data and findings from two of the largest Iron Age centres in Bela krajina, namely Podzemelj and Vinica. We will present and discuss the initial results of archaeometric analyses of non-ceramic finds, especially bronzes, and of mineralised textile remains, and other organic materials. This research aims to provide a deeper understanding of the prehistoric communities in the region and their way of life.

833 ADRIATIC BRIDGE - UNRAVELLING POLITICAL, SOCIAL, AND CULTURAL TRANSFORMATIONS IN THE ADRIATIC?IONIAN, AND BALKAN REGION IN THE LAST MILLENNIUM BC

Session theme: 6. The Mediterranean from Within

Session organisers: Perkic, Domagoj (Dubrovnik Museums, Archaeological Museum) - Miše, Maja (UCL Institute of Archaeology) - Potrebica, Hrvoje (University of Zagreb, Faculty of Humanities and Social Sciences) - James, Sarah (Department of Classics, University of Colorado Boulder) - Meo, Francesco (University of Salento, Department of Cultural Heritage)

Session format: Regular session

Over the last millennia BCE, the Adriatic – Ionian region experienced a series of profound transformations. This transitional period witnessed the evolution of local communities along the eastern and western coasts to the emergence of integrated societies characterized by the coexistence of Greeks, indigenous communities, and newly arrived Romans. Amidst these changes, the region exhibited expanding economic complexities, the development of distinct local identities through enhanced mobility and network connectivity, and a flourishing trade and exchange network. These developments played a key role in unifying diverse social organizations and material culture, ultimately resulting in a unified culture at the end of the last millennium BC. However, scholarly discussions often fall short of examining the Adriatic region, leading to fragmented representations of the area and its historical significance within the broader context of ancient Mediterranean connectivity and communities.

This session aims to address several pertinent questions concerning the historical trajectories of Adriatic communities:

- How did Adriatic communities develop from the Late Bronze Age, and what influence did the collapse of the Bronze Age in the Mediterranean have on this region?
- Can we trace the catalysts behind Adriatic – Ionian trade and their impact on local communities?
- What were the consequences of the arrival of external actors, the Greeks and Romans, on the transformation of the Adriatic region?

The primary objective of this session is to offer valuable insights into these inquiries, stimulate meaningful discussions among scholars, and potentially provoke the exploration of new research avenues within the study of the Adriatic – Ionian region during this transformative period. By delving into these questions, we anticipate a more nuanced comprehension of the connections that linked Adriatic communities and a clearer understanding of the related social and cultural developments that shaped the region during this pivotal era.

ABSTRACTS

1 HILLFORTS AND MOUNDS - EMERGENCE OF CULTURAL LANDSCAPE IN THE 1ST MILLENNIUM BC IN SOUTH OF THE EASTERN ADRIATIC COAST

Perkic, Domagoj (Dubrovnik Museums, Archaeological Museum) - Dizdar, Marko (Institute of Archaeology, Zagreb) - Potrebica, Hrvoje (University of Zagreb, Faculty of Humanities and Social Sciences, Department of Archaeology)

The settlement of Grad near Nakovana on a prominent stone rise, dominates over complex cultural landscapes defined by prominent hillfort settlements and dozens of stone mounds in their surroundings as well as an Illyrian cave sanctuary. Archaeological material recovered from Grad suggests a long period of occupation that was particularly intensive in the 1st millennium BC, evidenced also by dozens of stone mounds of various forms and sizes. Large, conical mounds probably date from the late Copper Age and the early Bronze Age (the Cetina culture), while explored necropolis of Zmijno consists of stepped mounds with a central burial chamber and two or three stone rings. They contained remains of a number of deceased as well as many metal, glass and pottery objects from the late 5th and 4th c. BC. Flat graves have also been found between mounds, dating from the late Bronze Age and the early Iron Age. In contrast, the Gradina hillfort at Zakotorac does not appear to have been fortified by a rampart. In the valley to the south of it there is a number of mounds that are similar to those attributed to the Cetina culture. Directly below the settlement, there is a group of mounds with one or more peripheral rings and a flattened stone fill that is sometimes step-like. So far we excavated three mounds and dry-stone tombs located next to them. The mounds contained several graves each, with a number of deceased, and the material dating from the 6th to the 4th century BC. Next to them, there were dry-stone tombs, also containing several deceased each with variety of finds from 4th-3rd/2nd century BC. This research conducted by consortium of several institutions will continue to explore complex cultural landscapes with large potential for future interdisciplinary research.

2 STINE - MISSING LINK IN THE IRON AGE OF THE ISLAND OF KORČULA

Borzić, Igor (University of Zadar, Department of Archaeology) - Potrebica, Hrvoje (Faculty of Humanities and Social Science, Department of archaeology) - Kalebota, Marta (Korčula City Museum) - Radić, Dinko (Centre of culture, Vela Luka) - Vuković, Miroslav (Faculty of Humanities and Social Science, Department of archaeology)

The Iron Age settlement of Stine is located on north-western edge of the fertile field behind the village of Žrnovo in the eastern part of the Island of Korčula. Unlike other recognized and confirmed settlements of that period it does not look like classic hillfort. In this case it is “hidden” behind ridge of the hill overlooking Pelješac Channel which probably served as natural fortification and monitoring point while settlement itself was placed on series of terraces sliding down towards the field on the southern side of the hill. Although systematic research just began it is clear that it will have large impact on understanding Iron Age dynamics on the island itself but also on the whole area of the southern Adriatic as well for several reasons:

1. It is the only settlement of significant size on the eastern part of Korčula. Therefore, if we accept hypothesis that Lumbarda's Psephysma mentions dynasts of local community that were benevolent to founding Isseian colony on Koludrt this is so far the best location for their settlement and ideal site for understand relationship between Greeks and indigenous population and perhaps shed more light to reasons of its founding and its disappearance.
2. It is the only Iron Age settlement of this type known so far. Although it could be reflection of adaptation to specific landscape, it definitely suggests that in research of the Iron Age landscapes of the southern Adriatic we have to move past traditional paradigm hillfort-field-communication-mounds.
3. The chronology of finds suggest that it lived deeply into the 1st century BC. It could give us additional insight in what actually happened during the Octavian campaign that allegedly wiped-out population of Mljet and Korčula and traces of which we discovered in Nakovana, just across the Pelješac Chanell.

3 THE EVOLUTION OF ARCHAEOLOGICAL LANDSCAPE IN THE TERRITORY OF KAVAJA AND RROGOZHINA (ALBANIA) FROM PREHISTORY TO THE IMPERIAL ROMAN PERIOD

Shehi, Eduard (Albanian Institute of Archaeology)

This presentation explores the evolution of territorial utilization in the region south of Epidamnus-Dyrrachium, the largest ancient city on the eastern Adriatic coast. The terrain is characterized by low hills, fields, and several rivers coursing through it, all facing the Adriatic Sea. Human presence traces back to the Neolithic period, gradually increasing with slow momentum until the Iron Age. Notably, settlements were primarily positioned on hill slopes, rarely in the plains, leaving interpretive clues.

Furthermore, a sudden expansion occurs from the Archaic period, particularly in the Classical era. Coastal positions, hillsides, and descent into the plains characterize this period. Territory usage significantly expands while strategically selecting positions to control valleys, fields, natural routes, or hillside slopes.

The highest level of settlement presence belongs to the Hellenistic period, with a notable increase in the number of settlements spreading across the territory, predominantly on hill slopes. Settlement types primarily consist of villages and farms, with fewer fortified settlements.

The Roman period witnesses a nearly drastic shift in territorial usage patterns. Firstly, there is a massive shift towards the plains, abandoning most hillside settlements. Those remaining on hillsides hold crucial positions for territorial control. Settlement types mainly comprise villages and rural villas, followed by roadside stations.

This presentation aims to detail the evolution of territorial usage in this area and attempts to explain the reasons behind residents' choices during different historical periods.

4 ECONOMY OF IRON AGE COMMUNITIES IN EASTERN ADRIATIC: INSIGHTS FROM LARGE STORAGE JARS FROM NADIN AND RAT VIČJA LUKA (DALMATIA)

Miše, Maja (UCL - Institute of Archaeology, UK) - Barbarić, Vedran (Faculty of Humanities and Social Sciences, University of Split, Croatia) - Čelhar, Martina (Department of Archaeology, University of Zadar, Croatia)

In the last millennium BCE, the Dalmatian region harboured diverse communities, each with unique social structures, cultural affiliations, and trading networks. The similarities and differences among these communities, discernible through hillforts, material culture, and burial customs, present a complex narrative. This complexity deepens when we consider their interactions and potential mutual economic strategies. Until now, these questions have remained unanswered, mainly due to a fragmented approach to each community. To address the complex issues surrounding production and trade, this study explores two Iron Age communities—one along the northern Dalmatian coast and hinterland and the other on the Central Dalmatian islands, focusing on the hillforts of Nadin and Rat Vičja Luka. Situated in different landscapes, with Nadin on the largest fertile field in Dalmatia and Rat on the island of Brač, these locations provide a unique perspective for investigation.

Material evidence from the 9th century BCE onwards indicates that both communities engaged in trade with the western Adriatic coast. These cross-Adriatic trade connections often signify economic surplus, indicative of communities with resources beyond immediate needs. To comprehend the economic dynamics of prehistoric communities, particularly Eastern Adriatic Iron Age societies, a holistic approach is imperative, incorporating archaeological evidence such as valuable items, trade routes, and settlement patterns. Notably, large storage jars serve as crucial archaeological finds shedding light on these dynamics.

This paper presents a detailed analysis of large storage jars from Nadin and Rat Vičja Luka, utilizing them as proxies to characterize local production and, consequently, local strategies of food storage. Through an integrated examination encompassing typological, microstructural, and geochemical analyses, the aim is to delineate local production and re-construct the technological aspects of large storage jar manufacturing. The evidence of local production, coupled with trading contracts, provides valuable insights for reconstructing Iron Age economies along the eastern Adriatic coast.

5 TRANSMISSION AND TRANSFORMATION IN THE ADRIATIC IRON AGE: A STUDY OF IMPORTED DRINKING WARES FROM GRADINA RAT, BRAČ

James, Sarah (University of Colorado Boulder)

After the Bronze Age, the earliest fragments of non-local pottery at Gradina Rat appear in the mid-9th century. At first, Italian matt-painted wares were imported from central or southeastern Italy comprised primarily of cups, pitchers, and large bowls/kraters that were used at the hillfort. These newly introduced wares had no parallels among local shapes. While it is possible that Italic imports took the place of metal vessels or ones made of perishable materials, I propose that these objects were adopted for their uniqueness and would have been understood as valuable exotica. In this way, who possessed them may be the more important point. Those with access to these matt-painted wares perhaps displayed (or used) them in communal settings in order to enhance their own social status. Access to Greek-style products produced in Mainland Greece and Magna Graecia began at the site in the 6th c. BCE and presumably had to compete with well-established Italic wares. The imported shapes are again drinking vessels and large, open shapes (kraters/bowls) and these are followed within a century by Greek-style transport amphorae typically used for wine. This evidence for imported wine suggests on-site consumption probably using Greek-style and Italic table wares, although the frequency of such events is uncertain. Given that wine production started with the arrival of Greek settlers to the Adriatic islands in the 4th c. BCE, the previous adoption of and subsequent adaptations to this new product by local inhabitants may help explain the rapid spread of viticulture in the region.

6 NORTHERN EPIRUS BETWEEN THE CLASSICAL AND THE HELLENISTIC PERIOD: THE CASE OF ÇUKA E AJTOIT, BUTRINT AND THEIR REGIONAL CONTEXT

Aleotti, Nadia (Sapienza University of Rome)

The ancient Northern Epirus, now southern Albania, provides an interesting point of view to observe the developments of interactions between different realities during the second half of the 1st millennium BC. It is a geographically marginal territory of Greece, but closely connected with the Corinthian and Corinthian-Corciran colonies in the Adriatic-Ionian area, as well as with the different local realities of this region. In this frame, the passage from the Classical to the Hellenistic period represents a crucial moment in defining the new Epirus realities and their new relations and connections with the rest of the Adriatic and Ionian regions.

The few pottery fragments of the 5th-4th cent. BC among the finds recovered by the recent surveys of the new Italian-Albanian research project in Çuka e Ajtoit (Albania), and the pottery of the same period from Butrint, are particularly interesting for the comprehension of this period in Northern Epirus from the particular point of view of the material culture. This period is archaeologically quite elusive, yet it brings fundamental changes, of which we only catch the final results in the early-mid Hellenistic period with the full adherence to the Hellenistic koine. By analyzing in detail the material culture of Çuka e Ajtoit and Butrint, the paper aims to help better delineate this transition, crucial for the region and its role in the Adriatic-Ionian area.

7 UNDER THE BRIDGE? CENTRAL DALMATIAN ISLANDS AND THE TRANS - ADRIATIC CONTACTS (2ND AND 1ST MILLENIUM BCE)

Barbaric, Vedran (University of Split, Faculty of Humanities and Social Sciences)

The contacts between two sides of the Adriatic in its central part rely on the maritime route that connects two shores via islands that are positioned between Gargano and Kaštela bay (in proximity of the main route inland through Dinarics). Known in the literature as the Adriatic Island Bridge, this route has been in use by prehistoric seafarers and sailors since the Neolithic. From that time on, the trans-Adriatic route connects two shores with different intensities, depending on the circumstances of the period. This paper examines the available archaeological evidence from the Central Dalmatian islands on this route and its potential for our understanding of the trans-Adriatic communication

dynamics during the last two millennia BCE. Mostly, we are dealing with settlement and burial evidence that rarely comes from the excavations. Still, islands have been surveyed in detail (through Adriatic Islands Project activities), so data on hillfort settlements and ritual mounds proves to be very helpful, especially when combined with the excavation data. The position of individual islands on the route, although seemingly similar, i.e., relatively close to the mainland, together with their morphology, seem to have greatly influenced cultural dynamics on the local level. The available archaeological record will be examined in order to identify key indicators that can help us understand the role of the islands and, possibly, up to some extent, the nature and scope of trans-Adriatic contacts as observed from its eastern shores.

8 RELATIONS BETWEEN KOSOVO AND THE GREEK COLONIES OF DURRACHION AND APOLLONIA DURING THE IRON AGE

Baraliu, Sedat (University of Prishtina, Faculty of Philosophy) - Premtim, Alaj (Archeological Institut of Kosovo)

This study will deal with the trade relations between Durrachion and Apollonia within the current territory of Kosovo during the Iron Age. After the establishment of two colonies, Dyrrachion in 627 B.C., and that of Apollonia around 600 B.C., before our era in the territory of Illyria, the relations between the Greeks and the Dardanians underwent a new flourishing, because these colonies served as a bridge to facilitate exchanges between the merchants of the two provinces. Through the White Drin, Kosovo could communicate with the Greek colonies in the Adriatic, and through them, with the rest of Greece. Many finds in the territory of Kosovo are considered as imported from these Greek colonies, or from their metropolis Corinth.

It appears that the colonies were primarily interested in silver mining. Between the 4th and 1st centuries B.C., Apollonia as well as Dyrrachion produced coins from silver metal which could have been taken from Dardania or from the city of Damastion. Strabo places this place in the hinterland of Dyrrachion and Apollonia. Proof of these exchanges are the coins from Apollonia and Dyrrachion found in the territory of Kosovo. The discoveries of the village of Qollopek in Peja reveal a treasure of coins from Apollonia, 475 drachmas and 2 imitations. But discoveries of such coins have also occurred in other places in Kosovo, such as in Janjevë and around Pristina. Evans claims that coins of Apollonia and Dyrrachion have been discovered in Dukagjin (Kosovo).

9 THE STRAIT OF OTRANTO: A GATE FOR ADRIATIC CONNECTIONS

Meo, Francesco (Department of Cultural Heritage, University of Salento (Italy))

This paper will focus on the role of the Strait of Otranto as a gate for the connections among populations in the first millennium BCE through a series of examples aimed at highlighting the links between southern Puglia Region and the eastern coast of the Adriatic sea.

Since before the creation of the Corinthian trade routes through the Adriatic sea and the foundation of the Greek colonies along its coasts, local populations on the two shores of the Strait of Otranto (the so-called Iapigian in southern Puglia and the Devollians in the nearby Albania) make pottery whose shapes and matt-painted decorations are similar each other.

The connection between the two coasts, far just 70 km, is also attested by a particular shape of mug made in Corinth or in its colonies, so-called boccaletto, never found in other areas except the South of Puglia and Albania.

On the other hand, the recent discovery of a ship wrecked not far from Otranto with an early 7th century BCE cargo of Corinthian vases in its hold (skyphoi, anphoras, hydriai) confirms the importance of Adriatic routes for the trade of goods which are purchased by the elites of local populations when they adopt customs typical of other cultures, which lead to a gradual change of their societies.

Even in the Hellenistic period the Adriatic sea is the scenario of changes. In 334 BCE, Alexander I of Epirus, also known as Alexander Molossus, came to southern Italy at the request of the Greek colony of Taras to aid them in battle against several Italic population. That episode is just the beginning of serious changes, for example in the architecture of the Messapians, the population who lived in Southern Puglia Region, with a strong influence by the Macedonians.

10 ANIMAL MANAGEMENT AT GREEK AND ROMAN PHAROS (STARI GRAD, HVAR ISLAND): PRELIMINARY RESULTS FROM FAUNAL STABLE ISOTOPE ANALYSES

Alagich, Rudolph (University of Sydney) - Barbir, Antonela (Institute of Archaeology, Zagreb) - Ugarković, Marina (Institute of Archaeology, Zagreb) - Smith, Colin (Universidad de Burgos; La Trobe University)

The settlement of Pharos was founded by Parian Greek colonists in 385/4 BCE. After the Illyrian wars and consolidation of Roman rule in the region, Pharos was incorporated into a broader homogeneous cultural sphere. It is unknown to what extent Roman administration impacted agricultural production at Pharos, and whether food continued to be

sourced from the same agricultural systems as under the Greeks. For example, land redistribution or a prioritisation of different agricultural commodities might have impacted the provenance of the food consumed within the city.

Analysis of the stable isotopic composition of faunal remains has become an increasingly popular way to elicit details of past agropastoral production. The advantage of using stable isotopes is that they provide direct evidence of animal diet and crop management, allowing the reconstruction of aspects of agriculture that are invisible to traditional archaeological analyses. This paper establishes the animal management strategies practiced at Greek and Roman period Pharos through the analysis of the carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) isotopic composition of faunal bone collagen, the first such study from a Greek settlement in Dalmatia.

Our results reveal that the animals consumed at Pharos were reared utilising a variety of management strategies. Roman rule over the settlement did not appear to make a difference in the way the cattle and pigs consumed here were managed, however subtle changes are visible in the sheep and goat diets suggesting Greek farmers tended to manage these animals under a more intensive regime.

11 CHALLENGES OF ANTHROPOLOGICAL ANALYSIS OF HUMAN OSTEOLOGICAL MATERIAL FROM PREHISTORIC SITES ON PELJEŠAC, CROATIA

Bedic, Željka (Institute for Anthropological Research, Centre for Applied Bioanthropology) - Vodanović, Marin (University of Zagreb, School of Dental Medicine) - Perkić, Domagoj (Dubrovnik Museums, Archaeological Museum) - Dizdar, Marko (Institute of Archaeology) - Potrebica, Hrvoje (University of Zagreb, Faculty of Humanities and Social Sciences)

Since 2020, archaeological research has been ongoing in the Nakovana and Zakotorac area on the Pelješac peninsula. Many stone mounds were recorded, which according to their construction method can be divided into those with a “classic” domed appearance; those that have an extremely regular circular plan, and consist of two or three concentric rings, with the flattened center where a square tomb can usually be seen; and the flat graves next to the mounds. Two graves in Nakovana, and seven graves from three mounds in Zakotorac dating back to the Bronze and Iron ages were investigated. The objects found in the graves include fragments of ceramic vessels, metal finds such as bronze jewelry and parts of clothing. Also, extremely fragmented human remains were found in the graves at both sites, which were anthropologically analyzed. In all but one of the graves, many deceased were buried. The teeth were the best-preserved elements of the human skeleton, so the determination of the minimum number of individuals (MNI) in the grave was determined according to the tooth that appears the most times. For example, in grave 1 from mound 1 there are 206 teeth, 18 of which are deciduous teeth. The upper left first premolar appears most often – 13 times, of which 7 belong to subadults. The second tooth that appears most often is the upper right canine (10), of which only one tooth belongs to a subadult, so it can be concluded that the MNI in this grave is 16 – nine adults and seven subadults. Detailed analyzes are still in progress and will also include indicators of dental health (caries, tooth enamel hypoplasia, calculus, and wear) and thus help in the reconstruction of the diet of the prehistoric populations that inhabited Pelješac during the Bronze and Iron Ages.

12 ARCHAEOGENOMIC RESEARCH OF KAMENICE, A PREHISTORIC ALBANIAN TUMULUS (1600-500 BCE)

Jia, Xiaowen (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Max Planck Harvard Research Center for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany; Institute for Pre- and Protohistoric Archaeology and Archaeology of the Roman Provinces, Ludwig Maximilian University of Munich, Munich, Germany) - Skourtanioti, Eirini (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Max Planck Harvard Research Center for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany) - Heilmann, Daniela (Institute for Pre- and Protohistoric Archaeology and Archaeology of the Roman Provinces, Ludwig Maximilian University of Munich, Munich, Germany) - Bejko, Lorenc (Department of Archaeology and Heritage Studies, University of Tirana, Tirana, Albania) - Amore, Maria (Department of Archaeology and Heritage Studies, University of Tirana, Tirana, Albania) - Aliu, Skender (Department of Archaeology and Heritage Studies, University of Tirana, Tirana, Albania) - Pojani, Iris (Department of Archaeology and Heritage Studies, University of Tirana, Tirana, Albania) - Ringbauer, Harald (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Max Planck Harvard Research Center for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany) - Krause, Johannes (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Max Planck Harvard Research Center for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany) - Stockhammer, Philipp (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Max Planck Harvard Research Center for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany; Institute for Pre- and Protohistoric Archaeology and Archaeology of the Roman Provinces, Ludwig Maximilian University of Munich, Munich, Germany)

Situated in southeastern Albania at the interface of the Aegean and the Adriatic, the Tumulus of Kamenice was used for inhumations from 1600 to 500 BCE. In order to understand societal transformations in Kamenice and its regional context, we generated genome-wide SNP data for 204 individuals from Kamenice that span the full-time transect, 24 individuals from Iron Age North Macedonia, and 2 individuals from Late Bronze Age southwestern Bulgaria. Our comprehensive dataset provides first insights into genetic continuities and changes of Late Bronze Age and Iron Age Albania as well as biological relatedness and demography of a single tumulus. Furthermore, we could compare the spread of cultural elements from central Europe and southern Aegean with genetic pattern and kinship practice.

We identified a genetically homogeneous population throughout the respective time in contrast to all societal transformations in the wider region. Our results indicate that populations from Albania, the northern Aegean and Dalmatia form a joint cluster along Adriatic east coast, which could be differentiated from both the southern Aegean and further inland Balkan. We also reconstruct a regional kinship network of Kamenice extending more than 250 kilometers by identifying biological relatedness up to 10th degree. By comparing the genetic profile and kinship network we could learn more about the mobility and connectivity on both supra-regional and micro-regional scales.

Moreover, we found evidence for not only a patrilineal society, but also a local population bottleneck event around 750 BCE for the first time in this region, adding another layer regarding human mobility.

13 GREEK EXPLORATION AND PHANTOM SETTLEMENTS IN THE ADRIATIC – A COLLISION BETWEEN ARCHAEOLOGICAL EVIDENCE AND HISTORICAL NARRATIVE

Budic, Filip (The Faculty of Humanities and Social Sciences in Zagreb University of Zagreb; Chair of Ancient History Department of History)

The earliest Greek navigation in the Adriatic is an intriguing and open question that has been much debated in the scholarly literature. The ancient written sources of historical and mythological provenance inspired several exploration concepts allegedly led by Mycenaean, Euboean, Phocaeans, Rhodians, Corinthians, Corcyraeans and others. Furthermore, there are also narratives about the Greek settlement foundations that might have occurred in the Adriatic during the Archaic and Classical periods. The so-called phantom settlements include the Rhodian/Coan Elpia in Daunia, Thessalian settlements in Umbria, as well as numerous locations on the Eastern Adriatic coast such as the Cnidian settlement of Corcyra Melaina, Parian Anchiale, or Herakleia.

This paper focuses on the early Greek influence in the Adriatic through the echo of potential prospection and the foundation of short-lasting settlements. The emphasis is on the interpretative framework of such concepts that are in archaeological and historical literature often observed contrastingly. One tends to reject the possibility of an ephemeral Greek presence in the Adriatic due to the lack of archaeological evidence, while the other attempts to construct coherent historical narratives, primarily by using the principle *ex mythologia - historia*.

The main aim is to offer a critical approach and propose a framework of valid arguments that could support or reject some of the concepts regarding Greek prospection, temporary settlements and their possible impact on the local and regional socio-cultural environment. The aforementioned phenomena are also considered in the context of indigenously trans-Adriatic connections that can be followed throughout the Early Iron Age.

834 WOMEN THROUGH THE AGES: ROLES, RITUALS, AND RESEARCH THROUGH THE LENSES OF ARCHAEOLOGICAL SCIENCES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Zeppilli, Carlotta (University of Cagliari (Italy)) - Farese, Martina (Department of Environmental Biology, Sapienza University of Rome (Italy)); Mediterranean bioArchaeological Research Advances (MAREA) Centre (Italy)) - Bernardini, Sara (University of Bologna (Italy)); LAMPEA, UMR 7269, Université d'Aix-Marseille (France); Mediterranean bioArchaeological Research Advances (MAREA) Centre (Italy)) - Bonucci, Biancamaria (Institute of Genomics, University of Tartu (Estonia))

Session format: Regular session

The 1980s represented a turning point in the rediscovery of the woman figure in past societies and the deconstruction of stereotypes based on modern standards. In gender archaeology, this ongoing process of change is characterised by a constant debate, also due to the various roles played by women across time and space. Researchers continue to challenge traditional views and question preconceptions, aided by the introduction of new fields of research in both Archaeology and Anthropology.

This session focuses on a comprehensive and interdisciplinary approach to exploring women, from prehistory to protohistory, from history to the present day. We aim to highlight new research regarding: i) aspects of daily life, such as group organisation, ii) burial rituals dedicated to women, iii) the health condition that characterised their lives, specifically during critical moments like pregnancy, childbirth and breastfeeding, iv) palaeopathologies, including traumas, v) evidence of exogamy, and vi) artistic production associated with women.

Of particular interest are cases involving the re-evaluation of burial contexts through the application of interdisciplinary approaches and new technologies (e.g. aDNA, proteomics).

We also invite works that question the presence of a gender-based division of labour, in any, using osteological and virtual imaging assessment. Studies on intra-life changes characterising women's lives, from puberty to menopause are also welcomed, as well as all the possible dietary, health and associated socio-cultural variations related to these events.

We encourage oral and poster presentations delving into the multi-faceted role of women in the past, discussing their life history while re-thinking past assumptions, through various approaches and methodologies. We welcome broad studies as well as works focusing on specific and local (pre-)historical contexts.

Lastly, we would also like to discuss the current roles of women in (bio)archaeological disciplines and the female researchers who are still leading feminist movements today.

ABSTRACTS

1 POWER TO THE 3RD MILLENNIUM WOMEN!

Olerud, Louise (Faculty of Archaeology, Leiden University)

The third millennium BCE is considered a period of much cultural and social change in European Prehistory. Recent results from ancient DNA studies have led to the revival of the traditional Kurgan hypothesis explaining these changes: mass migrations of militant, nomadic pastoralists from the Pontic Caspian steppe brought Indo-European languages and culture to Europe, as well as a 'male-dominant', patriarchal society. However, such an interpretation of this period is largely rooted in andro- and ethnocentric, Western assumptions, in which biological sex is equated with gender, and weapons are associated with masculinity. It also begs the question: what about the women?

Recent network analysis of burials from the Corded Ware culture (c. 2900-2500 BCE) has shown that, throughout Europe, men were typically buried in a supra-regional burial style, similar to other men buried up to 600 km away, while women were buried in a local burial style. Yet, stable isotope analyses reveal that women were actually more mobile than men. This finding has been interpreted as evidence for a system of female exogamy, by which is typically meant that women were passively exchanged as marriage partners to uphold alliances between communities. The sheer variability in patrilocal kinship structures known from ethnography, let alone the agency of the women themselves in these systems, is not taken into account in these narratives.

In this paper, I argue that women in the third millennium BCE would have had more agency than they are credited with and may have even played an important role in the cultural changes seen in this period.

2 FINNIC FEMALES: TRACING THE ORIGIN OF THE LIKELY EARLY FINNIC-SPEAKING WOMEN IN THE EASTERN BALTIC

Saag, Lehti (University of Tartu) - Salmela, Elina (University of Helsinki) - Konsa, Marge (University of Tartu) - Suni, Raivo (University of Tartu) - Moilanen, Ulla (University of Helsinki) - Tõrv, Mari (University of Tartu) - Tambets, Kristiina (University of Tartu; University of Helsinki) - Honkola, Terhi (University of Helsinki)

Previous studies have suggested that the ancestors of Finnic-speaking people reached the Eastern Baltic region during the 1st millennium BC. However, so far the focus in terms of studying the genetic background of these people has been on men because of the distinct male lineages connecting Finnic- and other European Uralic-speakers to Siberia. Here, we set out to study the genetic ancestry and strontium isotope ($^{87}\text{Sr}/^{86}\text{Sr}$) based mobility of the women living in the Eastern Baltic at this time.

The basis of this study is the fragmentary human remains from the Kunda Hiiemägi tarand cemetery – an above-ground stone structure in Northeast Estonia from early Pre-Roman Iron Age (around 800–400 cal BCE). Previously, two male individuals have been analysed and shown to be non-local based on $^{87}\text{Sr}/^{86}\text{Sr}$ analysis. These two individuals also have the highest proportions of genome-wide Siberian (modern Nganasan-like) ancestry among published Estonian Iron Age individuals (6% and 8%). Now, we have included 12 additional individuals from Kunda Hiiemägi into ancient DNA extraction and sequencing as well as $^{87}\text{Sr}/^{86}\text{Sr}$ isotope analysis. The aim of the current study is to reveal whether women from an early tarand cemetery, coinciding in time with the hypothesised arrival of Finnic languages in the Eastern Baltic, are local or show signs of mobility, similarly to men from the same cemetery.

Our study contributes to the comprehension of the Finnic languages' arrival in the Eastern Baltic region. We broaden the scope beyond Finnic-speaking men to encompass the role of females in potential migration events related to the arrival of the Finnic language in the region.

3 BIOMECHANICAL ADAPTATIONS AND THEIR IMPLICATIONS ON WOMEN'S ACTIVITIES IN EARLY AGRO-PASTORAL SOCIETIES IN FRANCE - WOMENSO FAR ANR PROGRAM

Bédécarrats, Samuel (UMR 5199 PACEA; Université de Bordeaux) - Lambert, Aurore (Eveha International; UMR 7268 ADES) - Goude, Gwenaëlle (UMR 7269 LAMPEA) - Leduc, Guillaume (UMR 7330 CEREGE) - Rottier, Stéphane (UMR 5199 PACEA) - WomenSOFar, Consortium WomenSOFar (WomenSOFar)

The WomenSOFar (2022-2026; ANR-21-CE03-0008; Individual life histories and WOMEN Status at the Onset of FARming) ANR research program explores the status of women in early Neolithic societies. Employing a multidisciplinary approach encompassing isotopic and genetic data alongside osteological characterizations, the project aims to investigate the intricate interplay between biology, environment and social behaviours, in order to make inferences on the lives of women in first agro-pastoral societies.

A main focus of the project is on bone adaptations to activity. Six funerary sites from the south-east and north of France, dating from the 5th millennium BC, are being studied using palaeopathological characterization and imaging methods. Cross-sectional geometry of long bones and bony changes that may reflect responses to mechanical stresses are examined conjointly in order to deduce activity-related biomechanical adaptations and infer social organizations. The study is additionally relying on an innovative data recording, in which observations are linked to their anatomical location, and spatial statistics tools are used to analyse them.

Preliminary findings suggest that there is no difference in the intensity of bone changes between women and men. Spatial analyses reveal different distributions of bone changes depending on the individual's sex. Cross-sectional geometry data indicate greater variability for women, overlapping with the male distribution. The latter is narrower and statistically different for the right humerus, potentially indicating specific adaptations in men to activities involving the upper limb. These results suggest different life histories according to sex, showcasing a greater variety of activities in women and a potential tendency towards specialisation in men. The results will be further explored in conjunction with archaeological, isotopic and genetic data to provide a comprehensive assessment of the biological, environmental and cultural factors influencing these findings.

4 SOCIAL IDENTITY AND MICRO-NARRATIVES OF LIFE TRAJECTORY FROM BIOARCHAEOLOGY: WOMEN FROM THE CHALCOLITHIC BURIAL SITE OF CAMINO DEL MOLINO (SE-SPAIN)

Díaz-Navarro, Sonia (Universidad de Valladolid) - Haber Uriarte, María (Universidad de Murcia)

Humans are complex beings who change and evolve throughout their lives. These changes occur during the different stages of childhood, adolescence, adulthood, and old age. They may also manifest in aspects like gender identity, health conditions, or transitions from being a native to becoming a foreigner. Furthermore, our identity or role as individuals within a group evolves and we are influenced by our interaction with other humans on issues such as learning, care or social relationships. Tracing specific cultural elements that can help characterise social features in past societies is a challenge. This paper offers an approach to the different identities of the women of a unique Mediterranean Chalco-

lithic community. The results come from an exhaustive bioarchaeological analysis of the skeletal remains of the 1,348 individuals recovered from the largest collective burial site known to date, the Camino del Molino archaeological site (Murcia, SE Spain) (2971-2251 years cal. BC, 2σ). The combination of archaeological, isotopic, palaeodemographic, palaeopathological, dental and osteometric analysis has allowed us to trace elements that can help us to characterise and hypothesise social factors such as the sexual division of labour, the specialisation of women in artisan tasks, and to identify gender/age biases in aspects such as diet, training/learning or even access to the tomb; and, in short, to shed light on the social identity of this community. This same analysis has allowed us to generate osteobiographies or micro-narratives of the life trajectory of specific individuals, framing them in the performance of different social roles.

5 "OF DUBIOUS CHARACTER": THE GENDERED RECEPTION OF WOMEN WITH BODY MODIFICATIONS IN THE ANCIENT MEDITERRANEAN

O'Keeffe, Amy (Trinity College Dublin)

There is an abiding impression that the people of the ancient world did not modify their bodies, and that those who did were social deviants. The archaeological evidence would indicate that a number of different modification types were carried out in the ancient Mediterranean, including artificial cranial modification, tattooing, and scarification. The incidence of modified bodies appears to be far higher among female individuals than male. In scholarly writings, the interpretation of these practices of a female majority repeatedly devolves into negative stereotypes. Women with altered crania are dismissed where their male counterparts are interpreted as being members of elite classes. Women with tattoos are almost unerringly labelled as concubines and as having low moral worth. Those with scarification markings on their faces are depicted as hysterical, and as ruining their aesthetic worth.

This paper will present a collection of case studies that demonstrate different body modification practices in the ancient eastern Mediterranean, and explore the significance of gender in these cultural practices. Particular areas of interest are the Cyclades in the Bronze Age (3200-2300 BCE), Cyprus in the Bronze Age (2600-1050 BCE), and Egypt in Dynasty XI (2150-1991). The significance and nuanced interpretations of this evidence has been stymied by biases within the discipline of archaeology. The purpose of this paper is to reassess the evidence for body modifications, and approach them through a multidisciplinary lens. Part of this reassessment is to critique the past scholarship of these modifications, and deconstruct these deeply rooted disciplinary biases, which affect numerous areas of archaeological interpretation, which is evidenced in this dynamic, yet intersecting, range of cultural practices being explored.

6 INTEGRATION THROUGH SEPARATION: THE DEVELOPMENT OF THE WOMEN'S SECTION IN THE MEDIEVAL SYNAGOGUE

Schöpf, Friederike (University of Münster)

Many traditions in today's Jewish religious practice are considered old-fashioned and an integral part of religion. However, behind certain traditions lies a long history of development. This is particularly striking when it comes to practices regarding issues of gendered religious traditions. The synagogue is part of this development. For a long time, modern scholars attributed the separation of women and men to the early synagogues of antiquity. However, the separation was only implemented during the Middle Ages. The new spatial concept of a separate women's section prevented a direct view of the prayer room. The exclusion of women was often referred to a male strategy, to keep the religious space clear from female influence.

However, rabbinic sources of the eleventh to the thirteenth centuries deliver a different view on this subject. The segregation of women is portrayed as a female concept to preserve tradition and piety. Did the establishment of women's synagogue therefore happen on the women's behalf?

This new research aims to change our perception of the character of women's synagogue and the reason for their development. By combining the archaeological and architectural evidence with the literal sources, a female approach to the subject is contemplated.

7 DETECTING WOMEN'S PRESENCE IN CASTLE ENVIRONMENTS THROUGH ARCHAEOLOGICAL AND HISTORICAL SOURCES

Vanecková, Daniela (Masaryk university)

The paper will discuss the presence of women in the castle environment, with a new progressive approach. Critically re-evaluated archaeological findings are linked with historical sources, allowing new conclusions to be drawn in the study of the role of women. The reconstruction of women's lives in the Middle Ages has so far only been investigated from historical sources, and archaeological evidence is often only interpreted in general terms without any connection to the presence of women. Women in the Middle Ages used various objects that we have recorded in written sources or period iconography. This large number of different objects, however, is not entirely preserved in the archaeological

evidence. With these objects (whether complete or in the form of fragments) there is a generalized interpretation of small objects, objects made of non-ferrous metals, jewelry, unspecified, etc., without gender determination. So, the woman is theoretically recognizable in material culture, but the objects she used are made of poorly preserved materials, unisex, or are poorly or not identified at all.

In a case study of known women (from historical sources) who lived at Rokštejn Castle, we will show what the possibilities of archaeology with a combination of historical sources are in detecting women in the castle environment. At Rokštejn Castle, there could be members of the noble family, their ladies-in-waiting, maids, and nurses for their children. Rokštejn Castle presents unique opportunities for exploring medieval society, and that's thanks to ongoing systematic archaeological research, which has lasted continuously since the eighties of the last century. An extensive file of data, which includes documents of material culture, and written and iconographic sources, allows, based on a review of already obtained data, the reconstruction of the quality of life of a woman in a castle environment during the High and Late Middle Ages.

8 HIP AT WHAT COST? HOW THE HUMAN FEMALE PELVIS HAS ADAPTED TO BIPEDALISM AND CHILDBIRTH: AN ONTOGENETIC PERSPECTIVE

Figus, Carla (Department of Cultural Heritage, Ravenna Campus, University of Bologna, Italy.) - Colombo, Antony (Department of Life and Earth Sciences, Ecole Pratique des Hautes Etudes (EPHE), Paris, France; Unite Mixte de Recherche (UMR) 6034 Archéosciences Bordeaux, Centre national de la recherche scientifique (CNRS) - Université Bordeaux-Montaigne, Pessac, France) - Bortolini, Eugenio (Department of Cultural Heritage, Ravenna Campus, University of Bologna, Italy.) - Ascanelli, Simona (University Hospital Ferrara, Italy.) - Bernardini, Federico (Department of Humanistic Studies, Università Ca'Foscari, Venezia, Italy; Multidisciplinary Laboratory, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy) - Belcastro, Maria Giovanna (Department of Biological, Geological and Environmental Sciences, University of Bologna) - Carlson, Kristian (Department of Integrative Anatomical Sciences, Keck School of Medicine, University of Southern California, Los Angeles, CA, United States; Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg, South Africa) - Ryan, Timothy (Department of Anthropology, Pennsylvania State University, University Park, PA, United States) - Benazzi, Stefano (Department of Cultural Heritage, Ravenna Campus, University of Bologna, Italy.)

The pelvis has undergone significant modifications throughout evolution towards efficient bipedal locomotion and the need to accommodate the birth of large-headed newborns. However, these modifications have led to consequences, and obstructed labor is now a significant global health challenge, contributing to 8% of maternal mortality worldwide. Many studies have explored the mechanics of the bony pelvis during bipedal locomotion and the role of the pelvic floor in facilitating the birth of large-headed newborns while maintaining efficiency in walking and running. Recent reviews have shown that high-risk labor is a multifactorial issue that includes gender inequality, poverty, malnutrition, infectious diseases, and short stature. However, there is a lack of understanding of the developmental perspective on the pelvis, which considers the biosocial context during growth. This perspective is crucial for a comprehensive understanding of pelvic anatomy. To address this gap, this new project, RISEN, a new MSCA-funded project, aims to explore the ontogenetic mechanisms that underlie pelvic development. RISEN seeks to unravel how external influences such as bipedalism and health status impact adult pelvic bony morphology. This project adopts an innovative and multidisciplinary methodology that leverages cutting-edge technologies and integrates biological and cultural data, such as economic and cultural background. The primary objective of RISEN is to present a compelling reinterpretation of pelvic morphology. By examining pelvic development through a biosocial lens, the project provides insights into the interplay between morphological features and biosocial dynamics. Ultimately, the project aims to offer society fresh tools for assessing the role that pelvic morphology plays in fetal delivery, igniting social and scientific debates about these issues.

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9 MATERNAL AND NEONATAL DEATHS IN 3RD-17TH CENTURY LITHUANIA: A STUDY BASED ON ARCHAEOLOGICAL, HISTORICAL, AND ETHNOGRAPHIC DATA

Valotkiene, Šarune (National Museum of Lithuania)

The aim of the presentation is to reconstruct the risks faced by pregnant women and mothers after childbirth during prehistoric and long historical periods in the territory of present-day Lithuania, utilizing an interdisciplinary research approach. The presentation will analyze archaeological, ethnographic, linguistic, and historical data.

So far, only 10 possible graves of dead pregnant women and mothers have been found among the abundant archaeological materials dating from the 3rd to the 17th centuries. This allows only cautious generalizations to be made, such as the inference that the deceased women were of childbearing age, and that almost all the newborn babies in these

graves were placed at the head of the deceased. The extremely fragmentary anthropological and archaeological material also hinders a more detailed study.

In order to reconstruct the various risks that could have led to the deaths of pregnant women and mothers and to better understand the fragmentary archaeological material, it was decided to analyse data from other disciplines, both contemporaneous and more recent, side by side.

Although it must be admitted that most of the data comes from later times, specifically from the 15th until the 17th centuries. Historical sources from this period abound on the plight of pregnant noble women. For example, a surviving will exist in which a woman in labour, anticipating her death during childbirth, documented her last requests. Less data is available on the life of peasant women, which is reflected in several beliefs and superstitions recorded during the Christian missions. A considerably larger amount of data comes from ethnography, folklore, and the Lithuanian language. While these sources provide a better picture of the situation of pregnant women and women in labour, unfortunately, they lack specific dates. On the other hand, the information encoded in these sources typically dates back to ancient times.

10 FOETAL AND FEMALE BODIES IN 4TH MIL. EGYPT: A COMBINED APPROACH ON PREGNANCY LOSS AND EARLY PERSONHOOD ACQUISITION

Barba Garcia, Pablo (Institute of Archaeology - UCL)

Feminist theories have recently highlighted the increasing individualisation and personification of the foetus in Western cultures. While the provision of personhood to foetuses might not be unique of modernity, archaeologists should be careful of individualising the foetus a priori in their studies, as this might incur in an unwanted imposition of western mentalities.

Drawing from these sources, this paper claims the necessity of studying foetal and neonatal remains in conjunction with the women's bodies. Resorting to the funerary record of Egypt during the 4th millennium BC, I analyse both the individual burial of foetuses and newborns, and of women who died during pregnancy, labour, and/or who were buried with the remains of foetuses and newborns. Paying attention to burial types and distribution of graves in the landscape, I argue that we can apprehend local understandings of personhood construction through the first moments of life.

My analysis shows an evident underrepresentation of foetal and infant remains under 6 months of age in burial spaces through the region, which cannot be exclusively adduced to post-depositional processes. These individuals are found in two different contexts. When in communal cemeteries, they always occur with women remains, either in utero or in the pelvic area—dystocia. Outside communal cemeteries, foetal and neonatal remains have been unearthed in individual burials in necropolises dedicated exclusively to children. Exceptionally, they are also found on their own in pot burials.

I conclude that, in these communities, foetuses and infants below 6 months might have not been considered as persons or individuals, but as part of the woman's body. It is argued that pot burials and child-only cemeteries could indeed embody female bodies. The paper highlights the possibilities for studying motherhood, foetal (non-)personhood, and emotional reactions to pregnancy loss in prehistoric communities behind this approach.

11 BORN IN A BROTHEL: NEW PERSPECTIVES ON CHILDCARE WITH MEDIEVAL SEX WORKERS

Poulain, Maxime (Ghent University) - Bon, Céline (Musée de l'Homme, Paris; UMR 7206 - Éco-anthropologie) - Palmer, Jessica (Ghent University)

Prostitution was omnipresent in medieval Europe. In the study of past sex work, historical studies have thus far mainly focussed on institutions and brothel keepers, which often pop up in the records (issuing rules or being fined for not paying taxes). The women who served in these houses, however, usually remain in obscurity. Archaeological sciences offer the potential to invert this perspective and get a better grip on the living and working conditions of female prostitutes in medieval society.

In this paper, we target a 14th-century brothel in the city of Aalst (Belgium). Excavations in 1998 revealed a three-month-old infant, buried in a corner of the building. This infant burial is being re-evaluated through combined isotopic and aDNA analyses. The results not only inform us about the care afforded to this child in a socially deviant environment, but equally provide new insights about its mother. For example, isotopes indicate that the Aalst infant was breastfed, nuancing dominant narratives of abortion and infanticide with prostitutes. Ancient pathogens, preserved in dental calculus or associated sediments, moreover show which diseases lingered in their living spaces and could possibly be passed on from mother to baby.

12 THE PERCEPTION OF MENOPAUSE IN THE PAST: COMBINING PALEOPATHOLOGICAL, ANTHROPOLOGICAL AND FUNERARY DATA

De Luca, Federica (University of Ferrara) - Zaccagni, Luciana (University of Ferrara) - Rinaldo, Natascia (University of Ferrara)

The term menopause refers to the point of time when the menstrual periods stop due to lower hormone levels. When studying past populations, menopause is considered a measure of "population health", and it gives us information on the social structure and beliefs of past societies, especially when anthropological, paleopathological, and funerary data are combined. In this study, we analyzed the skeletons of 52 adult females from the St. Biagio Cemetery (Ravenna, 17th-19th Century, Italy): 38 premenopausal and perimenopausal women (<50 years) (73.07%), and 14 post-menopausal women (50+ years) (26.93%). This study aims to: i) give an overview of the health status of these women and to highlight possible different roles between pre- and postmenopausal women in society; ii) gather information on the perception of menopause of this period. Concerning the index of frailty (BIF), the two categories fall into the medium frail category with an increasing trend with increasing age (40.01 vs 45.77, respectively). A high percentage of joint diseases and antemortem traumas (e.g. fractures of sternum and scapula) were reported both in pre and postmenopausal women. These results confirmed that women probably worked at all ages (just like men), as confirmed by historical sources. The perception of menopause by this past society could be reflected by the analysis of funerary treatment; in our skeletal assemblage, we found both normative and non-normative treatments in both pre- and postmenopausal women (e.g. marginalization in the cemetery). On the other hand, evidence of care and compassion by society has been shown for women of all ages. In conclusion, we can assume that generally women of all ages were well integrated in this society and no differences emerged in the comparison between peri- and postmenopausal women.

13 GENDER INEQUALITIES IN NORTHERN IBERIA: THE WOMEN BURIED IN THE CATHEDRAL OF SANTA MARÍA (VITORIA-GASTEIZ; 12TH-18TH CENTURIES)

Garcia, Nerea (Department of Genetics, Physical Anthropology and Animal Physiology, Faculty of Science and Technology, University of the Basque Country (UPV/EHU), Barrio Sarriena s/n 48940, Leioa, Bizkaia, Spain.) - Hervella, Montserrat (Department of Genetics, Physical Anthropology and Animal Physiology, Faculty of Science and Technology, University of the Basque Country (UPV/EHU), Barrio Sarriena s/n 48940, Leioa, Bizkaia, Spain.) - De-la-Rúa, Concepción (Department of Genetics, Physical Anthropology and Animal Physiology, Faculty of Science and Technology, University of the Basque Country (UPV/EHU), Barrio Sarriena s/n 48940, Leioa, Bizkaia, Spain.)

The archaeological intervention carried out in the Cathedral of Santa María (Vitoria-Gasteiz, Spain) revealed an extensive and complex funerary use of the temple, resulting in one of the largest skeletal collections in the Iberian Peninsula (N≈2200 burials). The study of a sub-sample of individuals randomly selected from all the burial areas of the temple (N=472) has provided insights into the biological and social structure of this human group. Specifically, we focused on the analysis of women in the population of Vitoria-Gasteiz between the 12th and 18th centuries, using a multidisciplinary approach that includes anthropology, palaeodemography and palaeopathology.

The higher proportion of women in this population represents an unusual finding compared to other similar parish cemeteries. This result could be partly explained by a differential migration of women from rural to urban areas in search of better living conditions; however, the preference of men to be buried in other convents and/or monasteries of Vitoria-Gasteiz instead of in the Cathedral because of their higher spirituality could also have contributed.

The palaeodemographic analysis reveals sex differences in mortality profile (χ^2 ; $p=0.01$), with women dying earlier, especially between the ages of 25 and 35. This difference, traditionally attributed to reproductive risks, may have been accentuated by possible differences in social status, which increase women's vulnerability to health problems at a younger age than men. However, a lower prevalence of arthropathies in women is observed in this population, which in this case may be related to their earlier mortality, as detectable joint lesions in skeletal material require some time to develop and evolve.

In conclusion, the differences between men and women in the migration and burial patterns, the mortality profile, or the health status, may be interpreted in terms of gender inequalities in the medieval population from Vitoria-Gasteiz buried in the Cathedral of Santa María.

14 SEX-RELATED VARIABILITY IN THE ANCIENT ORAL MICROBIOME

Ham, Allison (Pennsylvania State University) - Weyrich, Laura (Pennsylvania State University)

The human oral microbiome influences the manifestation of several chronic diseases that disproportionately impact females (e.g., dental caries, rheumatoid arthritis), and its reconstruction through aDNA technology represents a novel approach for understanding sex-specific patterns of health in the past. While several genetic, environmental, and

behavioral factors are known to influence the oral microbiome, a lack of consensus exists on the effect of sex on the composition of these microbial communities within archaeological contexts. This study reexamines sex-specific variability in beta diversity (differences in taxonomic composition) in the ancient oral microbiome using sequenced dental calculus samples from nine London cemeteries (~1000-1900 CE). Sex estimates were taken from the Wellcome Osteological Research Database, and all statistical analyses were performed using QIIME2. An ADONIS test was used to examine the effect of sex on taxonomic composition with several variables incorporated into the model that are known drivers of beta diversity within the sample, including dominant taxa (*Methanobrevibacter*, *Streptococcus*), time period, and tooth type. Dominant taxa, tooth type, and sex had an effect on beta diversity, and the sample was separated into subsets using dominant taxa and sex to further explore these results. ADONIS tests were performed for each dominant taxa with sex and tooth type included in the model. Tooth type had a significant effect on beta diversity in both taxonomic communities, but not sex. When only females were analyzed both dominant taxa and tooth type affected beta diversity, and no interaction was observed between the two variables. These preliminary results demonstrate that a higher proportion of females had *Streptococcus*-associated oral communities, which are linked to high-carbohydrate and dairy consumption. Overall, these findings suggest that gender differences in diet may have driven taxonomic composition within the sample, but further analysis is needed to understand how these differences impacted past patterns of female health.

15 **TWO ARMED FEMALE BURIALS FROM THE ENEOLITHIC NECROPOLIS OF CELLETTA DEI PASSERI (FORLÌ, NORTHERN ITALY): ARCHAEOLOGICAL, ANTHROPOLOGICAL AND PROTEOMIC ANALYSES**

Nicolosi, Teresa (Department of Cultural Heritage, Alma Mater Studiorum University of Bologna, Bologna, Italy) - Miari, Monica (Soprintendenza Archeologia, Belle Arti e Paesaggio per la città metropolitana di Bologna e le province di Modena, Reggio Emilia e Ferrara, Bologna, Italy) - Silvestrini, Sara (Department of Cultural Heritage, Alma Mater Studiorum University of Bologna, Bologna, Italy) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität, Frankfurt am Main, Germany) - Vazzana, Antonino (Department of Cultural Heritage, Alma Mater Studiorum University of Bologna, Bologna, Italy) - Sorrentino, Rita (Department of Biological, Geological and Environmental Sciences, Alma Mater Studiorum University of Bologna, Bologna, Italy) - Belcastro, Maria Giovanna (Department of Biological, Geological and Environmental Sciences, Alma Mater Studiorum University of Bologna, Bologna, Italy) - Benazzi, Stefano (Department of Cultural Heritage, Alma Mater Studiorum University of Bologna, Bologna, Italy)

This contribution focuses on the prehistoric necropolis of Celletta dei Passeri (Forlì, northern Italy), excavated between 2009 and 2010 and dated to the Eneolithic period (3.350-2.580 cal BC). It includes 75 graves, among which only 51 contain human remains, along with the burial of a dog. Most of the burials are single primary depositions, even if many of them show traces of manipulation practices related to displacement and removal of skeletal elements. Unexpected and significant data emerged concerning the typology of the grave goods and the sex of the individuals. All individuals are generally provided with a jug placed at their feet, without any apparent gender or age distinction. Flint artefacts and arrow-heads are common among males and young individuals. On the other hand, seven burials are distinguished by the presence of copper axes and/or daggers within their funerary goods. Osteological analyses, firstly performed by the University of Venice, immediately suggested that two of these could be attributable to female individuals. Consequently, following the re-assessment of the biological profile by means of traditional anthropological analyses, we run enamel peptide analyses, aiming at detecting the presence of sexually dimorphic variants of the protein amelogenin (AMELX and AMELY) and reinforcing the sex estimation. Results confirm that five individuals are males, while individuals buried in tombs 27 and 75 are females. Significantly, these latter were buried in proximity to armed male burials (tombs 25 and 74, respectively). Moreover, individuals 25 and 27 were 14C dated to the same period, suggesting potential social or familiar ties during life. These findings represent the first documented cases of armed female burials in Italy during the Eneolithic period, likely linked to a distinctive social status or rank held by these individuals within their community, providing insights into the prominent role played by women in increasingly complex societies.

16 **WARRIOR BURIALS AND OTHER MYTHS FROM THE LATE BRONZE AGE IN GREECE**

Albanese, John (University of Windsor)

The interpretation of the “Griffin Warrior” burial at Pylos and other similar burials are derived from and have served to reinforce gendered biases of our understanding of the Late Bronze Age. The focus on preconceived modern biases about masculinity projected into the past has contributed to the invisibility of women, children, and non-binary people during this and other periods in Greece and elsewhere. The systematic assessment of the fragmentary and commingled remains from a Late Helladic tholos tomb and ossuary at Tzannata on the Greek Island of Kefalonia is revealing that individuals of all sexes and ages were included in these monumental tombs. Following a review of the overall pattern of burials and mortuary practices in each tomb, the focus of this paper is on a case study involving one individual whose biological sex was almost certainly female and who was buried with a large amount of bronze. The goal of the

paper is to demonstrate that a more inclusive approach where maleness and masculinity are not the focus of research can lead to a better understanding of the lives and deaths of all people during the late Bronze Age.

17 **BEDLAM, BAGS, AND BURIAL RITES: FEMALE HIP ASSEMBLAGES IN EARLY MEDIEVAL BRITAIN**

Fry, Megan (University of Florida)

Before the wide-scale adoption of Christianity in Britain, burials included a wide variety of grave goods, often signaling status, ethnicity, and varied by demography. This study explores objects included in female graves which have been interpreted as bags worn about the hip. Although sometimes worn, some were often placed in the grave during the funerary ritual after the body was already placed. The function of the objects included within the bags is not always obvious (e.g., a pottery fragment, or a broken wrist clasp). This indicates that these items had a great personal, social, or cultural meaning than what is evident now. They are generally associated with burials that are of ‘high status’, or with burials that have previously been described as ‘deviant’. The latter often being interpreted as possibly representing a witch or sacrificial victim. These interpretations are far too simplistic, and generalizations remove any nuance and agency within this behavior. These hip assemblages are explored through the lens of materiality to ascertain the social and ritual significance behind this complex burial practice.

18 **RECONSTRUCTING WOMEN'S IDENTITIES IN ROMAN SALONA (DALMATIA) THROUGH FEMALE BURIALS AND GRAVE GOODS IN THE WESTERN NECROPOLIS**

Banovac, Ivana (Archaeological museum Split) - Jadrić-Kučan, Ivana (University of Zadar)

Due to its relatively good preservation, Salona, once the capital of the Roman province of Dalmatia, offers an extraordinary insight for learning about and understanding ancient Roman society. Systematic archaeological research in the city of Salona began as early as the 1820s and was first carried out on the city's Western necropolis. It has since been continuously explored and studied. Two centuries of research resulted in the discovery of an exceptional amount of rich archaeological material that will, for this purpose, serve as a source for interpreting the lives of Roman women within that city community. In this contribution, we will discuss the findings from an excavation campaign that took place in 1986 and 1987 during which a total of 615 graves dating from the 1st to the 5th century AD were found. Research will be based, primarily, on analysing artefacts found in the context as grave goods, specifically gendered and age related materials that could indicate female burials. In cases where skeletal remains don't offer sufficient information due to poor preservation, these analyses will be supported by osteological reports from excavations and, if possible, by analyses of skeletal remains conducted using methods of forensic anthropology. This material, which is still in the early process of being analysed and published, helps shed light on the characteristics and diversity of the city's population, especially women whose extremely important role in that society has been a somewhat neglected topic in the discussions of local scholars. This research aims to try to identify female burials based on preserved grave goods and grave architecture and to analyse the funerary rituals to reconstruct the identity and social status of women in Salona for a better understanding of the role of women as the important members of that community, as well as the entire Roman society.

19 **SCULPTING THE SKULL. PATTERNS OF SEX-BIASED TREATMENT OF THE DEAD IN THE EARLY IRON AGE ROMANIA**

Constantinescu, Mihai (Faculty of History, University of Bucharest)

The Early Iron Age Babadag culture (10th-9th century BCE), is known for its large number of settlements and the absence of cemeteries. However, numerous “deviant” burials have been excavated in every settlement archaeologically investigated in various habitat structures. The skeletons recovered are in different states of preservation and completeness, either in anatomical position or with parts of the skeletons and scattered bones found in partial or with no anatomical connection. Adult individuals represent the majority, with children being less represented in the available sample.

After analyzing the cause of death and the pattern of dismemberment of some individuals, a distinct treatment pattern for males and females emerged. Some of the males showed lesions on the skulls associated with deliberate perimortem deadly violent actions. In contrast, several female skulls found in different sites had their skulls intentionally processed post-mortem, using similar tools and techniques. These skulls were intentionally cut and chipped out, using similar blunt and sharp tools and similar techniques in order to remove them from the rest of the corpse and possibly prepare them for exposure and further manipulation within the settlement. These similar patterns of fragmentation lead us to the deduction that “specialists” might have existed in the Babadag settlements to perform such procedures and that some female skulls remained within the community of the living for longer periods.

This study highlights sex-differentiated patterns in the treatment of the dead, based on individual-level causes of death in the Lower Danube region during the EIA, which might arise as a result of the identity or character of the individuals. These treatments are discussed in the wider contemporary south-east European context regarding macabre funerary practices, using bioarchaeological and historical information to understand the socio-cultural aspects related to this unique practice of female skull processing and post-mortem manipulation.

20 **RETHINKING GENDER MODELS: A PRELIMINARY ANALYSIS TO RECONSIDER WOMEN'S FUNERARY IDENTITY IN BURIALS FROM THE MIDDLE NEOLITHIC NORTHERN ITALY**

Colli, Laura (Università degli Studi di Siena) - Pizziolo, Giovanna (Università degli Studi di Siena) - Mariani, Pier Paolo (Università degli Studi di Siena)

This work, still in progress, is focusing on assessing the variations of gender identities in funerary records from the Square Mouthed Pottery Culture of Northern Italy.

Methodologically, it draws inspiration from the most recent theories of feminism and gender studies, such as Judith Butler's ideas on the performativity of gender, and their reflection on archaeological interpretations of sex, identities, and roles. Considering gender as a continuum of variations and not a fixed paradigm was the starting point to rethink some of the previously proposed gender models for the SMP culture: such models were based on dichotomous and presentist ideas that connected men with symbols of power, hunting and violence, while relegating women to an ancillary role, strictly associated with maieutic and domestic activities.

Thus, after collecting all the legacy data available, the information has been organized in a database, then, the 398 burials were analysed through descriptive statistical analysis, with a focus on the association between the sex of the individual and the grave features, that would point out the presence of preferential links and connections between certain rituals or objects and the sex of the buried. This method underlined the existence of a richness in the funerary culture, which might be representative of a more fluid concept of identity. Specifically, the funerary record for women shows a great variability of connections depending on the differences in age and, possibly, status, with individuals buried with complex and diverse features, that oftentimes diverge from the role proposed in previous models.

21 **WOMEN OF POWER? EXPRESSIONS OF GENDER, POWER AND IDEOLOGY IN THE NORDIC BRONZE AGE C. 1300 - 900 BC**

Felding, Louise (Vejlemuseerne)

With a focus on gender, power, and ideology, the aim is to investigate expressions of gender from the transitional period around 1300 - 900 BCE in the Nordic Bronze Age. This period marks the shift from the early to the late Bronze Age in the Nordic region and is characterised by a significant ideological change, as well as marked by disruptions in extensive import networks. The ideological shift is observed in the material culture as a change from inhumations to cremations and a rise of votive depositional practices.

Through network analyses of burials and deposits from the early and late Nordic Bronze Age expressions of identity are analysed with the overall aim to examine a potential change in the gendered material expressions. Objects related to the female sphere appears to dominate the depositional assemblages and therefore the role of women and their visibility in the public sphere and in Bronze Age religion is noted. These observations seem to contrast statements from older historical sources dating back to Homer that describe a structural exclusion of women from the public and political sphere. Such exclusion is not clear based on the material evidence from the Nordic Bronze Age suggesting that powerful women of the past have been overlooked.

835 **THE HORSE IN ARCHAEOLOGY: AN INTERDISCIPLINARY APPROACH FOR UNCOVERING RELATIONS BETWEEN HORSE AND HUMANS IN THE PAST**

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Coimbra, Fernando (Polytechnic Institute of Tomar, CGeo, Coimbra University) - Gheorghiu, Dragos (Doctoral School, National University of Arts, Bucharest) - Golec Mirová, Zuzana (Charles University Prague; Institute of Archaeology of the Czech Academy of Sciences, Prague) - Schifter Bagge, Merethe (Museum Skanderborg) - Sundkvist, Anneli (Societas Archaeologica Upsaliensis; Equine History Collective)

Session format: Regular session

The horse has been part of human history for thousands of years, having multiple roles: prey, source of raw materials and food, mount, "war machine", co-worker, and companion are just a few examples of the outcome of horse and human relations through the millennia. This large diversity can be analyzed through e.g. economic, social, artistic and mythological aspects. The horse-human interactions are visible in many different types of sources: archaeological, historic, iconographic, symbolic and technological, just to mention a few.

We invite speakers to explore this grand area of different aspects of this long history and relationship in a session with two main focuses:

1) The archaeological, historical, cultural and artistic study of horses in its different contexts. Iconography available on several archaeological and historical remains such as prehistoric art, sculptures, numismatics, mosaics, and frescoes, among other artistic manifestations of very different chronologies allows us to understand better the importance of the horse in the History of Humankind and development of civilization, mainly after the domestication process.

2) Equestrian archaeology in the 21st century with the starting point in the horse as an animal. This highlights the need to bring horses, horse-related artefacts and 'horse people' within archaeology into a disciplinary field of research. Topics such as horse breeding, the evolution of horsemanship, and the art of riding, just to mention a few examples, cannot be studied based on archaeological artifacts only. In the growing field of equestrian studies, all types of sources and methods that help us to understand past relations between horse and man are welcome and needed.

ABSTRACTS

1 **CONTRIBUTING TO THE HISTORY OF EQUIDS: THE PORTUGUESE ARCHAEOZOOLOGICAL RECORD FROM THE PALAEOLITHIC TO THE BRONZE AGE**

Guinot, Catarina (Universidade de Évora, PT) - Almeida, Nelson (CHAIA, Universidade de Évora, PT; UNIAHQ, Universidade de Lisboa, PT)

Equids have had an important and changing role throughout history and human-equid relations can be discussed from different perspectives. Several colleagues try to understand human-equid relations under a broader socio-cultural and ideological framework, while their characterisation under a more "traditional" framework can still be highly informative albeit mostly from an economic point-of-view. Focusing on Western Iberia, the archaeozoological record shows a fluctuating frequency of equid species through time, with variables such as changing palaeoenvironment, different geographies, or even socio-cultural and ideological aspects having had varying influences on their representativeness or body part presence in faunal profiles. Even if the prehistoric and protohistoric records of equids might not be the most abundant in comparison to other species, they nonetheless provide important information if one is to try and discuss their paleoeconomic relevance under a longue durée perspective. We provide a state-of-the-art archaeozoological record of equids' presence in current Portuguese territory, aiming to discuss their importance, mostly focusing on their "prey status", and how it changed from the Palaeolithic to the Bronze Age.

2 **ON TECHNOLOGY TRANSFER, ICONOGRAPHY, AND HORSES IN THE CUCUTENI-TRIPOLYE AND STEPPIC TRADITIONS**

Gheorghiu, Dragos (National University of Arts - Bucharest)

In the 5th millennium BC, in the western and northern Pontic area, the Cucuteni - Tripolye tradition begins a slow diffusion towards the east, exporting to the steppe populations a series of cultural elements.

In the Cucuteni - Tripolye tradition among domestic animals, cattle are present both in the osteological record and in ceramic miniatures. The painting of some of the miniatures suggests that cattle were used for yoke traction.

Of the wild animals, the horse is rare in the diet in the western part of the tradition until late but is present in the eastern part of the tradition, closer to the steppe populations. However, the horse is absent in all artistic representations.

In contrast, for steppe peoples the horse represented an important animal, both as a food source, as an image of prestige in the form of amulets or 'sceptres', as ritual deposition in fragmentary - rhetorical form in funerary contexts, or as a riding animal and emerging means of transport.

Towards the end of the Cucuteni - Tripolye tradition a change in diet is observed, with osteological remains of horses present in greater quantities, denoting a change in mentality and economics.

The iconography of ceramic painting from the same period begins to contain iconic images of dogs and people with dogs, probably evoking hunting scenes.

The present paper examines the differences and similarities in the perception of cattle and horses, as well as possible technological transfers between the two cultural blocks.

A case study is the analysis of a rare image of a horse, from a complex narrative scene painted on a Cucuteni Phase B vessel, which suggests the emergence of a use of the horse different from that of a simple food source.

3 THE HORSE IN THE ART OF THE KOBAN CULTURE

Makhortykh, Sergey (Institute of Archaeology Ukrainian Academy of Sciences, Kyiv) - Kotova, Nadia (Institute of Archaeology Ukrainian Academy of Sciences, Kyiv)

One of the recurring artistic motifs in Koban Culture imagery of the Late Bronze - Early Iron Age is the horse which occupies an important part of its visual framework. It is worth noting that the main centre of their distribution is not in the plains, but in the high mountains of the Central Caucasus (Koban and Tli cemeteries). Horses are represented here as the volumetric cast bronze figures or their parts (protomes), as well as in the form of engraved images on metal artefacts (axes, belts, etc.). Not all horse images are the same and it is possible to distinguish them stylistically. There is also a distinct gender specificity, as evidenced by the fact that horse figurines and pins ending in two symmetrical horse heads facing in opposite directions are associated with female burials, while axes, daggers and cheek pieces decorated with various horse images/compositions (rider on horseback, horse led by neck yoke, etc.) are characteristic of male burials. What these people have in common is that they were both holders of sacred and/or military power, while the horse would have been an emblem of status. An innovative artistic tradition associated with the depiction of the horse and its elements spread in the Koban Culture in the 9th - 8th centuries BC. This was the time when the cult of the horse and its associated deities developed in the North and Central Caucasus, an important manifestation of which was also the discovery of bridles in tombs and the presence of horse burials themselves. The appearance of horse images in the art of the Koban Culture can be seen as a local response to particular impulses triggered by intensive intercultural contacts with the horse-breeding centres of Eastern Europe and Western Asia.

4 ROCK ART ENGRAVED HORSES AND NARRATIVES FROM THE MINHO REGION (NORTHWEST OF PORTUGAL): SOME ARCHAEOLOGICAL EVIDENCE FROM A PREVAILING "HORSESCAPE."

Sampaio, Hugo Aluai (Laboratorio de Paisagens, Património e Território (Lab2PT); Centro de Investigação, Desenvolvimento e Inovação em Turismo (CiTUR); Laboratório Associado para a Investigação e Inovação em Património, Artes, Sustentabilidade e Território (IN2PAST); Departamento de História do Instituto de Ciências Sociais da Universidade do Minho; Escola Superior de Hotelaria e Turismo do Instituto Politécnico do Cávado e do Ave) - Coutinho, Luís (Unidade de Arqueologia da Universidade do Minho) - Ana, Bettencourt (Laboratório de Paisagens, Património e Território (Lab2PT); Departamento de História do Instituto de Ciências Sociais da Universidade do Minho) - Cardoso, Daniela (Centro de Geociências da Universidade de Coimbra (CGEO); Laboratorio de Paisagens, Património e Território (Lab2PT))

Archaeological records attest the figurative (naturalistic or schematic) engraving of equines sparsely between the South of Galicia (Rias Baixas, Spain) and river Ave (North of Portugal). Roughly considered from between the end of the 3rd and the end of the 1st millennium BCE, they may share its presence with circular motifs (solar symbols?), weapons, or vessels, or can appear isolated, in herds, mounted or "accompanied" by anthropomorphs.

Considering the known set of horses depictions in the Northwest of Portugal, this work will address, among other, issues related to their proximity to distinct rock art manifestations, their orientation, alignment, relation, and positioning to other motifs, or even its interlinking with other horses and (sometimes armed) horseman. Denouncing processes of addition perpetrated over time, to maintain or change the significance of the sites, reflecting cults to the solar horse or metaphorizing mythical or daily narratives, horse engravings also reflect the socio-ontological transformations occurred from the regional Late Bronze Age onwards and during the Iron Age.

Nevertheless, the horse was always seen as communally crucial. Its socioeconomic, ideological, ritual-symbolic meaning can be inferred by the role assumed in some narratives: functioning as a "tool" or a "power device", among other meanings, its significance endured more than 2000 years. Being part of the local imaginary until the XX century, the presence of legends and beliefs, toponymy, and even some local habits directly and indirectly related to horses, shows its perseverance over time until global progress gradually replaced traditional lifestyles.

Curiously, its local significance prevails in the landscape due to the presence of Garranos. Elements of this breed, domesticated and used for different purposes, still living in semi-wild or wild states in herds, interlink past and present, leading us to propose the concept of "horsescape" and horses as referentials in the landscape of Minho.

5 REFLECTION OF THE HORSE IN MATERIAL CULTURE IN MORAVIA (CZECH REPUBLIC) IN THE URNFIELDS AND HALLSTATT PERIOD

Golec Mírová, Zuzana (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic; Charles University Prague)

The horse, a majestic and noble animal. During prehistoric times and especially during the Bronze and Iron Ages, a unique relationship between man and horse was formed. From a hunted, consumable animal, to a luxury "item" of the highest social classes, to a companion in battles and duels, and even a friend. The issue of horses and the sources associated with them has long been neglected in the Late and Final Bronze Ages and Hallstatt Period (1300-450

BC) research in Moravia (Czech Republic), although it offers considerable potential for research into typological and chronological issues, and subsequently also socio-economic, religious, communication and many other topics. Comprehensive research on the horse not only aids in understanding its specific role in prehistoric societies but also provides insights into prehistoric society as a whole. The association of horses with the elites of these periods is crucial – chiefs, magnates and princes and princesses manifested their power through the possession of horse, which was a luxurious article. The paper explores various categories of materials from the studied periods, including wagons, chariots, yokes, horse harnesses, riding equipment, depictions, and remains. The contribution focuses particularly on the relevance to chronology, long-distance travel and social disperse of the horse.

6 HORSES DURING THE EUROPEAN BRONZE AGE AND IRON AGE

Coimbra, Fernando (Polytechnic Institute of Tomar, CGEO, Coimbra University)

During the Palaeolithic horses were only useful for their meat for nourishment, skin for clothing and bones for making tools. After the domestication process, in the Neolithic, the milk of mares is included in nourishment, as for example in Central Asia.

With the Metal Ages and the development of complex societies this animal acquires a larger importance regarding simultaneously a social, economic, military and mythological level, with several roles that were not seen before.

This paper analyses some of these roles among European societies of the two last millennia BCE, focusing on data available through archaeological excavations, iconography and written sources. In what concerns iconography, there are examples taken from rock art, pottery, sculpture, funerary tombstones, among other cases, which allow to understand better the importance of the horse as a "war machine", a help in hunting, mean of transport, status symbol and a psychopomp animal. This last characteristic can be seen for example in Ancient Greek texts such as Iliad (XXIII, 171-2), where Achilles ordered a sacrifice of four horses over the funerary pyre of his friend Patroklos, killed in Trojan war, in order that they could lead his soul to Hades' kingdom, the Otherworld, being the horse considered to be a guide of souls in the afterlife.

In the Bronze Age and Iron Age of Southern Europe the horse appears associated with elites of an equestrian character, which constitute a true aristocracy seen through rock art examples from Greece, Italy, Spain and Portugal.

Also archaeological excavations in several different countries sometimes contribute with findings of artefacts related to a horse culture, which allow a better understanding of the importance that this animal had in the development of civilization.

7 HORSES AND HORSE EQUIPMENT IN THE LATE HALLSTATT SOUTH-EASTERN PANNONIA

Dizdar, Marko (Institute of Archaeology, Zagreb, Croatia)

The Late Hallstatt period in the south-eastern Pannonian plain is mostly defined by a group of finds from women graves attributed to the Sarmatian group. The number of investigated cemeteries is not large, and separate horse burials with or without horse equipment were also found in some of them. These burials, as well as the graves of the deceased, have been dated to the 5th and 4th centuries BC. A phenomena of horse burials in the Late Hallstatt cemeteries has been documented over a wide area from northern Italy to the Lower Danube and the northern parts of the Carpathian Basin. Zooarchaeological analyses were carried out on some remains of horses from cemeteries of the Sarmatian group, which indicate the possibility of trade and exchange of horses, and probably their equipment, between different communities. Horse equipment were found in some horse burials of the Sarmatian group, while in some it is missing. Also, horse equipment was found on other sites of the Sarmatian group, and probably originate from destroyed graves. Different forms of horse equipment are recognized, most often different shapes of iron bits. The decorative bronze fittings stand out, which indicate contacts with the Lower Danube region. In the last research in Croatian Danube region were recorded bronze phalerae of the Magdalenska Gora type, indicating cultural connectivity with the south-eastern Alpine area, and/or with the northern parts of the Carpathian Basin where the Vekezug culture spread. Finds of horse equipment of the Sarmatian group indicate existing of cultural connectivity between different Late Hallstatt communities, which is also shown by the items of women's costumes and jewellery. These communities used the same objects of horse equipment, with inclusion of new forms through different kinds of transfers and exchange, and which may have been used for display of complex social identities.

8 HORSE AS A HISTORICAL AND ARCHAEOLOGICAL SOURCE, AND AS A CULTURAL MONUMENT. CASE STUDY: CRETAN HORSE

Klontza-Jaklova, Vera (MUNI - Ústav archeologie a muzeologie)

The Cretan (or Messara, Giorgalidiko) horse or pony was mentioned for the first time in 1895 by the Ottomans as a distinct and specific breed of horse. This horse has a much longer history dating back to prehistoric times. The paper presents archaeofaunal, iconographic, and historiographical information supporting its roots in the Bronze Age and

the development of horse culture on the island. The Cretan horse is considered to be part of local tradition, a historical source, and an integral part of Cretan cultural heritage. The specific geographical, climatic, historical, and cultural conditions of the island, as well as the needs of the island's population, have shaped its characteristics. However, the Cretan horse remains poorly documented and is threatened with extinction. We also try to answer the question of why this is so.

The paper argues that even a living culture (in this case horses) can serve as a fully-fledged archaeological and historical source and that a great deal of information can be obtained by studying the living horse population and the current equestrian culture. It also argues that specific breeds need to be protected as inorganic monuments.

9 HOLD YOUR HORSES! NEW INSIGHTS INTO THE EARLY IRON AGE EQUID BURIALS IN SLOVENIA

Škvor Jernejc, Brina (Research Centre SAZU, Institute of Archaeology) - Toškan, Borut (Research Centre SAZU, Institute of Archaeology) - Turk, Peter (National Museum of Slovenia)

In the eastern Hallstatt culture, horses were considered as an expression of the social status and identity of the Early Iron Age elites. Their sacrifice and burial are connected with socially privileged individuals, commonly men, who could be regarded as leaders of local communities with the highest political, military, economic and possibly religious power. In this paradigm, the ritually offered horses served as companions on the last journey of the deceased and at the same time as a symbol of the highest social rank. The custom has its roots in the Late Bronze Age, where it is traditionally associated with the emerging warrior elite.

Of the several dozen horse graves known from the East Alpine Hallstatt region, almost half come from the Dolenjska Hallstatt group in the south-eastern Alpine region. A further fifteen burials have been reported for other Hallstatt cultural groups from the area of present-day Slovenia, with four independent horse burials, not directly associated with human graves, from the Most na Soči site in the west of the country demonstrating prevalent influences from the neighboring Venetians. We present here part of the results of the first comprehensive archaeozoological study of horse remains from the Late Bronze Age and Early Iron Age cemeteries of the south-eastern Alpine region, combined with a detailed analysis of selected associated contexts and several newly obtained ¹⁴C dates. The list of topics addressed includes the timing and form of the earliest deposition of equine remains in human graves, the main cross-group differences in horse-related burial rituals, and the justification of the traditional association of horse depositions with exclusively male individuals of higher social status.

10 HORSE SACRIFICES IN THE ROYAL HELLENISTIC NECROPOLIS OF THE GETAE IN SBORYANOVO NATIONAL RESERVE, NE BULGARIA. OVERVIEW OF STUDIES.

Gergova, Diana (National Academy of Arts) - Gergova, Diana (Academy of Art, Sofia,; BNC - ICOMOS Bulgaria)

The large-scale interdisciplinary research of the Hellenistic royal necropolis of the capital of the Getae in Sbornovo from 1982 to now reveal the important place of the horse in the specific beliefs and funeral practices of immortalization of the Getic elite and of the two Getic rulers Kotela and Dromichaites, whose burials have been identified in the Southern and in the Northern group of tumuli of the necropolis.

Horses of different age and use in life are found in the tumuli in a wide variety of contexts, some of them raising the question of their ethnical peculiarities and phases of the realization of these burial rites. Diversity in the poses of the sacrificed horses, including the unique for the Getae „levade” pose, suggests not only chronological differences, but also some ideological nuances.

The scope of the traditionally applied interdisciplinary approaches in the interpretation of palaeozoological materials in Sbornovo has been broadened in the frame of the Bulgarian-Swiss collaboration in the last years. The strontium analyses of the remains of some of the sacrificed horses, which will be reported in a separate paper, is a new step towards deepening our knowledge about the relations between horse and humans in the world of the Getae.

11 THE ROLE OF HORSES AND HORSE FIGURINES IN THE SANCTUARY OF OLYMPIA

Patay-Horváth, András (Eötvös Loránd University, Budapest; Magyar Régészeti és Művészettörténeti Társulat)

During the Early Iron Age (10th-8th c.), small bronze animal figurines were dedicated at Olympia in exceptionally large numbers. I have already discussed the bovines in detail, in the present paper I focus on the horse figurines and extend the inquiry on the entire period of pagan Antiquity.

It is usually assumed that horse figurines were somehow related to (local?) horsebreeding and were dedicated by local or external owners of these animals. In general, horses were certainly bred and were clearly regarded as prestige goods representing wealth and status during later centuries as well, but the dedication of horse figurines was mainly restricted to the Geometric period. The communis opinio, however, does not offer any explanation for this change, i.e. for the

disappearance of these votives after ca. 700 BCE. The basic reason for dedicating the animal figurines and for their conspicuous accumulation in the sanctuary of Olympia is not satisfactorily explained either.

As an alternative theory, I argue therefore that the figurines did not represent domesticates but wild or feral animals hunted and/or captured around the sanctuary. This idea can be corroborated by comparing other votive assemblages of similar animal figurines from Geometric Greece and from other regions dating from prehistory to modern times. Some confirmation also comes from ancient written sources dealing with relevant, i.e. horse-related cult phenomena at Olympia and elsewhere. The scattered pieces of evidence suggest a reconstruction of ritual practices based on capturing feral horses living around the sanctuary and thus explaining the large numbers of dedicated figurines as well as their disappearance approximately at the same time as the equestrian contests were introduced at the Olympic Games.

12 HORSES AND HUMANS: AN INTERDISCIPLINARY STUDY OF THE SECOND IRON AGE NECROPOLIS IN SBORYANOVO (BULGARIA)

Desideri, Jocelyne (Archaeology of Africa & Anthropology Laboratory (ARCAN) University of Geneva) - Gergova, Diana (Bulgarian Academy of Sciences, Sofia, Bulgaria) - Rosselet-Christ, Deborah (Archaeology of Africa & Anthropology Laboratory (ARCAN) University of Geneva) - Kottas, Georgios (Archaeology of Africa & Anthropology Laboratory (ARCAN) University of Geneva) - Gios, Matteo (Department F.-A. Forel for Environmental and Aquatic Sciences, University of Geneva, Switzerland) - Anastassov, Jordan (Institute of Archaeology and Classical Studies, University of Neuchâtel, Switzerland)

The Sbornovo archaeological reserve in northeastern Bulgaria covers an exceptionally rich area of almost 800 hectares and testifies to the existence of an important political, economic and religious center - probably a capital - associated with the Getic kingdom during the Second Iron Age. The excavated complex includes an urban centre, sanctuaries and necropolises with more than a hundred burial mounds, two of them containing royal burials.

Since 2014, a Bulgarian-Swiss mission has been conducting interdisciplinary archaeological research in the necropolises of the archaeological reserve. The data collected since the beginning of the systematic investigations in 1982 represent the most important series of remains from an aristocratic funerary context of the 4th-3rd centuries BC on the scale of Bulgaria - and the Balkans in general. The aim of the project is to characterize, in the broadest sense, the funerary occupation of this area. To date, nine survey and excavation campaigns have been carried out, and research is still ongoing. They involve an international team of about thirty researchers and students, mainly from Switzerland, Bulgaria, France and Belgium.

Far from being simple necropolises, they have turned out to be privileged spaces with monumental structures in which the animal has a privileged place alongside the human. This presentation deals with the study of mobility by strontium isotope analysis of animals (horses and dog) buried in two Second Iron Age burial mounds discovered in the Sbornovo archaeological reserve. The results obtained reveal a very interesting story about the lifestyle and treatment of the animals deposited in these funerary structures.

This study - the first of this kind on animal bones in Sbornovo - is part of a broader ongoing program focusing on all human and animal remains found in the Archaeological Reserve.

13 ABOUT HEROES AND HORSES. THE COMMON ICONOGRAPHY OF HORSEMAN DEPICTIONS IN THE CONTEXT OF SUMPTUOUS TOMBS (4TH-3RD CENTURIES BC.)

Sorin, Clesiu (Bucharest Municipality Museum)

The presentation will focus on the relationship between the horse and the rider during the 4th-3rd centuries BC, within the Thracian-Getic political structure when the horse has a privileged status transferred to the horseman, who becomes not only a formidable fighter, but also a figure whose role among the elite is to legitimately administer territory.

As a result, the horse ownership has turned from a close relationship, into a community endeavor when the management of the relationship with the horse, acquired a social dimension.

In fact, from the 4th century BC, riding horses that are specially bred, become the object of symbolic gifts, and harnesses adorned with silver pieces will be the object of tomb deposits.

The peoples whose universe developed around the horse, illustrated and integrated its image into what has been historiographical called the „animal style”, which also includes North Thracian artistic manifestations, whose anthropo- or zoomorphic representations were created as a result of convergent Scythian or Greco-Macedonian influences.

Starting from two artefacts belonging to a private collection, in which the horse and the horseman are in the foreground of their symbolic iconography, we will try to reach on a more general background, putting them in context with other discoveries found in sumptuous tombs, such as those at Agighiol, Peretu in Romania or Vratsa and Letnitsa in Bulgaria.

A number of artefacts were also analyzed by X-ray Fluorescence (XRF), and the results help emphasize their symbolic value.

14 **THE ART OF HORSEMANSHIP RIDING IN GEOMETRIC GREECE: THE RELATIONSHIP BETWEEN HORSE AND RIDER IN ICONOGRAPHY AND BIOARCHAEOLOGY**

De Souza, Camila (Fluminense Federal University)

This presentation aims to discuss the meanings of the art of horsemanship in some societies during the Geometric Period of the History of Ancient Greece (between 900 and 700 BC). The analysis of the iconographic record of the geometric pottery of the burials is associated with the bioanthropological study of the human remains that show the bodily experience of this activity in individuals in life, allowing us to understand the characteristics of the relations between horse and rider in different societies of the period. The research also aims to gather, organize, catalogue, analyze and compare the iconography of the horse and rider and the available osteological data from the sites of Argos (Peloponnese), Athens (Attica) and Eretria (Euboea), in order to understand the role of art of horsemanship in relation to the historical context of the process of rise and origins of the polis during the Geometric Period, especially the 8th century BC.

The art of horsemanship emphasizes the importance of multidisciplinarity for understanding a period of transformation and structuring of what we call the Hellenic world, marked by human practices and actions that result in multidimensional material expressions of sociocultural domains. Whether iconographic or funerary in nature, the recording of social inequalities is conceived as a political, ideological and symbolic violence resource with the aim of legitimizing local and regional identities.

15 **HORSES IN THE FUNERAL CULTURE OF THE WEST BALTIC CIRCLE: A CASE STUDY OF THE CEMETERY IN RÓWNINA DOLNA (POLAND)**

Szubska, Magdalena (Cardinal Stefan Wyszyński University in Warsaw; Ministry of Culture and National Heritage)

Horse burials constitute a distinctive element of the funeral culture within the West Baltic circle. The oldest ones come from Masuria region. During the Roman Period, they are present in Sambia, Masuria, Suwałki Region, western Lithuania, and northwestern Latvia. During the Migration Period, they also appear in the central and eastern regions of Lithuania and Latvia. The cemetery discovered in the 1990s in Równina Dolna (Warmian-Masurian voivodeship, north-east Poland), site III, dating back to the Roman Period and the Migration Period, is exceptionally valuable due to a significant number of skeletal horse graves (over 70) that accompanied human graves (over 350). These horse burials were equipped with equestrian gear. Among the horse pits, various items were discovered, including two parade bridles, snaffle bits (over 60), bridle buckles, large iron buckles, leather strap ferrules, and nosebands.

The presentation will discuss the layout of the cemetery and the relationships between horse and human graves. In many cases, a direct connection between them has been observed. The extremely challenging question of the method of burying horses will also be addressed – whether the animals were placed in the graves alive or dead.

16 **HORSE HUSBANDRY IN LITHUANIA FROM THE LATE ROMAN TO THE EARLY MODERN PERIOD: 1500 YEARS LASTING TRADITIONS?**

Piliciauskienė, Giedre (Vilnius University)

The first horse remains in Lithuania date back to the early 4th millennium BC. During the Subneolithic and Neolithic, horse remains in the settlement sites were still very scarce. The situation has changed considerably since the Late Bronze Age, 800-600 cal BC, when horse bones are among the most commonly found in the zooarchaeological material in western Lithuania. Moreover, around 200 cal BC, horses began to be buried. The tradition of horse burials in Lithuania lasted to the 14th C AD, leaving about 2000 horse burials are still known today. During the Late Roman and Migration Periods, exceptionally large horses are found in Lithuania, and $^{87}\text{Sr}/^{86}\text{Sr}$ analysis revealed that some of them are of non-local origin. In addition, stable isotope analysis of $^{87}\text{Sr}/^{86}\text{Sr}$, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ stable isotopes have provided insights into horse husbandry during the 2nd to 14th C AD. However very detailed historical records on horse husbandry in the 16-17th C AD contributed to the interpretation of stable isotope data of Late Roman and Migration Period horses and shed light on the husbandry practises of horses bred during the first millennium AD. Early Modern period historical written and iconographical records provide very valuable data on the horse equipment, and care, breeding, training the horses in the Grand Duchy of Lithuania. In this presentation, I will talk about the peculiarities of horse husbandry in the territory of present-day Lithuania from the Late Roman Iron Age to the 20th century AD, based on stable isotope data and historical records.

17 **DAUGHTERS OF THE VALKYRIES: THE EQUESTRIANISM OF WOMEN IN VIKING AGE SCANDINAVIA**

Sundkvist, Anneli (Independent researcher)

Horses in the Viking world have long been considered a male affair. However, there are numerous examples of connections between horses and women, expressed in the written sources, the art, and the archaeological material.

In the Old Norse written sources, the only group with clear connections to horses as well as war in myths and literature is the Valkyries. These servants of Óðinn, and possibly goddess Freyja, rode to the battlefield to bring home the worthiest of the fallen. The Valkyries were semi-divine, violent and blood thirsty. And they were all women.

The story of the Valkyries tells us that it was not unthinkable to connect women and horses in the Viking Age. Still, the Valkyries are women of myth. However, the archaeological material reveals that many women in the Viking world were buried in a way that stresses their equestrianism. What parts did they play in the Viking equestrian world? This paper explores some of these women and the way they were buried, depicted, and written about. As riders, drivers, owners, or providers. As – to use a modern word – horsewomen. “

18 **FEEDING HORSES IN THE AFTERLIFE**

Bagge, Merethe Schifter (Museum Skanderborg) - Out, Welmoed (Moesgaard Museum, Department of Archaeological Science and Conservation)

Horses have played an important role in human societies throughout the past. At a certain point horses became a crucial part of their owners' identities, and sometimes, such as times of war, even the essential part. Therefore, the well-being of horses was probably one of the most important issues for prehistoric people. An ill or debilitated horse was useless in warfare or as a means of transportation.

This contribution presents a recent find of an equestrian grave from Fregerslev dating to the Viking Age. A small group of similarly richly equipped burials are known from Viking-Age Denmark (including present day Denmark, Scania and northern Germany). At Fregerslev, an impressive array of horse equipment with gold and silver fittings was placed in one corner of the grave, and the horse (detected by geochemistry) was placed next to the harness. The bridle and saddle gear lay in two different piles and a pile of horse fodder, evidenced by phytoliths, was placed in between them. Remnants of leather close to the phytoliths suggest the presence of a food bag as well. The phytoliths proved the presence of well-sorted chaff, primarily from oats.

Food offerings accompanying deceased humans are well known from many regions and periods in the past, but food offerings in animals' graves are almost unknown. The primary reason for this is probably the rapid decomposition of the organic elements, leaving remains that in many cases would not be visible to the naked eye. The finds from Fregerslev shed new light on burial rituals and thereby also elucidate human-horse relations, even in death and the afterlife.

19 **ARCHAEOETHOLOGY: A NEW FRAMEWORK TO INTERPRET PAST HORSE-HUMAN RELATIONS**

Larsen, Renate (University of Leicester)

How can we explore the lived experiences of horses in the Viking Age? That is one question at the core of my multi-disciplinary research, which aims to provide a deeper understanding of how animals experienced life in Iron and Viking Age Scandinavia c. 400-1100 C.E. Classically, interpretations of past animal-human relationships tended to focus on the agency of the human: what humans did to animals and how humans felt about them. Recently, archaeological and interdisciplinary research has been disrupting this approach by de-centring the human in the animal-human relationship and exploring the nuances and complexities of animal-human interactions.

By drawing on multidisciplinary knowledge of horses from the field of ethology, I believe we can explore the range of experiences past horses might have had and gain a deeper understanding of past horse-human interactions. In this paper, I want to present a theoretical framework I've framed as 'archaeoethology', which combines zooarchaeological methods with modern research into animal behaviour, cognition, and emotions, and demonstrate how such an approach can be applied to the archaeological material from Iron and Viking Age Scandinavia. Ultimately, I am interested in exploring the range of horse-human interactions in the past by giving attention to the relational aspect – how did horses negotiate their place in Viking Age society, and how might they have felt about us?

20 **HORSE RIDING STYLE AND MOUNTED COMBAT TECHNIQUES IN THE AVAR PERIOD (6TH- 9TH CENTURY AD) – A TRANSDISCIPLINARY APPROACH**

Bühler, Birgit (Vienna Institute for Archaeological Science (VIAS), University of Vienna)

The Avars, a nomadic tribal confederation originating in Central and Inner Asia, were present in the Carpathian Basin from the late 6th to the early 9th century AD. Horses were an important aspect of life in the Avar realm: According to the historical sources, the Avars were accomplished mounted warriors. Avar warriors' outstanding skills in mounted

archery, but also in fighting with a range of different weapons on horseback, appear to have been a major reason for their military success, especially when they first arrived in Europe in the late sixth and early seventh century AD. Archaeological evidence also suggests that horses were essential within the Avar realm, both from a practical and from a symbolic point of view. Although the exact details of horse-riding style in the Avar period are no longer accessible to us, some basic principles of the communication between rider and horse have remained the same throughout the history of equestrianism – past or present. Also, much can be inferred about Avar horse-riding style due to the necessities of mounted combat. For example, the ability to direct the horse without using the reins is a major pre-requisite, both for using any type of weapon on horseback and for many tasks in the everyday work of equestrian pastoralists. Experimental ethnoarchaeology, on the basis of a comparative study of horse-riding styles within modern “schools” of horseback archery could be helpful for understanding the riding style of early medieval populations of mounted archers. On the basis of a review of previous research on Avar horsemanship, this paper presents an innovative, trans-disciplinary approach to Avar-period horse-riding style and mounted combat technique, including biomechanical research, for example using a horse-riding simulator.

21 THE WHOLE HORSE: RESULTS FROM THE MEDIEVAL WARHORSE PROJECT

Outram, Alan (Department of Archaeology and History, University of Exeter) - Creighton, Oliver (Department of Archaeology and History, University of Exeter) - Kanne, Katherine (University College Dublin)

Based at the Universities of Exeter and East Anglia, and Funded by the Arts and Humanities Research Council, the research project ‘Warhorse: A Medieval Revolution?’ conducted the first ever systematic study of warhorses, and horses generally, in England in the Middle Ages. In this paper, we present the results of the Warhorse project as a case study of genuinely interdisciplinary research, integrating zooarchaeology, genetic and isotopic analyses, material culture, and landscape-wide datasets, dating between the late Saxon and Tudor period (c. AD 800–1600), all contextualised by new historical research. Our whole horse, multiproxy approach was undertaken at a variety of different scales, from individual equestrian artefacts and scientific samples of bones and teeth from a single horse, through to landscape analysis of equine environments, and nationwide datasets of horse bones and material culture. This allowed us to interrogate the medieval horse in its social context, including military, economic, political, and ideological importance, leading to the most comprehensive image to date of the most iconic animal of the Middle Ages.

22 EQUID-HUMAN INTERACTIONS IN MEDIEVAL ROME: EXPLORING THE ROLE AND MANAGEMENT OF EQUIDS THROUGH AN INTERDISCIPLINARY APPROACH

Minniti, Claudia (Sapienza University of Rome) - Corbino, Chiara (CNR - ISPC - Istituto di Scienze del Patrimonio Culturale) - Modi, Alessandra (Università di Firenze, Dipartimento di Biologia) - Caramelli, David (Università di Firenze, Dipartimento di Biologia)

Equids have exerted a notable influence on the history of humanity. Thanks to the use of horses, people’s mobility, cultural exchanges and commercial activities have increased. The success of horses in war is also widely documented in the history of each conquest and expansion. One of the aspects of greatest interest is related to the diffusion of different varieties selected for different functions. Ancient sources attest to the presence of some varieties of horses that should have been widespread from Roman period onwards, linking them to the geographical areas from which they came. More than a simple geographical catalogue, some physical distinctions are also described. Archaeozoological studies are also contributing to defining the history of the evolution of horses, however the difficulty of discriminating between the various equids (horses, donkeys and hybrids) represents a strong bias factor. Rome represents an ideal case study as the excavations and studies carried out for several decades provide a large quantity of remains that can be correlated to a very broad chronological period, allowing to investigate ancient horse husbandry strategies to highlight changes and resilience through time and functions. This paper aims to present the first results of an interdisciplinary study that compares recent aDNA analysis of some equid remains, morphological and biometrical studies and written and ichnographic sources in order to deepen our knowledge on the use of horse in Rome in the medieval and post-medieval periods.

23 THE HORSE IN MEDIEVAL POLAND. AN INTERDISCIPLINARY OVERVIEW

Makowiecki, Daniel (Institute of Archaeology, Nicolaus Copernicus University, Torun)

In archaeology, horse bones excavated in strongholds, settlements, castles, towns and commentaries are the most frequent evidence of the importance of this species in the tribal and early state of Poland. Elements of riding equipment are much less frequently discovered. Short historical accounts supplement the records by reporting only some aspects of the human relationship with this animal.

The history of the horse and its importance among the medieval Slavs inhabiting Poland in the 8th and 14th centuries were the subject of a project implemented in 2018-2023*. Data was collected and analysed from the source categories mentioned above. Additionally, biomolecular methods – aDNA and isotope – were used to study horse bones

and teeth. The paper presents the most important results of the project. It indicates the principles of interpretation of horse bone remains based on zoological, biological and taphonomic data. Thanks to them and the 14C dating, it turned out that treating the skeletons and skulls of horses, recorded in archaeological contexts, as offerings and sacrifices was an overinterpretation. Attention was drawn to the widespread consumption of horse meat and utilisation of horse bony waste, e.g., in prestigious places without care. Various rules for treating horses in religious and magical ceremonies among individual groups of Slavs have been recorded. Information was obtained about what types of horses were bred in different regions, what coat colours were preferred and how long the horses were used. The types of diseases and their frequency were determined thanks to paleopathological research, which let us consider how horses were treated by their owners. It was also an excellent chance to confront historical records on horses with archaeological data.

*) The research is the result of the project “Horse in Poland among the early Piasts and internal fragmentation” (2017/25/B/HS3/01248) financed by the National Science Center.

24 HEIGHT AND WEIGHT OF HORSES IN PORTUGAL (LATE MIDDLE AGES AND EARLY MODERN ERA): AN APPROACH BASED ON WRITTEN SOURCES

Soares de Sousa, Afonso (Instituto de Estudos Medievais; Faculdade de Letras da Universidade de Coimbra) - Nisa, João (Centro de História da Sociedade e da Cultura; Faculdade de Letras da Universidade de Coimbra)

Seen as a sturdy companion since its domestication, the horse was first seen as a workforce, but it quickly became an important weapon of war. Several technological advances carried out throughout the Middle Ages, such as the stirrup and the improvement of the saddle for military purposes, further highlighted its worth and made it one of the symbols of the age itself, embodied in the figure of the Medieval knight. In Portugal, particularly in the Late Middle Ages, the Crown tried to encourage and enforce the acquisition of mounts destined for war, focusing on their breed, use and maintenance. However, the study of horses’ height and weight in Portugal between the Medieval and the Early Modern periods has not aroused much interest in Portuguese historiography. Nonetheless, in other geographies significant contributions have already been made, mainly from studies in the field of zooarchaeology. We therefore propose to provide a new view, based on a newly discovered and unpublished written source, of equine morphology in Portugal, with the aim of establishing a starting point that will stimulate new developments in the knowledge of the different types of equids. The results we intend to present aim, at the same time, to establish a starting point that could in future benefit from a dialogue with zooarchaeology – a science with which the estimates presented here could be compared.

838 COMMUNITY ENGAGEMENT IN ARCHAEOLOGICAL HERITAGE: BEST PRACTICES, OBJECTIVES, CONFLICTS, AND PLANS FOR THE FUTURE

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Stefanou, Eleni (The Heritage Management Organization; Hellenic Open University, MSc Cultural Organizations Management) - Anagnostopoulos, Aris (University of Kent; The Heritage Management Organization)

Session format: Workshop

In this workshop on community engagement in archaeological heritage management individual colleagues and/or initiatives that do community engagement from all over Europe meet to discuss methods, limitations, prospects, and plan for the future. Participants will be divided into different working groups and will engage in an organised discussion about methods that are put into practice, the selection of audiences,

the non-participants and the reasons for not getting involved, the power dynamics and the issues of conflict, the common values that can emerge from community engagement archaeological heritage projects, as well as the potential future steps to be taken. The purpose of this closed interactive workshop is to formulate a series of proposals for the development of a manual of best practices and methodologies for organizing actions to engage and activate local communities in archaeology and cultural heritage. The participants will be divided into groups that will work in round tables, and with the guidance of the moderators will be focused on the following topics: best practices that they have implemented so far, indicating the specific characteristics of the communities to which they were targeted, problems and / or conflicts they face in organizing their actions, goals and objectives for future actions and synergies. In the end of the workshop the topics from each group will be presented to all participants.

842 CONTINUITY IN CHANGE: ENVIRONMENTAL, CULTURAL, SOCIAL AND MATERIAL EVOLUTION IN ANCIENT ARABIA

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Maini, Elena (Sapienza University of Rome) - Fernández Rodríguez, Carlos (Universidad Autónoma de Madrid) - Maiorano, Maria Pia (Goethe University Frankfurt) - Gómez Sanz, Paula (Universidad Autónoma de Madrid)

Session format: Regular session

The archaeological record of the Arabian Peninsula is marked by a convoluted interplay of continuity and change. This session seeks to delve into the intricate narratives of the region's prehistory and early history. As we reflect on the persistence and endurance of ancient human communities populating the Peninsula and how they have contributed to ongoing transformations, we will examine the profound effects of climate and environmental changes (including those caused by humans), shifts in population density, interactions, mobility and migrations. We will also examine the evolving relationships between human groups and the material culture they conceptualized, produced and exchanged, and the fluctuating dynamics of settlement patterns and resources exploitation, from mobile to sedentary and conversely, exploring instances of collapse, resilience, persistence and evolution.

Archaeological evidence will also make it possible to go beyond the material expressions of human cultures and explore the evolution of the religious, spiritual and ritual spheres that were created and lived by the different communities. Our discussion will consider insights from archaeological projects and research spanning different time periods and regions, evidencing medium- to long-term transformations in subsistence strategies, settlement patterns, exchange modes, and ritualistic behavior.

We, therefore, encourage communications from a wide range of subjects adopting a variety of methodological/theoretical approaches, including landscape archaeology and paleoenvironment, bioarchaeology, material culture and ancient technologies, architectural and building techniques, behavioral evolution, cultural transmission, ancient written sources, etc. Helpful proxies will eventually emerge to enable refinement of our comprehension of the subtle interface between continuity and change in the cultural evolution of the Arabian Peninsula and the transformative forces that have shaped the region's history.

ABSTRACTS

1 TRACKING THE EVOLUTION OF PEOPLE-PLANT RELATIONSHIPS IN THE SOUTHERN HAJAR PIEDMONT (CENTRAL OMAN) THROUGH THE MIDDLE-LATE HOLOCENE

Proctor, Lucas (Goethe University Frankfurt)

The mutually co-determining relationship between plants and people has an important role to play in the resilience and transformation of societies over the longue durée. Understanding this relationship is especially important in southeastern Arabia, where low rates of annual precipitation place significant ecological constraints on both humans and plants. During the Middle Holocene, conditions in southeastern Arabia are thought to have been moister than present, owing to a northward shift in the ITCZ. Following the onset of aridity in the 5th–4th millennia BCE, evidence suggests there are marked changes in human occupational and subsistence patterns in the region, culminating with a transition to crop production during the 3rd millennium BCE. However, the precise timing of this development and the broader nature of human-plant relationships during these millennia remain poorly understood.

This study uses the southern Hajar piedmont of central Oman as a case study for understanding continuity and change in human-plant relationships over millennial timescales in hyperarid environments. Through an analysis of macrobotanical remains from the Middle/Late Neolithic (5500–3200 BCE), Hafit (3200–2700 BCE), Umm an-Nar (2700–2000 BCE), and Late Islamic (1700–1900 CE) sites, we will examine potential changes in vegetation and resource management related to 1) the end of the Holocene Humid Period and 2) the development of local oasis agroforestry. Wood charcoal recovered from these sites provide insight into fuel harvesting and woodland management, and, when considered over long timescales, can provide information on changing vegetation patterns. In particular, this study will consider whether the flourishing of local copper production in the Hafit and Umm an-Nar contributed to wood scarcity in an already non-forested landscape. Meanwhile, carpological remains allow us to examine changing patterns of subsistence, especially surrounding the timing of early date palm cultivation and emergence of the unique Arabian oasis agroforestry system.

2 LAYERS OF TIME: UNEARTHING THE DYNAMIC HISTORY OF RAS AL JINZ RJ-3 FROM NEOLITHIC TO EARLY BRONZE AGE OMAN

Azzara, Valentina (Netherlands eScience Center; Leiden University, Faculty of Archaeology; Time of Magan Field School) - De Rorre, Alexandre (Time of Magan Field School)

This paper delves into the cultural transformations and the adaptation strategies of local populations to changing environmental conditions at the site of Ras Al Jinz RJ-3 in Oman, across the Late Neolithic (c. 4300–3200 BCE) and the Early Bronze Age (Hafit Period, c. 3200–2600 BCE; Umm an-Nar Period, c. 2600–2000 BCE). Occupied from the Late Neolithic through to the end of the EBA, RJ-3 presents a unique opportunity to study the evolution of complexity in a single location, which is rare in the area. It also allows us to focus on “regular” settlement remains, while most projects have focused on the excavation of tombs and monumental towers.

Extensive excavations and deep test-trenches at the site have revealed a wealth of data, including remnants of a Late Neolithic occupation, which yielded a lithic industry that has no comparison so far in the region; a settlement of the Hafit period, exceptional as very few Hafit settlements are known across the region, despite thousands of documented cairns; specialized workshop areas dating to the Umm an-Nar period, and contemporary to the residential area of RJ-2, c. 300 m to the south, marking the apogee of the occupation.

This paper presents the evidence unearthed at the site, offering a comprehensive view of the settlement's long-term development and provides a remarkable narrative of the continuity and evolution of occupations in coastal Omani Sharqiyah, redefining our understanding of settlement dynamics in prehistoric Oman.

3 THE OTHER SIDE OF AL-KHUTM: CONTINUITY IN CHANGE IN A SOUTHEAST ARABIAN BRONZE AND IRON AGE PALIMPSEST

Swerida, Jennifer (Leiden University) - Bryant, Robert (University of Pennsylvania) - Dollarhide, Eli (New York University Abu Dhabi) - Smith, Stefan (Wissenschaftlicher Mitarbeiter at Staatliche Schlösser und Gärten Hessen) - Casana, Jesse (Dartmouth College) - Creamer, Petra (Emory University) - Nugent, Selin (Oxford Brookes University)

The archaeological site of al-Khutm, similar to the neighboring site of Bat in northwest Oman, is known for its Early Bronze Age monuments, particularly the third millennium BCE tower constructed on the northwestern end of the site's long hillside. Contexts on the other side of the Khutm hill, however, exist in a dense palimpsest of domestic, monumental, and mortuary remains preserved at surface level. Rather than a continual occupation, the architecture and material culture found at al-Khutm Settlement reflect an intermittent presence and repeated reoccupation of the hillside from the late fourth through the first millennium BCE. Such complex sets of multi-period surface remains are common at archaeological sites throughout southeast Arabia, but are rarely addressed through an explicit methodological or theoretical framework.

Engaging with results of recent fieldwork by the Bat Archaeological Project, this paper presents the Khutm Settlement in terms of an Early Bronze and Iron Age persistent place and cultural palimpsest. Methodological review will consider the challenges posed by such archaeological landscapes for site documentation and characterization. Theoretical discussion will address the impact of palimpsest, where each occupational phase is superimposed on and interacts with the remains of previous phases, on the formation and experience of the site as a cultural space over time. Results of this study will provide a framework for evaluating questions of continuity and change in light of these characteristically Arabian persistent, if intermittent, places and landscapes.

4 CHANGE AND DOMESTIC ARCHITECTURE IN ANCIENT HILI

Morgan, Colleen (University of York) - Eddisford, Daniel (Heritage International) - Araar, Leila (University of York) - Fowler, Louise (Museum of London Archaeology) - Roberts, Xavier (Durham University) - De Vreeze, Michel (Self-Employed) - Al Meqbali, Ali Abdu Rahman (Department of Culture and Tourism, Abu Dhabi) - Valente, Tatiana (Department of Culture and Tourism, Abu Dhabi)

A team from the University of York in collaboration with the Department of Culture and Tourism of Abu Dhabi has just completed its second season of fieldwork in Hili Archaeological Park, part of the UNESCO Cultural Sites of Al Ain. This project is exploring the poorly understood Bronze Age (c. 2500 BCE) domestic architecture and remains in the Park. In this paper we describe our results from these two seasons, which include trial excavations exploring the landscape and the intensive excavation of multiple architectural forms at a single site, Hili-16, including a large mud-brick structure. This structure contrasts with the large stone-built tombs and towers commonly associated with Umm an Nar architecture, and could be seen as domestic in function. Using theory and methods derived from household archaeology, we describe some potential uses of this structure, and present a 3D reconstruction to compare to other similar, contemporaneous buildings in the Gulf. Finally, during the investigation of this structure we found extensive evidence of both earlier and later phases of occupation of the area, and a potential new form of Iron Age structure

that contrasts with other contemporaneous occupations at Hili. Importantly, the material recovered from the site also evidences wider interactions with the Arabian world, as well as further afield with locations like the Indus Valley. Thus we present the change of use of the site and landscape over time, reflecting the adaptive use of architectural materials and technology.

5 UMM AN-NAR RITUAL BUILDINGS FROM AL BATINAH PLAIN IN OMAN, UNITY OF CONCEPT AND DESIGN

Douglas, Khaled (Sultan Qaboos University) - Pizzimenti, Sara (Pisa University) - Al Jahwari, Nasser (Sultan Qaboos University) - Hesein, Mohamad (Sultan Qaboos University)

Despite the scarcity of ritual buildings discovered in the Omani Peninsula from the Umm al-Nar period, recent excavations in al Batinah Plain region in northern Oman revealed three distinctive buildings that their function related to ritual. These buildings found in three different archaeological settlements all belong to Umm an-Nar culture (2700-2000 BC), these sites are: Dahwa 1 (DH1) and Dahwa 7 (DH7), both sites located ca. 24 km southwest of the coastal city of Saham, the third site is al-Tikha located at the northern periphery Al-Rustaq, ca. 42 km southwest of the coastline. All these settlements situated at the east foothills of Al-Hajar mountains. The buildings showed great similarity in term of size, architectural layout, and nature of archaeological finds, which presumably indicates the presence of unity in term of concept and perhaps belief. Was this kind of ritual buildings exclusive to the coastal region of Oman or could it be extended throughout the Omani Peninsula?

6 THE SAMAD LATE IRON AGE (SLIA) IN EASTERN OMAN, 2024 UPDATE

Yule, Paul (University Heidelberg)

The archaeology of Oman focusses largely on archaeological survey and the Bronze Age, as in other ANE subfields. Samad Late Iron Age (SLIA) sources are often fragmented, mortuary, necessitating considerable fieldwork to achieve minimal results. Beginning and end dates are hardly fixed by contexted absolute datings. SLIA sites are far fewer than of the Early Iron Age (EIA) in South-eastern Arabia, indicating a less sustainable environment: 364 vs. 274 sites, as of 24.01.2024. The c. 500-year lifespan of the SLIA (>300 BCE to 300 CE) shows little tangible artefactual development. Few sites can be more finely dated.

The methods used to list and date sites in our gazetteer require explanation. Since 1998 the author attempted different site lists. The site gazetteer, 'ent' went through builds in 1998, 2014 and 2023, each with different goals. The current iteration of 'ent' lists suspected EIA and SLIA sites in two Excel databases which are continuously updated. As of 24.01.2024 the EIA version is online: <https://uniheidelberg.academia.edu/paulyule/Drafts>, 2024a Yule ent eia oman+uae.

Its publication in print media is limited in that it cannot be updated continuously and is too large to fit onto a print-page and in this format is impractical. The discussion of a smooth or abrupt transition from the EIA to the SLIA is re-opened. This year fifteen 14C dated contexts are intended to support a more differentiated chronology.

7 REASSESSING EARLY BRONZE AGE TOWERS IN CENTRAL OMAN THROUGH ARCHITECTURE, STRATIGRAPHY, AND LANDSCAPE INTERACTION

Antinori, Guido (Sapienza Università di Roma)

This study investigates the circular monumental structures, known as "early bronze age towers", associated with the Hafit (3200-2700 BC) and Umm an-Nar (2700-2000 BC) cultural contexts in central Oman. Without the hallmarks of bureaucratic and urban centres, these mobile, kin-based and tribal communities achieved monumental architectural feats, sophisticated water management systems, and advanced metallurgical practices. The study proposes a reevaluation of these monumental structures' architecture and stratigraphy, placing a significant emphasis on their relationship with the surrounding landscape. This connection is critically analysed to infer potential agricultural and metallurgical practices of the time, i.e. development of palm groves oasis and the exploitation of copper and its associated chaîne opératoire from ore extraction to the production of artifacts and ingots. By mapping the geographical distribution of the structures and assessing their proximity to key water and mineral resources, the research aims to highlight the strategic selection of settlement sites influenced by the landscape's potential to support oasis agriculture and copper metallurgy. This approach offers new insights into socio-economic strategies for resource management and adaptation, and illuminates broader socio-environmental dynamics. These structures' locations were not arbitrary but were instead integral to a complex network of human-environment interactions, reflecting a deep understanding of, and adaptation to, the arid landscapes of ancient Arabia.

8 CONTINUITY IN CHANGING SETTLEMENT PATTERNS IN BRONZE AND IRON AGE CENTRAL OMAN

Döpfer, Stephanie (HCCH, Heidelberg University)

From the Early Bronze Age, circa 3,100 BCE, to the end of the (Early) Iron Age, around 300 BCE, the communities in Eastern Arabia were significantly affected by environmental and social changes. This paper will concentrate on the diachronic developments in settlement patterns on a local scale in a selected area of the Wilayat Al-Mudhaybi in central Oman. From 2018 to 2022, the Al-Mudhaybi Regional Survey, funded by the German Research Foundation (DFG), was conducted in the region, using a variety of methods including remote sensing, ground truthing and systematic field-walking of transects. This paper presents past adaptation strategies to an arid environment based on the survey results, which go beyond the traditional dichotomy of sedentary and mobile, temporary and permanent. The paper utilises Bernbeck's (2008) concept of multisited communities as a basis for developing a new understanding of settlement patterns in the region. According to Bernbeck's model, sites are permanent features of a landscape that, however, do not necessarily require the year-round presence of sedentary inhabitants. Several places were used by the same group at different times and on different occasions, where diverse resources could be exploited and different activities could be carried out. The communities in central Oman from the Bronze to Iron Age are thus characterised by the various forms and practices of mobility and sedentism as well as subsistence.

9 WATER MANAGEMENT THROUGH TIME SEEN FROM THE AL MADAM FALAJ

Fernández Rodríguez, Carlos (Universidad Autónoma de Madrid) - del Cerro Linares, Carmen (Universidad Autónoma de Madrid)

Falaj (pl. aflaj) meant extraordinary progress in terms of Water Management in the Southeast of Arabia during the Iron Age. In fact, it marked a milestone in the History of the region: a revolution in the way of managing the Water of an ancient population.

Previously, people of the Bronze Age could only get water thanks to the wells available in the natural oasis. Settlements of that period were located mainly in the mountains, near the natural oases, or close to the sea. However, this hydrological system allowed the first permanent occupation of the interior of the Oman peninsula and the appearance of new oases, thanks to the water provided by aflaj. The population grew remarkably in these centuries. It is supposed that the water of the falaj only served for agricultural purposes, considering that wells have also been found in connection with the settlements.

To understand this phenom, we propose to take the Al Madam Falaj (Sharjah, UAE) as an example. It is one of the best excavated aflaj in the Peninsula, considering that we know all the parts of the whole structure (the underground gallery, the first meters of the opencast channel, the first secondary channels, and the main irrigation network area). In addition, we will reflect on the last part of every falaj: its end, and its archaeological search. It will provide a global perspective of the structure and culminate long research.

10 HAPPY TROPICS IN THE LAND OF MAGAN. A NEW MULTIMILLENNIAL ARCHAEOLOGICAL LANDSCAPE NORTH-WEST OF MUSCAT IN SOUTH BATINAH

Ramazzotti, Marco (Sapienza University of Rome - Sciences of Antiquity) - Kzzo, Ahmed (Sapienza University of Rome) - Di Ludovico, Alessandro (Sapienza University of Rome - Sovrintendenza Capitolina)

Sapienza Archaeological Mission in Arabian Peninsula and the Gulf (MASPAG) surveys in the Omani southern Batinah, northwest of Muscat, near the Muslimat oasis, has recently revealed a new hitherto unknown multi-millennial archaeological landscape crossed by the Tropic of Cancer. In this vast area, two enormous cemeteries with hundreds of collective tombs have been identified. The oldest graves typologically and morphologically date from the end of the 4th millennium, but both the cemeteries appear to be associated with long-lasting settlements continuously inhabited up to the Islamic period. The two cemeteries next to a settlement that was fortified in the Iron Age offer the possibility of investigating the social complexity of those nomadic groups interposed between south-eastern Arabia and the Persian Gulf on a broad spectrum. Powerful nomadic coalitions capable of governing large portions of the piedmont territory interposed between the rocky Hajar mountains and the spectacular western coasts of the Arabian Sea, a nomadic and half-nomadic territorial state in the south-eastern frontier of the ancient Near East which Mesopotamian texts identify as the Land of Magan.

11 **MODELING ACCESSIBILITY TO INTERPRET SETTLEMENT PATTERN: A CASE STUDY FROM IRON AGE SOUTHEAST ARABIA**

Paulsen, Paige (Johns Hopkins University)

Settlement pattern analysis seeks to describe the regional-scale organization of societies and the spatial dimensions of small-scale decision-making. Settlement patterns can speak to questions ranging from subsistence strategy to political organization, while changes in these patterns both reflect and reproduce changes in a society itself. The accessibility of settlements is a component of arguments about their role in the settlement pattern, as settlement locations and the social interactions between sites are necessarily mediated by people moving over the landscape. Sites might be located to oversee or control trade routes, be built in inaccessible locations to provide defense, or take advantage of specific resources. Assessing these possible interpretations requires methods for describing the landscape in terms of how people might move across it. In Iron Age Southeast Arabia, settlement patterns are notable for their expansion from preceding periods: there appears to be an increase in the number of settlements and in the variety of environmental zones that host them, participating in a broadly shared material culture horizon. What drives this shift? And what interactions link these settlements together to produce the cohesive material culture of the 1st millennium BCE?

This paper uses GIS methods to approach the spatial dimensions of Iron Age Southeast Arabia by considering affordances and constraints of movement across the landscape. By modeling human movement, the physical location is connected to the movement used to access it and the social context this interaction generates. By comparing the locations of known Iron Age sites to the outputs of movement potential, we provide another line of evidence for arguing about reasons for and implications of changing settlement pattern.

12 **VISIBILITY, TOPOGRAPHY AND DISTRIBUTION OF THE EARLY BRONZE AGE HAFIT TOMBS IN THE AL-HAJAR MOUNTAINS IN SOUTHEAST ARABIA**

Kuronuma, Taichi (Research Institute for Languages and Cultures of Asia and Africa, Tokyo University of Foreign Studies) - Miki, Takehiro (The University of Tokyo) - Tanabe, Kantaro (The University of Tokyo) - Kondo, Yasuhisa (Research Institute for Humanity and Nature; The Graduate University for Advanced Studies, SOKENDAI)

Visibility is the key to considering the distributional pattern of tombs during the Early Bronze Age Hafit period in Southeast Arabia. Hafit tombs on hills along the broader wadi floodplains are typical landscapes that are often related to territoriality. However, the Hafit tombs are also distributed in the mountain region, such as on the highly visible cliff ridges or wadi slopes, indicating different landscapes in the cases of wide and open topographical conditions. Such a distribution is not likely related to territoriality but to other factors. This paper discusses the relationships between the distribution of Hafit tombs, local topography, and visibility in the Southeast Arabian mountain region based on the results of archaeological investigations in the Tanuf District, North-Central Oman. We have recorded more than 90 Hafit tombs distributed in and on narrow canyons, high plateaus, wide floodplains, and isolated hills. Their distributions differ according to local topographical conditions. Around the small basin and wide floodplains, tombs were built in highly visible areas, such as slopes and very shallow hills. At the junction between the mountain and the floodplains, the tombs are seamlessly distributed along the slopes, which are gentle enough to climb to the high plateaus of Jabal Al-Akhdar. Inside the canyon, we confirmed tombs on steep slopes and gentler slopes. Such distributional characteristics indicate the nexus of typical Hafit mortuary landscapes in open topographic conditions and mountain-specific landscapes, and the visibility of tombs functioned to guide the approach to the high plateaus of the Al-Hajar Mountains at the junction and inside the canyon. The distributional pattern of the Hafit tombs in the mountains relied on local topography and high visibility capability, possibly containing the concept of pass indicators.

13 **PERSISTENCE AND CHANGE IN SINGLE-CHAMBERED CAIRNS DURING THE SECOND HALF OF 3RD MILLENNIUM BCE IN THE OMAN PENINSULA**

Bortolini, Eugenio (Dept. of Cultural Heritage, University of Bologna, Italy) - Williams, Kimberly (Dept. of Anthropology, Temple University, Philadelphia, USA)

Tomb architecture and mortuary ritual in the Early Bronze Age of southeastern Arabia has long been thought about as a shift between single and smaller scale multiple interments in Hafit-Type cairns (3200-2700 BCE), and large scale communal interment in Umm an-Nar tombs (2700-2000 BCE). The fundamentals of interment in either of these structures stand in stark contrast to one another. The first involves the placement of a body and some mortuary goods in a cairn at a high place. The tomb is often used successively and the bod(ies) were disturbed during later reuse events (typically post Bronze Age, i.e. 1500 BCE through the late Pre-Islamic period, < CE 600). Umm an-Nar tombs, on the other hand, are true communal tombs where up to hundreds of individuals are interred and deliberately broken and commingled as part of the mortuary ritual. The authors have each considered the transition between these conditions and have identified intermediate forms and practices in both empirical and modeled data. In this paper, we go

further and consider cases of Umm an-Nar period groups who had either elaborate transitional cairns built for their interment or who were placed in more conservative (Hafit-Type?) cairns even when an appropriate communal tomb might have been available. Why did these tomb designs differentially persist? Can we glean any information about what life circumstances may have led to their exceptional interment situations? Are they exceptional at all? Are they all expression of reuse, or do they rather entail a portion of variability in funerary practices that defy current models of development in Early Bronze Age mortuary rituals of the Oman Peninsula?

14 **THE FIRST CAMPAIGN OF EXCAVATIONS AT MANAQI (AL-BATINAH SOUTH): DISCOVERING AN EARLY IRON AGE FUNERARY BUILDING**

Hesein, Mohamed Abdulhamed (Sultan Qaboos University) - Gernez, Guillaume (, Université Paris 1 Panthéon-Sorbonne) - Douglas, Khaled (Sultan Qaboos University) - Al-Jahwari, Nasser (Sultan Qaboos University)

Manaqi archaeological site is located in Rustaq (al-Batinah South) on the banks of the Wadi al-Ghashab. The banks of this wadi, surveyed in 2010 by the joint Omani-British team from the Department of Archaeology at Sultan Qaboos University (SQU) in Muscat and the Department of Archaeology at Durham University in the UK, revealed dense Iron Age occupation, with the notable presence of several settlements and at least one possible ritual site.

In January 2024, the SQU team conducted its first season of excavations to understand the organisation of one of these sites and determine its chronology and function. The excavation was undertaken in Area 1 of Manaqi, located at the top of an 8-metre-high alluvial terrace overlooking the whole wadi. Two large buildings were excavated: the largest and highest, building 1, was disturbed by several later tombs built on top of it but is promising based on its surface area, its architecture and the artefacts discovered on the surface, typically of the Early Iron Age II. It has only been superficially cleaned. Although partially excavated, building 2 is very enigmatic: its T-shape has yet to be known as the Iron Age equivalent in the region. While only foundation layers were found, it is above all the presence, inside and outside the building, of at least thirty infant and perinatal burials, most of them arranged along the walls, that raises the most questions: this atypical funerary complex, entirely devoted to burials of young children, is unique in Southeastern Arabia.

The construction, stratigraphy, chronology and function of these two buildings will be discussed based on the initial results of absolute dating, the preliminary study of the archaeological material and physical anthropology results, and the possible known parallels, the originality of the site, and the prospects for further research will be discussed.

15 **CORRIDOR-SHAPED TOMBS IN OMAN IN THE LATE 2ND MILLENNIUM BC: CONTINUITY OF COLLECTIVE PRACTICE AND THE EFFECT OF SOCIETAL EVOLUTION**

Genchi, Francesco (Sapienza University of Rome)

The talk aims to characterize the spread of an original type of collective monumental tomb, showing on the one hand the continuity of a very common practice in southeastern Arabia, and on the other hand the introduction of distinctive and innovative characters. Among the main and most striking features of the social complexity of the prehistoric communities of eastern Arabia is the funerary aspect characterized since the end of the fourth millennium by the construction of collective tombs. This trend increased during the Umm an-Nar phase and reaches its peak between Late Bronze Age and Early Iron Age with the introduction of the long and wide corridor-shaped tombs. From Bronze Age oases and contemporary coastal settlements surrounded, surmounted, and marked by hundreds of collective burials comes the construction of cemetery areas often composed of numerous collective underground tombs that were large, structurally complex, and had a strong identity value. They seem to represent a reflection of the tribal-based society that is fully delineated by the end of the second millennium BCE and leads to the construction of burial monuments capable of housing hundreds of individuals. The continuity of collective funerary practice alongside the variability of architecture thus offers us a unique and privileged perspective on social changes in the local population structure.

16 **A PROPOSED METHODOLOGY FOR THE REINTEGRATION OF CAIRN TOMBS: THE AL KHUDAIRAH NECROPOLIS**

Gómez Sanz, Paula (Universidad Autónoma de Madrid) - Alonso García, Alicia (Universidad Autónoma de Madrid) - Fernández Rodríguez, Carlos (Universidad Autónoma de Madrid) - Guerra García, Pablo (Universidad de Castilla-La Mancha) - del Cerro Linares, Carmen (Universidad Autónoma de Madrid)

Through this communication we seek to develop and propose an approach for the reintegration of cairn structures made of stone in the frame of the funerary world of the Oman peninsula (the Sultanate of Oman and the United Arab Emirates).

First of all, we will study and compare the different conservation and restoration interventions carried out in various funerary structures throughout the different peninsular necropolises. We will mainly focus in the architectonic reinte-

gration of funerary monuments and in the importance of the digital documentation of the original preservation status for the conservation of cultural heritage, which has gradually gained relevance due to the development of techniques such as photogrammetry.

Various archaeological teams in the Oman peninsula have already carried out different interventions focused on the restoration and reintegration of tombs. This is the case of Jabal Salut (C. Condoluci and M. Degli Esposti, 2015, *High Places in Oman: The Imto Excavations of Bronze and Iron Age Remains on Jabal Salut: 3*, *Quaderni Di Arabia Antica*, 3).

The main section of our communication will focus on the development of an approach for the calculation of architectural volumes and reintegration of funerary structures in stone. Tombs T18, T19 and T20 from the al Khudairah necropolis (emirate of Sharjah, UAE) will serve as an example. These tombs were excavated during the field seasons of 2020 and 2023 and will be the subject of a future intervention.

843 THE ?DATA RUSH? - ADAPTING TO THE CONSEQUENCES OF INCREASED QUANTITIES OF HIGH-QUALITY DATA IN ARCHAEOLOGICAL RESEARCH

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Ialongo, Nicola (University of Göttingen, Department of Pre- and Protohistory) - Cereda, Susanna (University of Innsbruck, Institute of Archaeologies) - Lago, Giancarlo (University of Bologna) - Johnson, Paul (University of Nottingham; Magnitude Surveys Ltd) - Mlekuz Vrhovnik, Dimitrij (University of Ljubljana; Institute for the Protection of Cultural Heritage of Slovenia)

Session format: Regular session

Over the course of several decades, archaeology has exhibited a growing reliance on an expanding corpus of data generated through the continuous evolution of techniques and methodologies. The integration of technological innovations and novel methodologies in archaeological research has not only led to an era of data accumulation but has also fundamentally reshaped models and theories.

Rather than simply providing straightforward answers to original questions, the wealth of information now at our disposal has undertaken a subtler, yet more profound role: it has shown that some of the previously held assumptions were either plain wrong, or more often considerably more nuanced than expected. The consequences of this data-winning frenzy invite a critical re-evaluation of long-standing paradigms.

This session aims to explore the transformative impact of data-driven approaches on the field of archaeology, and how they have reshaped our understanding of the past. Specifically, it will examine how the proliferation of data has profoundly affected the way archaeologists conceive and investigate key archaeological themes such as “migration”, “trade”, “adaptation”, “technological transfer”, “cultural change”, “human behaviour”, and more.

To stress the profound interdisciplinary nature of the topic and of the themes debated in archaeology, we welcome contributions from archaeologists, anthropologists, geoscientists, geneticists, and other related disciplines. The session will offer a platform for researchers to share their experiences, methodologies, and case studies that illustrate the impact of increasing data in transforming the way we conceive and tackle distinctive human phenomena. By bringing together experts in different fields, our aim is to foster discussions that will advance our collective understanding of a (big)data-driven archaeology.

Moving on from the words of philosopher Alison Wylie, who observes “how inquiry succeeds when evidence is sparse and uncertain”, and aim to explore how inquiry itself shapeshifts when the evidence is abundant and detailed.

ABSTRACTS

1 REFLECTIONS ON SCALE AND RESOLUTION IN ARCHAEOLOGICAL SURVEY DATASETS (REDUX): FROM HECTARES TO SQUARE-KILOMETERS (AND BACK)

Johnson, Paul (Magnitude Surveys Ltd; University of Nottingham)

It can be argued that developments in the equipment and methodologies used for archaeological prospection have resulted in “a technologically-driven tendency towards hyper-empiricism, and the collection of more data in the belief that enlarged datasets will inevitably lead to the revelation of answers to all of our questions”. In the UK, geophysical surveys for development-led projects encompassing over 1,000ha are now regularly commissioned, with expectations that the data will be collected and interpreted within relatively short timescales. While there is extensive discussion about the archiving and accessibility of such data, progress on moving the interrogation of these datasets beyond a simple assessment of “archaeological potential” is lagging. We are now at a point where geophysical survey datasets are no longer only suitable for locating individual sites, or their boundaries. It is increasingly feasible to ap-

proach whole poly-focal landscapes using these techniques. Previously research aiming to move beyond “the Site” has addressed concepts of “emptyscapes”, or deliberately targeted the gaps between known sites in order to try to understand what, in the terminology of traditional field survey would be referred to as the “off-site”. As the unit of study shifts and extends to encompass these useful – but perhaps now obsolescent – concepts as a matter of course, we return to a landscape that can be mapped and interrogated extensively, and also intensively. I have previously argued that self-reflection, and a recursive reappraisal of research questions and methodologies, is essential if we are to avoid falling into a hyper-empiricist paradigm which privileges the quantity of information collected over its quality, or its value for understanding the past. In this context, the challenge for Archaeological Prospection as a discipline is not “how do we collect more data”, but “how do we value the data we collect, and make it meaningful”.

2 LARGE-SCALE META-ANALYSIS AS A NEW FRONTIER FOR UNDERSTANDING PAST MOBILITY AND MIGRATION WITH ANCIENT DNA

Schmid, Clemens (Max Planck Institute for Evolutionary Anthropology; Max Planck Institute of Geoanthropology) - Schiffels, Stephan (Max Planck Institute for Evolutionary Anthropology)

Human archaeogenetics is a quickly accelerating field, now producing new data faster than individual researchers can keep track of and co-analyze. Recently, the threshold of genome-wide data for 10,000 ancient human individuals has been surpassed [1], with many of these samples featuring rich context information ranging from archaeological field observations to radiocarbon dating. This wealth of data poses both challenges and chances, first regarding data handling, storage and distribution, but then also concerning analysis, visualisation and the conceptualisation of research questions now coming within reach.

In this talk we will (i) give a brief overview over the data generated and available in human archaeogenetics and then (ii) introduce the genotype data management system Poseidon [2] as a potential solution for some of the key technical challenges emerging from the new abundance of data points between genetics and archaeology.

Finally and most importantly we will (iii) present our ongoing work on quantitative mobility estimation through spatiotemporal interpolation. Each archaeogenetic sample can be considered an informative observation for the reconstruction of a spatiotemporal ancestry field, which in turn enables a probabilistic similarity and “origin” search to obtain a derived mobility proxy [3]. This meta-analysis is only truly viable with large amounts of data and opens up a novel macro-perspective on past human mobility as measurable ancestry relocation. At the same time it paves the way towards methods that empower individual researchers to make use of the growing amount of reference data without getting overwhelmed.

[1] Ewen Callaway. ‘Truly gobsmacked’: Ancient-human genome count surpasses 10,000. In: *Nature* 617.7959 (2023). doi: 10.1038/d41586-023-01403-4

[2] <https://www.poseidon-adna.org>

[3] Clemens Schmid and Stephan Schiffels. Estimating human mobility in Holocene Western Eurasia with large-scale ancient genomic data. In: *PNAS* 120 (9) e2218375120 (2023). doi: 10.1073/pnas.2218375120.

3 GENDER VISIBILITY IN BURIAL PRACTICES OF PRE- AND PROTOHISTORIC EUROPE

Pape, Eleonore (Max Planck Institute for Evolutionary Anthropology, Department of Archaeogenetic)

Burials provide dual insights into two interconnected aspects of society: they reveal burial practices influenced by ideologies and illuminate the social and biological makeup of burial communities. Ideological practices can spread and shape societies over time, yet they may also obscure crucial information. For instance, collective burials with commingled remains and artifacts pose particular challenges for archaeologists in determining the social roles of the deceased, while cremation practices hinder biological structure analysis.

The transition from collective to single inhumation burial in much of Europe between the 4th and 3rd millennia BC has sparked prolonged debate. This shift is commonly associated with population movement, and with the ubiquitous development of increasingly hierarchical societies, where gender roles become clearer and (male) warriors gain significant stature. However, this transition in burial rites may also reveal previously obscured social structures. Determining gender and status in collective burials is particularly challenging, and patterns in Bronze and Iron Age single burials may perhaps not differ significantly from Neolithic practices preceding the collective burials.

Building on this premise, my research aims to assess the visibility of gender in selected single inhumation burial sites across Neolithic, Bronze Age, and Iron Age Central and Southern Europe. In the scope of my contribution, I will analyze and compare the gender and sex determinacy rates achieved by archaeologists, osteologists and geneticists in different regions and eras. I will explore the correlation between the spread of burial ideologies and shifts in societal structures concerning gendered practices and investigate whether the apparent increase in gender visibility in single burials during the 3rd millennium BC and thereafter could be rather attributed to methodological factors.

4 MEASURING UP? EXPLORING THE RELATIONSHIP BETWEEN THE 'DATA RUSH' AND ARCHAEOLOGICAL PROXIES FOR DEMOGRAPHY AND INEQUALITY

Lawrence, Dan (Durham University)

Archaeologists study unobservable past human behaviours through the observable material remains they leave behind. In order to bridge this gap, we use proxies – variables which we can measure in the present and which we assume correlate with the values and properties of variables we want to understand in the past. For example, past population levels can be reconstructed using data such as site counts or occupation areas. An under-discussed result of the 'data rush' described in the session abstract is that aggregated archaeological datasets can be used to create proxies which were not previously available. For example, summed probability distributions of radiocarbon dates, generated through the collection of vast databases of individual dates manipulated using a range of computational and statistical techniques, have provided an additional proxy for population. While this has allowed us to expand our capacity to extract meaning from the archaeological record, integrating new proxies into our archaeological toolkit presents theoretical and methodological challenges. This paper will consider how novel scales of data collection and integration have introduced new proxies in two major research areas in archaeology, demography and inequality, and reflect on how far the challenges which resulted have been resolved. In doing so, it will demonstrate how careful consideration of the meanings of proxies, and explicit discussion of their implications, limitations and biases, is critical to future work in archaeological data science.

5 DATA SELLS... BUT WHO'S BUYING? EXPLORING PROXIES OF ECONOMIC GROWTH IN BRONZE AGE EUROPE

Ialongo, Nicola (University of Göttingen)

There is a widespread perception that the European Bronze Age experienced steady economic growth. People, things, and ideas seem to circulate more frequently, in greater quantities, and farther away than ever before. At the same time, terms like globalisation, long-distance trade, market integration, and even money are becoming commonplace. Such a perception largely derives from the substantial investments of the last decades in partnerships between archaeology and the natural sciences.

Interestingly, a large portion of the ever-growing data-pool produced by these partnerships is qualitative in nature, and does not easily lend itself to quantification: We know that raw materials moved long distances, but we cannot pinpoint the provenance of single objects; we know that people moved long distances, but we cannot tell how many and where from; we see increasing inequality, but we cannot really put a number on it; we assume demographic growth, but we cannot obtain reliable figures.

This raises several questions: Did the economy really grow during the Bronze Age? And if it did, by what margin? And if growth cannot be quantified, how can we be sure that previous economies did not grow as well? Are existing data enough to answer these questions, or do we need new ones?

In this paper, I will illustrate ongoing research on pre-coinage money, and explore how quantitative approaches can reveal patterns of economic growth¹. Results suggest that the mass values of metal fragments are reliable proxies of consumption, opening unexplored scenarios for the quantification of prehistoric economies.

Metal objects are one of the most widely available form of data for the Bronze Age, and preliminary results encourage exploring new ways to extract information from common, yet perhaps underestimated sources.

1. Ialongo, N. & Lago, G. Consumption Patterns in Prehistoric Europe Are Consistent with Modern Behaviour. <https://www.researchsquare.com/article/rs-3282505/v1> (2023) doi:10.21203/rs.3.rs-3282505/v1.

6 NEW PERSPECTIVES IN QUANTITATIVE ARCHAEOLOGY: DATA DRIVEN APPROACHES IN POTTERY ANALYSIS

Cardarelli, Lorenzo (University of Roma La Sapienza; CNR - Istituto di Scienze del Patrimonio Culturale)

The analysis and study of ceramics plays a central role in archaeology, providing insights into technology, cultural exchange, and chronological indicators. Traditionally, ceramic analysis has relied on empirical methods involving the definition of classifications or typologies as a prelude to further investigation. This paper explores the transformative impact of the integration of new technologies, in particular machine learning and broader computer science concepts such as big data, on archaeological ceramic studies. Indeed, the integration of these technologies spans several stages, from the creation and management of datasets (object detection, information retrieval) to analysis (exploratory and predictive analyses) and dissemination of results (replicable processes, shared repositories, software libraries). This shift leads to significant simplifications and improvements in ceramic studies, including accelerated dataset creation through computer vision pipelines, automatic classification algorithms, statistical analysis for images and text, and the sharing of datasets and analysis functionality through repositories and software libraries. This paradigm shift implies a

change in perspective and approach to archaeological ceramic studies. The automation of large-scale data processing, together with automated analysis and classification, marks a clear departure from traditional qualitative approaches, often based on a limited number of artefacts. This paper aims to illustrate the potential benefits, limitations, and future prospects of a data-driven approach to archaeological ceramic studies. By reflecting on these issues, this paper not only assesses the impact and prospects of these methods, but also encourages consideration of existing empirical tools and methodologies used in ceramic studies. Such an approach facilitates a comprehensive understanding of the implications, challenges, and opportunities of data-driven archaeological ceramic research.

7 SUBJECTIVITY AND REFLEXIVITY AS FOUNDATION FOR AN EXTRAORDINARILY FERTILE COLLABORATION BETWEEN ARCHITECTURE AND ARCHAEOLOGY

Toulouse, Catherine (Lengyel Toulouse Architects) - Lengyel, Dominik (BTU Brandenburg University of Technology Cottbus-Senftenberg)

Reflexivity is a process that can not only challenge one's own actions, but also directly enriches them as an agency, namely when the medium is transcended. A very common procedure in every design discipline consists of transferring thoughts, primarily design thoughts of course, but essentially still vague ideas about a complex issue, by translating them into a drawing, a reflexive observation, as it were from the outside. No less subjective than the initial concept, the observation of the same takes on an illusory objectivity, which particularly encourages reflection. However, this design thinking also works in archaeology, only it works differently at first. Here, too, drawings encourage reflection. In architecture, however, the special expertise lies in giving concrete form to even extraordinarily vague ideas. The step by step progression from a rough volumetric cubature to the final design version is comparable to the gradual process of discovery in archaeology. Faithfulness to facts thus becomes faithfulness to hypotheses, literally, when the aim is to create a meaningful architectural vision with as little added as possible, just as it is for a building contractor. Seeing one's own design, or hypothesis, in a different light also influences one's view of the outside world. Above all, however, it stimulates self-reflection. A series of practical examples, all of which were developed in close collaboration between architecture and archaeology, shall be used to present and explain the potential of this combination of subjectivity and reflexivity.

845 TRANS-ADRIATIC DYNAMICS: LATE BRONZE TO EARLY IRON AGE MATT-PAINTED POTTERY IN THE SOUTHWESTERN BALKANS AND SOUTHERN ITALY

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Pavuk, Peter (Institute of Classical Archaeology, Charles University, Prague) - Krapf, Tobias (Swiss School of Archaeology in Greece) - Bernardo-Ciddio, Leah (Interdepartmental Program in Ancient Mediterranean Art and Archaeology, University of Michigan) - Iacono, Francesco (Dipartimento di Storie Cultura e Civiltà)

Session format: Regular session

The topic of LBA/EIA Matt-painted pottery on both sides of the Adriatic Sea has intermittently sparked discussions for some time now, resulting in several comprehensive studies examining the material from both regions. However, the subject has rarely been approached as a cohesive unit and it has been over 15 years since the last significant survey of material on the Eastern side of the Adriatic (Horejs 2007). While not all regions have provided substantial new evidence, notable discoveries have been made, particularly on the Western side of the Adriatic.

The session aims to bring together experts currently researching matt-painted pottery in the broader region encompassing Southern Italy, Albania, the Republic of North Macedonia, and Greece. The goal is to discuss both old and new evidence, highlighting the continuity from approximately the 15th to 7th century BC, while also examining distinct regional variations. Additionally, the session seeks to explore potential connections between the two Adriatic coasts concerning the transfer of style, knowledge, and materials. We welcome input on new developments in technology, provenance analyses, radiocarbon dating, and contextual analysis.

ABSTRACTS

1 ON THE WAY NORTH, WEST, AND EAST: AEGEAN MATT-PAINTED WARES IN THE EARLY LATE BRONZE AGE

Pavuk, Peter (Institute of Classical Archaeology, Charles University, Prague) - Krapf, Tobias (Swiss School of Archaeology in Greece) - Iacono, Francesco (Dipartimento di Storia Culture Civiltà, Università di Bologna) - Bernardo Ciddio, Leah (Department of Classical Studies, University of Michigan)

Matt-painted wares (MPW) have traditionally been associated with the Middle Bronze Age on the Greek mainland, particularly with the island of Aegina. However, it is now understood that there is not one unified version of MPW;

rather, there exists a whole variety, likely stemming from several larger exporting workshops and numerous smaller, more locally focused ones. Additionally, it has become clear that Central Greece played an important role, being home to many of these workshops. Furthermore, there is evident development over time, both within individual workshops and among them. Particularly noteworthy is the spread of MPWs towards the end of the Aegean Middle Bronze Age, extending not only to the North but also to the East and West, as both imports and locally produced items. This paper aims to provide insight into the factors preceding these later developments and the origins from which they emerge, setting the stage for further exploration in other papers within this session. It will also sketch the different terminologies used between Aegean, Italy and the Balkans.

2 MOVING AROUND THE TELL SETTLEMENTS OF CENTRAL MACEDONIA, GREECE: THE CASE OF LATE BRONZE AGE MATT PAINTED POTTERY

Vliora, Evagelia (Aristotle University of Thessaloniki) - Kiriati, Evangelia (Fitch Laboratory, British School at Athens)

The introduction of Matt Painted pottery among the LBA prehistoric societies in Central Macedonia, Greece, has often attracted the interest of researchers during the last decades. The elaborate painted decoration of the matt painted vessels was often attributed to the presence of skilled potters who were receptive to stimuli from neighbouring areas, mostly to the South. The published material from excavations conducted during the second half of the 20th century such as those of Kastanas, Ayios Mamas, Assiros Toumba and Thessaloniki Toumba have significantly enriched our understanding of Bronze Age in the region. However, a cohesive comparative study of pottery from the tell settlements of the region was until recently missing. Our study aimed to fill this gap by applying a comprehensive, interdisciplinary approach in the study of table wares from this area. The study combined the detailed macroscopic typological and technological examination with the use of ceramic petrology. The pottery assemblages involved derived primarily from Thessaloniki Toumba and from several other sites located in neighbouring parts of Central Macedonia. The technological characterization of the pottery and the reconstruction of the manufacturing process indicated that the matt painted ware stood apart from the undecorated tableware for their relative standardization, suggesting a consistent range of potter's choices and a limited number of production locations. The results of this interdisciplinary analysis revealed some interesting patterns concerning intra- and inter- regional mobility dynamics in Central Macedonia as well as some new evidence on issues of cohesion and identity among the communities at least towards the very end of the LBA. In the presentation, the social implications of these observations will be discussed both in the intra-community and in a regional level.

3 THE MATT-PAINTED POTTERY OF THE LATE BRONZE AGE ULANCI CULTURAL GROUP SHAPES, DECORATIVE MOTIFS AND CHRONOLOGY

Videski, Zlatko (Archaeological museum of the Republic of North Macedonia)

With the new researches, the amount of matt-painted pottery discovered in the territory of the UlanCI cultural group is increasing, which highlights the need for its definition and systematization. Matt-painted pottery represent the most characteristic category of findings through which the strong Aegean influence present in the Late Bronze Age in R. N. Macedonia. In addition to the new way of making, with the use of quality clay and with the new way of decoration, with the choice of new decorative motifs, is also characteristic the appearance of new pottery forms, which represent local copies of the Helladic ceramic production. According to the pottery forms present, matt-painted pottery can be divided into two subgroups: local matt-painted and local Mycenaeanized pottery.

The local matt-painted pottery is represented by the kantharos form, which is an expression of the nurturing of the local pottery tradition that takes on a new look under the influence of the pottery from the south. When performing the decoration, there is a lack of decorative motifs, so the motif of a full and hatched zig-zag line is typical and is found only in this pottery form. Local Mycenaean pottery consists of the new forms of the alabastron and amphoriskoi, which represent local handmade copies of Mycenaean pottery. In the decoration, this southern influence is most pronounced through the Late Helladic way of dividing the surface of the vessel with horizontal lines and the choice of the main motifs. The motifs of hatched and solid colored triangles, a running spiral and hatched stripes are present, and the combination of two motifs on one vessel is also characteristic.

4 BETWEEN REGIONAL CONFINEMENT AND CULTURAL TRANSMISSION: STYLISTIC ATTRIBUTES OF MATT-PAINTED POTTERY IN SOUTHERN ALBANIA AND ADJACENT AREAS

Krapf, Tobias (Swiss School of Archaeology in Greece; University of Lausanne) - Agolli, Esmeralda (Department of Archaeology and Culture Heritage, University of Tirana)

There is hardly any type of pottery in the late prehistoric southwestern Balkans that has received comparable scholarly attention to the matt-painted. Widely encountered in four modern countries (Greece, the Republic of North Mace-

donia, Albania, and southern Italy), matt-painted pottery has been perceived as a key material for the understanding of the Late Bronze and Early Iron Age. Furthermore, major attention has been given to issues regarding its origin or even its motherland, queries vigorously implied by nationalistic agendas aiming to align modern nation borders with prehistoric ones.

Recent research on late prehistoric pottery around the area has increasingly expanded its focus, addressing various questions about technology, modes of production, models of cultural transmission, and, of course, forms of regional and interregional networks. The properties of matt-painted pottery especially when different attributes such as the composition of motifs, fabric, shaping technique, vessel shape and size are combined, maintain great potential to explore routes of interaction as well as the nature of exchange within and between the communities that chose to adopt this stylistic feature into their local pottery production.

Against this backdrop, in the present paper, we focus on the stylistic properties of the matt-painted pottery encountered in southern Albania and adjacent areas, and analyse the quantitative profile of its regional and intraregional distribution. An important aspect is to clarify issues concerning the chronology and internal evolution of these productions. We argue that despite its extensive distribution around the southwestern Balkans and southern Italy, the matt-painted pottery developed within the socio-economic confines of the communities that produced it. In this context, we will briefly examine the scarce evidence from the Albanian coast, before posing the question about the region's involvement in presumed trans-Adriatic dynamics.

5 A PXRF STUDY OF BRONZE- AND EARLY IRON AGE MATT-PAINTED POTTERY FROM ALBANIA, EPIRUS AND CENTRAL GREECE

Aslaksen, Ole Christian (Independent)

The aim of this paper is to present the results of a collaborative pXRF survey of pottery from the Southeastern Albania (Sovjan, Barç, Maliq and Staro Selo), Epirus (Krya, Liatovouni, Dodona, Vitsa and Kastritsa) and Central Greece (Agia Paraskevi and Lianokladi) dating to the Bronze Age and Early Iron Age. With an emphasis on the Albanian and Epirote material, this paper is focused on the regional traits of the matt-painted pottery, but also compares it to other pottery types and wares found at the key sites of this study. The paints themselves are also included in the framework of the study presented here, with a regional focus. The material from Agia Paraskevi and Lianokladi is added as it may inform on the relation between communities producing matt painted pottery located within the same valley, but also as Central Greece is part of the discourse concerning the spread of matt painted pottery between regions. The matt painted pottery from Albania and Epirus shows localism not only in style but also chemistry. The study was conducted as a collaboration between the French Albanian Archaeological Mission in the Korçë Basin, Ephorate of Antiquities of Ioannina, Ephorate of Antiquities of Phtiotis and Evrytania and the University of Gothenburg, with funding from the Bank of Sweden Tercentenary Foundation.

6 MATT PAINTED POTTERY FROM THE REGION AROUND GREAT LAKES: NEW CHRONOLOGICAL EVIDENCE

Ardjanliev, Pero (National Archaeological museum of North Macedonia)

The subject of research in this study will be Matt painted pottery from the region around the Great Lakes. This name for the region was first established in archaeological science by Bouzek in his capital work „Graeco-Macedonian Bronzes. Analysis and chronology“. The main geographical characteristic of the region subject to this study are the lake systems of Lake Ohrid, both Prespa lakes and the recently dried Lake Maliq. This lake region, later historically attributed to the Dassaretai, has a very favourable geographic position, providing the best direct connection between the Aegean and the Adriatic coast. Considering the geography of the region and taking into account the importance of river valleys as main communications in the past, we come to the conclusion that it represents an important cross-road in this part of the Balkan peninsula. This can be concluded from the discovered archaeological remains and the discovered settlements and necropolises that cover the entire period of human activity in the past in the region.

The main feature of the material culture in the region in this so-called transition period from the Late Bronze Age to the Early Iron Age is the appearance of the local Matt painted pottery.

There are various debates in archaeological science about Matt painted pottery, such as the reasons for the distribution of the pottery, its origin and of course its chronological determination. Here, with the help of the results of the latest research, we will try to determine the chronological framework of this phenomenon in the Great Lakes region.

7 THE BLACK AND THE WHITE: THE EMERGENCE OF SOUTHERN ITALIAN PROTOGEOMETRIC POTTERY THROUGH THE PRISM OF ROCA VECCHIA

Iacono, Francesco (Dipartimento di Storie Cultura e Civiltà) - Guglielmino, Riccardo (University of Salento) - Coluccia, Luigi (Università del Salento / Università di Foggia)

Southern Italian Protogeometric wares, a peculiar class of dark-on-light painted pottery, emerged at some point toward the very end of the second millennium BC in southern Italy, in a context which was dominated by connections with the Aegean world on the one side, and a range of diverse areas, including both the northern Adriatic and the Balkans on the other. In this paper we will try to explore, through the lens of the archaeological record of the important Bronze Age hub of Roca Vecchia, the role played by this pottery in southern Italian societies of the late 2nd millennium BC. At Roca the Protogeometric repertoire is abundant and dated to a non-final phase of the Final Bronze Age/Protovillanovan, roughly contemporary to the early material of this class recorded elsewhere in the Central Mediterranean (e.g. at Lipari). Through a stylistic and contextual examination of Southern Italian Protogeometric finds we will try to explore the significance of this pottery at crucial junction of the development of society of peninsular Italy at the end of the Bronze Age.

8 EXPLORING PRODUCTION PROFILES AND COMMUNITY DYNAMICS: SALENTO'S MATT-PAINTED POTTERY REVISITED

Bernardo-Ciddio, Leah (University of Michigan)

Building on the important early work of De Juliis and Yntema on the matt-painted pottery of southern Italy, a new generation of scholars has continued to address regional matt-painted productions through new methodologies and theoretical perspectives.

The expansion of theoretical discourse on transmission of technical knowledge and habits, the phenomenon of innovation, and the social contexts of learning has allowed scholars to deploy the chaîne opératoire approach, originally rooted in French ethnography and then applied to the description of manufacture of lithics. Roux and Courty, whose application of this approach to identify the technical signatures of potting communities of practice in the archaeological record, have produced a model and body of work that has been enormously influential. The archaeologists of today are thus able to approach ceramic production evidence from a producer-focused approach, examining new finds with a close eye for the traces left behind by the actual production sequences in an attempt to discern intra- and inter-site social realities.

This approach has been applied to address the production of south Italian matt-painted pottery, most recently by Fasanella Masci, Barresi, and Kleibrink in Calabria. The results of their work have highlighted the potential for this approach to use material excavated in the past to shed new light on social realities in other regions.

In this paper, I will present the preliminary results arising from my close study of previously excavated matt-painted pottery from the Borgo Nuovo deposit at Taranto, excavated settlement contexts at Otranto, and limited survey and excavations at other sites in Salento. Comparison of these datasets allows for examination of production practices through an important period that includes the emergence of distinct regional style in this part of Apulia and the adjustment by local potters to a period of increased exchange and human mobility within the South Adriatic.

9 THE MATT-PAINTED POTTERY FROM INCORONATA (ITALY). CONTEXTS, PRODUCTIONS AND ICONOGRAPHIES

Vita, Cesare (Université Rennes 2)

This communication aims to discuss craft issues related to the matt-painted pottery and their function and consumption in the contexts put in light at Incoronata in Southern Italy. This Oenotrian site, subject of archaeological investigations since 1971, and situated only 7 km from the Ionian coast of today's Basilicata region, has been occupied from the 9th century BCE. While the initial phase was characterised only by indigenous frequentation, from the beginning of 7th BCE this was also the place of encounter with Aegean communities, thus making Incoronata a key site for the understanding of the dynamics of Greek-Indigenous interactions before the foundation of the Greek colony of Metaponto. Starting from the presentation of the indigenous contexts, and then passing to the mixed Greek-Indigenous ones, the paper will highlight the use of the matt-painted pottery as prestigious objects in the ritual activities. It will also address the subject of decoration styles and the meaning of some iconographies, through the comparisons of regional similarities and differences; finally, it will present the results of recent archaeometric analyses.

10 DYNAMICS OF INTERACTION AND COMMENSALITY THROUGH THE INVESTIGATION OF TECHNOLOGY AND FUNCTION OF THE MATT-PAINTED POTTERY OF SALENTO (SOUTHEAST ITALY)

Notarstefano, Florinda (University of Salento) - Semeraro, Grazia (University of Salento) - D'Alfonso, Serena (University of Salento) - Sabetta, Gaia (University of Salento)

In the last decades, multidisciplinary scientific research and projects have been applied to the study of the settlement system, landscapes and internal organization of ancient sites in southern Puglia. These investigations allowed recognizing a complex settlement system, characterized by a general process of expansion in the second half of the 8th century BC, a period marked by intense demographic growth, mobility and exchanges between populations, documented by an increasing number of hut villages indicating the presence of organized communities in the Salento peninsula. In these villages, the archaeological research revealed aspects of daily life as well as significant evidence of ceremonial practices, evidenced by the particular incidence of lapygian Late Geometric matt-painted vessels, sometimes associated with Corinthian geometric ceramics. In the lapygian villages of Salento, some of the individual dwellings seem to play a dominant role with respect to the surrounding structures as shown by the presence of imported Greek vessels, linked to wine consumption and commensal practices. On the other hand, the matt-painted pottery of Salento has many signs of regional stylistic coherence in the 8th century BC along with the adoption of new shapes, a growing complexity of the decorative motifs and the reoccurring set of drinking vessels. Furthermore, the pottery shapes and the use alteration traces on the interior of vessels show comparisons with those observed in containers used for alcohol fermentation reported in many ethnoarchaeological studies. The contextual and functional analysis carried out through the study of vessel technology, use-wear and organic residue analysis provided insights into the development of commensal practices that possibly could have involved the production and consumption of fermented beverages in the Iron Age settlements. This work is part of the PRIN PNRR 2022 project "POTOR. People, Pots and Drinks. An interdisciplinary approach to drinking and commensal practices in pre-Roman southern Italy".

11 THE EARLY IRON AGE MATT-PAINTED POTTERY OF THE IONIAN ISLANDS: SOME PRELIMINARY REMARKS

Haywood, Christina (University College Dublin)

This paper will discuss some finds of handmade pottery from the Ionian Islands that fit in the category of Iron Age matt-painted pottery. These pieces come from caves and settlement sites in Ithaca, Kefalonia and Lefkas. Some of the material is new and some comes from old excavations, but was unrecognised, poorly published or remains unpublished. Stylistically it is not a uniform lot. Various questions arise from the preliminary study of this material and will be raised in this paper: firstly, how can it be recognized as Early Iron Age and how can it be distinguished from the local Middle Bronze Age Matt-painted ware; secondly, how is it related to the latter if at all; thirdly, what is its relationship with the local fineware pottery from Late Bronze Age to the Protogeometric periods. Last, but not least, what are its stylistic and chronological connections with the matt-painted pottery of Greek mainland regions, mainly neighbouring Aitolakarnania and Achaia but also beyond, and what do these mean in terms of potters' choices, connectivity and the mobility of people.

12 DAUNIAN MATT-PAINTED POTTERY FROM NORTHERN DALMATIA: NEW PERSPECTIVES FROM THE NADIN-GRADINA SITE

Celhar, Martina (University of Zadar) - Zaro, Gregory (University of Maine)

Matt-painted pottery of southern Italy is one of the region's most recognizable and distinctive artifact classes, and its distribution around the Adriatic reflects tight exchange networks among different communities. In the eastern Adriatic, it was widely distributed from the 9th century BC, with the oldest type (South-Italian Early Geometric) thus far concentrated in middle Dalmatia only. However, the most abundant quantity to date is found in Istria, the Kvarner region, and in northern Dalmatia. In Northern Dalmatia, Daunian matt-painted pottery has been documented at 16 different sites, including the archaeological site of Nadin-Gradina, the focus of this study. Nadin-Gradina lies in the Ravni Kotari region along Croatia's Adriatic coast and has long been recognized as one of the largest and most distinctive Liburnian Iron Age and Roman settlements in Dalmatia. In 2015, the Nadin-Gradina Archaeological Project began systematic excavation on the hillfort settlement. Daunian matt-painted pottery was recovered from nearly every settlement layer, from the late 9th/8th to 5th century BC, suggesting that it was a fairly common commodity within the Nadin community. These objects have been frequently discussed as foreign prestige goods, clearly distinguished from locally produced coarse ware by their fine paste and painted ornamentation. However, one Daunian Middle Geometric olla was filled with cereals and recovered from a storage feature. This unique context raises questions about how these foreign "luxury" items were actually perceived and what meaning it may have held within the Nadin-Gradina community.

848 THE ARCHAEOGENETICS OF ANCIENT ITALY: SOCIO-CULTURAL CHANGES, INTERACTION AND MOBILITY FROM PREHISTORY TO THE MIDDLE AGES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Fontani, Francesco (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology; Department of Cultural Heritage, University of Bologna) - Sabatini, Serena (University of Gothenburg) - Vai, Stefania (Department of Biology, University of Florence) - Scorrano, Gabriele (University of Copenhagen)

Session format: Regular session

Italy's unique position in the Mediterranean and its diverse geographical features, including the Alps and the Apennine range, have shaped its complex history and demography. In recent decades, archaeogenetics has revolutionized our understanding of population dynamics, social structures, and kinship networks in ancient Italy, revealing patterns of ancestry and social organization that traditional archaeology alone could not uncover. This interdisciplinary approach has also prompted critical discussions regarding interpretative models and the association between genetics and culture. This session aims to explore how the integration of archaeogenetics with traditional archaeological methods can deepen our understanding of Italy's past, from prehistory to the Middle Ages. We focus on the intricate relationship between genetic and cultural variations across the Italian peninsula and the broader Mediterranean region. Seeking to foster dialogue among researchers working on different aspects of Italy's archaeological and genetic heritage, we invite papers that leverage multidisciplinary methods, integrating archaeogenetics with studies on diet, mobility, demographics, and anthropology. Contributions should provide new perspectives on population genomics in ancient Italy, exploring themes such as continuity and change in social organization, kinship, social stratification, gender, and ethnicity. We encourage submissions that present fine-tuned case studies, innovative models of past population patterns, and critical analyses of big data modeling's impact on our perception of past population genomics. By integrating diverse approaches and datasets, we aim to offer fresh insights into the archaeological discipline and the role of the Italian peninsula in the ancient Mediterranean world, addressing questions of cultural and genetic interplay at various scales, from site-specific to interregional analyses. In addition to the primary proponents, this session will benefit from the co-organizational expertise and support of Dr. Serena Aneli (University of Turin) and Dr. Alissa Mittnik (Max Planck Institute for Evolutionary Anthropology and Harvard University).

ABSTRACTS

1 THE BIOMOLECULAR PROFILE OF 17,000-YEAR-OLD HUMAN REMAINS FROM RIPARO TAGLIENTE

Posth, Cosimo (University of Tübingen) - Efe Yavuz, Orhan (University of Tübingen) - Oxilia, Gregorio (University of Bologna) - Silvestrini, Sara (University of Bologna) - Tassoni, Laura (University of Bologna) - Drucker, Dorothée (Senckenberg Centre for Human Evolution and Palaeoenvironment at the University of Tübingen) - Talamo, Sahra (University of Bologna) - Fontana, Federica (University of Ferrara) - Benazzi, Stefano (University of Bologna)

The Epigravettian human remains from the Tagliente rockshelter in northern Italy represent some of the earliest evidence of human occupation in the southern Alpine slope after the Last Glacial Maximum. However, the biological relationships between the Tagliente 1 postcranial skeleton and the Tagliente 2 mandible remain unknown. Here, we apply state-of-the-art paleogenomic, isotopic and radiocarbon dating techniques on a femur fragment of Tagliente 1 and compare the results to previously published data from Tagliente 2. Despite showing different isotopic signatures and non-overlapping radiocarbon dates, we reveal close genetic relatedness between the two human remains. We demonstrate that the distinct isotopic values can be explained by different dietary practices, whereas the discrepancy in dating can be caused by a minor ^{14}C contamination, possibly stemming from post-excavation conservation treatments. These findings highlight the importance of interdisciplinary biomolecular studies in offering new perspectives on the Upper Palaeolithic fossil record and addressing long-standing bioarchaeological questions.

2 UNCOVERING THE GENOMIC STRUCTURE OF PREHISTORIC INDIVIDUALS FROM THE ICEMAN'S TERRITORY IN THE EASTERN ITALIAN ALPS

Coia, Valentina (EURAC Research, Institute for Mummy Studies) - Croze, Myriam (EURAC Research, Institute for Mummy Studies) - Paladin, Alice (EURAC Research, Institute for Mummy Studies) - Zingale, Stefania (EURAC Research, Institute for Mummy Studies) - Maixner, Frank (EURAC Research, Institute for Mummy Studies) - Günther, Torsten (Department of Organismal Biology, Evolutionary Biology Centre, Uppsala University) - Zink, Albert (EURAC Research, Institute for Mummy Studies) - Pedrotti, Annaluisa (Department of Humanities, University of Trento)

The Eastern Italian Alps played a crucial role as a bridge between the Mediterranean and the Northern Alps, and several cultural contacts are documented in this area since prehistory. However, thus far, genomically analysed prehistoric samples from this strategic area have consisted of only one Upper Palaeolithic (Villabruna) and a few Copper Age individuals, including the Tyrolean Iceman. Therefore, to define the genetic structure of alpine prehistoric groups and investigate whether cultural contacts were accompanied by genetic exchanges, we extended the genomic analyses (shotgun and capture data) to other 47 individuals from 17 archaeological sites radiocarbon dated from the Mesolithic (6380-6107 cal. BCE) to the Middle Bronze Age (1601-1295 cal. BCE).

The Mesolithic sample shows high genomic affinity with Western Hunter-Gatherers (WHGs), also with genomic contribution (~16%) from Eastern HGs, indicating genetic admixture between these two HG groups dating back at least from ~6400 cal. BCE. The alpine Neolithic genomes indicate a genetic shift associated with the arrival of the first farmers from Anatolia, showing a high Early-farmer-related ancestry (average ~87%) with limited contribution from HGs (~13%). The same ancestral model persists in most alpine individuals from the Neolithic onwards, with few changes, also evident at the Y-chromosomal level. Limited genetic impact was observed from groups carrying steppe-related ancestry, although this ancestry reached the Eastern Italian Alps, possibly through trans-alpine migrations, at least from ~2400 cal. BCE, earlier than it has been observed in northern Italy (~2200 cal. BCE). Another genetic component related to Neolithic Iranians was detected in the Eastern Italian Alps, possibly introduced through migrations of groups from southern areas. In summary, although our study highlights some gene flow from groups of different origins, it suggests also a certain genetic continuity over time in the Eastern Italian Alps compared to other European areas.

3 PALEOGENOMIC ANALYSIS IN A MULTIDISCIPLINARY FRAMEWORK FOR A FINE DESCRIPTION OF A COPPER AGE SITE: CORNA NIBBIA DI BIONE (BRESCIA)

Savarino, Francesco (Department of Biology, University of Florence) - Vanni, Margherita (Department of Biology, University of Florence) - Modi, Alessandra (Department of Biology, University of Florence) - Pizzolo, Giovanna (Department of Historical Sciences and Cultural Heritage University of Siena) - Dori, Irene (Department of Biology, University of Florence) - Moggi Cecchi, Jacopo (Department of Biology, University of Florence) - Baioni, Marco (Valle Sabbia Archaeological Museum - Gavardo (BS)) - Caramelli, David (Department of Biology, University of Florence) - Lo Vetto, Domenico (Department of History, Archaeology, Geography, Art and Entertainment (SAGAS); Florentine Museum and Institute of Prehistory Paolo Graziosi) - Vai, Stefania (Department of Biology, University of Florence)

Corna Nibbia is a rock shelter in the municipality of Bione (Brescia, Northern Italy), investigated by the Superintendence of Archaeological Heritage of Lombardy and the Archaeological Museum of Valle Sabbia di Gavardo from 2000 to 2010. The first evidence of human frequentation of the site dates back at around 3400 BCE (Copper Age) and continues (with phases of abandonment) intensively until around 900 BCE (Recent/Final Bronze Age). A funerary area delimited by two enclosures, associated to the "Culture of Civitate", was characterized by a secondary burial of scattered human remains with signs of crushing and sometimes semi-combustion, from which at least 29 individuals were estimated. A multidisciplinary study was set up and it involves archaeology, anthropology, paleogenomic and landscape archaeology: the aim is to provide a detailed picture of the community who frequented the site. We started from the whole genome analysis of all the petrous bones available, corresponding to 9 individuals. The biological portrait (sex, phenotypic traits, state of health, diet, mobility, and kinship relations) together with a fine analysis of the settlement characteristics and of the cultural dynamics will be provided and compared at a local and multi-regional level. The data obtained from each discipline are constantly integrated and managed through a GIS, allowing the creation of interpretative models. The results will lead us to evaluate the timing of use of the necropolis and the ritual patterns, suggested by the criteria of selection of the individuals, their position in the burial area and the relationships between them. In addition to this fine-scale description of the site, these data will provide novel information about the genetic variability in the Mediterranean area during the Copper Age.

4 GENOMIC ANALYSIS OF HUMAN SKELETAL REMAINS FROM THE ANCIENT BRONZE AGE NECROPOLIS OF VIGGIANO (PZ, BASILICATA, ITALY)

Lucci, Michaela (Sapienza University of Rome) - Antonelli, Lorenzo (Department of Environmental Biology, Sapienza University of Rome, Italy) - Coppa, Alfredo (Department of Environmental Biology, Sapienza University of Rome, Italy; Department of Evolutionary Anthropology, University of Vienna, Austria; Department of Genetics, Harvard Medical School, Boston (MA), USA) - La Pastina, Francesco (Department of Environmental Biology, Sapienza University of Rome, Italy) - Mittnik, Alissa (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Department of Genetics, Harvard Medical School, Boston (MA), USA; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA) - Natali, Elana (Freelance researcher, via Firenze 36 - 17100 Savona, Italy.) - Rohland, Nadin (Department of Genetics, Harvard Medical School, Boston (MA), USA; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA) - Pinhasi, Ron (Department of Evolutionary Anthropology, University of Vienna, Austria) - Reich, David (Department of Genetics, Harvard Medical School, Boston (MA), USA; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA) - Fernandes, Daniel (Institute of Geosciences, Goethe University Frankfurt, Frankfurt, Germany; Research Centre for Anthropology and Health (CIAS), Department of Life Sciences, University of Coimbra, Coimbra, Portugal; Department of Evolutionary Anthropology, University of Vienna, Austria)

The Viggiano necropolis is located in the Upper Agri Valley (647 meters above sea level), in the province of Potenza (Basilicata, Italy). Excavations, conducted in 2003 as part of the works for the construction of the Eni Viggiano-Taranto oil pipeline, brought to light, above the Neolithic levels, the remains of a funerary structure chronologically relevant to the Early Bronze Age, dated 2035-1900 calBCE (3620±20 BP, PSUAMS-12701).

The necropolis uncovered 11 burials, including two with two skeletons, with a total of 13 individuals, 11 of which had skeletal remains that could be studied, relating to eight adults and three children. Of these individuals, eight yielded positive results for genomic analysis. Almost all the individuals analyzed are male, 7 out of 8, including children, and 6 are related to relatives up to the fourth degree, all male. Of these three are brothers, one is the son of one of the brothers, and the remainder are two first cousins.

The Y Chromosome haplogroups are all subclades of R-M269 (R1b1a1b) heavily introduced to Europe through the large steppe migrations of the Late Neolithic.

The haplogroups of the mitochondrial genome are T2, found throughout Europe, North Africa, and Central Asia as far as Siberia, and haplogroup H, which is the most common and most diverse maternal lineage in Europe, most of the Middle East, and the Caucasus region.

The PCA of the Viggiano individuals shows that the occupied area is shared with other Early Bronze Age and Middle Bronze Age individuals from Sicily and also with Early Bronze Age populations from Spain, just as, although more distant than the Neolithic of Sardinia.

This study begins to shed light on a still little-known period of peninsular Italy.

5 GENETIC ANCESTRY AND KINSHIP PRACTICES IN MIDDLE BRONZE AGE CALABRIA

Fontani, Francesco (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology; Department of Cultural Heritage, University of Bologna) - Larocca, Felice (Speleo-archaeological Research Centre "Enzo dei Medici") - Cilli, Elisabetta (Department of Cultural Heritage, University of Bologna) - Luiselli, Donata (Department of Cultural Heritage, University of Bologna) - Stockhammer, Philipp (Institute for Pre- and Protohistoric Archaeology and Archaeology of the Roman Provinces, Ludwig Maximilian University Munich; Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology) - Krause, Johannes (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology) - Mittnik, Alissa (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology)

Located at the center of the Mediterranean Basin, at the "tip" of the Italian boot, the territory of present-day Calabria is characterized by a richness in natural resources and an extremely inhomogeneous landscape. Its strategic position as a bridge to Sicily and its wealth in minerals spurred several waves of migrations and colonization of the region since the Early Neolithic up to the modern era, both on coastal and inner mountain areas. Moreover, coastal sites experienced millennia of maritime contacts. While more recent events, such as the Hellenic colonization, are well documented on the archaeological record, the demography of prehistoric native populations remains a topic of debate, mostly due to chronological discordance of the findings and a general lack of integrated archaeological research. As such, nearly no genetic information exists today for ancient Calabrian populations. Here, we present genome-wide data for 13 ancient humans found buried in the Middle Bronze Age cave site of Grotta della Monaca. Supported by archaeological evidence, we use paleogenomic data to decipher funerary customs, social organization, family ties, and gender-related burial practices of a Proto-Apennine community dated 1700-1380 cal BCE. We also contextualize the biogeographical origin and ancestry of prehistoric people of Calabria within the broad landscape of existing data from Mediterranean populations. We investigate the persistence of distinct genomic components, such

as Near Eastern-related ancestry, for which we provide the earliest appearance in mainland southern Italy. We also highlight the first evidence for prehistoric Italy of close-kin incestuous mating, which we address in light of the existing archaeological, anthropological, sociological and historical knowledge.

6 ANCIENT GENOMES FROM A ROCA VECCHIA, APULIA, SHED LIGHT ON MINOAN MODES OF COLONISATION

Nicolini, Valeria (Department of Biology and Biotechnology "L. Spallanzani", University of Pavia) - Montinaro, Francesco (Department of Biology, University of Bari; Institute of Genomics, University of Tartu) - Aneli, Serena (Department of Public Health and Pediatrics, University of Turin) - Sasso, Stefania (Institute of Genomics, University of Tartu) - Saupe, Tina (Institute of Organismal Biology, Evolutionary Biology Centre, University of Uppsala) - Guglielmino, Riccardo (Department of Cultural Heritage, University of Salento) - Vincenti, Giorgia (Department of Cultural Heritage, University of Salento) - Fabbri, Pier Francesco (Museo Fiorentino di Preistoria) - Pagani, Luca (Department of Biology, University of Padova; Institute of Genomics, University of Tartu)

Roca Vecchia, an iconic bronze age stronghold in Apulia, southern Italy, was completely destroyed during a siege between the end of the 15th and the beginning of the 14th century BCE. During the siege, part of the local people hid within the stronghold walls, where their remains were found during the excavation that took place in the 1990s.

Material culture found at Roca Vecchia and associated with the period of the siege includes Minoan-type pottery produced from local clay, imported Aegean pottery and an Aegean type dagger, pointing to an established relationship between the site and the Minoan civilization. Therefore, the site offers an unprecedented opportunity to characterise the genetic components of the population inhabiting an indigenous settlement with traces of a Minoan minority, to shed light on the demic or cultural modes of the Minoan presence in the central Mediterranean.

With our work we sampled all the available individuals excavated at the siege and obtained genome-wide information for two individuals. When compared with available Minoan, Apulian and broadly Mediterranean genomes, the individuals showed a characteristic Bronze/Iron Age Italian peninsula genetic signature, with limited contribution from Minoans. We conclude that the local population of Roca Vecchia, at the moment of the siege, was predominantly autochthonous, with a minoritarian Minoan component. Archaeological data suggest that the Roca Vecchia Aegean population component probably increased in the following centuries.

7 NEW INSIGHTS IN THE POPULATION DYNAMICS OF THE ITALIC IRON AGE: ARCHAEOGENETIC ANALYSIS OF THE MIDDLE-ADRIATIC CULTURES

Ravasini, Francesco (Sapienza University of Rome, Italy) - Solnik, Anu (University of Tartu, Estonia) - Delpino, Chiara (Superintendence Archaeology, Fine Arts and Landscape for the Provinces of Frosinone, Latina and Rieti, Ministry of Cultural Heritage, Italy) - Finocchi, Stefano (Superintendence Archaeology, Fine Arts and Landscape of the Marche Region, Ministry of Cultural Heritage, Italy) - Giroladini, Pierluigi (Superintendence Archaeology, Fine Arts and Landscape for the metropolitan city of Florence and the provinces of Pistoia and Prato, Ministry of Cultural Heritage, Italy) - Scheib, Christiana (Department of Zoology, University of Cambridge and St John's College, University of Cambridge, UK) - Tambets, Kristiina (University of Tartu, Estonia) - Cruciani, Fulvio (Sapienza University of Rome, Italy; Institute of Molecular Biology and Pathology (IBPM), CNR, Italy) - D'Atanasio, Eugenia (Institute of Molecular Biology and Pathology (IBPM), CNR, Italy) - Trombetta, Beniamino (Sapienza University of Rome, Italy)

The Italic Iron Age (approximately 10th-3rd century BCE) was characterized by a mosaic of different cultural groups, thoroughly characterized by an archaeological perspective. While some of these ethnicities have been partially investigated from a genomic point of view (providing new insights into population dynamics) a comprehensive genetic portrait remains elusive, particularly for those populations residing along the mid-Adriatic coast. To better understand the evolution and history of Iron Age Italic populations, we focused our attention on the Picenes, a civilization that flourished along the Adriatic coasts of Central Italy from the 9th to the 3rd century BCE, until Roman colonization. The Picenes were composed of many local groups not necessarily related from a genetic perspective. We analyzed the genome of 81 ancient individuals buried in three different Iron Age necropolises located in Central Italy, two associated to the Picene culture (Novilara and Sirolo-Numana, 8th-5th century BCE) and one Etruscan necropolis (Monteriggioni/Colle di Val D'Elsa, 8th-6th century BCE). Our investigation unveiled genetic homogeneity not only among the two Picene sites, indicating extensive gene flow, but also between the Picenes and other contemporary populations, pointing to a common genetic origin of the Italic Iron Age ethnic groups. Despite this homogeneity, relevant genetic distinctions emerged between coeval Adriatic and Tyrrhenian populations, pointing to genetic contacts between the Adriatic coast of Italy and the Balkans and/or Northern Europe. Furthermore, the identification of genetic outliers (indicating foreign ancestries) within the cultures here analyzed suggests that the Italic Iron Age was characterized by a multicultural society where individuals with diverse genetic origins from across Europe coexisted.

8 ALFEDENA (AQ, ABRUZZO, ITALY), A 6TH-5TH CENTURY BCE SAMNITE COMMUNITY: ANALYSIS OF KINSHIP AND SOCIAL STRUCTURE THROUGH ARCHAEOGENETIC DATA

Coppa, Alfredo (Sapienza University of Rome; Department of Evolutionary Anthropology, University of Vienna, Austria; Department of Genetics, Harvard Medical School, Boston (MA), USA) - Bondioli, Luca (Department of Cultural Heritage: Archaeology and History of Art, Cinema and Music, University of Padua, Italy) - D'Anastasio, Ruggero (Department of Medicine and Aging Sciences, University "G. D'Annunzio" Chieti-Pescara, Italy) - D'Ercole, Vincenzo (Department of Humanities, Arts and Social Sciences (DiLASS) University "G. D'Annunzio Chieti-Pescara, Italy) - Lugli, Federico (Institute of Geosciences, Goethe University Frankfurt, Frankfurt, Germany; Department of Chemical and Geological Science, University of Modena and Reggio Emilia, Italy) - Lucci, Michaela (Department of Environmental Biology, Sapienza University of Rome, Italy) - Nava, Alessia (Department of Odontostomatological and Maxillo Facial Sciences, Sapienza University of Rome, Rome, Italy) - Mittnik, Alissa (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Department of Genetics, Harvard Medical School, Boston (MA), USA; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA) - Pinhasi, Ron (Department of Evolutionary Anthropology, University of Vienna, Austria) - Reich, David (Department of Genetics, Harvard Medical School, Boston (MA), USA; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA)

The Samnite necropolis of Alfedena (6th-5th century BCE, L'Aquila, Abruzzo, Italy) underwent systematic excavations in the late 19th and early 20th century, revealing around 1,500 burials, of which only 38 cranial remains are preserved. Subsequent systematic excavations of the site between 1974 and 1979 were the first in Italy to involve a biological anthropologist on the ground. These excavations uncovered 132 burials with a total of 140 individuals. Over the years, this collection has been the subject of numerous analyses, leading to the publication of many articles on various aspects of bioarchaeology.

Of these latter 140 individuals, 109 were analyzed for aDNA, with 77 (70.1 %) yielding positive results. We reconstruct several large pedigrees that span up to six generations. With only a few exceptions, all 1st degree relationships were found between pairs of male individuals or a mother and son, indicating a patrilineal social organization. Instances of consanguineous offspring suggested the practice of cousin marriage. Notable for the reconstruction of the social structure and marriage patterns is that in the 9 cases detected, the parents' graves were next to each other and the children were placed in the immediate vicinity, testifying to a clear planning in the topographical development of the cemetery. Strontium radiogenic isotope analysis suggested that some individuals appeared to be non-local, likely originating from neighboring areas of Abruzzo and Molise. The Alfedena samples were analyzed in the context of the four neighboring coeval necropolises from Abruzzo (Barrea 2.3 km, and Opi 15.7 km) and Molise (San Pietro Avellana 9.5 km, and Abbazia Nuova 11.2 km), and that of Alfedena Alboreto, slightly later (3rd century BCE), which is 2-300 meters away from the oldest group of tombs.

9 ARCHAEOGENETIC CHARACTERIZATION REVEALS SOCIAL ENDOGAMY AMONG SAMNITE GROUPS IN ANCIENT PRE-ROMAN ITALY (PONTECAGNANO, CAMPANIA, 5TH-4TH CENTURY BCE)

Riccomi, Giulia (Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Italy.; Department of Archaeology, Max Planck Institute of Geoanthropology, Jena, Germany) - Petta, Valeria (Università degli Studi di Salerno, Italy.) - Giuffra, Valentina (Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Italy.) - Pellegrino, Carmine (Università degli Studi di Salerno, Italy.) - Sirak, Kendra (Department of Human Evolutionary Biology, Harvard University, Cambridge, MA 02138, USA.) - Mittnik, Alissa (Department of Human Evolutionary Biology, Harvard University, Cambridge, MA 02138, USA.; Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany.) - Reich, David Emil (Department of Human Evolutionary Biology, Harvard University, Cambridge, MA 02138, USA.)

The Samnites, prominent competitors of the Romans prior their dominance over the Italian peninsula in the 3rd century BCE, underwent a transformative cultural period known as the 'Samnitization process' between the 5th and 4th centuries BCE. This marked a shift in the political structure of Italic populations, involving mobility of groups from inland central Italy to the Campania region in the south. While the analysis of topography, spatial organization, and material culture has shed light on these migrations, biosocial and biocultural aspects of this process remain largely unexplored. In this study, we integrated osteological and archaeological data with new genomic data obtained from the disarticulated petrous bones of 26 individuals inhumated in the funerary sector of Di Renna (5th-4th centuries BCE) within the eastern necropolis of the Etruscan-Campanian site of Pontecagnano (Salerno, southern Italy). The archaeological interpretation based on the grave goods allowed us to identify individuals belonging to Samnite groups; 'aeroplano' fibula was usually found in female and non-adult burials while males were adorned with bronze belt and spear. As for topography of Di Renna funerary sector, several family clusters were identified. Biocultural relatedness

was supported by characterization of genetic kinship and detection of runs of homozygosity providing direct evidence of consanguineous marriage practices among cousins at high frequencies during 425-375 BCE, the later phase of the Samnitization. Genomic data also revealed that the ancestry of these individuals mainly arose from the Italian mainland, with some showing additional ancestry from the eastern Mediterranean. Our results shed light on the social organization of this ancient group and highlight the potential of archaeogenetic approaches for unravelling the interplay of genetic admixture, mating patterns, and marital practices associated to mobility in pre-Roman Italy.

10 KINSHIP PATTERNS AND GENETIC PROFILE IN THE LATE IRON AGE SEMINARIO VESCOVILE NECROPOLIS (NORTHEASTERN ITALY; 3RD - 1ST CENTURIES BCE)

Zingale, Stefania (Institute for Mummy Studies, Eurac Research) - Laffranchi, Zita (Department of Physical Anthropology, Institute of Forensic Medicine, University of Bern) - Paladin, Alice (Institute for Mummy Studies, Eurac Research) - Goffredo, Giulia (Institute for Mummy Studies, Eurac Research) - Salzani, Luciano (Soprintendenza per i Beni Archeologici del Veneto, Settore territorio, Sede di Padova-Nucleo di Verona) - Dori, Irene (Soprintendenza Archeologia, Belle Arti e Paesaggio per le province di Verona, Rovigo e Vicenza; Department of Biology, University of Florence) - Zink, Albert (Institute for Mummy Studies, Eurac Research; Faculty of Biology, Ludwig Maximilian University of Munich) - Milella, Marco (Department of Physical Anthropology, Institute of Forensic Medicine, University of Bern) - Coia, Valentina (Institute for Mummy Studies, Eurac Research)

The European Late Iron Age (4th-1st centuries BCE) is characterized by cultural exchanges favored by trade networks and human movements, including the southward movement of transalpine groups to the Italian Peninsula. Here, we investigate 92 individuals from the Northeastern Italian necropolis of Seminario Vescoville (SV, 3rd - 1st centuries BCE) through paleogenomic analyses (genetic sex determination and kinship analyses) to contribute to the understanding of their social organization and obtain a first insight into the genetic profile of the individuals from this funerary context.

We successfully analyzed the ancient genomes (via shotgun plus nuclear and mtDNA enrichment data) of 90 individuals from SV, including 42 non-adults. Genetic sex assignment revealed 50 females (XX) and 40 males (XY), with a higher frequency of female non-adults (~43%). While male Y-Chromosomal haplogroups are primarily represented by the main haplogroup R1b* (~73%), mtDNA haplogroups assignment showed high genetic variation in the maternal lineages, including besides typical European lineages (e.g., H* and U*), an African haplogroup (L1). This was found in a non-adult female whose funerary treatment does not deviate from that observed in the rest of the burial site. Additionally, kinship analyses identified 20 cases of close biological relationships (up to the 3rd degree). However, kinships do not follow any specific spatial patterning, as burials of closely related individuals are located in distant necropolis areas. Comparative analyses confirm genetic diversity among individuals from SV and no genomic affinity with present-day populations from the same geographic area.

Overall, our findings indicate higher mobility of females compared to males, suggesting possibly patrilocality. Furthermore, the absence of specific kinship patterns emphasizes the complexity of social structures of ancient Iron Age groups from Northern Italy. Moreover, we reveal that the Iron Age individuals have contributed little to the gene pool of today's North-Eastern Italians.

11 REINTERPRETING POMPEII'S PLASTER CASTS USING ANCIENT DNA

Mittnik, Alissa (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Department of Human Evolutionary Biology, Harvard University, Cambridge, MA, USA; Department of Genetics, Harvard Medical School, Boston, MA, USA) - Pilli, Elena (Department of Biology, University of Florence, Italy) - Vai, Stefania (Department of Biology, University of Florence, Italy) - Moses, Victoria (Department of Human Evolutionary Biology, Harvard University, Cambridge, MA, USA; Department of History, Harvard University, Cambridge, MA, USA) - Modi, Alessandra (Department of Biology, University of Florence, Italy) - Morelli, Stefania (Department of Biology, University of Florence, Italy) - Amoretti, Valeria (Parco Archeologico di Pompei, Naples, Italy) - Osanna, Massimo (Ministry of Cultural Heritage and Activities and Tourism, Rome, Italy) - Caramelli, David (Department of Biology, University of Florence, Italy) - Reich, David (Department of Human Evolutionary Biology, Harvard University, Cambridge, MA, USA; Department of Genetics, Harvard Medical School, Boston, MA, USA; Howard Hughes Medical Institute (HHMI), Harvard Medical School, Boston, MA, USA; Broad Institute of MIT and Harvard, Cambridge, MA, USA)

The 79 CE volcanic eruption buried several Roman towns on the Gulf of Naples, preserving civil and private structures, sculptures, paintings, and mosaics in ash, offering an unparalleled glimpse into ancient Roman life. Excavations in Pompeii from 1748 on revealed over 1,000 human victims. Developed in the 19th century, archaeologist Giuseppe Fiorelli's plaster cast method captured the shapes of over 100 of their bodies. Their interpretations, shaped by initial archaeologists and restorers, reflect the worldview of their time.

We generated genome-wide ancient DNA data to characterize the genetic relationships, sex and ancestry of five individuals from the casts sampled during the 2015 restoration efforts. Genetic analysis of several individuals previ-

ously assumed to be women revealed them as genetically male. Additionally, members of a presumed family unit were found to be genetically unrelated. Our findings challenge longstanding interpretations about gender roles and familial relationships such as associating jewelry with femininity or interpreting physical closeness as indicators of biological relationships and underscore the unreliability of the commonly repeated narratives.

All individuals from Pompeii consistently trace their ancestry largely to recent immigrants from the eastern Mediterranean, echoing findings from contemporaneous ancient genomes in the city of Rome. This underscores the cosmopolitan nature of the Roman Empire during this period, revealing a mosaic of diverse cultural influences shaping the demographic landscape of both Roman urban centers.

Integrating genetic data with archaeological and historical information proves essential, even in historically rich sites like Pompeii to significantly enhance our understanding of past lives and behaviors.

12 HERCULANEUM, 79 CE: ARCHAEOGENETIC INSIGHTS INTO ROMAN SOCIETY FROM A CATASTROPHIC DEATH ASSEMBLAGE

Petrone, Pier Paolo (Department of Advanced Biomedical Sciences, Unit of forensic Medicine, University of Naples Federico II, Naples, Italy) - Mitnik, Alissa (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA; Department of Genetics, Harvard Medical School, Boston (MA), USA) - Krause, Johannes (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany) - Reich, David (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA; Department of Genetics, Harvard Medical School, Boston (MA), USA; Howard Hughes Medical Institute, Harvard Medical School, Boston, Massachusetts, USA; Broad Institute of Harvard and MIT, Cambridge, Massachusetts, USA)

The eruption of Mount Vesuvius in 79 CE captured a unique snapshot of Roman Imperial society, burying nearby settlements along with their architecture, writing, art, household objects and thousands of lives lost in the catastrophe. Our genetic study focused on the remains of 94 of the volcano's victims excavated at Herculaneum, 80 of whom perished in the boat chambers on the shore while awaiting rescue—a group that encapsulates a frozen cross-section of Roman society.

We identified 13 families through genetic relationships, predominantly consisting of mothers and their young children, but also adult men and their elderly parents. The group displayed remarkable genetic heterogeneity, even within families, with ancestral roots extending across the Central and Eastern Mediterranean, Central Europe, and North Africa, and indications of immediate Levantine origins for some. This finding underscores the diversity and mobility within the Roman Empire, also described for the population of the city of Rome—a phenomenon intricately woven into territorial expansion, trade, slavery, and cultural exchange.

By integrating the genetic insights with a comprehensive reassessment of the archaeological and anthropological evidence we examine the individuals' demographics, pathologies, and personal items associated with their socio-economic status to illuminate the diverse background of Herculaneum's inhabitants, unraveling their identities, social roles and behaviors amidst the catastrophic eruption.

13 POPULATION CHANGES IN NORTHERN ITALY FROM THE IRON AGE TO MODERN TIMES

Yavuz, Orhan Efe (Archaeo- and Palaeogenetics Group, Institute for Archaeological Sciences, University of Tübingen, Tübingen, Germany; Senckenberg Centre for Human Evolution and Palaeoenvironment, University of Tübingen, Tübingen, Germany) - Zaro, Valentina (Dipartimento di Biologia, Università degli Studi di Firenze, Florence, Italy) - Laffranchi, Zita (Institute of Forensic Medicine, Department of Physical Anthropology, University of Bern, Bern, Switzerland) - Dori, Irene (Dipartimento di Biologia, Università degli Studi di Firenze, Florence, Italy; Soprintendenza archeologia belle arti e paesaggio per le province di Verona, Rovigo e Vicenza, Italy) - Bruno, Brunella (Soprintendenza archeologia belle arti e paesaggio per le province di Verona, Rovigo e Vicenza, Italy) - Belcastro, Maria (Dipartimento di Scienze Biologiche, Geologiche e Ambientali, Alma Mater Studiorum Università di Bologna, Bologna, Italy) - Milella, Marco (Institute of Forensic Medicine, Department of Physical Anthropology, University of Bern, Bern, Switzerland) - Lari, Martina (Dipartimento di Biologia, Università degli Studi di Firenze, Florence, Italy) - Caramelli, David (Dipartimento di Biologia, Università degli Studi di Firenze, Florence, Italy) - Posth, Cosimo (Archaeo- and Palaeogenetics Group, Institute for Archaeological Sciences, University of Tübingen, Tübingen, Germany; Senckenberg Centre for Human Evolution and Palaeoenvironment, University of Tübingen, Tübingen, Germany; Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany)

Archaeological investigations and historical accounts consistently indicate a diverse and highly localized cultural landscape throughout the Italian peninsula during the pre-Roman period. The Iron Age in northern Italy can be defined as a dynamic and cultural mosaic, including the presence of groups associated with the northernmost expansion of the Etruscan culture. Through the establishment of the Republican period, Rome extended its control to this territory (2nd-1st century BCE), resulting in an increased cultural homogeneity with other areas of Italy. The Roman Empire

then strengthened its cultural, political, and economic hegemony also on provinces surrounding the Italian peninsula. However, it is unclear if these geopolitical processes led to demographic changes in northern Italy.

Here, we generated genome-wide data of 66 individuals from eleven sites in northern Italy associated with Etruscan and Imperial-period groups. We integrated them into the published relevant archaeogenetic dataset, including Medieval and present-day genomes, with the aim of gaining insights into population changes in northern Italy during the last 3,000 years while filling this geographical and temporal gap in the record.

Our results revealed that most northern Etruscan individuals cluster genetically with coeval genomes from Etruria. This seemingly homogenous genetic profile among the Etruscan groups experienced a strong demographic shift during the Imperial period. As a result, most northern Italian individuals derive three-quarters of their genetic profile from the local Iron Age substratum and one-quarter from contemporaneous groups in the Near East. This Eastern Mediterranean signal persists in the genetic record of Medieval and modern-day northern Italian populations albeit in diluted form due to significant genetic admixture with central and northern European groups. In conclusion, our findings suggest that northern Italy, in terms of population dynamics during the Imperial rule, adheres to a pattern akin to that observed in the city of Rome and central Italy.

14 THE LATE ANTIQUE/EARLY MEDIEVAL NECROPOLIS OF CASTEL SOZZIO (CIVITELLA D'AGLIANO, VT, ITALY): A MULTIDISCIPLINARY RESEARCH APPROACH

Candilio, Francesca (Museo delle Civiltà, Italian Ministry of Culture, Rome, Italy; Department of Environmental Biology, Sapienza University of Rome, Italy) - Antonelli, Lorenzo (Department of Environmental Biology, Sapienza University of Rome, Italy) - Borgia, Emanuela (Department of Antiquities, Sapienza University of Rome, Italy) - Coppa, Alfredo (Department of Environmental Biology, Sapienza University of Rome, Italy; Department of Evolutionary Anthropology, University of Vienna, Austria; Department of Genetics, Harvard Medical School, Boston (MA), USA) - La Pastina, Francesco (Department of Environmental Biology, Sapienza University of Rome, Italy) - Lugli, Federico (Institute of Geosciences, Goethe University Frankfurt, Frankfurt, Germany; Department of Chemical and Geological Science, University of Modena and Reggio Emilia, Italy) - Lucci, Michaela (Department of Environmental Biology, Sapienza University of Rome, Italy) - Pinhasi, Ron (Department of Evolutionary Anthropology, University of Vienna, Austria) - Reich, David (Department of Genetics, Harvard Medical School, Boston (MA), USA; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA) - Fernandes, Daniel (Department of Evolutionary Anthropology, University of Vienna, Austria; Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Research Centre for Anthropology and Health (CIAS), Department of Life Sciences, University of Coimbra, Coimbra, Portugal)

In the territory of Civitella d'Agliano (VT, Lazio), at the site today called Castel Sozzio, excavation campaigns from 1997-1998 and 2020-2023 brought to light a funerary complex of great importance, as it is the only one investigated in the Tiber Valley for this period. The burials, many of which were reused several times, show different funerary typologies, and very few grave goods were found in the tombs. However, preliminary chronological interpretation suggests a date between the 5th and 7th century CE - a crucial period when Italy was affected by the Gothic invasion, by the war between Byzantines and Goths, and then by the advent of the Lombards.

To date, 148 skeletons have been recovered, of which 76 have been analyzed for ancient DNA, with 70 giving positive results. An initial PCA analysis shows substantial heterogeneity, in line with the findings on the population structure of Rome highlighted in previous research (Antonio et al., 2019). Six family groups, consisting of 2-4 members, were identified, to which 15 individuals belonged. In addition to genomic analyses, and in order to study mobility, strontium radiogenic isotope analyses were carried out for 55 samples, of which 35 were also analyzed for oxygen isotopes. Of great interest is Family D where a father and son are genetic outliers, with the former being non-local. About 20% of the sample individuals are of non-local origin, and preliminary data indicate at least two different areas of origin. This preliminary study shows how the integration of molecular and isotopic data is of fundamental importance in the study of the human population of specific geographical areas.

15 AN ARCHAEOGENETIC STUDY OF THE RISE OF THE MARITIME REPUBLIC OF NOLI, ITALY

Moots, Hannah (Centre for Palaeogenetics) - Gordon, Imani (University of Chicago) - Gold, Claire L. (University of Massachusetts Amherst) - Fuente, Constanza (University of Chicago) - Bandyopadhyay, Esha (University of Chicago) - Koch, Emily (University of Michigan) - Witonsky, David (University of Chicago) - Lupiáñez-Corpa, Natividad (University of Chicago) - Raghavan, Maanasa (University of Chicago) - Holt, Brigitte (University of Massachusetts Amherst)

In the 12th century CE, the small coastal Ligurian town of Noli grew into a maritime republic, with territorial holding and a trading network distributed across the Mediterranean, the Black Sea, and beyond. While steep mountains isolate Noli from many neighboring cities by land, its wide maritime trade network and sailing prowess meant that it was highly interconnected with other communities by sea. As competition with other Italian city-states grew, Noli allied

itself with the Republic of Genoa, sharing military support and mutually increasing their overseas connections. In this study, we sequenced and studied archaeogenomic data from 23 inhabitants of medieval Noli, spanning the 10th - 13th centuries, to better understand the rise of this maritime republic. We find that the population is genetically highly diverse, reflecting the far-reaching networks of the allied republics, which included territories on nearby Corsica and Sardinia, as well as further away in North Africa, the Aegean, and the Black Sea. We examine patterns in biological relatedness across the site and investigate genomic evidence for infectious diseases impacting this population. We present an archaeogenomic glimpse into the population of this maritime republic and contextualize our findings within the rich historical and archaeological documentation of medieval Italy.

16 **ARCHAEOGENETIC INSIGHTS INTO THE ANCIENT CITY OF BLANDA: A MILLENNIA-LONG PERSPECTIVE FROM THE NECROPOLIS OF TORTORA (CS, CALABRIA, ITALY)**

Mollo, Fabrizio (University of Messina) - Barbato, Mariangela (Superintendency of Archaeology, Fine Arts and Landscape for the province of Cosenza, Italy) - Coppa, Afredo (Department of Environmental Biology, Sapienza University of Rome, Italy; Department of Evolutionary Anthropology, University of Vienna, Austria; Department of Genetics, Harvard Medical School, Boston (MA), USA) - La Pastina, Francesco (Department of Environmental Biology, Sapienza University of Rome, Italy) - Lucci, Michaela (Department of Environmental Biology, Sapienza University of Rome, Italy) - Mallick, Swapan (Department of Genetics, Harvard Medical School, Boston (MA), USA; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA) - Sperduti, Alessandra (Servizio di Bioarcheologia, Museo delle Civiltà, Italian Ministry of Culture, Rome, Italy; Università degli Studi "L'Orientale" di Napoli, Naples, Italy) - Pinhasi, Ron (Department of Evolutionary Anthropology, University of Vienna, Austria) - Reich, David (Department of Genetics, Harvard Medical School, Boston (MA), USA; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA) - Mittnik, Alissa (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Department of Genetics, Harvard Medical School, Boston (MA), USA; Department of Human Evolutionary Biology, Harvard University, Cambridge (MA), USA)

The necropolis of Tortora comprises two main burial nuclei: the first dating to the Archaic and Pre-Roman period, features two culturally distinct chronological periods, the older Oenotrian (6th and 5th century BCE) and later Lucanian phase (4th century BCE). The second pertains to the Early Medieval period (7th to 9th century CE).

In our ongoing archaeogenetic study, genome-wide data from 44 individuals across all phases, reveal five pedigrees, two from the Oenotrian, two from the Lucanian, and one from the Early Medieval phase. Population genetic analyses delineate two main genetic clusters aligning with the cultural and chronological groups. Most individuals from the 6th to 4th century BCE genetically resemble contemporaneous populations from Lazio and Etruria, while the Early Medieval individuals are shifted more toward Aegean and Near Eastern populations. Notable, genetic outliers from the first period suggest potential Greek gene flow or incorporation of Greeks into the local Oenotrian population.

A series of absolute dates largely confirms the archaeological chronology, albeit with low resolution for the earlier phases due to the Hallstatt Plateau. Unexpectedly, two individuals from Tomb 61 were dated to the Roman Imperial period, a phase during which there is no archaeological documentation of the use of the necropolis. This Lucanian tomb had been violated in ancient times; it was devoid of grave goods, but the structure (chamber tomb of large blocks of limestone with red-coloured walls) signifies very high rank. These individuals are also outliers in terms of their genetics: the adult male (2nd-4th century CE) shares genetic affinity with ancient Eastern Baltic populations, while the adult female (1st century BCE-2nd century CE), clusters with contemporaneous population of Rome.

This research illuminates the population and social dynamics of the city of Blanda, spanning over a millennium and offering nuanced insights into the use of its necropolis.

17 **1000 ANCIENT ITALIAN GENOMES: EVIDENCE FROM ANCIENT BIOMOLECULES FOR UNRAVELLING PAST HUMAN POPULATION DYNAMICS**

Vai, Stefania (Department of Biology, University of Florence, Italy) - Boscolo Agostini, Rajiv (Department of Life Sciences and Biotechnologies, University of Ferrara, Italy) - Mittnik, Alissa (Department of Human Evolutionary Biology, Harvard University, Cambridge, MA 02138, USA; Department of Genetics, Harvard Medical School, Boston, MA 02115, USA; Max Planck-Harvard Research Center for the Archaeoscience of the Ancient Mediterranean, 04103 Leipzig, Germany; Max Planck-Harvard Research Center for the Archaeoscience of the Ancient Mediterranean, Cambridge, MA 02138, USA; Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, 04103 Leipzig, Germany) - Luiselli, Donata (Department of Cultural Heritage, Ravenna, University of Bologna, Italy) - Rickards, Olga (Department of Biology, University of Rome, Tor Vergata, Italy) - Sineo, Luca (Department of Biological, Chemical and Pharmaceutical Sciences and Technologies, University of Palermo, Italy) - Volante, Nicoletta (Department of History and Cultural Heritage, University of Siena, Italy) - Ghirotto, Silvia (Department of Life Sciences and Biotechnologies, University of Ferrara, Italy) - Reich, David (Department of Human Evolutionary Biology, Harvard University, Cambridge, MA 02138, USA; Department of Genetics, Harvard Medical School, Boston, MA 02115, USA; Max Planck-Harvard Research Center for the Archaeoscience of the Ancient Mediterranean, 04103 Leipzig, Germany; Max Planck-Harvard Research Center for the Archaeoscience of the Ancient Mediterranean, Cambridge, MA 02138, USA; Howard Hughes Medical Institute (HHMI), Harvard Medical School, Boston, MA 02115, USA; Broad Institute of MIT and Harvard, Cambridge, MA 02142, USA) - Caramelli, David (Department of Biology, University of Florence, Italy)

Italy occupies a strategic geographical position in the center of the Mediterranean Sea, while affected by the influence of continental Europe. Since its prehistory, Italy has been characterized by a variety of groups defined by different material culture and traditions. Among the possible reasons for this peculiarity there are different levels of cultural and biological contributions from outside the country, different levels of genetic exchanges between local groups occurred both in prehistoric and historical times, as well as the presence of different environments, climates and resources that could have led to cultural and/or biological differentiation and even isolation. A multidisciplinary approach is needed to reconstruct the past population dynamics of the Italian country, and the contribution of paleogenomics is fundamental to investigate biological variation through time and space. To infer the details of the peopling of the country from the Paleolithic to the Middle Age we analyzed about 1,000 ancient human remains through a combination of target enrichment of nuclear informative SNPs and whole genome sequencing. Both explorative analyses of the genomic variation and model-based methods have been used to infer explicit demographic scenarios to be tested through an Approximate Bayesian Computation (ABC) framework specifically optimized for low-coverage data. Thanks to this approach, the colonization dynamics and the genealogical relationships through time and space will be explored at an unprecedented level. Radiocarbon dating and Strontium Isotopes analysis will also be used to refine the reconstructions obtained through the paleogenomic analysis.

849 **ZOOARCHAEOLOGY IN TRANSITION(S): SUBSISTENCE PATTERNS, CULTURAL CHANGES AND CONTINUITY IN EUROPEAN PREHISTORY THROUGH OLD AND NEW TOOLS**

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Marchán-Fernández, Alberto (Universidad de Salamanca) - Gabucio, Maria Joana (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art) - Pineda, Antonio (UMR 7194 HNHP (MNHN-CNRS-UPVD), Département Homme et Environnement, Muséum National d'Histoire Naturelle; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA)) - Rufà, Anna (Interdisciplinary Center for Archaeology and Evolution of Human Behaviour – ICArEHB, Universidade do Algarve; Université de Bordeaux) - Téllez, Edgar (Centro Nacional de Investigación sobre la Evolución Humana (CENIEH))

Session format: Regular session

Throughout the Pleistocene, numerous cold and temperate climatic phases alternate, culminating around 11,800 cal BP with the onset of the Holocene, characterized by warm climatic conditions. This sequence of environmental changes had an impact on the technology, economy and internal dynamics of Pleistocene and early Holocene hunter-gatherer groups, as well as the first food producers of the Neolithic. Research on human-animal interactions provides a great amount of information about aspects such as the socio-economic organization of human groups, their territorial distribution or their symbolic world, among others.

Zooarchaeology involves the study of faunal remains (bones, teeth, shells, etc.) recovered from archaeological sites, paying special attention to the phenomena of change and continuity in order to infer the existence of cultural patterns. It is also characterized by the incorporation of new tools, as well as the permanence of others. Thus, in the last

two decades, this discipline is undergoing its own transition, in which traditional methods (taxonomic identification, taphonomic analysis, etc.) are combined with new techniques (e.g. ZooMS, genomic studies, Artificial Intelligence) through transdisciplinary and multiproxy approaches.

This session aims to create an open forum to explore in depth the subsistence patterns, the procurement of animal resources and their subsequent management by Pleistocene hunter-gatherers and early prehistoric farmers, as well as their implications for the organization and cosmology of these human groups. Our objective is to provide a space for sharing and integrating new and old methodological approaches, contributing to a better understanding of the phenomena of change and continuity in human-animal relationships during Prehistory. Communications and posters related to these associated aspects are welcome:

- Archaeofaunal and archaeomalacological analyses.
- Isotopic and proteomic analyses.
- Genomic studies.
- Osteometry and specific variability.
- Experimental protocols.
- Bone industry and operational chain.
- Taphonomic and biometric analyses.
- Geostatistics and territorial occupation strategies
- Palaeoclimatic and palaeoenvironmental analyses
- Other new methodological and technological approaches in Zooarchaeology.

ABSTRACTS

1 A TAPHONOMIC REVIEW OF THE SEQUENCE OF THE MIDDLE PLEISTOCENE SITE OF NOTARCHIRICO (MIS 17-MIS 16)

Alcalá, Antonio (Museum National d'Histoire Naturelle; Institut Català de Paleoeologia Humana i Evolució Social) - Iannucci, Alessio (Eberhard-Karls-University Tübingen) - Mecozzi, Beniamino (Sapienza University of Rome) - Carpentieri, Marco (Università degli Studi di Ferrara) - Sardella, Raffaele (Sapienza University of Rome) - Moncel, Marie-Hélène (Museum National d'Histoire Naturelle)

The Middle Pleistocene site of Notarchirico plays a crucial role to study the arrival and evolution of the Acheulean technology in Western Europe and its relationship with human behavior. First excavations (1979 to 1995), coordinated by Marcello Piperno, led to the discovery of 11 archaeological levels (from alpha (α), to G) in a seven-meter-deep sequence. Since 2016, a new project started, directed of Marie-Hélène Moncel and older levels have been unearthed (up to level J). The site has been dated between 610 and 695 ka (MIS 17-MIS 16) by $^{40}\text{Ar}/^{39}\text{Ar}$ and ESR.

The first taphonomic studies were only on the upper levels of the sequence: alpha and A. In this work we present the preliminary data of the taphonomic study of the rest of the whole sequence (levels B to I2). The total number of faunal remains analyzed amounts to 3389, although the distribution of the material in the sequence is unevenly. Levels D and E of the old excavation and levels F, G, I1 and I2 of the new one yielded the majority of the faunal material.

The faunal record is almost totally composed by elephants and ungulates, being *Palaeoloxodon antiquus*, *Bison* sp., *Praemegaceros* sp., *Cervus* sp., Dama-like deer the most represented taxa. Other taxa, like *Macaca* sp., *Castor* sp. and carnivorans (*Canis* sp. and *Martes* sp.) are scarcely represented. No evidence of anthropic modification was identified in the whole sequence, whereas carnivore activity is only proved by some tooth-marked specimens. Although the poor preservation of the bone surfaces makes difficult to infer the role of hominins and carnivorans, this taphonomic review can help to elucidate the formation process of the site of Notarchirico and to discuss hypotheses on the reasons of the regular presence of hominins on this place and along the lake/water channels.

2 BONE TOOLS AT THE NEANDERTHAL SITE OF ABRI SUARD (CHARENTE, FRANCE) DURING MIS 6-5

Téllez Peñaranda, Edgar (Consortio Centro Nacional de Investigación sobre la Evolución Humana (CENIEH)) - Doyon, Luc (PACEA UMR 5199, Université de Bordeaux, CNRS, Ministère de la Culture et de la Communication. Bâtiment B8, Allée Geoffroy Saint Hilaire F-33600 Pessac, France) - Genuite, Kim (PACEA UMR 5199, Université de Bordeaux, CNRS, Ministère de la Culture et de la Communication. Bâtiment B8, Allée Geoffroy Saint Hilaire F-33600 Pessac, France) - Gómez-Olivencia, Asier (Dept. Geología, Facultad de Ciencia y Tecnología, Universidad del País Vasco/Euskal Herriko Unibertsitatea (UPV/EHU). Barrio Sarriena s/n, 48940 Leioa, Spain; Aranzadi Zientzia Elkartea/Sociedad de Ciencias Aranzadi, Zorroagaina 11, 20014 Donostia-San Sebastián, Spain.; Centro UCM-ISCI de Investigación sobre Evolución y Comportamiento Humanos, Avda. Monforte de Lemos 5 (Pabellón 14), 28029 Madrid, Spain.; Departamento de Geodinámica, Estratigrafía y Paleontología, Facultad de Ciencias Geológicas, Universidad Complutense de Madrid, c/ José Antonio Novais, 12. Ciudad Universitaria, 28040 Madrid, Spain) - Sala, Nohemi (Consortio Centro Nacional de Investigación sobre la Evolución Humana (CENIEH)) - Rodríguez-Hidalgo, Antonio (Consejo Superior de Investigaciones Científicas, Instituto de Arqueología (CSIC-Junta de Extremadura), Plaza de España 15, 06800, Mérida, Spain; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4 (Edifici W3), Campus Sescelades URV, 43007, Tarragona, Spain.) - López-Onaindia, Diego (PACEA UMR 5199, Université de Bordeaux, CNRS, Ministère de la Culture et de la Communication. Bâtiment B8, Allée Geoffroy Saint Hilaire F-33600 Pessac, France; Aranzadi Zientzia Elkartea/Sociedad de Ciencias Aranzadi, Zorroagaina 11, 20014 Donostia-San Sebastián, Spain.)

The use of animal bones for the manufacture and modification of stone tools is documented in the archaeological record since the Lower Palaeolithic. These elements combine features of lithic and bone technology, and their identification and characterization is of interest from the perspective of faunal resource management and the dynamics of site occupation by human groups. The site of Abri Suard (Charente, France) was excavated intermittently between the 1930s and 1980s by P. David and A. Debénath and preserve a stratigraphic sequence deposited from the end of the Middle Pleistocene to the beginning of the Late Pleistocene (Debénath, 1974; Blackwell et al., 1983). A recent review of the faunal material from the levels containing human remains (250-120 Ky) allows the documentation of eight knapping bone tools used as retouchers and for organic soft hammer percussion.

The taxonomic list was described by David and Prat (1965) and Griggo (1996). Retouchers occur on reindeer (*Rangifer tarandus*) bones, including a proximal phalanx, a metacarpal and a calcaneus and on horse (*Equus ferus*) bones, i.e., a proximal phalanx, a calcaneus, as well as on unidentified long bone diaphyseal fragment. A rhinoceros radius (*Coelodonta antiquitatis*) and a radius/ulna belonging to a very large animal show stigmas and cortical extractions that suggest their use as organic soft hammers. Some of the retouchers show cut marks and cortical extractions, which is consistent with the pattern found in the rest of the analysed assemblage and indicates an intensive exploitation of faunal resources. They bear between one and three active areas. The morphology of the pits (ovoid vs. triangular) and scores (rectilinear vs. sinuous) on these areas entails the retouching of different raw materials, including quartzite and flint (Mallye et al., 2012). Our findings contribute to elucidate behavioural aspects of ancient Neanderthals in southwestern France.

3 WOLVES OR LARGE CATS? GIS IMAGE ANALYSIS FOR THE IDENTIFICATION OF UNGULATE MODIFICATION AND ACCUMULATION IN PLEISTOCENE CONTEXTS

Terrón, Gerard (Grup de Recerca del Quaternari, GRQ-SERP. Department of History and Archaeology, University of Barcelona, Barcelona, Spain) - Daura, Joan (Grup de Recerca del Quaternari, GRQ-SERP. Department of History and Archaeology, University of Barcelona, Barcelona, Spain) - Parkinson, Jennifer (Department of Anthropology, University of San Diego, San Diego, CA, USA.; Human Origins Program, National Museum of Natural History, Smithsonian Institution, Washington, DC, USA.) - Sanz, Montserrat (Grup de Recerca del Quaternari, GRQ-SERP. Department of History and Archaeology, University of Barcelona, Barcelona, Spain)

Various biological agents are involved in the processes of accumulation and alteration of faunal remains from Pleistocene sites. Among these agents, carnivores are an important consideration. Multiple zooarchaeological and taphonomic techniques and methodologies have been developed to identify carnivore involvement in archaeofauna assemblages. This research proposes the use of a methodology based on image processing in Geographical Information Systems (GIS), developed over the last decade, which maps surface modifications and breakage patterns onto bone images that serve as composite "maps" of bone surface damage and preservation. Different types of analyses can then be applied, such as calculating the bone portion survivorship, which allows evaluation of the level of destruction and damage to bones across an assemblage, or Kernel Density Estimation (KDE), which analyses the patterns and density of marks on bone surfaces. We apply this method to examine Layers I-II at the Late Pleistocene Cova del Rinoceront site (Castelldefels, Spain), which has more than 2000 well-preserved vertebrate remains associated with the use of the cave as a carnivore den. Previous taphonomic work proposed two carnivore taxa (canids or large felids) as presumed producers. The aim of the present work is to determine which agent is involved using GIS methods to

compare the Pleistocene assemblage with data from two experiments carried out with modern wolves and felids. In conclusion, it was observed that the pattern noted in the Pleistocene sample matches that modified by wolves. The results obtained confirm the potential of this method, highlighting the possibilities of digital methods for the study of faunal remains.

4 **PALAEOECOLOGY AT RECLAU CAVES (SERINYÀ, IBERIA): FAUNAL ASSEMBLAGES FROM MIDDLE PALAEOLITHIC TO LAST GLACIAL MAXIMUM AT ARBREDA AND MOLLET III**

Fernández García, Mónica (Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA)) - Rufi, Isaac (Institut de Recerca Històrica - Universitat de Girona; Departament d'Història i Arqueologia, Universitat de Barcelona) - López-García, Juan Manuel (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art) - Lécuyer, Christophe (Laboratoire de Géologie de Lyon: Terre, Planètes, Environnement (LGL-TPE, CNRS-UMR5276, ENSL)) - Soler, Joaquim (Institut Català de Recerca en Patrimoni Cultural (ICRPC-CERCA); Institut de Recerca Històrica - Universitat de Girona)

There are only few archaeological sequences in Iberia that provide evidence of Neanderthals and Anatomically Modern Humans (AMH) occupying the same geographic location. Reclau Caves in northeastern Iberia host evidence of human presence spanning from the Upper Palaeolithic to the Middle Palaeolithic across distinct caves within the same karstic system. Arbreda cave presents an extensive archaeological sequence encompassing Mousterian, Aurignacian, Gravettian, Solutrean, and Magdalenian periods (from level N to level A), while Mollet III reveals episodes associated with Gravettian and Solutrean. Human remains were recovered at both sites, with findings of Neanderthals in Arbreda and AMH in Mollet III.

This study aims to synthesize environmental data obtained through several proxies in these sites, with a primary focus on large and small mammal assemblages. This research provides novel insights from the older Mousterian levels at Arbreda (N to L) and the Upper Palaeolithic assemblage from Mollet III. Additionally, stable isotope analysis ($\delta^{18}O$) of microvertebrate remains along the Arbreda sequence serves as a valuable proxy for quantifying climatic shifts. By combining traditional taxonomy-based methods for studying faunal remains with modern biochemical approaches, this work provides a comprehensive landscape and environmental reconstruction.

This interdisciplinary approach sheds light on the human population dynamics associated with climate during two crucial episodes: the Middle-to-Upper Palaeolithic transition and the Last Glacial Maximum. During this period, the region experienced notably colder conditions (-5 to -1°C) compared to present-day temperatures, yet a mosaic-like vegetation landscape appears to have been maintained. The environmental impact is more pronounced during the Upper Palaeolithic, characterized by abrupt climatic alterations, particularly during the Aurignacian. These findings highlight that Anatomically Modern Humans were well-adapted upon their arrival to Iberia.

5 **NEANDERTALS AND MODERN HUMAN: INVESTIGATION OF THE FATTY ACID METABOLISM COMBINING ZOOARCHAEOLOGICAL ANALYSIS AND GENOMIC STUDIES**

Crezzini, Jacopo (Department of Biology - University of Florence, Laboratory of Anthropology Molecular Anthropology/Paleogenetics Unit, via del Proconsolo 12 50122, Firenze, Italy; Department of Physical Science, Earth and Environment - University of Siena, Research Unit of Prehistory and Anthropology, Strada Laterina 8 53100, Siena, Italy; Centro Studi sul Quaternario ODV, Sansepolcro, Italy) - Modi, Alessandra (Department of Biology - University of Florence, Laboratory of Anthropology Molecular Anthropology/Paleogenetics Unit, via del Proconsolo 12 50122, Firenze, Italy) - Cannariaro, Costanza (Department of Biology - University of Florence, Laboratory of Anthropology Molecular Anthropology/Paleogenetics Unit, via del Proconsolo 12 50122, Firenze, Italy) - Caramelli, David (Department of Biology - University of Florence, Laboratory of Anthropology Molecular Anthropology/Paleogenetics Unit, via del Proconsolo 12 50122, Firenze, Italy) - Boschini, Francesco (Department of Physical Science, Earth and Environment - University of Siena, Research Unit of Prehistory and Anthropology, Strada Laterina 8 53100, Siena, Italy)

Zooarchaeological analyses of MIS4/MIS3 faunal assemblages from Apulia (southern Italy) have shown the lack or scarcity of spongy elements in macromammal samples, together with the evidence of fresh-bone breakage and the focusing of the hunting activities on adult and old preys. This peculiar exploitation of ungulates is attested in other European Middle Palaeolithic deposits. We interpreted our

zooarchaeological data as an intense exploitation of bone marrow and grease by Neandertals. During the Late Mousterian period Apulia was characterised by frequent and prolonged drought climate conditions that could have caused the scarcity of vegetable foods and, as a consequence, the availability of important nutritional compounds. Apulian Neandertals may have responded to this crisis by increasing the intake/absorption of nutrients from animal resources by activating an intensive extraction/consumption of

bone grease. Through the consideration of ethnographical data, the preparation of 'fermented bone-grease base food' was also considered. Recent genetic studies have evidenced the selection of different haplotype (defined by 28 SNPs) that associate with very distinct measurements of long chain PUFA product-to-substrate ratios among great apes, extinct human groups and modern humans. We tried to identify other polymorphisms related to the expression of enzymes involved in fatty acid metabolism in Neanderthal and modern human. This was carried out through the analyses of the genomes related to Homo neanderthalensis and extant human groups characterized by a peculiar dietary fat consumption.

6 **BEYOND THE SHORELINE: EXPLORING EARLY UPPER PALAEOLITHIC MARINE MOLLUSC EXPLOITATION AT RIPARO BOMBRINI (VENTIMIGLIA, ITALY)**

Gazzo, Silvia (Department of Antiquities, Philosophy, History, University of Genoa, Via Balbi, 2 - 16126 Genoa, Italy) - Cristiani, Emanuela (DANTE - Diet and Ancient Technology Laboratory, Department of Oral and Maxillo-Facial Sciences, Sapienza University of Rome, 00161, Rome, Italy) - Negrino, Fabio (Department of Antiquities, Philosophy, History, University of Genoa, Via Balbi, 2 - 16126 Genoa, Italy) - Riel-Salvatore, Julien (Département d'Anthropologie, Université de Montréal, Montréal, Canada)

This research explores the modes of exploitation of marine molluscs at Riparo Bombrini (Ventimiglia, north-west Italy) during the Protoaurignacian and the Early Aurignacian.

Although marine shell remains have been found in some Palaeolithic sites along the Tyrrhenian coast, a comprehensive study of these collections has never been carried out, leaving the question of the exploitation of marine resources by the hunter-gatherer groups in this geographical area unresolved.

Riparo Bombrini has proven to be a significant starting point for investigating the exploitation of marine malacofauna in Liguria during the Early Upper Palaeolithic. It has yielded not only remains of shellfishes consumed for dietary purposes but also a considerable quantity of small marine shells used for the fabrication of personal ornaments.

As integral components in more complex decorative combinations and symbolically charged objects that outwardly express cultural value, shell beads have been analysed in relation to both site function and on-site human activities, with the aim of understanding the relationship between craftsmen and raw materials. In particular, this study contributes to a better characterization of the technological and social organisation of Early Upper Palaeolithic hunter-gatherers who inhabited the rockshelter.

The analysis of the assemblage highlights the presence of trends in the selection of shell species for beads production. Specifically, at Riparo Bombrini there appears to have been a preference toward small and spherical gastropods - especially *Homalopoma sanguineum* and *Tritia pellucida* - possibly reflecting the influence of intra- and inter-regional traditions.

Nonetheless, beyond behavioural factors and human preferences, local variations in raw material availability must be taken into account when examining trends in the production of shell ornaments.

7 **MARINE RESOURCES EXPLOITATION AT COVA ROSA (ASTURIAS, SPAIN) DURING THE LATE PLEISTOCENE (CA. 22,500 - 15,300 CAL BP)**

Marchán-Fernández, Alberto (Universidad de Salamanca) - Aguirre-Uribesalgo, Amaia (Universitat Autònoma de Barcelona) - Álvarez-Fernández, Esteban (Universidad de Salamanca)

This paper presents the results of the analysis of archaeomalacological remains from five consecutive archaeological interventions carried out in Cova Rosa (Layers A1 to B11), located in the Sella valley (Asturias, Spain) during the 1970s (1975-1979). Specifically, we have studied the remains of molluscs and crustaceans collected by hunter-gatherer groups. This analysis has been carried out from a quantitative, taxonomic, taphonomic and biometric point of view. The sample analysed is dominated by species collected for their bromatological interest (mainly *Patella vulgata* and *Littorina littorea*), although taxa with no food value have also been documented. A selection of large limpets and periwinkles has been observed. In addition, different anthropogenic (e.g. burning, trampling) and natural alterations on the shells (annelids, calcium carbonate precipitation) have been documented. The study of this type of evidence can provide information on the patterns of coastal exploitation that took place in the past, particularly during the Magdalenian period, as well as on the types of beaches chosen by hunter-gatherer groups to collect resources. The results obtained in the analysis of the remains of marine origin are compared with existing information from other sites from the end of the Late Pleistocene, both in the Sella Valley and in Cantabrian Spain.

8 UNRAVELLING THE SUBSISTENCE STRATEGIES IN A MAGDALENIAN DWELLING STRUCTURE OF THE LOWER GALLERY OF LA GARMA (OMOÑO, CANTABRIA, SPAIN)

Portero Hernández, Rodrigo (Universidad de Salamanca; Instituto Internacional de Investigaciones Prehistóricas de Cantabria (Universidad de Cantabria)) - García-Noriega, Carlos (Instituto Internacional de Investigaciones Prehistóricas de Cantabria (Universidad de Cantabria)) - Ontañón, Roberto (Museo de Prehistoria y Arqueología de Cantabria; Instituto Internacional de Investigaciones Prehistóricas de Cantabria (Universidad de Cantabria)) - Arias, Pablo (Instituto Internacional de Investigaciones Prehistóricas de Cantabria (Universidad de Cantabria))

La Garma is a hill which contains a group of archaeological sites that have yielded evidence of human activity from the Lower Palaeolithic to the Middle Ages. Notably, the Lower Gallery within this complex, dated ca. 14,800 cal BC, is distinguished by exceptionally well-preserved floors and structures. This preservation results from the entrance's collapse at the Palaeolithic's end, leading to extraordinarily well-preserved evidence of human activities. In this paper we present the results of the archaeozoological and taphonomic analysis carried out inside the dwelling structure I-A of the Zone I of the Lower Gallery. Our objective is to determine subsistence strategies carried out by the human groups that inhabited this structure during the Middle Magdalenian. To this aim, the anatomical and taxonomic identification of the species represented has been carried out and the processing and consumption patterns of these animals have been documented. Although the information that it provides on the lifestyles of the Magdalenian groups is exceptional, the study of the Palaeolithic faunal remains has been a challenge, as conventional recording processes are inapplicable, due to potential conservation damage. For this purpose, each faunal remain has been analysed on the surface of the structure in situ, moving the laboratory to the cave and returning each remain to its original position.

The faunal remains documented have revealed the importance of the consumption of ungulates, mainly red deer and horses, in the subsistence of the human groups that inhabited the Lower Gallery, while other resources such as molluscs, birds and fish would have been a complementary resource in the diet. The taphonomic study has shown the presence of all the tasks in the operational chain of animal processing, including butchery marks, the intentional breakages of the bone to access the marrow content and the thermoalteration of the remains.

9 SMALL GAME PROCUREMENT DURING THE LATE GLACIAL IN NORTHEASTERN IBERIA: A CASE STUDY FROM COVA GRAN DE SANTA LINYA (SPAIN)

Rufà, Anna (ICArEHB, Universidade do Algarve; PACEA UMR-5199) - Sánchez-Martínez, Javier (Centre d'Estudis del Patrimoni Arqueològic de la Prehistòria, Universitat Autònoma de Barcelona; ICArEHB, Universidade do Algarve; IPHES-CERCA) - Martínez-Moreno, Jorge (Centre d'Estudis del Patrimoni Arqueològic de la Prehistòria, Universitat Autònoma de Barcelona) - Mora Torcal, Rafael (Centre d'Estudis del Patrimoni Arqueològic de la Prehistòria, Universitat Autònoma de Barcelona)

The Upper Palaeolithic period in the Iberian Peninsula witnessed a notable ecological shift, as seen in the archaeobotanical and archaeofaunal record. This change was especially perceived on subsistence strategies, particularly in the Mediterranean basin, as an increased procurement of small game was documented in many archaeological sequences. This region provided optimal conditions for the proliferation of small animals like rabbits, which are abundant and easy-procured prey.

Cova Gran de Santa Linya (northeastern Iberia) is one of the most complete sequences for the Late Pleistocene - Early Holocene period in Iberia, standing out as a key archaeological site to explore this topic. This site has been subject to meticulous fieldwork aimed at understanding site formation processes and identifying its archaeological potential across different sectors. Since 2015, archaeological works are focused on Sector V a new excavation area that has unearthed over 10 archaeological units, dating from the Late Upper Palaeolithic (c.14.3-13.6 ky cal BP). This sector has revealed human remains attributed to *Homo sapiens* between the layer V20 and V22, which has instigated a detailed analysis of the faunal record from these units to better understand the subsistence strategies employed by Late Glacial. The majority of faunal remains associated with these archaeological layers comprise small animals, mainly leporids and birds.

The taphonomic analysis of more than 1600 small animal bones unveiled specimens exhibiting human-induced damage such as cut and chewing marks. Other surface modifications related to burning processes were observed too, stressing the significance of these taxa for human feeding. The result of this research contributes with novel data to comprehend the taphonomical processes that affected the formation of Sector V. In addition, it provides new data to broaden our understanding of subsistence strategies during the Late Upper Palaeolithic period in the region.

10 EXPLORING THE AHRENSBURGIAN PRESENCE IN BELGIUM FROM A ZOOARCHAEOLOGICAL AND ISOTOPIC PERSPECTIVE: THE CASE OF REMOUCHAMPS (AYWAILLE)

Pironneau, Camille (Ghent University) - Robert, Prudence (Ghent University) - Vandendriessche, Hans (Ghent University) - Abrams, Grégory (Ghent University; Scientific Department, Espace muséal d'Andenne) - Crombé, Philippe (Ghent University) - De Groote, Isabelle (Ghent University)

The Ahrensburgian complex emerged during the Younger Dryas in northwestern Europe, during the last glacial period before the onset of the Holocene's global warming. This techno-complex of the Final Palaeolithic is characterised by a lamino-lamellar lithic industry: tanged points and obliquely truncated points called Zonhoven. In Belgium, Ahrensburgian sites that yielded faunal remains are mainly located in caves and highlighted massive exploitation of reindeers. Remouchamps, located near the municipality of Aywaille in the Belgian Ardennes, is the most important of these sites.

The faunal collection, coming from excavations conducted in the 20th Century, has been re-visited considering advances in zooarchaeological methods. Studying those animal remains provides new insight into specialised hunting strategies, including transport, exploitation, and more generally new information regarding the site occupation and its function(s).

Besides this zooarchaeological research, the implementation of strontium, oxygen, and carbon isotope analysis on the reindeer tooth enamel provides additional information regarding reindeer herds' mobility and seasonality of the occupation(s) in Belgium. This study therefore provides new insight into Ahrensburgian settlement dynamics and how they took shape in response to reindeer herd migrations during the last cold episode of the Pleistocene.

11 EXPLOITING THE ALPINE MOUNTAINS IN THE MESOLITHIC: THE CONTRIBUTION OF ARCHAEOZOOLOGY TO UNDERSTANDING THE DYNAMICS OF MOUNTAIN LAND USE

Derbord, Louise (TRACES UMR 5608, Université Toulouse Jean Jaurès, France) - Angelin, Alexandre (Archéorient UMR 5133, Université Lumière Lyon II, France) - Costamagno, Sandrine (TRACES UMR 5608, Université Toulouse Jean Jaurès, France)

Since the early 1960s-1970s, archaeological research in the Alps has highlighted the increased frequency of mountainous environments during the Mesolithic era (10th-6th millennium cal. BCE in Europe). Indeed, during this period of climatic change, the post-Würmian glacier retreat allowed occupation of mountain territories at most altitudinal levels. Occupations dynamics and their evolutions thus became a main focus for investigation, the latter turning particularly towards the exploitation of wildlife resources.

It has long been accepted that the population adopted a vertical mobility, moving up in altitude in summer to exploit specific resources and in particular, hunt ibex (*Capra hircus*). When winter arrives, these populations would then retreat to the valleys and foothills. This model was based on incomplete data at the time, with few sites containing faunal remains and little to no zooarchaeological analysis. It has since been questioned, but a more precise model has not yet been proposed.

New zooarchaeological studies (e.g. France, Italy) have recently resumed, after being at a standstill for a long period, bringing this issue to the forefront of scientific research. Located in the northern French Alps, the Grande Rivoire rockshelter (Sassenage, Isère, France), serves as a reference site for studying the utilization and occupation of mountainous territories. The one meter's high stratigraphic sequence spanning the First and Second Mesolithic has proven rich in faunal remains and thus allows a complete study of the territorial occupation strategies and their evolutions during this period. By comparison with data from several alpine ranges (from France, Switzerland and Italy, for instance) it allows us to better understand the human-animal and environmental relationships during Prehistory. In addition, for more in-depth results and interpretations, it now seems more necessary to use new methods, to overcome the limitations of classic archaeozoological studies (e.g. highly fragmentary artifacts, osteological similarities between species).

12 TRAVELLING CATTLE OR HERD MANAGERS? BULK AND COMPOUND-SPECIFIC ISOTOPE EVIDENCE FOR THE NEOLITHIC INTRODUCTION OF AGRO-PASTORALISM AT GROTTA DELL'UZZO (SICILY)

Mannino, Marcello (Aarhus University, Department of Archaeology, Aarhus, Denmark; Former Department of Human Evolution, Max Planck for Evolutionary Anthropology, Leipzig, Germany) - Van Biesen, Geert (Core Research Equipment & Instrument Training (CREAIT) Network, Stable Isotope Laboratory, Memorial University of Newfoundland, St. John's, Canada) - Fuller, Benjamin (Aarhus University, Department of Archaeology, Aarhus, Denmark; Géosciences Environnement Toulouse, CNRS, Observatoire Midi Pyrénées, Toulouse, France) - Talamo, Sahra (Department of Chemistry "Giacomo Ciamician", Alma Mater Studiorum, Bologna University, Bologna, Italy; Former Department of Human Evolution, Max Planck for Evolutionary Anthropology, Leipzig, Germany) - Tagliacozzo, Antonio (Formerly at Service of Bioarchaeology, Museo delle Civiltà, Museo Preistorico Etnografico "Luigi Pigorini", Rome, Italy) - Collina, Carmine (Museo Civico "Biagio Greco", Mondragone (Caserta), Italy) - Richards, Michael (Department of Archeology, Simon Fraser University, Burnaby, British Columbia, Canada; Former Department of Human Evolution, Max Planck for Evolutionary Anthropology, Leipzig, Germany) - Grimes, Vaughan (Department of Archaeology, Memorial University of Newfoundland, Queen's College, St. John's, Canada; Department of Earth Sciences, Memorial University of Newfoundland, St. John's, Canada)

Zooarchaeological and isotopic investigations on assemblages from Grotta dell'Uzzo have demonstrated that significant subsistence changes took place in NW Sicily during the early Holocene. Animal protein was the dominant component in human diets for most of the prehistoric occupation of the cave, hunting being the key activity in the Mesolithic, whilst a combination of hunting, fishing and herding dominated the transition into the Neolithic. Here we show how, by undertaking more substantial sampling than is often the case for isotopic investigations aimed at reconstructing human diets, useful life history data can be accrued on mammals exploited by prehistoric humans. We focus on the results of our isotopic analyses on bone collagen extracted from Neolithic domesticates. In fact, a few ovicaprids and numerous cattle (*Bos taurus*) specimens from Grotta dell'Uzzo have very high carbon isotope values, unlike earlier and later terrestrial mammals. Bulk isotope analyses (C, N, S) suggest that early Neolithic cattle fed heavily on C4 plants, which is confirmed by compound-specific carbon isotope analyses on the amino acids of the same bone collagen samples. Different interpretations of these data are evaluated in this talk, with a view to: (i) obtain a clearer understanding on the spread of agro-pastoralism by Neolithic peoples voyaging across the Mediterranean Sea and (ii) develop new approaches for the study and interpretation of faunal assemblages contemporary to major prehistoric transitions.

13 TOOTH ENAMEL CARBON AND OXYGEN ISOTOPE RATIOS REVEAL DIVERSE OVICAPRID HUSBANDRY STRATEGIES DURING THE NEOLITHIC ON THE DALMATIAN COAST, CROATIA

Triozzi, Nicholas (UC Santa Barbara) - McClure, Sarah (UC Santa Barbara) - Horvat-Oštrić, Kristina (University of Zadar) - George, Richard (UC Santa Barbara) - Ebert, Claire (University of Pittsburgh) - Podrug, Emil (Muzej grada Šibenika) - Kennett, Douglas (UC Santa Barbara)

This paper presents stable isotope results from sequentially sampled archaeological sheep and goat teeth recovered at Early, Middle, and Late Neolithic sites in Dalmatia. The use of intra-tooth sequences of oxygen isotope ratios is a reliable and effective method for determining birthing seasonality and elucidating migration patterns of herbivores in zooarchaeological assemblages. Sequential sampling of enamel bioapatite for stable carbon and oxygen isotope analysis produces direct evidence of an animal's diet as a time-series spanning that period of tooth growth. A series of enamel $\delta^{18}\text{O}$ values captures variation in the ^{18}O -enrichment of precipitation which is largely influenced by seasonal changes in temperature. Variation in $\delta^{13}\text{C}$ values may signal changes to the animal's diet arising from switching between C3 and C4 plants and movements between different grazing and foraging environments. The stable isotope data presented in this study offers a diachronic perspective animal husbandry spanning the Neolithic in the Eastern Adriatic. The results from our study lends support to recent traditional zooarchaeological analyses of the source assemblages, which evinces a greater emphasis on dairying and that a shift in the seasonal allocation of alternative subsistence activities (e.g., hunting) occurred during the Middle Neolithic. The stable isotope data point to multiple or extended lambing seasons in addition to increased mobility, potentially taking the form of vertical transhumance. The implications of these revelations are discussed in consideration of key developments to food production that coincide with the arrival of Danilo ceramics to northern Dalmatia.

14 AT HOME IN THE NEOLITHIC: ZOOMS ANALYSIS OF FAUNA FROM A POTENTIAL STARČEVO HOUSE IN THE SOUTH MORAVA VALLEY, SERBIA

Wernado, Shana (Institute for Archaeological Sciences, Department of Geoscience, University of Tübingen) - Bulatovic, Jelena (Department of Historical Studies University of Gothenburg, Sweden) - Brown, Samantha (Institute for Archaeological Sciences, Department of Geoscience, University of Tübingen) - Horejs, Barbara (Austrian Archaeological Institute, Austrian Academy of Sciences; HEAS & UHA, University of Vienna)

Extensive excavations at the Neolithic site Svinjarička Čuka in the South Morava Valley of Serbia have been ongoing since 2019 (<https://www.oeaw.ac.at/oeai/forschung/praehistorie-wana-archaeologie/prehistoric-phenomena/pus-ta-reka-research-neotech-project>) and aim to deepen our understanding of the Neolithization process of the central Balkans. These excavations revealed domestic features associated with phases of occupation on the river terrace, dating between 5700/5600 and 5500 BC. Especially interesting is a domestic structure measuring 7.50 × 4.30 m, indicative of a potential Starčevo house (Horejs et al. 2022). Repeated occupation phases had previously been unknown for the Starčevo culture, allowing for novel insights into social dynamics and possible cultural trends over time.

We examined the faunal assemblage to detect differences between these occupation horizons in the interior and exterior of the house. While previous zooarchaeological analysis yielded successful results, a considerable number of bones lacked diagnostic features. To address this, high-throughput ZooMS (Zooarchaeology by Mass Spectrometry) was conducted. This method allows for taxonomic identification of collagen through the known differences in amino acid sequences between fauna. 376 bone specimens were collected and analysed, including 43 that were previously identified by morphology to compare methodologies.

This comprehensive study encompasses a thorough analysis of faunal remains from various occupation horizons within a domestic building dating to early phases of the first agricultural communities of the Balkans, associated with the Starčevo horizon. It involved a comparative assessment of results derived from morphologically based and proteomics-based zooarchaeological analyses, marking a significant advancement of proteomics in Neolithic research methodologies.

Our results give insight into the animal management and subsistence strategies of Svinjarička Čuka occupants across multiple occupation horizons, demonstrating the utility of ZooMS analysis to other Neolithic assemblages.

852 MANUFACTURING MEMORY. PAST MNEMOTOPOI AND PRESENT MAP-MAKING IN THE QUEST OF COLLECTIVE MEMORIES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Da Vela, Raffaella (SFB1070 RessourcenKulturen University of Tübingen) - Ballmer, Ariane (Independent Researcher) - Irvin, Aaron (Murray State University) - Schumann, Robert (University of Hamburg) - Giovannetti, Chiara (Sapienza University of Rome)

Session format: Session with keynote presentation and discussion

This session investigates the relation of mnemotopes and collective memories within a diachronical and global framework, analyzing processes and practices occurring in the spatialization of memories, as well as the expression of that space through mapping. Drawing from multiple fields and experiences, we seek to explore theoretical models as well as practical methodologies that concur in the construction, deconstruction, and manufacturing of collective memories. What is the conceptual relationship between spatial materiality and memory? By what physical means is memory embedded in the landscape? What role can and do narrated topographies play in the construction and transformation of cultural memory? How can practices such as participatory mapping, counter-mapping, or feminist mapping alter the way physical spaces are interpreted? What effect might cartographical narratives have had in reinforcing political structures, or bringing about political changes?

This session explores diverse approaches to topographical mnemotechniques and memoryscapes, as well as symbolic mapping. We seek to identify points of agreement as well as key differences in order to critically debate dimensions of both physical, spatial memory, and its expression in the methodologies involved in the craft of map-making. Our goal is to examine the conceptualization of space itself, both physical and in abstraction, and its use to develop and manufacture communal purpose, identity, memory, and meaning. Our focus is in the past in general, beyond the boundaries of individual fields, in order to further develop innovative research tools of value to the field of archaeology at large, rather than confined within particular approaches or material types.

1 THE INVENTION OF CULTURAL HERITAGE AND MEMORY. ANTHROPOLOGICAL PERSPECTIVES ON A CONTESTED CONCEPT AND THE STORY OF AN (UN)POPULAR MONUMENT

Klocke-Daffa, Sabine (University of Tuebingen)

Ever since the UN World Heritage Convention of 1972, which was expanded several times in later years, tangible and intangible objects, archaeological sites, monuments, architectural ensembles and landscapes, as well as oral traditions, music and craft techniques, have been considered assets worthy of protection. They are said to be points of reference in space and time, links between past and present and the “cement of identity”. Regardless of how historical it is, cultural heritage has become a much sought-after resource which, in addition to its symbolic and identity-forming significance, shows undeniable financial benefits. Heritage sites promise to attract streams of visitors, income-generating employment and (sometimes dubious) fame. However, the fact that a society’s memory is time-bound and rarely shared equally by all members, its heritage may constantly be re-defined, negotiated, and disputed. The case study of a much-contested monument in Southern Africa illustrates the ambivalence of invented heritage and constructed memory: once described as a symbol of German power and Germanness in Africa, it later turned into a thriving tourist attraction, then site of contested memory, heated debates and hallmark of oppression. Today, it stands where invented cultural heritage ends up at best: in a museum.

2 METSEMEGOGOLO: OF FRAGMENTED ARCHIVES AND STORY-MAPPING FOR THE EXPLORATION OF ANCIENT AFRICAN URBANISM

Merlo, Stefania (University of Cambridge) - Wintjes, Justine (Kwa-Zulu Natal Museum, South Africa) - Coetzee, Anton (School of Arts, University of the Witwatersrand)

Story-mapping is a compelling form of presentation of curated narratives or pathways along which archaeological, historical and various other archives of the past can be explored and presented to various publics. As other forms of digital storytelling, it potentially enables users to share personal stories, produce novel, multiple, complementary and, at times, conflicting knowledges and to raise awareness of marginalized and contested histories through the co-creation of heritage. Yet, the premise of digital storytelling through maps is the existence of digital archives and a digital platform that facilitates the creative process as well as accessibility by both producers and consumers. The lack of one or all is a hindrance to its implementation and the reason for its almost complete absence as a narrative tool for the exploration of the African past.

Metsemegogolo means ‘ancient towns’ or ‘old cities/places’ in Setswana. It is the name chosen for a project, developed by a collective of researchers since 2019, aimed at both redressing the lack of digital materials that speak to the theme of pre-colonial African urbanism (with a particular focus, for now, onto Tswana settlements c.1600 into historical times in Southern Africa) and experimenting with varied forms of curations of this rich but rarely represented past, outside the bounds of scholarly research. The multimodal platform at the core of the project uses spatio-temporal principles to do so. This allows, at the same time the re-aggregation of archival materials that have been refracted into different spaces over time and can therefore be reconnected and re-enlivened to subvert traditional hierarchies (most of which colonial in lineage) and the use of place and landscape as dynamic structural principles of creative mapping.

3 MARKING THE PAST, ORGANIZING THE PRESENT, SHAPING THE FUTURE: THE TREES OF THE KAABU KINGDOM (SENEGAMBIA, 13TH-19TH C)

Canós-Donnay, Sirio (INICIPIT (Instituto de ciencias del patrimonio), CSIC (Consejo superior de invest))

From the 13th century until its collapse six centuries later, the Kaabu Kingdom dominated politically, economically and culturally most of the Senegambia (current Senegal, Gambia, and Guinea-Bissau). Initially as part of the Mali Empire, later as an independent kingdom, Kaabu flourished and expanded its commercial networks across West Africa and the Atlantic world. Over the past decade, and through various projects, I have studied the archaeology of Kaabu and its landscape organisation; this has involved recognising and understanding the key role that some trees play in the articulation of its political landscapes. As places of memory, political institutions (assembly points, courts, markers of political office), and/or shrines, these ‘political’ trees defined the kingdom’s power geographies. The combination of a materially ephemeral nature with a deep-time social life, however, makes their study methodologically challenging. In this paper I review the nature of these trees and the challenges posed by their archaeological study.

4 HEROES, ANCESTORS, AND TREES: WRITING MANDLAKAZE’S HISTORY INTO THE LANDSCAPE

Cruz, M Dores (University of Cologne)

In Southern Mozambique, as in other sub-Saharan regions, trees can be loci of spiritual power, of local and regional identity. They mark places of reverence and establish links between ancestors and present generations. They are, at once, material and symbolical marks engaged in mediating social relations between past and present, memorializing events and individuals. But they also map local events and individuals, sometimes relevant for national narratives, but unfailingly inscribed in local concepts of history, time, and landscape. In this paper, I discuss briefly the significance of trees and tree groves in local narratives of past events that took place in the Mandlakaze’s district, that highlight local lineages and the power of the deceased. While trees materialize the memory of ancestors, they are also used to write national heroes into local views of landscape and history. Sacred trees and tree groves related to counter-narratives of local lineages are often associated with archaeological and/or ritual sites, while others located in national heritage sites, particularly related to the liberation struggle are used to integrate national heroes into local narratives. This case study broadens our understanding of archaeological evidence, contributing to decolonize archaeological practice by considering non-western epistemologies and local memories.

5 PLANTING HOME GROUND: TREES IN SPECIAL BLACK AMERICAN YARDS

Gundaker, Grey (Teachers College Columbia University)

Many peoples around the world see trees as mediators between earth and sky and this and the other world. In the African Diaspora to North America, trees also mediate between past and present, and between the places where Africans enslaved in the Americas began their journeys and where their descendants took root. Based on ethnographic research in the southeastern United States, this paper will show a variety of ways that Black homeowners used trees in memorials for ancestors and more recent family members. These memorials serve as anchors for the home places of extended families and assert that members hold rights to land, contribute to their communities, and uphold principles of right living against the grain of racism, disenfranchisement, and other injustices. By taking literally the phrase “family tree,” planting miniature “sacred forests,” and adorning trees with bottles and light reflecting materials, the elders I met during fieldwork in the 1980s and 90s looked back through their family histories and forward toward healing the ruptures of the Middle Passage. Although home ownership allowed larger scale, the arrangements of plants and objects around and in trees may help archaeologists to identify commemorative and communicative activities at smaller scales and in earlier contexts as well.

6 ARCHITECTURAL RITUAL AS MNEMONIC ACT: GUDEA’S TEMPLE BUILDING SEEN THROUGH THE DEDICATIONS AND THE WORKFORCE

Sen, Kutay (Columbia University)

The topic, which is the integral theme of the dissertation that I am presently working on, investigates foundations of the temples of the middle and late 3rd millennium B.C. in southern Mesopotamia, and the foundation deposits laid therein, as topographical memoryscapes which this session convenes to address and discuss. I question whether both the foundations and their deposits can be studied as vessels of composing and preserving a collective consciousness of the material worldview of the Mesopotamians. I argue that an approach which integrates life-stories of objects, archaeological context-analysis and epigraphic evidence would allow us to construct an alternative reading of historical consciousness in Mesopotamia through material and architectural record, rather than a predominantly scribal/linguistics-oriented tradition of studying the subject in the archaeology of ancient West Asia.

Within the confines of this session, I propose to present on the Cylinders of Gudea, which narrate the most detailed account of a temple foundation ceremony, as well as the remains of the temple of Ningirsu in ancient Tello, and some of the foundation deposits of Gudea and his father Ur-Bau in the 22nd century B.C. The materiality of this ritual is manifest in the dedications and tools used in the ceremony as well as the participation of the workforce in the making of the whole structure. This paper presents an account of the foundation ceremony based on the spatial continuity and temporal diachronicity of both foundation deposits and experience of the workforce, extending the subject beyond the person of the ruler and royal ideology which dominate the field. I argue that the preservation of temple foundations was a mnemotechnical act, and their deposits are pertinent to architecture as much as to ideology; and these two phenomena come into effect intertwined in the collective memory of all the participants.

7 MONUMENTAL ‘MEMORYSCAPES’ OF SARDINIA: NURAGIC RE-USE THROUGH SPACE, TIME, AND MEMORY

Gustafson, Julia (University of Cambridge)

Once a monument has been built in a landscape, it forever changes the way in which humans perceive and interact with that space. The re-use of monuments demonstrates how meaning was attached to these places and how this

shifts over time, becoming ‘memoryscapes’ or palimpsests of human-monument interaction. Questions such as why societies that are separated both temporally and culturally have re-used and even re-constructed older monuments remain to be answered.

In Sardinia, these questions are of particular relevance because of its cross-continental and cross-cultural connections in the Mediterranean. The Sardinian Bronze Age (1800-1100 BC) saw the emergence of the Nuragic civilisation, which is characterised by the construction of impressive megalithic architecture, in the form of the eponymous nuraghi. Today, nuraghi are an important symbol of Sardinian national identity, and their continued re-use throughout the classical, medieval and modern periods stands as a record of their important place in the imagination, memory, and identity of Sardinians. While it is not unusual for prehistoric monuments to have a continuous impact on the landscape and popular imagination, the case of monument re-use in Sardinia seems to be unique in that it is both almost universal (i.e. most monuments show signs of re-use) and persistent (i.e. most time periods in Sardinia have some re-use). Previous research on Sardinia relating to archaeological ‘memoryscapes’ has only begun to address the phenomenon of Nuragic reuse in Sardinian society throughout the Roman, Byzantine, and modern-historic periods.

This study investigates how Nuragic monuments are used/re-used, built/re-built, encultured/re-encultured through the *longue durée*, considering whether they act as mnemonic devices within the broader Sardinian landscape in relation to the preservation, creation, and transformation of memory and identity, and how this impact, if any, manifests in the physical, metaphysical, and sensorial spaces around them.

8 ANCIENT ASIAN ECHOES: TRACING CULTURAL MEMORIES THROUGH ARTISTIC REPRESENTATIONS OF HUMAN-HEADED BIRD

Sun, Yu (Durham University)

Memory is an abstract concept, and for archaeologists studying the cultural memory of ancient societies, some of the most crucial carriers of memory are material culture and visual arts, serving as the embodiment and concretization of cultural memory. This study explores cultural exchanges in different ancient Asian regions, focusing on a supernatural creature often depicted in ancient Asian art, the human-headed bird, similar to the creature known in the West as the “Siren”.

By comparing the varied applications and transformations of this theme by different cultural groups, we are able to investigate social exchanges and map the cultural exchange networks of ancient Asia during specific periods. In this presentation, a specific case study will illustrate this research approach by tracing the origin and dissemination of a particular image type, priest with a human head and a bird’s body, along with the altar image in Zoroastrianism. Originating in the Achaemenid Empire, inherited by Chorasmia, and transformed with Hellenistic elements, this motif spread in Central Asia and gained popularity among the Sogdians. Through the migration of the Sogdians, it reached ancient China, where cultural memories of the same image differed between those who migrated and those who stayed in the Sogdian cultural area. This phenomenon is reflected in the treatment and processing of the priest with a human head and a bird’s body image.

In summary, this project aims to reinterpret archaeological materials from the perspective of cultural memory and exchange through visual culture, exploring communication and interaction among ancient Asian civilizations.

9 SPATIAL MODES OF CULTURAL MEMORY AS SEEN IN THE ALPINE BRONZE AGE

Ballmer, Ariane (Independent Researcher)

In the Central Alps, the second half of the 1st millennium BC is characterised by increased human presence and activity. Among the archaeological remains (including settlements, burials as well as sites associated with agricultural and resource production practices), ritual depositions and emerging ceremonial sites are typical. Based on these two source categories, both of which are clearly related to topography, the paper proposes two spatial modes of cultural memory, one of which refers to a flexible, meta-geographical reference points within ‘scapes’, essentially determined by the natural environment, and the other one featuring fixed locations of territorial significance. A trend towards a detachment of the cultural memory from the unaltered, natural terrain in favour of an increased collective use of ceremonial sites controlled by elites, is identified. This development can be explained against the background of the economic and social change in the Central Alpine region at the transition from the 2nd to the 1st millennium BC.

10 MEMORY INFRASTRUCTURES IN THE IRON AGE NORTHERN APENNINES (ITALY) AS RESOURCES FOR THE CONSTRUCTION OF MEMORYSCAPES

Da Vela, Raffaella (Post-Doc Researcher at the SFB1070 RessourcenKulturen University of Tübingen)

What were the infrastructures of collective cultural memory in the northern Apennines between the 8th and 5th centuries BC and what was their role in the construction of memoryscapes? This mountainous region connected central and northern Italy and thus the Etruscan core and the Po Valley. Memory infrastructures are defined here as

the socio-natural systems that constitute the necessary and contingent condition for the construction, manipulation and transmission of cultural memory within local communities. These infrastructures are located at the intersection of social, cultural and personal identities and enable the formation of shared memories between communities settled on both sides of the mountains. The focus will be on the spatial infrastructures of memory, and in particular on the impact of vertical resource landscapes on memory construction. Social infrastructures, such as gender roles and social functions, as well as semantic infrastructures, such as value systems, will also be considered in their interaction with spatial infrastructures. Particular attention will be paid to the invention of mythological topographies and to the role played by the mobility of people and ideas in the construction, transmission and manipulation of cultural memory across generations.

11 NECROPOLEIS AS MNEMONIC PALIMPSEST: TOMB VIOLATION, TOUCH, AND REMEMBRANCE IN PRE-ROMAN ITALY

Peruzzi, Bice (Rutgers State University of New Jersey)

Tombs are physical embodiments of memory. Even when they lack an epitaph, funerary monuments act as reminders of individuals who have passed away and their conspicuous presence in the landscape affects generations of onlookers over the years.

Yet, collective memory – very much like that of an individual – is not static, but rather it is a continuous active process of creation where memories compete, change, or are eradicated depending on the contemporary social context.

This paper analyzes the relationship between burials and collective memory, focusing on the widespread custom in Southeastern Italy of violating, reusing, and removing tombs (sometimes even to build residences). I argue that this practice was the expression of complex strategies used by specific social groups, to create a narrative about their past. By repeatedly engaging with the physical remains of pre-deceased members of their communities, they were able to blur the boundaries between past generations and their present, alternately rejecting, incorporating, and reinventing shared memories.

The archaeological evidence shows that this phenomenon was particularly prevalent towards the end of the 4th century BCE, a period of profound reshaping of the sociocultural structures of the communities that populated Apulia and Basilicata. In such times of social restructuring, when competition for authority must have been the rule, being able to own a piece of the shared past must have been particularly appealing, as it allowed the new elites to legitimize their newfound power.

12 MANUFACTURED MEMORY AND THE URBANIZATION OF ROMAN GAUL

Irvin, Aaron (Murray State University)

As a result of the Roman conquests, Gallic communities suddenly found themselves fractured, resettled, relocated, and assigned wholly new identities and functions by not only their conquerors, but by a new Gallo-Roman elite that emerged within the Gallic provinces. This elite was tasked with governing the existing Gallic population, while also maintaining amiable relations with the new Roman imperial power.

The range of different settlement types and proto-urban centers in Gaul, coupled with the period of Roman conquest and domination, present what has become a confused and unclear narrative. It is the argument of this presentation that theories and paradigms arising out of current glocalization models allow us to instead view the process of Gallic urbanization as a process of negotiation over shared identity, memory, and memorialization; an attempt to crystallize group experience and therefore manifest identities into shared social spaces. What have thus far been viewed as attempts at aping Roman culture, or imprecise efforts at Romanization, were instead smaller pieces of a larger cultural discussion taking place throughout the Three Gauls on what Gallic society would look like post-conquest, and how it would relate to itself and Roman society both in a manufactured past and future.

13 HEADDRESS, COMBAT HEADDRESS, THE POWER OF INSIGNIA

Fleury, Béatrice (Freelance)

This presentation attempts to re-assess violence in ancient societies through items of military equipment and related insignia, and link their impact on memory and role in our “imaginary”.

The portrait of the “Good Savage” (Rousseau), as taken up in its “essence” in “L’archéologie de la violence”, reflects the nineteen-sixties pacifist outlook.

The Ancients would not have perpetrated acts of violence, or not at the same level of savagery as modern societies.

In Soudsky’s neo-Marxist model, in neolithic societies, accumulation of economic surpluses causes differences in wealth, leads to intensification of competitiveness, and ultimately to territorial and cultural expansionism, consecrated in the enshrinement of unparalleled power.

Mauss, Sahlins, Godelier described “primitive” systems on Marxist lines.

Chesneaux analysed the collapse of political/economical systems of African and Asian societies in the nineteenth century as part of the imposition of European hegemony.

The impact of one culture on another, the accompanying changes and inevitable acts of resistance, end in uncertain acculturation. Consider Caesar’s Gallic Wars ...

Findings supporting an escalation of violence are few. Recent discoveries of enclosed neolithic sites in Europe which unveil indices of violence, suggest the reverse. For the end of the Iron Age, discoveries at Gallic sites testify intense savage practices of putting to death.

Comparison of items of iron age defensive equipment with modern ones, fortuitously uncovers the impact insignias have on behaviour; they carry messages contradictory to their aim, as their semiotics induce the impulse for power.

Consciousness provide us with the arms to combat the “syndrome violence”. Whether it is attested by rituals of sacrifice, mortuary practices, warfare, even murder.

Helmets painted in romantic mode by Rochard reflect our “imaginaire”.

Resilience, resistance, repression, are vectors of aggressivity. “Nothing has changed”, other than in form, and in the shift from ostentatious symbol to functionality.

14

A PLAYFUL MAPPING APPROACH TO ARCHAEOLOGICAL LANDSCAPES

Giovannetti, Chiara (Sapienza University of Rome) - Anichini, Francesca (Università di Pisa) - Basile, Salvatore (Università di Pisa) - Gattiglia, Gabriele (Università di Pisa) - Paperini, Elisa (Università di Pisa) - Sciuto, Claudia (Università di Pisa) - Voccia, Raffaele (Università di Pisa)

The archaeological landscapes we survey are a living and lively reality in the daily lives of many. People shape the landscape and are also shaped by it, engaging in a daily exchange that often goes uncharted. This study addresses the challenge of capturing this dynamic, with a specific focus on the non-dominant voices of children.

The presented case study, conducted during an archaeo-anthropological investigation of the Apuan Alps led by Map-paLab (Pisa University), suggests that employing playful mapping techniques provides children with a valuable avenue to freely express their perspectives on archaeological sites, thereby challenging established power structures within the field. Methods such as accompanied archaeological surveys, simplified Topographic Unit models, GPS apps, and participating walks were utilized to engage children, with a hybrid digital and analogue approach. Results indicate a positive reception of the approach, providing a pleasant and educational experience. Conducting activities in familiar places for children was a facilitating element and a privileged moment to observe the unfolding relationship between the landscape and the children. It allowed seeing how these spaces, for us ‘archaeological sites,’ were living and present elements in the ongoing narrative of their everyday lives.

The implications of this study will extend to the creation of a meta-data schema linking experiential data from children with archaeological datasets, paving the way for a more inclusive and collaborative understanding of archaeological landscapes, and reuse of archaeological data. The cases for reuse are particularly geared towards formal educational contexts, with the aim of facilitating a discussion on the epistemological potential of material sources, often excluded from school curricula after the advent of written sources.

15

ARCHAEOLOGY, CRAFTING MAPS, AND POLITICAL CHANGE: PLAYFULLY MAPPING THE CONTESTED URBAN LANDSCAPES AND MEMORIES OF SURIÇI IN DIYARBAKIR

Hacigüzeller, Piraye (University of Antwerp)

In this talk, I aim to situate maps and mappings (i.e., the practices involved in map-making and map-using) within the field of archaeology. I characterise archaeological mapping as a craft that necessitates a distinct set of skills. Like all crafts, it requires attentiveness, improvisation, and an openness to affect. I present the impact that the digital transition has had on archaeological mappings, particularly since the 1990s. Further, I elucidate how, from the 2000s onwards, mappings began to serve as a focal practice for advocating, demanding, and effecting political change in archaeology—a process I name mapping archaeology for change. Despite inherent challenges, archaeological mapping can prove to be a powerful ally for nondominant individuals and communities striving to make their voices heard. For instance, such mappings can serve as important aids in exploring contested landscapes through unique performances. These performances can highlight attempts to erase collective memories woven into urban materialities as I will illustrate with a playful mapping activity I carried out in Diyarbakir, southwest Turkey, in February 2024.

16

TO MAP A COUNTRY’S ANCIENT REMAINS AND CULTURAL HERITAGE WITHIN THE FRAMEWORK OF SYSTEMATIC PROTECTION AND INTERACTIVE PRESERVATION

Thunberg, Carl L. (Västernorrland County Museum; ICOM)

The endeavor to map a country’s ancient remains and cultural heritage within the framework of systematic preservation and with an ambition to also capture the relationship between people, cultural heritage and their surrounding environment necessitates a transformative shift in perspective. Beyond the conventional focus on inventory and documentation, this multidisciplinary approach places a paramount emphasis on the intricate interplay between human interaction and the landscape, seamlessly intertwining preservation and community engagement. The selection process for preservation evolves into a nuanced endeavor, where differing narratives and memory preservation shape the criteria. Based on cultural and historical significance, the interpretation of sites becomes a pivotal factor in the selection process. Diverse perspectives must be considered to ensure a comprehensive representation of the country’s rich cultural tapestry. The need to address memory preservation, and weaving the collective memory, i.e. memories, and contested memories, into the fabric of heritage preservation should be underscored. The complexities of memory preservation must be addressed in such a process, not least the intricacies of archiving and safeguarding narratives. The studies that form the basis for this lecture propose an inclusive preservation strategy that not only catalogues ancient sites but also incorporates the stories embedded within them, acknowledging the diverse cultural memories associated with each locale. Furthermore, the implementation of systematic cultural heritage protection extends beyond legal frameworks. It underscores the necessity of integrating public awareness and education initiatives, fostering a collective responsibility for preservation. Integrating GIS technology becomes a tool not just for spatial documentation but a dynamic medium for capturing the evolving relationship between people, heritage sites, and their surrounding environment. This tech-enabled approach allows for real-time monitoring of changes, identifying potential threats, and ensuring a responsive preservation strategy.

Internationally, the abstract advocates for collaborative efforts, urging countries to engage in information sharing and cooperative initiatives. Recognizing the universal significance of cultural heritage, this collaborative approach seeks to benefit from diverse perspectives and expertise, creating a global network committed to preserving the world’s ancient treasures. In essence, this framework envisions a collaborative, community-driven effort where government agencies, local communities, researchers, and international organizations converge to safeguard and celebrate a country’s antiquities. An intertwining preservation of physical ancient remains with narratives and memories, could be an approach to enable enduring protection of our ancient remains in a more holistic manner. This is of course also something that would be most beneficial within a framework of international cooperation.

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BUILDING BRIDGES: AN OPEN FORUM FOR ARCHAEOLOGY AND METAGENOMICS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Bonucci, Biancamaria (Institute of Genomics, University of Tartu) - Borry, Maxime (Max Planck Institute for Evolutionary Anthropology; Leibniz Institute for Natural Product Research and Infection Biology Hans Knöll Institute) - Lopopolo, Maria (Institut Pasteur, Université Paris Cité, CNRS UMR 2000, Microbial Paleogenomics Unit, F-75015 Paris, France) - Pach, Aleksandra Laura (Globe Institute, University of Copenhagen) - Quagliariello, Andrea (Dept. Comparative Biomedicine and Food Science, University of Padua)

Session format: We propose a dynamic session format that encourages diverse contributions, emphasising both “tandem presentations” and traditional ones from “regular session”, in order to foster an interdisciplinary exchange of ideas. In this innovative session type, participants are invited to submit presentations in pairs, where one presenter focuses on the archeological angle of the project, and the other on the ancient metagenomics one, each offering their fresh perspectives and insights. These “tandem presentations” will be followed by open discussions that explore the synergies between disciplines. Additionally, we welcome standard presentations that showcase research from the individual disciplines of expertise. This mixed approach not only accommodates the varied expertise of our attendees but also promotes an enriching dialogue across interdisciplinary boundaries, making our session a hub for cutting-edge collaboration.

Humans and microbes have always maintained an enduring coexistence, directly and indirectly shaping each other’s biology and evolution.

Ancient metagenomics is an emerging field at the crossroads of archaeology, biology and computational sciences. It interrogates our shared past by analysing preserved ancient microbial DNA from a variety of archaeological matrices, ranging from dental calculus to preserved biological material in ancient vessels. This innovative approach has introduced a paradigm shift in our comprehension of historical human lifestyles, dietary customs, and health.

Seizing the rare opportunity of bringing experts in archaeology, molecular and computational biology together, we aim to promote an open and collaborative atmosphere to stimulate exchanges between disciplines and enrich our collective grasp of the past.

In this session, we encourage the presentation of projects that are at the intersection of the above disciplines. For instance, the study of ancient pottery (e.g. a wine amphora), can provide new insights into historical context, international trade, ancient diet, as well as the identification of ancient microorganisms associated with wine fermentation.

Embracing this dynamic format, the session will endorse “tandem presentations”, with an expert from each field, alongside conventional talks and posters, that showcase research from the individual disciplines of expertise. As an example, a study based on birch tar could be presented by a biologist, delving into the oral microbiome and dietary signals extracted from the substrate, together with an archaeologist who investigates the uses of this material and its cultural context.

The presentations will be followed by discussions designed to mend the gap between disciplines. Through this integrative approach, our session aspires to bridge disciplinary boundaries and promote a more nuanced and interconnected understanding of our shared heritage.

ABSTRACTS

1 INTEGRATING PALEOMETAGENOMIC DATA WITH ARCHAEOLOGICAL EVIDENCE TO STUDY POPULATION DYNAMICS IN THE SOUTHERN ANDES DURING THE LATE INTERMEDIATE PERIOD

Rascovan, Nicolas (Institut Pasteur, Université de Paris Cité, CNRS UMR 2000, Microbial Paleogenomics Unit, F-75015 Paris, France) - Luisi, Pierre (Institut Pasteur, Université de Paris Cité, CNRS UMR 2000, Microbial Paleogenomics Unit, F-75015 Paris, France) - Ponce Soto, Gabriel Yaxal (Institut Pasteur, Université de Paris Cité, CNRS UMR 2000, Microbial Paleogenomics Unit, F-75015 Paris, France) - Nelson, Elizabeth (Institut Pasteur, Université de Paris Cité, CNRS UMR 2000, Microbial Paleogenomics Unit, F-75015 Paris, France) - Willingham Grijalba, Arve Lee (Institut Pasteur, Université de Paris Cité, CNRS UMR 2000, Microbial Paleogenomics Unit, F-75015 Paris, France) - Lopopolo, Maria (Institut Pasteur, Université de Paris Cité, CNRS UMR 2000, Microbial Paleogenomics Unit, F-75015 Paris, France) - Barberena, Ramiro (Laboratorio de Paleoecología Humana, Instituto Interdisciplinario de Ciencias Básicas (ICB), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Facultad de Ciencias Exactas y Naturales, Universidad Nacional de Cuyo, Mendoza, Argentina; Centro de Investigación, Innovación y Creación, Universidad Católica de Temuco, Chile)

The archaeological record is highly fragmented, and all pieces of evidence must be considered and integrated to better understand the human past. Recent advances in the study of ancient biomolecules in archaeological human remains, and particularly ancient DNA and isotope data, have greatly contributed to this end. Ancient DNA studies have been mainly driven by the analysis of ancient human genomic data, but important contributions came also from genomes of ancient human pathogens and ancient oral microbiota data. However, to date these layers of information have been mostly studied separately and rarely jointly analyzed with archaeological data. In this work we aimed at bridging that gap by analyzing multiple paleometagenomic datasets to study populations from the southern Andes of Argentina and Chile (30–34° S) between 1200–1420 AD (Late Intermediate Period), a period characterized by prevalent migration preceding the Inka conquest. The diets and mobility patterns of the human populations in the area were assessed with N15, C13 and 87Sr/86Sr stable isotope analyses. These analyses revealed a complex pattern of population dynamics, with co-existing local and migrant populations with different dietary patterns. Metagenomics of dental calculus was employed to investigate the oral microbial diversity of both populations, using strain level resolution. Metagenomic analysis of petrous bones was utilized as a source of human genomic data to determine the identity and origins of migrant and local populations, while also serving as a proxy for the environmental microbial background in oral microbiome analyses. Finally, preliminary results from metagenomic analysis of ancient teeth suggest that migrant populations may have been affected by Tuberculosis, raising questions about the role of this disease in the context of these migrations. This work perfectly exemplifies the benefits of a synergic work between archaeologist and geneticists to get more profound understanding of the history of past populations.

2 ANCIENT DENTAL CALCULUS REVEALS ORAL MICROBIOME SHIFTS ASSOCIATED WITH LIFESTYLE AND DISEASE IN GREAT BRITAIN

Weyrich, Laura (Pennsylvania State University) - Gancz, Abigail (Pennsylvania State University) - Farrer, Andrew (University of Adelaide)

The prevalence of chronic, noncommunicable diseases has risen sharply in recent decades, especially in industrialized countries. While several studies implicate the microbiome in this trend, few have examined the evolutionary history of industrialized microbiomes. Here, we sampled 235 ancient dental calculus samples from individuals living in Great Britain (~2200 BCE to 1853 CE), including 127 well-contextualized London adults. We reconstructed their microbial history spanning the transition to industrialization. After controlling for oral geography and technical biases, we identified multiple oral microbial communities that co-existed in Britain for millennia, including a community associated with *Methanobrevibacter*, an anaerobic Archaea not prevalent in the oral microbiome of modern industrialized

societies. Calculus analysis suggests that oral hygiene contributed to oral microbiome composition, while microbial functions reflected past differences in diet, specifically in dairy and carbohydrate consumption. In London samples, *Methanobrevibacter*-associated microbial communities are linked with skeletal markers of systemic diseases (e.g., periostitis and joint pathologies), and their disappearance is consistent with temporal shifts, including the arrival of the Second Plague Pandemic. This suggests pre-industrialized microbiomes were more diverse than previously recognized, enhancing our understanding of chronic, noncommunicable disease origins in industrialized populations.

3 THE NEOLITHIC TRANSITION FROM A BACTERIAL PERSPECTIVE: A POPULATION GENETIC APPROACH

Santos, Patrícia (University of Ferrara) - Vizzari, Maria Teresa (University of Ferrara) - Boscolo Agostini, Rajiv (University of Ferrara) - Ottoni, Claudio (University of Rome Tor Vergata) - Quagliariello, Andrea (University of Padua) - Modi, Alessandra (University of Florence) - Lari, Martina (University of Florence) - Ghirotto, Silvia (University of Ferrara)

The Neolithic transition, one of the main demographic events in Europe 10.000 years ago, marked the shift from hunting-gathering to farming. The adoption of a new lifestyle triggered important changes in the evolution of both humans and their oral microbiome possibly associated with a higher abundance of two bacterial species: *Olsenella* sp. oral taxon 807 (OT807) and *Anaerolineaceae* bacterium oral taxon 439 (OT439). Previous studies on the oral microbiome during this transition gave contrasting results, often limited by small sample size distributed over a broad geographical area characterized by distinct ecological conditions. Moreover, most of these studies did not focus on the genetic structure of these bacteria.

This project combines metagenomic and population genetic analyses to reconstruct the genomes of OT807 and OT439, focusing on dental calculus as a rich source of information. By analyzing published metagenomic data spanning different areas from the Paleolithic to the Bronze Age, our findings suggest an increase in the abundance of both OT439 and OT807 during the Neolithic, in agreement with previous studies. We also highlighted a clear genetic structure associated with this transition for the OT439 bacteria, which is absent in OT807. This suggests that OT439 could be a good marker for understanding Neolithization processes.

4 COMBINED GENOMIC AND LIPID ANALYSES REVEAL NEW INSIGHTS INTO BIRCH TAR USE AND FUNCTION IN THE NEOLITHIC ALPS

Koch, Tabea (Université Côte d’Azur, CEPAM, CNRS, France; Department of Archaeology, University of York, York, UK) - White, Anna (Globe Institute, Faculty of Health and Medical Sciences, University of Copenhagen, Denmark; Department of Archaeology, University of York, York, UK) - Little, Aimée (Department of Archaeology, University of York, York, UK) - Wales, Nathan (Department of Archaeology, University of York, York, UK) - Regert, Martine (Université Côte d’Azur, CEPAM, CNRS, France) - Schroeder, Hannes (Globe Institute, Faculty of Health and Medical Sciences, University of Copenhagen, Denmark)

Birch tar is the first synthetic material in the archaeological record used as early as the Middle Palaeolithic in Europe. The Neolithic provides a larger corpus of birch tar finds in relation to composite tool hafting, pottery repair and sealing. Tar lumps have been shown to bear tooth imprints, implying they were chewed, and recent studies revealed ancient DNA preservation within such lumps. It remains unknown whether DNA also preserves in other tar artefacts. To address this question, we analysed 30 artefacts from 9 archaeological sites in the Alpine region. We applied organic residue analysis with ancient genomics to characterise the composition and microbial signature of adhesives linked to hafting, repair and lumps. Our results show that birch tar is the main component, while two samples also contain conifer resin/tar. Ancient DNA was found in all categories, identifying oral microbes, human DNA and several plant and animal species. Our study is the first large-scale investigation into birch tar artefacts using a combination of lipid and genomic analyses with implications for our understanding of birch tar functionality, production-related technologies and cultural practices.

5 TRACING PAST INTERACTIONS: METAGENOMIC ANALYSES OF KURĪ PALAEOFAECES FROM AOTEAROA NEW ZEALAND

van Os, Meriam (Department of Anatomy, School of Biomedical Sciences, University of Otago; Archaeology Programme, School of Social Sciences, University of Otago) - Greig, Karen (Archaeology Programme, School of Social Sciences, University of Otago; Southern Pacific Archaeological Research, University of Otago) - Anderson, Atholl (School of Culture, History & Language, Australian National University; Ngai Tahu Research Centre, University of Canterbury) - Campbell, Matthew (CFG Heritage Ltd; Anthropology, School of Social Sciences, University of Auckland) - Collins, Catherine (Department of Anatomy, School of Biomedical Sciences, University of Otago) - Knapp, Michael (Department of Anatomy, School of Biomedical Sciences, University of Otago) - Tucker, Brooke (Archaeology Programme, School of Social Sciences, University of Otago) - Walter, Richard (Southern Pacific Archaeological Research, University of Otago; School of Social Science, University of Queensland)

Aotearoa New Zealand was the last major land mass to be settled by humans, populated about 750 years ago from East Polynesia. The archaeological record suggests that upon arrival, ancestral Māori rapidly radiated across most of the coastal North and South Islands, quickly adapting to new environments and mastering the use of new resources.

The relative abundance of palaeofaeces throughout archaeological sites in Aotearoa New Zealand provides a unique opportunity to study these human-animal-environmental interactions in more detail. This tandem talk will present preliminary results of metagenomic shotgun analyses of thirty kurī (the extinct Māori dog) palaeofaeces, within the broader archaeological context of Aotearoa New Zealand. The samples are from three archaeological sites: the Long Bay Restaurant site in the upper North Island (1430-1485 AD, n=10), Wairau Bar in the upper South Island (early 14th century AD, n=10), and Sealers Bay Camp on Codfish Island/Whenua Hou in Southern New Zealand (two occupation phases: 13-15th & 19th century AD, n=10).

6 A COMPLEX BLEND OF WEST AND EAST: A BIOMOLECULAR STUDY OF WINE MANUFACTURING IN JUDEA OF THE EARLY ROMAN PERIOD

Ben-Gedalya, Tziona (Eastern R& Center, Ariel, Israel; Department of Molecular Biology, Ariel University, Israel) - Spiteri, Cynthianne (Eberhard Karls University Tübingen, Germany; ArchaeoBiotics, Department of Life Sciences and Systems Biology, University of Turin, Italy) - Porat and Herodium Expedition, Roi (Herodium Expedition, The Institute of Archaeology, Hebrew University of Jerusalem, Israel)

An early Roman period winery was discovered in 2017, in the fortress palace of King Herod in Herodium. Located on the margins of the Judean desert along the Dead Sea rift, within an earthquake prone region, the site combines well-defined archaeological evidence of a winery, the Judean desert climate, and contexts sealed by ancient episodes of collapse attributed to earthquakes. Providing the opportunity to systematically study well preserved organic remains of ancient winemaking, the Herodium winery proved an excellent case study for exploring the preservation of ancient wine signatures in different substrates and archaeological artefacts. Wine production processes were studied by applying organic residue analysis to ceramic fermentation vessels and ancient grape pomace remains as well as control sediments. Using Gas Chromatography-Mass Spectrometry we observed well-preserved residues demonstrating evidence of wine and pine tar/resin, the latter probably used as a sealant as thick remnants were found adhering to the inner surfaces of the ceramic containers. Moreover, we further established a new approach to search for evidence of fermentation, applying scanning electron microscopy to the ancient fermentation vessels versus controls. Overall, our study provides insights regarding the interpretation of wine in archaeological findings, enhances understanding of wine making traditions in the Mediterranean basin and informs on a culinary aspect of the vibrant Roman influenced globalization processes in Judea at the end of the first century BCE.

7 ANCIENT WINE MICROBES FROM FIRST CENTURY AD ROMAN CLIENT KINGDOM OF JUDEA

Borry, Maxime (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; 2Leibniz Institute for Natural Product Research and Infection Biology, Hans Knöll Institute, Jena, Germany) - Ben Gedalya, Tziona (Eastern R&D Center, Ariel University, Ariel, Israel; Department of Molecular Biology, Ariel University, Israel) - Warinner, Christina (Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Faculty of Biological Sciences, Friedrich-Schiller University, Jena, Germany; Department of Anthropology, Harvard University, Cambridge, MA, USA) - Expedition, Herodium (Hebrew University, Jerusalem, Israel)

This project will be presented in tandem with Tziona Ben Gedalya, who will cover the archeological, and organic residue analyses of this project. From the organic material consistent with grape residues remaining at the bottom of ancient fermentation vessels, we extracted and sequenced DNA using shotgun metagenomics and targeted capture, aiming for enrichment of DNA from fermentation associated microbes. While the analysis of the sequencing data first revealed a partial degradation of the overall microbial communities, we could successfully control for contaminant microbes using soil samples from the fortress and a differential abundance analysis approach. After de novo assembly and binning of the remaining fermentation bacteria genomes, we analyzed the reconstructed high-quality metagen-

ome-assembled genomes (MAGs) from a phylogenetic and functional standpoint. The phylogenetic signal of these ancient fermentation bacteria confirmed both their ancient origin and their affiliation to bacteria associated with wine fermentation. Gene functional analysis of the reconstructed fermentation-associated MAGs revealed both beneficial genes involved in malolactic fermentation and diacetyl production, as well as genes involved in the production of wine spoilage compounds, especially in species typically viewed today as spoilage bacteria. Overall, our analysis brings a new appreciation on the microbiology of winemaking in Roman Judea and enriches our understanding of Roman accounts of flavoring wine with different herbs and aromatics, which may have been performed in part to mask the off-flavor compounds produced by bacterial wine spoilage genes.

8 THE MICROBIOME OF THE HYPOGEAL ETRUSCAN TOMBS OF TARQUINIA

Rinaldi, Teresa (Sapienza University of Rome) - Tomassetti, Maria (Parco Archeologico di Cerveteri e Tarquinia)

The preservation and conservation of hypogeal environments are a significant challenge for the conservators and restorers. The ancient Etruscan Necropolis of Tarquinia, an UNESCO site in Italy, consists of 6000 hypogeal tombs. Among them, 200 are decorated with extraordinary mural paintings, of great value for the comprehension of this important population. We will report how, along the last eight years, a restorer and a biologist approached the restoration and conservation of mural paintings in the Tomba degli Scudi. The Etruscan tombs in Tarquinia, carved in a calcarenite rock, called macco, show a peculiarity with an important role in the conservation of their mural paintings: the presence of a calcium carbonate patina covering walls and ceilings. This deposition corresponds to the moonmilk, a patina of microbial origin. The microbial communities from various tombs were studied and we will show how microorganisms, usually considered as biodeteriorative agents, could help in preservation of these hypogeal environments.

9 EXPLORING CONSUMPTION AND ENVIRONMENTAL PATTERNS DURING THE ROMAN PERIOD IN HARELBEKE, BELGIUM VIA SEDADNA ANALYSIS

Özdoğan, Kadir (Utrecht University; Wageningen University & Research) - Nota, Kevin (Max Planck Institute for Evolutionary Anthropology) - Sanchez Garcia, Guillermo (Utrecht University) - van Mousch, Roy (BAAC) - Garcia Furni, Fabricio (Vrije Universiteit Amsterdam) - de Groot, Arjen (Wageningen University & Research) - Plets, Gertjan (Utrecht University)

Recent studies show that sedaDNA methods could provide information about the biodiversity of past environments. This study explores the use of sedaDNA methods to investigate past consumption habits and their implications on the northwestern border zones of the Roman Empire (The Lower Germanic Limes). We were able to obtain ancient DNA from latrine contents that gave an insight into the biodiversity of the past environment of the region and consumption patterns, with a focus on domestic animal and plant taxa. While our findings were supported by previous archaeozoological and archaeobotanical research, they also demonstrated the complementary nature of sedaDNA studies with other archaeological methods for investigating historical periods. Therefore, this study highlights the potential of sedaDNA methods for improving our knowledge of the past and contributes to our understanding of ancient societies and their interactions with the environment. Furthermore, the future sedaDNA research in the Limes area has the potential to provide a more comprehensive understanding of consumption habits and trade routes in the borderlands of the Roman Empire.

10 PALAEOFAECES FROM A VIKING-AGE URBAN SETTLEMENT AT RIBE, DENMARK - METAGENOMICS, MULTI-OMICS, AND HIGH-DEFINITION ARCHAEOLOGY

Lanigan, Liam (Globe Institute, University of Copenhagen) - Croix, Sarah (UrbNet, Aarhus University)

Palaeofaeces (or coprolites) recovered from archaeological sites have the potential to provide insights into the diet, health and behaviour of past individuals. Recent advances in “-omic techniques” (lipid analysis, shotgun metagenomics and palaeoproteomics), can allow archaeologists to further investigate the “invisible. For instance, reconstructing the microbiome and identifying the host, as well as pathogen detection. Here we discuss the potential of these tools in connection with palaeofaeces recovered from the deep-urban stratigraphy of the Posthustorvetsite, an early proto-urban community dating to the 8th-9th century from Ribe, Denmark investigated in connection with the Northern Emporium project. The preservation of biomolecules in palaeofaeces seems to be highly-variable, and related not only to the “producer”, but also related to micro-climatic conditions of their deposition. The different biomolecules provide contrasting, as well as complementary levels of information, but only where preservation is adequate. We discuss issues with recovering, authenticating, and contextualising biomolecular information from the palaeofaeces of the earliest inhabitants of Ribe.

11 OPTIMIZING A PROTOCOL FOR ANCIENT DNA EXTRACTION FROM CLAY TOBACCO PIPESTEMS

Harder, Reed (Dartmouth College) - Fleskes, Raquel (Dartmouth College)

Clay tobacco pipes were used by European, African and Indigenous persons in colonial North America to smoke tobacco or other plant materials. Clay material preserves well in archaeological contexts, making pipestems a commonly found artifact. Recently, clay tobacco pipes have been shown to harbor DNA deposited from the saliva of persons who smoked from them. However, only one protocol for DNA extraction from clay pipes has been published, utilizing a DNA purification kit not optimized for highly degraded and inhibited DNA samples. In this study, we aim to develop an optimized laboratory and computational protocol for ancient human and oral microbiome DNA extraction and authentication from clay tobacco pipe stems. Nine pipestems were selected from three 17th-18th century archaeological sites in North America (one English site in 17th century Delaware, and two 17-18th century Connecticut sites). Pipestems with tooth marks were preferentially chosen, as they provide evidence of contact with the human mouth and subsequent saliva deposition. The pipestem artifacts and positive/negative control pipestems were subdivided into three parts to test different extraction protocols at the University of Connecticut. Extracted DNAs were dual-indexed and sequenced on one lane of a NovaSeq X Plus. We then compare output metrics, including sample complexity and contamination, to determine the most effective extraction protocol. Using a combination of contamination filtering by statistical models of postmortem damage and read length distribution, we identify the presence of authentic aDNA. We find the extracted DNA to be characterized by a very high proportion of ultra-short DNA fragments. With this optimized protocol for pipestem DNA extraction, we hope to expand the potential for minimally destructive aDNA extraction from ceramic artifacts, avoiding destructive sampling of skeletal remains and informing our understanding of ancestry, biological kinship, and oral health of clay pipe users in the context of their material culture.

12 AMETA: A COMPUTATIONAL METHOD FOR DATA-DRIVEN ANCIENT METAGENOMIC ANALYSIS

Oskolkov, Nikolay (Lund University)

Analysis of microbial data from archaeological samples is a growing field with great potential for understanding ancient environments, lifestyles, and diseases. However, high error rates and false-positive discoveries have been a challenge in ancient metagenomics, and the availability of computational frameworks that meet the growing demands of the field is limited. Here, we propose aMeta [1], an accurate metagenomic profiling workflow for ancient DNA designed to minimize the amount of false discoveries and computer memory requirements. Using simulated data, we benchmark aMeta against a current state-of-the-art workflow and demonstrate its superiority in microbial detection and authentication, as well as substantially lower usage of computer memory.

[1] Zoé Pochon, Nora Bergfeldt, Emrah Kirdök, Mário Vicente, Thijessen Naidoo, Tom van der Valk, N. Ezgi Altınışık, Maja Krzewińska, Love Dalen, Anders Götherström, Claudio Mirabello, Per Unneberg and Nikolay Oskolkov, aMeta: an accurate and memory-efficient ancient Metagenomic profiling workflow, *Genome Biology* 2023, 24 (242), <https://doi.org/10.1186/s13059-023-03083-9>.

13 BONE ADHERED SOIL AS A SOURCE OF TARGET AND ENVIRONMENTAL DNA

de Dios Martinez, Toni (University of Tartu) - Bonucci, Biancamaria (University of Tartu) - Dittmar, Jenna (University of Aberdeen; Edward Via College of Osteopathic Medicine) - Inskip, Sarah (University of Cambridge; University of Leicester) - Robb, John (University of Cambridge) - Scheib, Christiana (University of Cambridge; University of Tartu)

In recent years sediments from cave environments have provided with inestimable data for the study of ancient hominids, but also for past fauna and flora reconstruction. Unfortunately, locations with favourable conditions for ancient DNA (aDNA) preservation in sediments are scarce. In this study we analysed a set of samples obtained from soil adhered to different human tissues and cavities originating from medieval sites of East Anglia. From them, we were able to recover aDNA sequences matching the genomes of endogenous Gut and Oral microbiome bacteria. Regarding human sequences, we have been able to reconstruct the genetic profile of the original individual. We also find the presence of genetic data corresponding to other animals, including members of the genus *Canis*, *Ovis* and *Ascaris*. Moreover, we have been able to retrieve the whole mitochondrial genome and a partial nuclear genome of a Black Rat (*Rattus rattus*). Those sequences displayed damage typical of aDNA and when placed in a mitochondrial phylogeny, fell within other medieval *Rattus rattus* lineages. Our results demonstrate that material usually discarded, as it is soil adhered to human remains, could be used to get a glimpse of the environmental conditions at the time of the death of an individual.

856 SO FALLS THE WORLD: ARCHAEOLOGY AND HERITAGE AGAINST EMPIRE(S)

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Politopoulos, Aris (Leiden University) - Moshenska, Gabriel (University College London) - del Rio, Judit (University of Burgos) - Hadjigavriel, Maria (Leiden University) - Arciero, Roberto (Leiden University)

Session format: Regular session

Our shared pasts, particularly in their Western retellings, are dominated by empires. The Assyrian empire, the Inca, the Timurid empire, the Mali empire, and of course the Roman empire, are some of the most common past polities that are shared in academic and popular history. These entities are often considered inevitable phenomena in global history, as linear developments of powers that grow from their immediate territories, to global domination. The cultural imprint of empires has also been a centerpiece of archaeological and heritage discourse and practice. Palaces, temples, and burials with treasures of great kings and emperors have been sought after from the early stages of our discipline in the 19th century all the way to the present. Such finds have also become mainstays of the way heritage is presented by modern nation states, and the way national identities are built on the grandiose pasts of empires. Palaces become museums or parliaments. Statues of kings and emperors adorn plazas and government buildings, such as the (replica) of equestrian Statue of Marcus Aurelius emperor at Campidoglio in Rome. These emperors are, more often than not, men who have left a bloody history of conquest and destruction but are venerated as the “greats” of history.

In this session we aim to explore and put under scrutiny such imperial narratives, arguing that if archaeology and heritage practice aims at a future that is inclusive and diverse, it needs to deconstruct the histories and heritages of empires. As such we are looking for papers within the broader theme of resistance to power and empire(s) related but not limited to:

Archaeology of empires

Anarchist archaeology perspectives

Heritage & Museum Studies

Contemporary archaeology

Gender and queer archaeology

Any kind of topic pertaining to archaeology and heritage against empire(s).

ABSTRACTS**1 MOBILITY AND INTERACTION IN THE 3RD-2ND MILLENNIUM BCE IN CENTRAL ASIA AND THE MEDITERRANEAN. A CASE OF RESISTANCE?**

Hadjigavriel, Maria (Leiden University) - Arciero, Roberto (Leiden University)

The emergence of complex proto-State societies in Central Asia during the second half of the 3rd millennium BCE marked a significant development. Among them, the Bactria and Margiana Archaeological Complex (BMAC) held a pivotal position. While the political structure of the BMAC remains elusive, evidence suggests the presence of elites or a ruling class. In the first half of the 2nd millennium BCE, notable changes occurred in the region, particularly in pottery assemblages. A distinct style of pottery, characterized by handmade and incised decorations (ICW) emerged. This ICW pottery exhibited clear connections with the Andronovo horizon, leading scholars to interpret it as evidence of Andronovo groups entering the region. These groups, interpreted as pastoralists based on pottery assemblages, settled on the peripheries of BMAC settlements.

Meanwhile, in the Eastern Mediterranean, Cyprus was entering the Bronze Age in the second half of the 3rd millennium BCE, with the so-called Philia Phase. This change has long been ascribed to the arrival of migrant populations from Anatolia, who brought their technologies and subsistence strategies with them. However, recent research has disputed this view, giving more attention to local developments and the agency of Cypriots.

By examining the subsistence economy of Andronovo (ICW) pottery sites and Philia Phase Cyprus, we contend that they resemble their BMAC and Anatolian counterparts while retaining their unique characters. Furthermore, we will explore the concept of “resistance” to the emerging BMAC state from Andronovo sites, and Philia Phase Cyprus challenging the prevailing notion of peaceful coexistence and integration, and taking a closer look into how foreign and local communities interacted. This perspective sheds light on the intricate dynamics of ancient eastern Mediterranean and Central Asian societies and their interactions during this transformative period.

2 THE MAYA ENLIGHTENMENT: COLONIALISM, IMPERIALISM, SUBLIMATION AND THE POLITICS OF PERIODISATION

Kratimenos, Panos (UCL Institute of Archaeology)

While increased focus in recent decades has been paid to conceptions of time in archaeological interpretation, comparably less attention has been afforded to the way in which we ourselves conceive of time in the construction of chronologies to periodise the past. In the current climate of (justified) disciplinary anxiety concerning the appropriation of archaeological work – and the past more broadly – to justify and naturalise exploitative, chauvinistic and re-vanchist practices in the present, the relative paucity of critical reflection on this fundamental conceptual framework which we all necessarily utilise represents a significant gap in archaeological theorising. This oversight is rendered all the more acute given the well-established colonial and imperialist roots of archaeology as an academic discipline, from which many of our chronological conceptual models originate.

In this paper, I focus on the tripartite chronology utilised by scholars of the Precolumbian Maya as a case study to explore the potential of a critical approach to archaeological chronologies and periodisations. By examining this particular chronology's origins and the intellectual histories which underpin it, I demonstrate that the issues at stake are more than questions of temporal accuracy but, rather, matters of reflexivity. Through a process of 'sublimation', problematic assumptions and mentalities upon which periodisations were originally constructed are obscured in contemporary usage, leading to the perpetuation of outdated tropes and a conceptual path dependency in narratives of the past. Conversely, appreciating the arbitrary nature of chronological demarcations, treating such frameworks as negotiable and open to revision, and consciously reflecting on the imperialistic cultural imprints which may have become sublimated within orthodox models of periodisation are powerful tools in opening up new interpretive possibilities to the narration of the past.

3 LATE ANTIQUE MONASTICISM IN EGYPT AS A REVOLUTIONARY COUNTERCULTURE

Schrauder, Julienne (RGK - Romano-Germanic Commission DAI)

Despite Early Christianity being in itself in a way a 'counter-culture' to the Roman way of life and thinking, this angle has so far not been focus of much research. The persecution of Christians by Roman Imperial authorities is in itself a testimony of the conflict between the official rule and a group of people that were seen as a threat. The concept of early martyrdom, i. e. of dying whilst defying the authorities and renouncing the world of the living, could not be more revolutionary for the time in question. It is firmly embedded in the narrative of Christian believers as antagonists of the Empire – and the Empire as antagonist to the Christians. Not without reason is a recurring theme in Christian art and literature that Empires and their rulers are temporary at best, destined for death and oblivion.

But it is not only in textual and pictorial evidence that contempt for the secular and non-Christian powers that be can be found, the archaeological remains, too, can be interpreted this way. In this presentation the early monastic communities and non-communities of Christian practitioners shall be presented as a movement that went against the establishment. Two angles will be highlighted: a) the interaction of monks with structures that are emblematic for Imperial power and representation such as temples, and b) the monastic body as an antithesis to the Hellenistic and Roman ideal.

4 THE SUNBURY ABORIGINAL EARTH RINGS FROM WURUNDJERI WOI-WURRUNG COUNTRY, SOUTHEASTERN AUSTRALIA: EMPIRES, COLONISATION AND SELF-DETERMINATION

Spry, Caroline (Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation; La Trobe University) - Lucille Freedman, Delta (Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation) - Jones (Wurundjeri Woi-wurrung Elder), Ron (Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation) - Wandin (Wurundjeri Woi-wurrung Elder), Allan (Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation) - Mullins (Wurundjeri Woi-wurrung Elder), Bobby (Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation) - Morrison, Wendy (Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation) - Spencer-Gardner, Ariana (Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation) - Modra, Lauren (Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation) - Gribble, Lauren (Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation) - Lasky-Davison, Zara (Wurundjeri Woi-wurrung Cultural Heritage Aboriginal Corporation)

The Sunbury Aboriginal earth rings are a mysterious series of circular features of approximately 20m diameter located on lands traditionally known as Wurundjeri Woi-wurrung Country in greater Melbourne, southeastern Australia. Recent archaeological research indicates the Rings pre-date colonisation by the British Empire in Australia in the late 1700s. However, since colonisation, Wurundjeri Woi-wurrung people and the Rings have been impacted by dispossession and development. This paper presents the results of recent archaeological research of one of the Rings and an assemblage of stone artefacts excavated from this ring, and the results of a Wurundjeri Woi-wurrung-led study documenting the cultural values of the Rings and surrounding cultural landscape. The results highlight the many different faces of the Rings as potential ceremonial locations in the deep past, locations of Frontier encounters during

colonisation, and locations of continued connection and self-determination for Wurundjeri Woi-wurrung people today in the face of continued development threats.

5 SICK, REFUGEES, DETAINEES AND OCCUPIERS: MANY LIVES OF 500-BED HOSPITAL IN TEHRAN

Naeimi, Maryam (Freie Universität Berlin, Germany)

There is this operating hospital in Tehran, that was designed and built by a German architect and a German construction company to be a modern, fully equipped hospital of the capital in the late 1930s. Before it was finished, Iran was invaded and occupied by Anglo-Soviet forces (1941), German construction people were arrested by Allied forces and detained there. Later, Polish refugees were moved to this hospital. These refugees were deportees that were transported in their thousands from Soviet Union to Iran in 1942 to later leave to other parts of the Allied-control world. At the same time, in 1944, the hospital was partly turned into an internment camp where Allied (British) forces held captive Iranian Political prisoners accused to be Nazi sympathizer, anti-Allied or politically dangerous for Allies. Some of the captives were part of the anti-Allied resistance from around the country.

I'd like to present an archaeological diachronic study that sheds light on different occupation phases of the hospital. In doing that I will discuss the resistance of the captives against British forces, the hardship of the lives of Polish refugees and emancipating actions of families of the captives which lead to British forces giving up their authority over the internment camp. All of this will be discussed in connection to the space and its affordance. In another word how resistance is connected to alteration of space.

6 THE HERITAGE AGONY. ENCLOSURE CONTESTATIONS BETWEEN STATES AND EMPIRES IN THE 19TH AND 20TH C. AEGEAN SEA

Lekakis, Stelios (Newcastle University)

Cultural heritage emerges as a national endeavor, originating during the formation of a new collective political identity. This identity, rooted in the shared past, selectively incorporates socially significant events, structures, landscapes, and figures to construct a national narrative that emphasizes triumphant peaks while downplaying equally glorious but minor setbacks. This selective interpretation of the past is evident not only within nations but also within empires, particularly in their later stages (19th to early 20th century) when they clashed with the rising nation-states in Europe.

Focusing on the 19th and 20th-century Aegean Sea, this paper aims to highlight similarities in the perception of cultural heritage among the Ottoman Empire, the Greek Kingdom, and competing European colonial forces. Specifically, it explores the collection and management of antiquities by these entities. The examination extends to the contemporary contexts of Greece and Turkey, raising the question of whether the legacy of this historical contest persists and, if so, what measures are required to address it.

7 "BUT YOU ARE AGAINST ALMOST EVERYTHING!". SOME NOTES AFTER A YEAR OF TEACHING HERITAGE

del Río, Judit (University of Burgos)

Spain, notoriously during the Francoist dictatorship, has engaged consistently in what we could call the political uses of Heritage. The Cid, a prominent character used in the construction of national identity whose military endeavours in the 11th Century are the focus of a well know medieval chanson de geste, is one of the most known symbols of Burgos, said to be his birthplace. A mercenary according to some, a hero to others, it is to this day a cornerstone for cultural tourism in the region. The Cid's Weekend Festival, a dedicated event that takes place in Burgos every year at the beginning of October, is a good example of this. The Festival is marketed as a historical and cultural event, and as such is mentioned in some Cultural Heritage and Tourism course syllabuses. My teaching includes a critical stance about said festival. Here, an autoethnographical account of my experience as a teacher will be combined with content and discourse analysis of past year's edition of the Cid's Weekend. I propose –both in this paper and on my class– that, similarly to what was done in the past, the festival also puts Heritage to political use nowadays, reinforcing a continuationist understanding of culture and the past. I argue that the festival: a) engages a-critically with a character much intertwined with the dictatorship, and b) offers mainly mainstream entertainment along a much trodden path, more focused on attracting tourism than on nuanced re-tellings of the Cid's, despite the official claims. It is my belief that, as politically engaged teachers, we have a duty to deconstruct simplistic narratives and provide radical ideas of reparation and justice that oppose the current statu quo; and that this duty is better accomplished if we can draw from what is familiar and within our reach.

8 NARROW, CAPITALIST CONCEPTS OF PROPERTY MAKE ARCHAEOLOGY AND HERITAGE BORING AND REINFORCE OPPRESSIVE SOCIAL STRUCTURES

Moshenska, Gabriel (University College London, Institute of archaeology)

Most heritage practice and a lot of heritage theory are grounded in uncritical acceptance of narrow definitions of property. This is a reflection of the enduring and pervasive powers of capitalism, nationalism, colonialism, patriarchy and other oppressive ideologies. It is also profoundly boring and intellectually impoverished: we can do better. This limited understanding of cultural property has been critiqued most powerfully by John Carman, who explored a variety of alternative approaches from a heritage perspective, including a brief outline of anarchist critiques of property: David Pacifico is another archaeologist who has approached similar questions from a more detailed and explicitly anarchist perspective.

Capitalist notions of property bore and irritate me. I want to build upon these important critiques of heritage/cultural property to consider how alternative notions of artefacts, human remains, places and landscapes as property – or the rejection of those notions – might constructively reshape heritage practice and thinking around issues such as identity, meaning, authenticity, repatriation, the roles of institutions, and the work of archaeologists and museum curators. Part of this work will be imaginative, challenging the limits of our own understandings. It forms part of a wider project of intellectual unfucking in archaeology and heritage, drawing attention to the oppressive fuckery that impoverishes all of us.

Carman, J. 2005. *Against Cultural Property: Archaeology, Heritage and Ownership*. London: Duckworth.

Pacifico, D. 2018. Beyond the Property Paradigm: Fragments for an Anarchist Approach to Archaeological Heritage. *Journal of Contemporary Archaeology* 5(2): 283-302.

9 THE EMPIRE GAMES BACK: HOW DIGITAL GAMES AND GRAND NARRATIVES GET US STUCK AND HOW WE CAN PLAY OURSELVES OUT?

Politopoulos, Aris (Leiden University) - Mol, Angus (Leiden University) - Lammes, Sybille (Leiden University) - Geritsen, Corine (Leiden University)

Empires have dominated our (hi)stories for too long. Whether in historical literature, documentaries, films, or series, narratives of empire – and its associated rulers, the so-called ‘big men’ of history – are ubiquitous, pervasive, prepotent, and resilient. Understanding how imperial narratives are expressed in the popular sphere is pivotal if we want to deconstruct them both within archaeology as well as in society as part of heritage. In this paper we explore how such narratives manifest and reinforce themselves in one of the most influential of contemporary media, video games.

We will do so by showing how enticing experiences of empire are offered in games such as Sid Meier’s *Civilization*, *Age of Empires*, and *Imperator: Rome* in which players are tasked with creating the ‘greatest’ empire the world has ever seen. We will scrutinise both the aesthetics and mechanics of empires – e.g. palaces, grand cities, maps, resources and ‘golden ages’ – and discuss the Grand Narratives of Empire, propped up by once fashionable archaeological theories, that lay underneath.

Following this, we will show how, from different positions – as players, modders, and indie game makers – people attempt to get unstuck from imperial narratives by, e.g. doing a pacifist run; creating mods that change game mechanics; or critiquing empire through subversive game design. We will reflect on what tools and insights we, as heritage practitioners and scholars of the past, have to contribute to such a playful dissolution of Empire.

At the heart of our paper lies a provocative question: are digital games, as technocratic, accounting, rule-driven, and algorithmic artefacts, de facto a tool of empire? Can game-based counter-practices help us resist and break down empires, old and new, or do they only get us stuck in other imperial systems?

857 PERSISTENT SIGNS ON SURFACES: THE INNOVATIVE USE OF VISUAL ARCHAEOLOGY TECHNIQUES IN INVESTIGATING VOLUNTARY AND CRAFTING MARKS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Previtì, Giulia (Sapienza University of Rome, Department of science of antiquity) - Giorgi, Lavinia (Sapienza University of Rome, Department of Classics) - Langner, Martin (Georg-August-Universität Göttingen, Institute for Digital Humanities) - Lerma, Jose Luis (Universitat Politècnica de València, Department of Cartographic Engineering, Geodesy and Photogrammetry) - Serino, Marco (Università degli Studi di Torino, Department of Historical Studies)

Session format: Regular session

The proposed session aims to offer an occasion to compare different Visual Archaeology techniques used to study worked surfaces. In the last decades, the digital age has completely revised archaeological research and documentation methods, changing the way we investigate (or re-investigate) the ancient world. Computational Imaging are now used in topographic analyses as well as in the study of material culture. Furthermore, at higher magnifications, some techniques are helpful to investigate manufacturing and wearing traces.

Visual Archaeology techniques – such as RTI (Reflectance Transformation Imaging), VRTI (Virtual-RTI), Photogrammetry, 2D/3D image reconstruction – are used to “read” surfaces in more detail than the naked eye. Thanks to these “digital” diagnostic approach, today it is possible to in-depth study inscribed, engraved worked or painted surfaces, made of clay, stone, bone, ivory, and metal. The observation of such traces using Visual Archaeology techniques helps, for example, to reconstruct and interpret texts, signs of writing and decorations as well as to understand how they were crafted and which tools were used, distinguishing voluntary and processing marks, and exploring the real sequence of artisanal gestures behind the artefact itself.

In this perspective, the main goals of the session are:

- offer a space for comparing different Visual Archaeology techniques in terms of developing various scientific intersections with other approaches (such as experimental archaeology, archaeometry, etc.), its cost-effectiveness, efficiency, light conditions, level of detail, magnifications and fieldwork, and discussing limitations and further potentiality;
- explore the possibility of applying these techniques to provide a renewed perspective in relation to the ancient artefacts and their crafting features and their function in order to define the best areas – distinguished by conservation status, degradation, presence of crafting traces, pigments, clay coatings, and patinas – on which indoor and outdoor microscale analyses can then be carried out.

ABSTRACTS

1 POTENTIALITY OF RTI AND HDR ON BRONZE AGE PHAISTOS “WRITING” SYSTEMS: THE PA-I-TO/PHAISTOS EPIGRAPHIC PROJECT

Giorgi, Lavinia (Sapienza University of Rome, Department of Classics) - Greco, Alessandro (Sapienza University of Rome, Department of Classics) - Lopez, Sara (Independent researcher)

The paper aims to show the potential of RTI and HDR applied on signs and marks engraved on hard media, such as clay and stone.

The case study is the writing evidence related to the important Cretan site of Phaistos during the Minoan and Mycenaean period (2nd millennium BC). The site has returned three different writing systems (Cretan Hieroglyphic, Linear A and Phaistos Disk) and examples of a non-scribal communication system (Masons’ marks).

The common element of these writings is that they are engraved on hard surfaces (clay and stone). For this reason, the computational photographic method of RTI can be effective because it applies well to objects that present irregularities on the surface. Moreover, RTI images highlight the way to engrave the signs and the tools used, allowing us to reconstruct the process of “writing” practice in terms of materiality and human action. Also, the use of HDR technology produces photos which, altering exposures and colours, can be useful for detecting surface changes and, particularly, palimpsests.

Currently, the pa-i-to/Phaistos Epigraphic Project is applying these techniques on Aegean writings for palaeographic and epigraphic purposes.

This paper wants to present some results achieved by the pa-i-to/Phaistos Epigraphic project applying RTI and HDR to Minoan and Mycenaean palaeography and the future research perspectives of the project.

2 EXPLORING MYCENAEAN KNAPPERS' TOOLKITS

Boitte, Odysseas (Université Paris 1 Panthéon-Sorbonne; UMR 7041 ArScAn Protohistoire égéenne) - Vargiolu, Roberto (Ecole Centrale de Lyon; UMR 5513 LTDS) - Vosges, Jérémie (UMR 5133 Archéorient) - Procopiou, Hara (Université Paris 1 Panthéon-Sorbonne; UMR 7041 ArScAn Protohistoire égéenne)

Our study aims to discern the tools employed by Mycenaean knappers (1600-1200 BC) for retouching stone arrowheads through pressure flaking. During the Mycenaean era, bronze metallurgy was widely acknowledged, providing two potential materials (copper and bronze) for the tips of pressure flaking tools in addition to deer antler.

Distinguishing between the use of deer antler and metal has been facilitated by specific macroscopic criteria, such as a small pressure point. However, they are not always visible. Our working hypothesis is that, in addition to these criteria, the resulting ripples vary according to the raw material of the tool.

To investigate this phenomenon, we initiated a collaborative experimental project. To accomplish this, a collection of 60 obsidian arrowheads was knapped by J. Vosges, incorporating diverse tools (20 with deer antler, 20 with copper, and 20 with bronze).

These projectile points were imprinted with silicone. In order to obtain the signature of the techniques employed, we will apply macro-scale surface measurements with a confocal rugosimeter and micro-scale ones with an interferometer. In order to characterize the surface signature the method of continuous wavelets transform (CWT) will be employed.

3 THE PORTRAIT OF KING SARGON II: 3D SCANNING, FILTERING AND COMPUTATIONAL IMAGING FOR SEMANTIC DATA EXTRACTION

Diara, Filippo (University of Turin - Historical Studies Department) - de Martino, Stefano (University of Turin - Historical Studies Department)

This research work, inscribed into the European Project ITSERR Italian Strengthening of ESFRI RI Resilience, is related to metric analyses from computational imaging and filtering of the 3D high resolution model of the portrait of King Sargon II. The limestone relief fragment (TO 10407, 89 cm in height and 52 in width), which portrays the Neo-Assyrian king (721-705 BC), is one of the masterpieces in the archaeological collection of Musei Reali in Torino. This relief comes from the ancient city of Dur-Sharrukin (Khorsabad) in northern Iraq that was founded by Sargon II and was his royal residence.

The fragment was 3D documented with Artec Space Spider structured-light scanner (50µm of point accuracy and 100µm of 3D resolution), obtaining a detailed mesh on which perform post-processing analyses for understanding nearly visible details as well as extracting semantic data: in fact, this fragment is a part of a bigger relief decoration coming from the royal palace but it has been detached and partially brushed for masking damages and cutting imperfections. Computational imaging analyses (Deviation analyses, MSII, virtual RTI) allowed non-invasive and precise metric investigations on decoration, unlocking new micrometric details useful for formulating updated hypotheses on decorative apparatus.

4 TECHNOLOGICAL INSIGHTS IN SOUTH ITALIAN RED-FIGURE POTTERY: NEW EVIDENCE FROM COMPUTATIONAL IMAGING AND EXPERIMENTAL ARCHAEOLOGY

Serino, Marco (Università degli Studi di Torino)

Crafting skills, artisanal technological procedures, and related phenomena of knowledge's transfer between craftspeople in antiquity can today be revealed observing signs on ancient artefact's surfaces. In this perspective, the case study of red-figure pottery production in Greece and Southern Italy – mostly painters – was investigated within the A.G.A.T.H.O.C.L.E.S. project, funded by the EU Commission within the framework of the Marie Skłodowska-Curie "Global" Fellowship, 2021–2024.

On the one hand, the RTI (Reflectance Transformation Imaging) allow us to detect various technological features invisible to the naked eye, i.e., different way of approaching the preliminary sketch, fingerprints, ways of applying milots (red ochre) on the vase's surface, sequence of different paintings, marks left by the different brushes, thickness of black gloss and the way it was applied, as well as the overpainting coatings.

On the other hand, experimental archaeological sessions can provide crucial "analogies" related to the technological features observed on vases' surface, allowing us to determinate the right sequence of artisanal gestures applied on these artefacts.

These data – related to the artisanal technology and the painter's gestures behind the entire crafting process – can significantly improve our knowledge on the artisanal ancient world and, in some way, re-humanize it. Together with stylistic, iconographic and morphological analyses, they can provide new clues of knowledge's transfer (and thus their

likely migratory movements) within some specific workshops (the whole ateliers or only painters) in Sicily and Campania, during the end of the fifth and the early fourth century BC.

This paper is also the occasion to debate about the methodological approaches that can be applied today to investigate crafting marks on surfaces, together with the efficiency and the profitable intersections between computational imaging, diagnostic techniques, and experimental archaeology as three sides of the same hermeneutic approach.

5 DIGITAL TECHNIQUES FOR ACQUIRING POTTERY SURFACES: COMPARING METHODS FOR ANALYSING TECHNOLOGICAL TRACES AND IMPRINTS ON EXPERIMENTAL REFERENCE COLLECTIONS

Previti, Giulia (Sapienza University of Rome, Department of Science of Antiquities, LTFAPA Laboratory) - Di Lello, Claudia (Sapienza University of Rome, Department of Science of Antiquities, LTFAPA Laboratory) - Lemorini, Cristina (Sapienza University of Rome, Department of Science of Antiquities, LTFAPA Laboratory)

This presentation discusses the development of protocols related to the study of technological traces and imprints on pottery by comparing different digital techniques at different scales, from macroscopic to mesoscopic.

Within the scope of experimental archaeology studies, pottery reference collections have been created, focusing on intangible and negative traces left on surfaces by plants, fabrics, corded objects, reed-like materials, tools, and finger impressions. To investigate these surfaces, which exhibit different elements (incisions, impressions, fingerprints, multi-tool treatments), various photogrammetric surveys have been conducted, resulting in 3D models of the surface. Through the three-dimensional reconstruction, we can identify traces, marks, or particularly interesting areas to investigate in a next step, at a microscopic scale.

To evaluate different digital acquisition techniques, we compared 3D models generated by means of standard photogrammetry by camera, photogrammetry performed with a macro lens and with a digital microscope and through a stereomicroscope.

The comparison of the models, led visually and with the aid of processing software, helped us to understand the level of detail and magnification achievable by every documentation method. At the same time, it was possible to reflect on the limitations and potential of each method, on the cost effectiveness, efficiency and usability in field work.

The photogrammetric models were compared with the Reflectance Transformation Imaging (RTI) technique to explore the utility of visual-related techniques for the initial assessment of surfaces.

6 THE DARK SIDE OF PHARMACY JARS: THREE-DIMENSIONALITY AND PHOTOGRAMMETRY OF THE POTTERY OF THE GORGA COLLECTION (SAPIENZA, UNIVERSITY OF ROME)

Cymerman Abad, Adriana (Sapienza, Università di Roma)

The work presented, carried out within the project for the digitalization of cultural heritage of the University of Rome "La Sapienza" Museum Pole, falls within the innovative approaches of Virtual Archaeology and the study of macro-traces.

In order to analyze the internal traces left during the turning process, the SFM (Structure For Motion) system was applied, thus obtaining a three-dimensional photogrammetric model of the interior of semi-closed ceramic artifacts.

In particular, the project focused on the three-dimensional digitalization of pharmacy pottery from the Gorga Collection, preserved at the Sapienza Museum of History of Medicine, which amounted to about 700 pieces.

These artifacts have challenged the techniques of the 3D documentation process of their internal profiles, allowing for a critical evaluation of the results obtained on the reliability of the digital model. The average dimensions and the sinuous hourglass shape, which tapers down to a diameter of 6 cm, have been successfully overcome thanks to the innovative application of the photogrammetric method.

7 "THE TRACK SEEN WITH POLYCAM". A COMPARISON OF SFM SOFTWARE FOR 3D MACRO-TRACES CAPTURE IN THE HOLY SEPULCHRE (JERUSALEM)

Vacatello, Federica (Sapienza University of Rome) - Melega, Alessandro (Sapienza Università di Roma)

The introduced contribution means to propose a compared analysis between the software SFM (Structure From Motion) Agisoft Metashape and Polycam for the seen visualization of the macros traces on the materials from the contexts of the archaeological excavation at the Basilica of the Holy Sepulchre in Jerusalem. The exceptionality of the site and the need to make a high level digital documentation, in a short time and specific for the reproduction in virtual reality, not only for each single stratigraphic context, but also of the materials and of the macros traces on them (manufacture of the stone, decoration, etc..), had impose the experimentation of different method of documentation able to reproduce an accurate digital twin, useful to the worksites' needs with times of an emergency dig. For those

reasons, the photogrammetry comes as the most useful solution for those kinds of needs. Now the algorithms SFM to the base of the proprietary software and Open Source became more educated for the making of mesh sufficiently accurate, to consent the visualization of the macros traces that are not perceivable to the human eye. Otherwise, some of them resulted more performing for the 3D a fast capture and a mesh with high resolution. A compare between the results achieved from Agisoft Metashape and the one taken from Polycam, open the possibility to news specific operating protocols specific for the 3D capture of the macro, and offers an investigation direction towards the writing of algorithms proposed to a visualization also for the micro, more performing.

8 VISUAL ARCHAEOLOGY TECHNIQUES TO ELICIT THE HISTORICAL GRAFFITI IN SAINT SOPHIA CATHEDRAL

Almevik, Gunnar (University of Gothenburg) - Westin, Jonathan (University of Gothenburg)

Carved into the walls of the Saint Sophia Cathedral in Kyiv are more than 7,000 inscriptions that span over a thousand years and follow different language and writing systems. The historical graffiti is carved in frescoes and architectural stone elements and constitute a source of knowledge about religious practice, language, trade, and cultural exchange and diversity in Europe. Saint Sophia Cathedral is a world heritage with universal values and a source material for various disciplines and fields of research that, with Russia's warfare against Ukraine, is under acute threat. To safeguard this cultural heritage and source for future research, a project collaboration between Ukraine and Sweden has been initiated aiming to document the inscriptions and publish the data through an online portal.

To collect the necessary raw data, the project applied a series of laser and image-based techniques as well as custom-made topography visualisation software to visually enhance the fine line inscriptions. The cathedral's interior has been scanned with laser to contextualise the inscriptions, and all fresco panels and stone elements with graffiti have been documented with high resolution photography for Reflectance Transformation Imaging (RTI) and photogrammetry through Structure from Motion (SfM). Selected parts are also documented with White Light Scanning (WLS). The techniques and work procedures have been assessed both in relation to the data they need to accurately capture, and their capacity and efficiency when applied to documenting this extensive material. In developing the online portal, a focus group of researchers have assessed the quality of the documentation and proposed requirements for the design of the database and the tools through which to analyse the visual data.

This paper presents the project, and we have a keen interest to get feedback on the work and to discuss the possibilities, limitations and situated considerations for Visual Archaeology techniques.

9 "THE NINE MEN'S MORRIS IS FILLED UP WITH MUD": MATERIAL TRACES OF PLAY AT THE PRIGIONE DEL CASTELLO, NOTO ANTICA

Anthony, Alexander (Syracuse University)

The medieval city of Noto Antica, Sicily, which rests on a plateau that has been continuously occupied since the 9th-century B.C., was completely destroyed by a devastating earthquake in 1693. In 2023, a digital mapping project was undertaken of the two rooms associated with the Prigione del Castello within "Ancient Noto". Utilizing a process of Structure-from-Motion photogrammetry a 3D surrogate of the site was created which was then imported into Blender 4.0 in order to manipulate lighting and animation effects of the model. Through the development of digital methods of material culture analysis in this open-access program multiple pieces of graffiti have been identified throughout one of the rooms of the castle prison. While a complete inventory is still underway, at least five gameboards used for Nine-Men's-Morris, among other names, have been identified on horizontal surfaces throughout the room.

This concentration of gameboards found within a site of confinement still under the ancien regime offers a unique case study in which to discuss the changing structures of discipline in the Early Modern world and the significance and potential meaning of play in these environments. Far from being merely a trivial past-time, play creates material places that become nodes of meaningful social interaction, a structured environment in which to alleviate interpersonal tensions, and a way to 'oppose' the erasure of humanity while in captivity. The current paper presents an examination of the evidence within the framework of play in the archaeological past.

10 UNVEILING THE HIDDEN STORIES: THE IMPACT OF DIGITAL TECHNOLOGIES ON MEDIEVAL EPIGRAPHIC RESEARCH

Luci, Beatrice (Sapienza - Università di Roma)

The inscriptions tell a double story, that of the text and that of the production of the object itself. For this reason the inscribed texts must be studied not only for their textual value, but also for their material value.

Considering this dual nature of the inscriptions, during PhD research has been applied and tested digital technologies to improve the textual and material knowledge of artifacts.

In fact, inscriptions are often irremovable and in urbanized contexts and therefore require some logistical precautions. The only way to be able to analyze the artefact in detail is therefore often through the exclusive use of digital technologies that can adapt to different types of context.

The aim of this article is to explore the advantages and limitations of applying photogrammetry and RTI to selected case studies of medieval epigraphy. Photogrammetry will be applied to investigate aspects of the production cycle (such as the study of traces) while RTI will be applied to integrate the epigraphic texts, with related decorative devices, whose reading is compromised or difficult for various reasons.

11 FROM THE DIGITAL SURVEY OF HISTORIC BUILDINGS TO THE TRACES OF CONSTRUCTION SITES: SOME CASE STUDIES OF THE MIDDLE AGES

Moschetto, Francesco (Sapienza University of Rome, Department of science of antiquity)

The aim of this contribution is to show the potential of the use of high-resolution three-dimensional surveys for the identification of traces on the stone of some architectural artifacts. On some sample sites of Norman-Swabian age placed between Lazio and Abruzzo, a specific procedure of digital acquisition of historical artifacts was used that could assist and enhance the analysis with the naked eye on the field. To a first phase of three-dimensional survey of structures through different techniques such as laser scanner, aerial and terrestrial photogrammetry with different sensors, followed the data processing phase based on a series of deliberate choices to maintain the resolution and accuracy of the different parts of the model. During the processing of the data, particular attention was given to the geometric optimization of the models and to the resolution and number of the textures in order to obtain a high-detail 3d model to be used in the subsequent analysis and extraction of elaborate 2d derivatives. In addition, the use of the drone (UAV) as a photogrammetric dataset acquisition tool, allowed to extend the investigation to all the architectural artifact by including portions of walls placed very high and not reachable by ground analysis. This workflow, therefore, aims to test how much a set of high-resolution superimposed orthoimages in pixel-to-pixel accuracy is able to detect work techniques and damages. In this sense, research should be considered as a preliminary assessment of the effectiveness of such three-dimensional acquisition and visualization techniques and a possible starting point for further Investigations, perhaps of a microscopic type, on the stone elements of architectural artifacts.

12 PHOTOGRAMMETRIC DOCUMENTATION AND VIRTUAL IMAGE ANALYSIS OF THE HISTORIC MARITIM GRAFFITI OF THE SANTA BÁRBARA WALL IN PEÑÍSCOLA (SPAIN)

Lerma, José (Universitat Politècnica de València) - Rahrig, Max (Universitat Politècnica de València) - Patrucco, Giacomo (Politecnico di Torino) - Zurita, José (Museu de la Mar)

On the wall of Santa Bárbara, located between the New and the Prince's Bastions close to the cliff in the eastern part of the historic centre of Peñíscola, some graffiti relating to nautical themes were discovered in 1993. The graffiti can be found on two sections of a wall, one next to the 'Museu de la Mar' with a length of 22 m and the other next to the Baluarte Nuevo with a length of 11 m. They are arranged horizontally at different heights between 0.40 m and 0.70 m, forming a group of approx. 75 figures depicting ship motifs scratched on lime plaster along the outer face of the wall. They belong to ship models dating mainly from the 18th and 19th centuries. The first study was conducted in 1996 by technicians from the Archaeological and Prehistoric Research Service of the Provincial Government of Castellón.

In 2022, it was possible to document the graffiti again using close-range photogrammetry and terrestrial laser scanning. High-resolution orthoimages were extracted from the 3D data, and image analysis was carried out using principal component analysis (PCA) and hybrid image analysis. The graffiti were traced and mapped for further investigation based on these image-sets, revealing additional ships and further nautical motifs.

This paper presents the workflow for the documentation and image analysis of the Santa Bárbara graffiti.

860 GOING WITH THE FLOW: THE MANY FACETS OF GLASS IN PAST SOCIETIES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Franjic, Ana (KU Leuven) - Nash, Charlotte (British Museum; University of Kent) - Penn, Timothy (University of Oxford; University of Reading) - Rosenow, Daniela (Griffith Institute, University of Oxford) - Rolland, Joëlle (CNRS, UMR 8215 Trajectoires)

Session format: Regular session

This session is dedicated to the multifaceted evolution of glass use in past societies. Its key aim is to encourage speakers to take a closer look at the transmutable quality of this material, gathered – pun intended – at the intersection of utility and prestige, politics and spirituality, economy and cultural identity. Since its discovery, glass has served both practical and more complex, culturally inflected purposes. Its versatility, malleability, recyclability, and other physical characteristics allowed it to play many different roles in shaping the lived experiences of past societies: from apot-

ropaic eye beads and everyday glassware to stained glass windows and telescope lenses offering links to the heavens. The diverse dimensions of glass use reflect the changing needs and aspirations of past peoples, and even today, glass continues to adapt, shape, and reflect distinct facets of contemporary societies.

We invite contributions that consider varied aspects of glass use and its meanings for past societies. We are particularly interested in research that reflects on the role of glass in the shaping of social structures, and investigates how glass was used to express cultural, religious, and aesthetic values. Furthermore, we encourage submissions that trace the impact of technological advancements, changing political landscapes, power dynamics, and cultural transformations on the changes in glass use, as well as the transitions in the meaning ascribed to glass. This session will bring together researchers working across different periods, themes, and aspects of ancient glass, in order to encourage a greater understanding of historical, economic, cultural, and symbolic significance of this exquisite material, among both specialists and the broader archaeological community.

ABSTRACTS

1 GLASS VESSELS IN MYCENAEAN GREECE: MANUFACTURE, PROVENANCE AND THEIR FUNCTION IN CONTEXT

Nikita, Kalliopi (Hellenic Ministry of Culture, Ephorate of Antiquities of East Attica)

The current paper presents and discusses the occurrence of glass vessels in Mycenaean Greece through published evidence from cemetery sites in the Peloponnese. In the first place, a definition of this distinctive category of glass artefacts with an overview of their main types is provided on the basis of their manufacturing techniques. Glass vessels are not included amongst the typical artefacts produced by the thriving Mycenaean glass industry, which was orientated primarily to glass-bead making. Taking into consideration that glass vessels are characteristic products of alien glass industries, their provenance is explored within the network of external relations of the Peloponnese with the Eastern Mediterranean and the Near East during the Late Bronze Age. Their rarity and uneven geographical and chronological distribution in Mycenaean Greece are discussed in conjunction with the occurrence of glass vessels outside the Peloponnese, in regions such as Boeotia, Crete, Rhodes and in distant Mycenaean sites on Cyprus. The paper also examines the role of glass in gift exchange and diplomatic relations in the Late Bronze Age. Given that Late Bronze Age glass vessels, as in the case of glass minor objects in general, are principally found in burial contexts mostly associated with luxuries and exotica, the paper aims to explain their function in relation to their burial deposition, their possible symbolic attributes and the social status of the dead.

2 THE BLUE OF BARBARIANS: GLASS ORNAMENTS AS MIRROR OF IDENTITIES IN LA TÈNE SOCIETIES

Rolland, Joëlle (CNRS, UMR 8215 Trajectoires)

When the societies of La Tène began to produce glass objects in the 5th century BC, they did so exclusively to produce ornaments that reflected their stylistic and symbolic codes. By reconstructing the various processes involved in the production of these glass beads and bracelets, it is now possible to see the technical evolution of production and identify the typological changes associated with the skills of the craftsmen. At the same time, however, it is also possible to recognise the limitation of these skills, which may be due to economic or stylistic choices. This article aims to examine the place of glass in La Tène societies by looking at the elements of identity it was supposed to reflect. What symbolism is associated with these objects, their shapes and colours? What stylistic or symbolic choices shape their production? Prestigious ornaments in a "barbaric blue", with designs that symbolise identity... the technical and social study of these objects has recently brought to light many elements about the values and role of glass as a social and cultural marker, as a reflection of individuals and societies in evolution.

3 TRANSPARENT TIMES - GLASS VESSEL FRAGMENTS FOUND AT TAYMA (ARABIAN PENINSULA)

Seifert, Antonia (Freie Universität Berlin)

The excavations at the oasis and ancient settlement of Tayma (Saudi Arabia), amid the ancient incense trade route, revealed numerous prestige goods such as metals, incense, and glass. Of over 180 glass fragments found in late Iron Age to Islamic contexts, 101 are the focus of the investigation, which aims to identify their provenance. Were these locally produced glasses, or were they acquired through supra-regional trade networks?

The presence of glass in Tayma for several centuries, both in residential and public contexts, has led to various interpretations of the objects. In this regard, the place and time of deposition of glass fragments will be analyzed by placing them within their archaeological framework, including stratigraphic context, distribution, and chronological classification. For the archaeometric investigation, the non-destructive portable energy-dispersive X-ray fluores-

cence analysis (p-ED-RF) was employed. All 101 glass fragments underwent chemical characterization to assess their composition and production techniques. The combination of archaeological and chemical classification allows the interpretation of the glass fragments as common commodities, material versus exchange value, and prestige goods.

The acquired data sets the stage for an area frequently demonstrated as an intersection in the commerce paths between major entities. However, this area provides implications for understanding the distribution and trade of glass artifacts across Egypt, Mesopotamia, the Mediterranean, and the Arabian Peninsula.

4 TRANSFORMATION OF THE ROMAN GLASS PRODUCTION - CASE STUDY ROMULA-SLOVENIA

Lazar, Irena (University of Primorska, Unesco Chair)

From the end of the 1st century BC through the 1st century AD the Roman glass production faced significant changes in technology, production and trade. On the example of the Roman road and customs station Romula in Slovenia (the Roman province of Pannonia) we would like to present these changes. We would present and compare the finds from the settlement, including mould-made mosaic, coloured and decolourised glass, imported mould-blown objects (Ennon beakers) as well as a wide range of free-blown glass (including a Sentia Secunda bottle from Aquileia) for everyday use.

All these find can be compared with the glass discovered in necropolises of the site, which reflects the use of glass as a grave good. There are important differences observed on these two groups of glass on the site, regarding the quality and dating of the glass items. Archaeometric analysis of the glass from the site was also made and will be mentioned.

5 ROMAN GLASS INSTRUMENTS FOR MEASURING LIQUID CAPACITY

Perovic, Šime (Museum of ancient glass in Zadar)

This paper deals with Roman square bottles housed in the Museum of Ancient Glass in Zadar. They were used primarily for commercial needs of transport or to sell liquids in retail. There are two ways of production of these vessels: free blowing and then pressing on the flat surface or by blowing in open molds which enables getting many regular and uniform shapes.

In our analysis we paid attention only to products made in open molds including several unpublished specimens. Precise analysis of their capacity enabled identification of a series of bottles and some other shapes with square bodies which had various dimensions but always with regular proportions of capacity which are parts or multiplicands of one another.

All these finds which are dated to the 1st and 2nd centuries AD have common characteristics such as capacity corresponding to classification of Roman hollow measures, thick walls and sturdy production, and other morphological particularities such as specifically flattened rim, wide ribbed handle, pronounced shoulder etc. These particularities in design which distinguish them from other similar forms indicate that there was standardized packing in the Roman period which could be used as a measuring instrument for liquid capacity.

It seems to us that the methodology of fine volume calibration can be recognized especially in the way the shoulder bend is performed, which compensates for errors in achieving the precise measurements of the item, that can occur during the process of glassworking.

The use of glass objects in this context of measuring devices should therefore be seen as a set of changes that occurred in Roman times in the perception of glass in general, primarily in terms of the exceptional expansion of the fields in which it is used, but also in the area of improving glass processing techniques.

6 THE SIGNIFICANCE OF USING GLASS IN EARLY ROMAN AQUINCUM

Kelemen, Zsófia (Budapest History Museum; Eötvös Loránd University)

The custom of using glass vessels arrived in the area that later became Pannonia in the first century with the conquering Romans. As Aquincum is located in the north-eastern part of the province, and had been integrated into the Empire only in the last stage of the conquest, it would be easy to assume that it would take time to adapt these new habits. Yet we found glass debris even in the earliest layers of the settlement complex. Not just in the newly founded parts, like e.g. the Civil town, but also in the the so called Víziváros settlement, which was already in use by the indigenous celts. This would suggest, that not only the new settlers brought their vessels with them, but the original inhabitants were also eager to use them. However, this need could be only supplied via trade, at least in the beginning, but it did not deter the consumers. With the evaluation of the finds we see common vessel types for everyday use, but unique luxury pieces, too. This indicates, that however fast was the integration of glass ware into the life of Aquincum's inhabitants, the vessels could also indicate the identity and social standing of its owner.

In this lecture I'd like to present case studies from different parts of the settlement to highlight the multilayered significance of the vitreous finds of early Aquincum.

7 LATE ROMAN GLASS WEIGHTS FROM LAODICEA AD LYCUM

Inceelgil, Yasemin (Pamukkale University)

Laodikeia ad Lycum, located 6 km north of Denizli province in Southwest Turkey, has been one of the most important political, commercial, and religious centres of ancient Anatolia and especially the Phrygian region since the 3rd century BC. After the heyday of the Roman Empire, the city managed to maintain its political and economic power during Early Christianity. It is well known that Laodikeia hosted one of the seven privileged Christian communities named in the Book of Revelation in the New Testament. A monumental and central church -known as the Laodikeia Church- was built in the public center of the city during the 4th centuries A.D. and has been a focal point until the abandonment of the city as a result of a major earthquake at the beginning of the 7th century AD.

This presentation aims to evaluate the disc-shaped glass weights, which constitute a very rare finding group unearthed in Laodikeia. This type of object which became popular, especially in the Late Antiquity appeared in a wide distribution area. They were used to determine the weights of delicate products as well as coins.

The disc-shaped glass weights of Laodicea have been unearthed in two different findspots: Two of them are from shops adjacent to the Syrian Street i.e. the decumanus of the city. On the other hand, two examples with busts of administrators and important depictions related to Christianity have been found during the work carried out in the Laodikeia Church, within the debris of the church on Eastern Street. They draw attention in terms of the industry they are affiliated with. These examples should be considered as indication of the role that the church/the religious organization plays in economic activities and they emphasize the influence of the Empire on the control of commercial activities.

8 GLASS IN THE CONTEXT OF THE ANCIENT IADER NECROPOLIS

Eterovic Borzic, Anamarija (Museum of Ancient Glass in Zadar)

This study focuses on a contextual analysis of glass found in graves from the ancient Iader necropolis (present-day Zadar), one of the best-known necropolises in Roman Dalmatia. The analysis covers more than two thousand graves, comprising different types with both burial rites (inhumation and cremation) and dating from the 1st to 5th century AD. A large amount of glass was found in them, especially in graves with cremated individuals dating from the 1st to 3rd century AD. Using a multidisciplinary approach, the research examines the role of glass objects within Roman funerary practices, social structures, and belief systems. By examining the typology, distribution, and symbolic meaning of glass artifacts, this analysis aims to decipher the cultural and socio-economic contexts in which they were deposited in the tombs. In addition, the study examines trade networks that facilitated the circulation of Roman glass and the connections of Roman Iader with the wider Mediterranean basin.

9 MYTHOLOGICAL DEPICTIONS ON ROMAN GLASS FROM THE EASTERN ADRIATIC

Štefanac, Berislav (Museum of Ancient Glass in Zadar)

Along the eastern coast of the Adriatic Sea, a variety of glass artifacts with cult and mythological features have been discovered that shed light on the cultural and religious customs of the ancient Romans in the area of the former province of Dalmatia. These glass items served not only practical purposes, but also had symbolic significance associated with various cults and mythological beliefs prevalent in the ancient period.

During the 1st century, Roman glass production experienced a significant boom, as evidenced by many archaeological finds from Roman colonies such as Jadera, Salona and Narona. This period was marked by the fruitful development of the aesthetic and creative component of glassmaking. The master glassmakers of that time found their place in the creation of glasses and bottles with embossed and engraved decorations inspired by characters from Greek and Roman mythology.

The paper particularly emphasizes the connection of glass artifacts with the cult of Dionysus and with other eastern deities. By examining the symbolism, iconography, and cultural contexts surrounding these artifacts, researchers can gain a deeper understanding of ancient religious traditions and their significance in society.

10 PLAYING AT (DEMI-)GOD: HERCULES' CLUB, MOULD-BLOWN GLASS, AND SENSORY EXPERIENCES IN THE ROMAN EMPIRE

Penn, Tim (University of Reading)

Roman glass studies are dominated by considerations around typology, production techniques and glass compositional analysis. The approaches provide important insights into the Roman glass industry and the circulation of vitreous materials in antiquity. However, there is room to do more to explore the cultural and social significance of glass in Roman society. This paper takes as its case study a class of early imperial mould-blown beaker known by many names today—bossed, lotus-bud, amygdaloid, teardrop, pineapple, and finally club beakers. I argue that a host of evidence in other media suggests that the beakers are most likely to represent Hercules' club and thereby served as a means

through which mortals could symbolically take on hero's most prominent attribute and therefore emulate or embody this demi-god. In this contribution I identify these vessels, contextualize them among classical depictions of Hercules and his club—especially in relation to the deity's role as a drunken reveller, competing with the likes of Dionysus and Silenus—and consider their symbolic meaning. I then explore the use of these vessels as humorous set pieces within the Roman dining tradition, allowing diners to emulate Hercules with regard to his mythic alcohol tolerance, and investigate some practical considerations regarding their use, including sensory perceptions.

11 THE MANY LIVES OF BLACK GLASS: LATE ANTIQUE AND MEDIEVAL BLACK-GLASS BANGLES IN IBERIA

Govantes Edwards, David (Universidad de Córdoba)

Black glass bangles are a fairly common find in late antique and medieval archaeological contexts in the Iberian Peninsula and in the Mediterranean and the European continent more broadly, and they have been interpreted from a variety of perspectives. Through the chemical analysis of a number of these bangles found in Spain and Portugal, the presentation aims to explore differences in technology and raw materials over time. In addition, chemical composition, in combination with other archaeological and historical evidence, will be used to explore differences in the value assigned to these bangles in various cultural settings. From the apparent attempts to imitate jet and other semi-precious stones in specialised workshops during the Late Roman period in the northwest of the Iberian Peninsula; to the seemingly apotropaic properties associated to heavily-recycled glass in Islamicate al-Andalus and also in the Christian territories to the north, where these bangles are often found in graves of children and women.

12 MATERIAL AND TECHNOLOGY OF EARLY MEDIEVAL (7TH-9TH CENTURY AD) GLASS BEADS IN THE CARPATHIAN BASIN

Bajnóczi, Bernadett (HUN-REN Research Centre for Astronomy and Earth Sciences) - Fülöp, Réka (Hungarian National Museum) - Schibille, Nadine (Institut de Recherche sur Les Archéomatériaux, Centre Ernest-Babelon (IRAMAT-CEB), UMR7065, CNRS/Université D'Orléans) - Szenthe, Gergely (Hungarian National Museum)

The entire Avar period (late 6th–early 9th century AD) in the Carpathian Basin was characterised by a diverse assemblage of glass beads in graves. However, there are several differences between Early and Late Avar bead wearing. The first half of the Avar period (late 6th–early 7th century) is characterised by shorter strings of more colourful beads and eye beads were one of the most popular bead types, whereas in the late Avar period (late 7th–early 9th century) new bead types appeared (e.g., melon-shaped, amphora-shaped), bead strings became longer, brighter colours were replaced by darker shades and various technological solutions were introduced. The aims of our analyses is to demonstrate if there were any changes in the material of the beads as well as to examine the factors responsible for the significant changes.

Early Avar-period glass beads from the Carpathian Basin were formerly extensively studied, however, Late Avar-period beads received little attention. To reveal the innovative beadmaking techniques and other specific technologies, such as copper metal tubes in thread holes and 'hair effect' decorations, used in the late Avar period, we studied bead strings from 172 graves from 12 archaeological sites in the Carpathian Basin. Additionally, to expand our knowledge on glass recipes and coloring technologies of the Early Medieval period (glass raw materials, colorants, opacifiers), we analysed fifty-eight Late Avar-period beads of various forms and colours, in addition to fifteen Early Avar-period beads, by SEM-EDX and LA-ICP-MS methods.

13 ISLAMIC PLANT-ASH GLASS TRADE AND RECYCLING IN THE EASTERN SILK ROADS: NEW INSIGHT FROM NISHAPUR, IRAN

Lu, Qin-Qin (University of Cambridge)

Islamic plant-ash glass (circa 9th–15th century) was extensively traded along the Silk Roads, and its use and reuse offer insights into the inter-regional connectivity and local material culture development in medieval Eurasia. Research on plant-ash glass has largely focused on evidence from the Near East, while the role of various plant-ash glasses in the eastern Silk Road societies, including Iran, Central Asia, and Xinjiang (China), is not well understood. This paper presents our ongoing research progress on Islamic plant-ash glass in the eastern Silk Roads, in particular focusing on an 11th–12th century assemblage unearthed in Shadyakh, Nishapur, Iran, suggesting diverse origins for the glass artefacts and potential recycling practices. An integrative approach for plant-ash glass provenance is employed, which incorporates chemical composition, Sr and Nd isotopes, Nd isotope mixing lines, and Sr-Nd isotope baselines. Chemical and isotopic compositional signatures reveal provenance and trade relations, while the Nd isotope mixing line may capture the dynamics of the mixing process in glass recycling. The results suggest that trade brought glass from Iraq, Syria, Central Asia, and potentially Iran to Shadyakh for consumption, showing that both eastward and westward flows of glass products occurred and that utilitarian glass was traded across distances. Within many of the analysed

assemblages from the eastern Silk Roads, glasses with compositional signatures of Central Asia, the Tigris-Euphrates River Basin, and possibly Iran are often found in the same context, implying a common trade network for glasses with different origins, designs, and functions. It is plausible that trade hubs such as Nishapur and other major metropolises, where various types of glass were gathered, traded, and sometimes reworked, facilitated the “mix and match” of diverse glasses along this major trade artery. (DOI: 10.1016/j.jas.2022.105695 ; 10.1016/j.isci.2023.108450)

14 WINDOW GLASS IN SACRAL SPACES FROM LATE ANTIQUITY TO THE MIDDLE AGES: STATE OF RESEARCH ALONG THE EASTERN ADRIATIC COAST

Jovic Gazic, Vedrana (Museum of Ancient Glass in Zadar, Croatia)

Due to the nature of the material susceptible to breakage even in the most favorable storage conditions, direct confirmations of window glazing in buildings of ancient origin are quite modest. The glass panes are regularly found in pieces and the recognition of the fragments as window glass is often very difficult. The context of the finds is of great importance, so are the traces of the technological process characteristic of the window glass production that can be recognized on the glass fragment surface or in its inner structure.

The aim of this lecture proposal is to present the historic window glass used in sacral architectural context along the eastern Adriatic coast, particularly in the area of Dalmatian region, from Late Antiquity to Late Middle Ages (from 5th to 15th century). The focus is on the material traces of the window glazing of early Christian basilicas, churches and medieval cathedrals on the basis of which the characteristics of the practical use in original architectural environment and the reflections of such practice in social context will be presented.

The archaeological sites considered in the area are situated outside the urban centres (e.g. Podvršje near Zadar, Bilice near Šibenik, Brzet near Omiš...), inside the historic centres with urban discontinuity in the Middle Ages (Salona, Narona) and in urban centres typical of the Dalmatian medieval communes with origins dating back in Antiquity and Late Antiquity (Zadar, Trogir, Split, Dubrovnik...). The secondary material evidence of glazing – the elements of window-pane framing, metal and wooden holders or the pieces of transennae, found in the considered archaeological sites will also contribute to the interpretation of the window glazing practice on the eastern Adriatic coast.

15 THE RELIGIOUS, CULTURAL AND AESTHETIC VALUES OF GLAZING IN ENGLISH MEDIEVAL MONASTERIES

Stone, Bronwen (University of Sheffield; Historic England) - Gherardi, Francesca (Historic England) - Merrony, Colin (University of Sheffield) - Paynter, Sarah (Historic England) - Tyson, Rachel (c/o Historic England) - Jackson, Caroline (University of Sheffield)

Around 1000 monasteries were built in England during the medieval period. From the C12th century these were soaring, gothic structures with the structural strength to carry expansive glazing. This provided not only light in the practical sense, but an ethereal light that enhanced the spiritual atmosphere and which was seen most conspicuously in the monastic church. The excavated glass reviewed originates from seven monasteries in England of two distinct orders, Benedictine and Cistercian. The glass is available to study because of the mid C16th Dissolution of the Monasteries when monastic windows were dismantled to recover the lead strips that held the glass pieces together.

Many windows were highly decorated, primarily with biblical scenes, using coloured glass and painted panes to create glazing schemes that were decoratively very complex and which used colours often in a symbolic manner: the yellow of a halo or the Virgin blue. In contrast, other windows employed a restrained palette and range of motifs to reflect religious dictates, fashion or parsimony. The glass used to glaze these monastic buildings is known from documentary evidence to have been procured from the continent, particularly from France. However, an English glassmaking industry was developing during the C13th and may have also been used to glaze these windows.

In this study, the results of investigations into both stylistic imagery and chemical analysis, indicating dates and provenance, are used to elucidate the complex nature of the use of glazing in a monastic setting in medieval England. This paper examines the aesthetic, cultural and religious values of monastic glazing, using examples from the ongoing research into the origins and use of English monastic window glass.

16 GLAZED TOWNSCAPE – GLASS WINDOWS IN MEDIEVAL TALLINN, ESTONIA

Reppo, Monika (Tallinn University)

Although with a far longer history in the rest of Europe, windows were first glazed in Estonia only by the end of the Livonian Crusades (1198–1227). The local use of glazed windows has not been studied thoroughly – for example, the oldest glass window is currently unidentified. The oldest preserved stained glass window is a crest from 1606 kept in the Church of the Holy Spirit in Tallinn, no longer in situ. As no medieval windows are known to have been preserved, and the oldest depiction of Tallinn hails from 1561, written sources and archaeological finds are the only way to study the use of window glass in medieval Tallinn. With the discovery of a 15th-century landfill where window and stained

glass fragments constitute for 80% of the glass artefacts and data collected from 2013–2024 from other archaeological collections, it has been possible to trace the use of window glass in medieval Tallinn. From urban residences and other secular buildings such as the Town Hall and Town Hall Pharmacy to churches and chapels, this paper examines the changing townscape and relationship with daylight through glazed windows and the work of glaziers in 13th–15th-century Tallinn.

861 INSECTS FOR ARCHAEOLOGY, ARCHAEOLOGY FOR INSECTS: ENVIRONMENTAL STORYTELLINGS FOR THE PAST, PRESENT, AND FUTURE

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Kourela, Eva (University College Dublin) - Shen, Benny (Department of Archaeology, University of Cambridge) - Vanin, Stefano (University of Genoa IAS-CNR) - Davis, Stephen (University College Dublin)

Session format: Regular session

Insects are by far the most diverse organisms on Earth, with many ecological adaptations and interactions. Their ubiquity and fundamental roles in the functional ecology of most terrestrial ecosystems across the planet are reflected in totemic representations, tropes, and knowledge systems of human societies today and throughout history. In the archaeological record, insect remains may serve as environmental indicators and agents of bioturbation, while also offering valuable insights into health and sanitation, past climate change, biogeography, funerary and agricultural practices, rituals, and folklore.

Archaeoentomology, funerary entomology, and other archaeological and anthropological approaches to past human-insect interactions consider insects both as silent witnesses to past activities and as active contributors informing ongoing environmental and social changes. These two views are not contradictory. Instead, they highlight the importance of revealing the intricate relationships between insects, human societies, and the broader environment in *longue durée*. Such understandings may inspire management and adaptation strategies in an era already facing diverse eco-entomological challenges, such as pollinator deficit, biodiversity decline, pathogen control, and global food security.

Echoing the insights from the forthcoming special issue of *Archaeological Review from Cambridge* (39.1) titled “Human-Insect Entanglement: Past, Present and Future” co-edited by some of the organisers, this session invites interdisciplinary contributions related to the themes of temporal and environmental (*sensu lato*) change, funerary archaeoentomology, cultural entomology, and beyond. These contributions aim to unravel the rich environmental stories woven together with these often underestimated agents in our shared history.

This session is the result of collaborative efforts from three separate proposals exploring various aspects of the field. We would like to acknowledge the contributions of the following colleagues: Rachel Brody (Boston College), Nynke Blömer (University of Cambridge), Jake Stone (University of Cambridge), Jeremy Farr (CSIRO; University of Queensland), Jean-Bernard Huchet (CNRS), Nick Schafstall (Czech University of Life Sciences), and Nicki Whitehouse (University of Glasgow).

ABSTRACTS

1 THE HOLE, THE BIRD, AND THE LARVAE: TRANSCENDENTAL TERRAINS IN THE MUNDANITY OF THE !XAM MYTH ‘MANTIS AND THE KORO-TWI:TƏN’

Mguni, Siyakha (University of Cape Town)

Insect biota contributed significant proportions of the foods gathered by the 19th century !xam Bushmen in the Nama-Karoo biome of South Africa’s interior plateau. Judging by the expansive collection of accounts in the Bleek and Lloyd archives the most pervasive insect form is arguably ‘larvae’ and ‘eggs’—of which two types were distinguished in !xam language, !hakən and ||xe:—generally called ‘Bushman rice’ in the colonial period writings. Generally speaking, in line with all culturally valued biological forms within San nomenclatures, it is evident that certain insect categories in hunter-gatherer cognitions were afforded more significance than others. Rationales for cultural selections vary considerably, however, with food merits normally being foremost. Yet these two insect forms were distinctly recognised in those environs for considerations outside their dietary or gastronomic endowments. Exploring the !xam myth titled, ‘Mantis and the Koro-twi:tən’, this paper argues that while the account focuses on the sustainable harvesting of a highly delectable insect form using shared forager technologies and methods, it features a dialogic background that unveils concealed terrains of phenomenological awareness and transcendental realities that permeated the !xam world of experience. Notably, the narrative depth and detail reveal the magnitude of the !xam interlocutor’s complex cultural information.

2 ASSESSMENT OF THE VARIATION IN LAND USE THROUGH ARCHAEOENTOMOLOGICAL STUDIES

Carta, Giuseppina (Department of Earth, Environment and Life Sciences (DISTAV), University of Genoa) - Lar-entis, Omar (Centre of Research in Osteoarchaeology and Paleopathology Department of Biotechnologies and Life Science, Insubria University; Soprintendenza Archeologia Belle Arti e Paesaggio per le province di Como, Lecco, Monza-Brianza, Sondrio, Pavia e Varese, MiC) - Leto, Alessandro (Pian di Marte) - Badano, Davide (Department of Life Science, University of Siena) - Vanin, Stefano (Department of Earth, Environment and Life Sciences (DISTAV), University of Genoa; National Research Council, Institute for the Study of Anthropic Impact and Sustainability in the Marine Environment (CNR-IAS), Italy)

Archaeoentomology is an interdisciplinary discipline that focus on insect remains from archaeological contexts, providing a further level of understanding of the interactions between humans and environment in an historical perspective. Focusing on this aspect, the study here presented aims to analyse the variation in land use through a detailed analysis of insects found in the archaeological context, comparing them with contemporary samplings. The study, started in 2022, was carried out in "Pieve of San Cristoforo" church situated in Pian di Marte (Umbria) in Central Italy.

Five hypogean crypts (XVIII-XIX century) were analysed and their entomofauna studied. Two of these burials, located on the North-East side of the church, have some drainage channels connecting to the external environment. Through these channels, predator and opportunistic species unrelated to the cadaveric fauna had access to the cadaveric entomofauna. Among them, species in the family Carabidae (Carabus, Pterosticus, Nebria, Trechus, etc.) are known as reliable soil bioindicators.

Pitfall, interception and Malaise traps were employed, along with direct hand collections, during the summer 2022 and in summer and fall 2023 to have a list of the nowadays active species of the area, focusing on informative species.

The analysis here presented was carried out at two levels: 1) comparison between archaeological and nowadays species - it is worth mentioning that the Italian Ministry for Environment and Agriculture published a volume about Carabidae as bioindicator of the Italian soils' use and evolution - and 2) comparing the available cartographies of the area with detailed reports of the land use (eg.: Catasto Chiesa, 1727-1734). The analysis results show a strong difference of the ground beetle entomofauna, whereas no difference appears on saprophagous species. The ground beetle difference reflects the differences in the cartography analysis where it appears a clear forest expansion and a reduction in the agriculture activities.

3 SANITARY AND HEALTH CONDITIONS IN RURAL EARLY MEDIEVAL IRELAND

Kourela, Eva (University College Dublin) - Radini, Anita (University College Dublin)

The analysis of sub-fossil insect remains in archaeological contexts is a vital tool for understanding the ecological conditions and the local environment of ancient settlements, and therefore the way people lived. In the past, like today, insects moved into microhabitat they could colonise. As insects gradually moved, lived and died into occupation sites (by introduction from a host, imports, activities such as butchering, crafts and dumping zones) they left behind their remains; The focus of this paper is the information on health and hygiene of rural societies in early medieval Ireland that can be inferred from ancient insects remains.

This study will also present the integration of other multidisciplinary approaches, including a novel analysis of insect remains strictly associated with ancient human remains. This study will show the benefits of multiproxy analysis to strengthen the results of archaeoentomology for future research, but also, published data from the Early Christian rath of Deer Park Farms (modern Northern Ireland) will provide a general overview of the hygiene levels, and present the progress of the new insect work currently undertaken.

4 INSECTS BENEATH THE ASH: EXPLORING POMPEII'S RUINS THROUGH ARCHAEOENTOMOLOGY (CAMPANIA, ITALY)

Huchet, Jean-Bernard (CNRS, Muséum national d'Histoire naturelle, Paris)

The preservation of crops and stored-foodstuffs figures among the recurrent themes in Classical literature (i.e. Theophrastus, Cato, Varro, Columella, and Pliny the Elder). Botanical study of the charred plant and fruits macro-remains of Pompeii, formerly destroyed by the eruption of Mount Vesuvius in A.D. 79, let suspect that some damage could be attributed to insect pests. Although important multidisciplinary researches have been conducted upon this emblematic archeological site, the entomological approach has been largely neglected.

An archaeoentomological survey carried out at the Laboratory of Applied Research, Pompeii, (Campania, Italy) allowed to evidence many insect remains as well as their traces of activity left among the archaeobotanical material, mainly associated with the charred leguminous grains (Fabaceae) and olive remains (Oleaceae) curated within this institution. The main purpose of these investigations was to evidence, by empirical means, how the foodstuffs protec-

tion methods recommended by the antique authors were really efficient against the stored product pests. The results of these investigations are presented here.

5 INSECT DEATH ASSEMBLAGES: A HELPFUL TOOL FOR RECONSTRUCTING PAST INTERACTIONS BETWEEN HUMANS AND LANDSCAPES IN THE FRENCH CENTRAL PYRENEES

Parrilla, Sarah (CNRS - UMR 5608 - Laboratoire TRACES; CNRS - UMR 5602 - Laboratoire GEODE; LASA - Laboratorio di Archeologia e Storia Ambientale) - Moret, Pierre (CNRS - UMR 5608 - Laboratoire TRACES) - Saulnier, Mélanie (CNRS - UMR 5602 - Laboratoire GEODE) - Py-Saragaglia, Vanessa (CNRS - UMR 5602 - Laboratoire GEODE)

Environmental archaeology provides information about the co-evolution between past societies and their environment, changes in land use and human impact on vegetation cover. In the Pyrenees, this research area has long relied on micro and macro-plant remains (pollen and charcoal). Subfossil insects from natural soils can provide additional information on past human practices such as pastoralism and landscape openness. In past forest contexts, they also have the potential to help us determine openness, canopy density, and the presence of old trees. Insects can therefore be proxies for the age and maturity of forest stands.

To test the ability of insects to reflect different degrees of anthropisation, we sampled in the northern slopes of the French Central Pyrenees three old-growth forest sites (Barrada, Bois-Neuf and Burat), two ancient forest sites (Bernadouze and Lacore) on north facing-slopes, and an ancient mining area (Les Argentières), on a south-facing slope, today in an open landscape. Two pits were dug in each old-growth forest site, two and three in the ancient forest ones, and two in the ancient mining area (one in an ancient waste heap and the other in a natural soil nearby), to collect soils/sediments and extract and analyse insect (n=2396) and charcoals remains (n=4297). Radiocarbon dating was performed on several charcoals (42) from the same sampling layers as the insects, ranging from the Mesolithic to the contemporary period. At all the sites studied, insect remains provided promising data that complement the charcoal record for detection of agro-sylvo-pastoral practices.

6 BEES FOR THE FUTURE: A HISTORICAL ECOLOGY OF BEEKEEPING ON THE CHERANGANI HILLS, ELGEYO-MARAKWET, KENYA

Shen, Benny (University of Cambridge)

Despite of its high economic and cultural importance, pollination services to some of the most important cash crops, and broader ecosystem services that enhance forest biodiversity and soil stabilization, beekeeping and beekeeper communities in sub-Saharan Africa have often been overlooked in development and conservationist literature for their roles in shaping their inhabited landscapes and ecosystems over longue durée. Simultaneously, despite of its well-attested antiquity, apiculture has been generally overlooked in archaeology. Current methods that traced the origin of beekeeping to early agriculturalist Near East, relying on either the remains of apicultural structures or lipid analysis of beeswax, become infeasible when encountered with sub-Saharan African apiculture where hives and receptacles were mainly made from perishable materials and where beeswax was not widely collected until recently.

Following earlier proposition of the concept of 'beescape' to embrace the meshed processes of multispecies intra-actions/co-becomings that reified ecosystem, landscape, and material memories, this study uses historical ecology-minded, multidisciplinary approaches to investigate the living beescape of the Cherangani Hills in Elgeyo-Marakwet, Kenya, by coalescing oral historical, participatory mapped, GIS-based, and remote-sensed, and archaeological materials. The study revealed a complex history of shifting land and forest uses partly dictated by apicultural concerns that provided a preliminary scope into how long-term beekeeping had mediated the landscape modification in East Africa and pointed directions for further historical ecological studies of African beescapes. This study also examines how learning from the ecological and landscape past of beekeeping in Kenya may inspire future policy-making concerning food security, forest conservation, and climate change reactions in both the local and global scales.

7 EVOLUTION OF ARCHAEOENTOMOLOGICAL INVESTIGATIONS IN ITALY

Vanin, Stefano (Department of Earth, Environment and Life Sciences (DISTAV) University of Genoa; National Research Council, Institute for the Study of Anthropic Impact and Sustainability in the Marine Environment (CNR-IAS), Italy) - Carta, Giuseppina (Department of Earth, Environment and Life Sciences (DISTAV) University of Genoa) - Giordani, Giorgia (Department of Pharmacy and Biotechnology (FABIT), University of Bologna)

Funerary archaeoentomology focuses on the arthropods associated with human remains or elements involved in funerary rituals, such as offerings. Over the past few years, several papers have been published on Italian material spanning approximately 5000 years. Since the publication of the paper regarding the state of the art of funerary archaeoentomology in Italy (Tuccia et al., 2022), which mentions 12 Italian sites, an additional 15 new sites have been studied, leading to a better understanding of the insects associated with skeletonized and mummified bodies across Italy. Most studies deal with mummified or partially mummified bodies stored in churches and crypts (15th to 19th

centuries). Among the insects, species from the following families are listed, along with their relationships with human cadavers: Calliphoridae, Sarcophagidae, Muscidae, Fanniidae, Piophilidae, Sphaeroceridae, Heleomyzidae, Phoridae (Diptera); Carabidae, Histeridae, Staphylinidae, Cleridae, Dermestidae, Ptinidae, Cryptophagidae, Latrididae, Zopheridae, Endomychidae, Salpingidae, Curculionidae (Coleoptera); Formicidae, Vespidae (Hymenoptera); Tineidae (Lepidoptera); Pulicidae, Leptopsyllidae (Siphonaptera); and Pediculidae (Psocodea). The presence of species belonging to Acarina, Aranea, and Pseudoscorpionida is also discussed. The analyzed entomofauna allows conclusions to be drawn about funerary ceremonies, cadaver taphonomy, as well as variations in distribution and local extinctions of some species within the investigated timeframe. Additionally, the difference between museophagous and “informative” insects is analyzed and described to provide knowledge and operational skills to meeting attendees.

8 LICE AND DOUBLE-SIDED COMBS: TRACING TECHNOLOGICAL NETWORKS OF EXCHANGE IN THE EARLY MEDIEVAL ATLANTIC ARCHIPELAGO

Brody, Rachel (Boston College)

The human head louse and body louse are creatures of humans, but just the same: humans are creatures of lice. Lice are heirloom parasites—coevolving with us—and we share a very long history with each other. We define these creatures as pests, a status that we have granted them through an existence only made possible by the ways we decide to wear our hair and clothe our bodies. They are, therefore, active subjects and historical actors. In this paper, I argue that by studying people and their lice in the early medieval Atlantic Archipelago, we can engage in new ways with time-old scholarly discourses on economic networks of exchange. In this paper, I will survey fine-toothed double-sided combs, a human material response and act of resistance to lice, to trace technological exchange between early medieval Ireland and Britain. Early results of this work show that the Romans likely introduced fine-toothed double-sided combs in Britain. As lice crawled and climbed from one human host to another, these combs traveled, and this technological innovation eventually spread to Ireland. The relationship between insects, humans, and combs is just one of the many entanglements that came to shape the past.

9 EVALUATING FOR THE FIRST TIME THE POTENTIALS OF LEPIDOPTERA MICRO-REMAINS FROM ANCIENT HUMAN DENTAL CALCULUS

Radini, Anita (School of Archaeology, University College Dublin, Ireland) - Kourela, Eva (School of Archaeology, University College Dublin, Ireland)

Dental calculus consists of mineralised dental plaque and is often referred to as tartar. This is the result of microbial activity on teeth, and if not removed, the mineralisation of the plaque forms a deposit on teeth that can survive for millennia. In the past 20 years dental calculus samples from teeth of ancient populations have been the subject of a wide range of research - from diet to oral microbiomes. This is because, during its formation, dental calculus can entrap and preserve a great variety of particles and molecules from food, the environment, air and water. The majority of studies have looked at particles from food, but insect remains have been found entrapped in this type of ‘deposit’ on teeth. This paper presents, for the first time, the wide range of microscopic remains of Lepidoptera in ancient human dental calculus. It discusses the evidence from a Medieval population from Leicester (England) and discusses potential and limitations in their identification and interpretation.

10 BABY, IT'S COLD OUTSIDE; HOW CHANGING FARMING PRACTICES INFLUENCE THE INSECT BIOTA ON THE EDGE OF THE INHABITABLE WORLD

Konradsdóttir, Hrönn (National museum of Iceland)

Some species of small mould feeding beetles are almost locally extinct in Iceland, most likely due to changes in the human made environment.

This presentation will discuss the different species of insects that lived in the byres, barns, and turf houses of the last centuries and the abundance of the same species in the archaeological record.

Living on the edge of the habitable world has its pros and cons. Changes in farming practices can impact the fauna quickly and permanently and local insect species extinctions do not normally ignite the population to protect the endangered habitats. There are many insect species in Iceland that cannot survive outside the human made environment even though many of them thrive in natural habitats in the warmer southern European climate. Most of these were likely first unintentionally imported during the Settlement Period in Iceland (10-11th century AD).

The first hay baler was imported to Iceland in 1982. This machinery has since spread to most if not all farms, making hay barns obsolete and the ecology of some insect species scarce. Prior to this new technology, the hay would be bound with ropes and stored in barns where the cattle or sheep would live close by in the winter, producing a warm and moldy environment, which is the perfect living condition for some coleoptera species. Today, the hay is covered in plastic and stored outside for the winter months causing a major impact on the fauna.

In this presentation, comparisons will be made between 16th-19th century insect faunas from excavations at high status places and small cottages analyzed by the author. These will also be compared to the modern specimens of the same species in Iceland collected by the Icelandic Institute of Natural History and other resources.

11 WORMS, DRAGONS, AND OTHER INSECTS: A CASE STUDY OF MATERIAL CULTURE FROM 19TH CENTURY WESTERN ALASKA

Althoff, Amanda (Columbia University)

In 1959, Robert Spencer noted in his Inupiaq ethnography that “no account of North Alaskan supernaturalism would be complete” without the mention of worms (1959:295). In their 2015 book on Inuit human-animal relations, Frédéric Laugrand and Jarich Oosten still critique the lack of studies investigating insects in the Arctic. To date, these calls have gone fundamentally unanswered. This paper, based on my doctoral dissertation research, provides a first overview of the diversity and connectedness of insect depictions in Yup'ik and Inupiaq material culture, largely from the 19th century, and now housed in museums around the world. Bringing these cultural belongings back into their cultural, ecological, and historical contexts allows us to recognize stories, names, and relations. It enables us to begin asking, what even is an insect in 19th century Western Alaska?

Bringing together archaeological data, museum collections, oral archives, and Indigenous frameworks, this case study showcases the need to see insects as more than proxies. For instance, with a particular wealth of worm depictions, we are forced to reconsider the universality of the hexapod-as-insect, and instead, see insect-ness and the powers and kin relations that lie therein as a culturally embedded conceptual framework, requiring our careful consideration.

12 ARCHAEOENTOMOLOGY AS A PROXY FOR RECONSTRUCTING ENVIRONMENTAL CHANGES DUE TO HUMAN ACTIVITIES IN A LANDSCAPE BETWEEN LAND AND SEA

Richelmi, Lisa (UMR 5199 - PACEA (University of Bordeaux, France)) - Huchet, Jean-Bernard (UMR 5199 - PACEA (University of Bordeaux, France); National Museum of Natural History (MNHN, Paris, France)) - Verdin, Florence (UMR 5607 - Ausonius (University of Bordeaux Montaigne, France))

France's Atlantic coastline, facing accelerated erosion and relentless retreating coastline, frequently reveals new archaeological remains which are threatened by rapid destruction. Several years of excavations at Amélie Nord (Sou-lac-sur-mer) have uncovered many archaeological structures dated from the Neolithic to Antiquity. These structures, hidden beneath the sand and located on the foreshore, are only accessible at the highest tidal coefficients and for very short periods of time. This waterlogged, anaerobic environment has preserved numerous arthropod remains for thousands of years. The archaeoentomological study of this rich corpus of insects enables us to reconstruct palaeoenvironments and human activities, and to assess their impact on local insect biodiversity. Insects are thus used as bio-indicators of the anthroposystem, making it possible to characterize settlement dynamics in coastal areas and to understand the challenges faced by societies occupying these territories. Ancient populations took advantage of the resources available in this environment between land and sea. The marshes protected by the dunes were used for salt production and oyster farming, while also providing water for livestock. Trees from the surrounding forest were widely used for construction, leading to a retreat of the forest and, consequently, more open environments in Antiquity. In this changing environment, strongly subject to oceanic influences, populations also had to adapt and cope with risks. This diachronic study puts the study of climate change into a multi-millennial perspective and contributes to the development of a memory of risk.

13 CHINESE BUTTERFLY AND MOTH MOTIFS AND THEIR CONNOTATIONS

You, Zhangheng (Xiamen University)

In China's history, insect motifs have appeared on a large number of material and spiritual carriers, such as tombs, arts and crafts, excavated relics, which have been entrusted with unique and rich connotations by the ancients.

Firstly, this report will take an overview of the research on the subject of domestic study in China, which is about butterfly-moth motifs, and systematically describes the existing research results on butterfly-moth motifs in imagery and literature. Secondly, the report summarizes the different characteristics of butterfly-moth motifs from the Tang to the Qing dynasties, analyzing the reasons that gave rise to these characteristics in the specific context of the times. The report then focuses on the connotations of butterfly-moth motifs, including faith connotations and aesthetic significance. The butterfly and moth plays as an important role in the early Chinese belief system, as a symbol of reincarnation and regeneration. They are associated with sun worship and ancestor worship. Together with silkworms and cicadas, they formed an important part of the system of “feathering and regeneration”. After the decline of moth worship, the aesthetic significance of the butterfly gradually emerged, including pure love, freedom and longevity. Finally, the report speculates on the relationship between butterfly and moth motifs and the natural environment due to the fact that the nations with butterfly totems were found to be distributed in the southern provinces and the high temperatures of the Tang Dynasty, when butterfly motifs emerged. The interaction between butterfly moths and

human beings is reflected in all aspects of belief shaping and aesthetic shaping, and the subject-object relationship is constantly changing. Butterfly and moth motifs also have a reaction to their corresponding times and regions, they are of high research value.

14 **WHERE ON EARTH HAVE YOU BEEN? FIRST APPLICATION OF FUNERARY ARCHAEOENTOMOLOGY IN CANADA**

Roger, Clotilde (Université Laval) - Bain, Allison (Université Laval; Groupe de Recherche en Archéométrie) - Huchet, Jean-Bernard (Université de Bordeaux; CNRS)

The study of insects from burials has been exploring numerous archaeological contexts and geographical areas in recent decades. As part of a master's thesis at Université Laval (Québec), 43 burials from three cemeteries from the province of Québec were analyzed through the lens of funerary archaeoentomology, thus constituting the first application of this approach in Canada.

The objective of this study was to assess the validity of this approach in unexplored contexts by evaluating to what extent insects could be found and then so see what information could be derived from them. Although essentially methodological and taphonomic, the scope of this research has allowed the discussion of seasonality of death, health conditions, body exposition prior burial, and possible rapid inhumation, thus placing the human-insect interactions at the heart of reflection.

If in forensic entomology and, by extension, funerary archaeoentomology, the body is considered as a short-lived ecosystem, the remains of insects that once inhabited this body perpetuate valuable heuristic in archaeology and provide access to informations that were once inaccessible. In the context of this research in particular, this perpetuity was reflected in the memorial importance that these insect remains carried. One of the multiple burials in the research corpus, which included Irish immigrants fleeing the Great Famine of 1845-1852, could be dated to the summer of 1847 thanks to the seasonality of death and the brief occupation of the site. This information is meaningful for the descending Irish community of Montréal: as in forensic entomology, placing the death of an individual on a calendar is certainly fundamental for an investigation, but also for mourning and memory. Consequently, funerary archaeoentomology may offer a tangible link between the past and present descending communities. Therefore, the aim of this conference is to share these research results and highlight their contributions and perspectives.

15 **IN THE DIRTY OLD PART OF THE CITY: FISHAMBLE STREET, DUBLIN THROUGH TIME AND IN CONTEXT**

Davis, Stephen (Stephen Davis (Institute of Archaeologists of Ireland)) - Reilly, Eileen (University College Dublin) - Kourela, Eva (University College Dublin)

This paper presents an overview of the remarkable body of work undertaken by Dr Eileen Reilly at the important Viking (C10-11th) site of Fishamble Street, Dublin, comprising the analysis of 104 samples from across multiple phases of early urban settlement. Excavated between 1974-1981 the site yielded exceptional organic preservation and resulted in a large number of samples: while at the time no analysis was undertaken these were archived for future research. A key part of this was analysis of insect remains: the potential for this had previously been shown by Harry Kenward in York and had been recognised at the time of sample collection. Samples were categorised by location – floor layers (aisles; corners), pits/ditches, wall deposits etc. and by phase. In general, the assemblages are overwhelmingly dominated by a small suite of typical 'house fauna' insects which wax and wane through time. These variations across time and space can be equated to the ebb and flow of settlement activities and, most probably, to broader episodes of societal change. This work especially demonstrates the value of in depth sampling and analysis in understanding change at fine spatial and temporal resolution. This paper is given in honour of the late Dr Eileen Reilly whose work over more than two decades was an inspiration to her colleagues and contemporaries.

862 **ARCHAEOLOGICAL HERITAGE ? DIVERSIFYING APPROACHES OF COOPERATION WITH NON-EUROPEAN PARTNERS**

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Kuraszkiwicz, Kamil (University of Warsaw, Faculty of Oriental Studies) - Augustyniak, Zuzanna (University of Warsaw, Faculty of Oriental Studies) - Abebe, Mearg Abay (Mekelle University)

Session format: Regular session

Archaeological Heritage, understood as the material remains of the past, does not rest in a void. It is an inherent part of the contemporary environment, shaping the landscape, societies, and visions of the past. Doubtless, past and contemporary cultures form a continuity, and any link to the past, including intangible remains like memories, customs, identities or linguistic legacy should be understood as part of archaeological heritage. It is essential while researching

non-European cultures that were for a long time victims of the colonial approach, seen either as curiosities or as predecessors of greater (meaning Western) cultures and thus described and explained for the benefit of Europeans, without acknowledging or even noting their proper context which at least severely limited their understanding. To appreciate the context, cooperation between archaeologists with specialists dealing with non-European cultures is needed. Perspectives of non-European partners differ from those rooted in European academic traditions, and – moreover – local contexts lead to shifts in priorities and add possibilities. For example, local initiatives to create community-based museums add interesting new possibilities for disseminating knowledge and integrating research results in a local context. Also, the integration of local knowledge of cultural contexts and traditions, which can enrich archaeological research and support the interpretation of finds, cannot be detached from local communities seeing themselves as guardians of historical sites.

Also, the postcolonial perspective emphasizes researched societies' involvement in archaeological and ethnographical research. Research should no longer be about them, but with them. It is mutually advantageous; local societies may help understand the past, and through involvement, they can effectively profit from it. Invited to join the discussion are colleagues who engage local communities in research on the past or who combine archaeological research with memory studies.

ABSTRACTS

1 **ETHNOHISTORICAL RESEARCH ON AN AKSUMITE SITE AND ITS ENVIRONS IN THE HIGH PLATEAU ABOVE THE „BLACK NILE“**

Abebe, Mearg (Mekelle University) - Smidt, Wolbert (Friedrich Schiller University Jena; Mekelle University)

The results of a German-Ethiopian cooperation are presented. Local inhabitants in Ketema Ra'isi (Central Tigray, Ethiopia) were intrigued by findings of Aksumite coins while ploughing, and by ruins within which since generations they were building and rebuilding their own habitations and as well as by stories about them. The Ethiopian author of this paper grew up at that site, and during his work as a museum expert, he started interviewing family members in cooperation with the ethnohistorian Wolbert Smidt, the second author of this paper. Following the initiative of the local community, the latter was invited to visit the site and document its context, in order to provide a first analysis of local memories. This paper will present a first insight into this cooperation. In a thickly forested area at the fringes of the highlands, there is a church and monastery, locally seen as an important place of refuge, well protected by the rocks and forests and by a steep pathway, which seems to be very ancient and well constructed. The modern church, which has an important manuscript collection due to its position hiding it from marauding armies, displays several Aksumite spolia. Local elders and priests are connecting their route with the ancient Nile of the Bible and tell that it is here that since ancient times people were „crossing the Nile“ - referring to the routes passing through the forest leading down to the Tekkeze, the most important Tigrayan tributary of the Nile. These narratives probably reflect an ancient identity of that place, which was located at the margins of the Aksumite kingdom, and connected itself with the Nile. The paper presents what is known today on the site, following the local inhabitants' invitation of foreign scholars to make their ancient living area known to scholarship and heritage experts.

2 **BALANCING RESEARCH, CONSERVATION, AND LOCAL ENGAGEMENT. A NEW COLLABORATIVE PROJECT BETWEEN ETHIOPIA AND TANZANIA**

Itambu, Makarius Peter (University of Dar es Salaam-Tanzania; Max Planck Institute of Geoanthropology-Germany; CEREGE-CNRS, France) - Itambu, Makarius (University of Dar es Salaam, Tanzania; Max Planck Institute of Geanthropoöogy-Germany; CEREGE, CNRS-France) - Solomon, Tadele (Ethiopian Heritage Authority, Addis Ababa, Ethiopia) - Gallinaro, Marina (Dipartimento di Scienze dell'Antichità, Università di Roma La Sapienza,)

The balance between economic development and conservation of landscape and cultural heritage is a critical global issue, particularly in developing countries. This challenge is compounded by drastic climate change, complex political conditions, and fluctuating economic developments affecting land and resource use. Population growth, inadequate legislative tools and management plans, and a lack of awareness of the value of nonrenewable natural and cultural resources exacerbate these issues. Cultural heritage management in several African countries is still influenced by the laws and structures of their former European colonizers. Furthermore, certain popular beliefs associated with colonial occupation contribute to inadequate care of cultural heritage, especially archaeological heritage. The existence of folk beliefs and myths with no historical basis, such as attributing the origin of rock art to colonizers as a marker to identify the sites with hidden treasures, leads to the vandalization of these sites.

The paper aims to present the current state of archaeological heritage in two areas of Eastern Africa: the Borana zone in southern Ethiopia and the Singida region in central Tanzania. It will introduce the initial steps of a partnership between African and non-African scholars, as well as local and national institutions. The partnership aims to establish the foundation for short- and medium-term actions to implement management plans for areas with rock art. The

goal is to promote sustainable development projects and challenge the misconception that studying and preserving archaeological heritage hinders economic development.

3 COMPLEXITIES OF (ARCHAEOLOGICAL) HERITAGE WORK AMONG/WITH MARGINALISED LOCAL COMMUNITIES IN SUDAN

Kleinitz, Cornelia (Deutsches Archäologisches Institut, KAAK) - Mohamed Ali Saeed, Alfatih (University of Khartoum) - Ebeid-Allah, Hassan (Musawwarat Community Council)

This talk reflects on some of the complexities of working among and with marginalised local communities in Sudan with a focus on the region of Musawwarat, part of the UNESCO World Heritage Entry 'Archaeological Sites of the Island of Meroe'. Here, a collaborative project on the archaeology of (local) pastoralism had successfully bridged the gap between the concerns of the Sudanese and European archaeologists and the local pastoralist population, who had long been engaged as 'workmen' during excavations and conservation work at the monumental archaeological site. Centring pastoralist knowledge empowered the local population to tell their (hi)story of the Musawwarat site and region, which greatly benefitted the archaeological project and also led to the development of locally-led community/rural tourism that in turn promised to benefit the local population. However, this level of mutual engagement also meant that the project documented and made visible the increasing precariousness of local pastoralist livelihoods in view of fast (industrial-)agricultural expansion and the effects of climate change, leading to the rapid loss of rangelands as well as pastoralist knowledge and heritage. Combining Sudanese and European archaeological, social anthropological as well as local perspectives, our joint observations showed the detrimental effects of specific – and in effect unsustainable – ideas of development and progress as imposed by Sudanese state-related actors on the drylands of Sudan and their marginalised people.

4 STAY IN AND GO OUT: THE COMMUNITY CONNECTION OF A NEOLITHIC CULTURAL MUSEUM IN CHINA THROUGH STUDY TOUR

Lin, Shiting (University of Cambridge)

Archaeological heritage is usually seen far away from public normal lives, especially prehistoric heritage. How to make prehistoric museums link to the public is significant. Facing the increasing demand for diverse tourism experiences, museums need to go out to involve more people. This research, taking the Banpo Museum in Xi'an China as a case study, aims to explore how a prehistoric museum with an archaeological site, through study tours, develops its connection with tourists and communities by getting them into the museum and by going out to reach them.

Banpo Museum, opened in 1958, is the first Neolithic Culture Museum in China. Consisted with collection galleries and an archaeological site, it shows the excavation findings and Banpo site dated back to 6800 to 5300 years ago. Banpo site is a part of Yangshao culture which proves China has Neolithic culture. Nowadays, it develops a "Prehistoric workshop" inside the museum targeting teenagers and a "Happy Tour to Primitive Tribe" outside targeting schools, local communities, and countryside communities. These two series of activities involve not only young visitors but also urban and rural communities, which share knowledge of neolithic culture with the public and improve their responsibility for heritage conservation.

Through analysing this case study, the research can shed light on the contemporary development of prehistorical museums and public involvement of archaeological heritage through study tours. Out of the European context, it can also contribute to the understanding of how museums in the Chinese context reach communities in their ways.

5 SPOILED: RECONSIDERING THE TERM SPOLIA FOR ANTIQUITIES REUSE IN THE OTTOMAN EMPIRE AND BEYOND

Silvia, Sean (Princeton)

Reuse of ancient materials to build new structures is a fascinating phenomenon which can provide rich insights into the lives of people who lived in and around ruins. Yet our continued use of the word "spolia" (originally meaning spoils taken in conquest) to describe this phenomenon and the assumptions that come with it contaminate our scholarship, especially concerning non-western cultures. In the long nineteenth century, the word served an ideological project. Western Europeans used its connotations of rupture to discredit Ottomans claims to ancient artifacts and justify plunder of antiquities from Ottoman lands. The word spolia misrepresented an Ottoman worldview primarily based on continuity with antiquity rather than rupture. The misrepresentation problem is not limited to the Ottomans. Spolia's assumptions of rupture and conquest cause scholars to assume conquest imagery without hard evidence. The word leads us to fixate on moments of rupture, often missing the broader world surrounding reuse in urban geography. The stakes are higher than a mere terminology question, because the 'rupture and conquest' mindset baked into the word "spolia" masks archaeology's destructive history of epistemicide against local knowledge systems. Building off ideas of rupture, local reuse of antiquities in the Ottoman empire is labeled as "protomuseological," "indigenous archaeology,"

and "antiquarianism" to legitimize reuse as a practice and research topic. Yet to reach this laudable goal, local antiquities epistemologies are forced into western knowledge system categories, the very same knowledge systems that violently displaced local ways of life in the long nineteenth century. It should not be necessary to force non-western knowledge systems into western categories to take them seriously, they can and should be recognized as epistemologies in their own right. This paper proposes alternative vocabularies to discuss architectural reuse that reckon with archaeology's violent disciplinary history and foster more productive and ethical discourse.

6 WE'RE IN THIS TOGETHER – SAQQARA AS AN EXAMPLE OF INCLUSION OF LOCAL KNOWLEDGE INTO ARCHAEOLOGICAL ACTIVITY

Kuraszkiewicz, Kamil (University of Warsaw) - Augustyniak, Zuzanna (University of Warsaw)

The current approach to heritage management entails engaging local communities in organising the protection of archaeological sites and making them available for visitors which often includes social events that bring together archaeological teams and members of the communities. This, however, seems to be only a small fraction of opportunities that such a cooperation can offer. As an illustration, the work of the Polish expedition to Saqqara (Egypt) will be discussed. The expedition employs usually 15-30 workers, with the rais (foreman) in charge of them. The workers, mostly farmers from the neighbouring village, have no formal education related to the history of their neighbourhood, but rather a general knowledge transmitted orally. The majority of them work in excavations occasionally, this being their additional source of income. Raises, on the other hand, although also without a formal archaeological education, come usually from families having been involved since generations in archaeological activities and they work on excavations constantly, switching between expeditions in the area. Both groups are usually not familiar with archaeological or conservation methodologies. However, a practical knowledge applied in their life and work can be more than useful in protecting and, moreover, interpreting archaeological objects. For example, some methods and technical solutions applied in ancient Egyptian architecture are – or were recently – continued in rural areas. A common misunderstanding is that the Egyptian heritage has not been re-discovered before the 19th century. However, works of Arab scholars and material evidence indicate that pharaonic sites were being explored long before that date. It may be supposed that the knowledge continues, and the research on an archaeological site should include also an analysis of much later sources and the memories of people living today around or in a close vicinity of the site, as a collaborative work of archaeologists, ethnographers and historians.

7 LIVING HERITAGE, INDIGENOUS WISDOM AND ENDANGERED ECOSYSTEMS: ROZVI NATURE METAPHORS DICHOTOMIZED

Machiridza, Lesley (University of Cologne; Great Zimbabwe University)

Across the globe, the distinction between the tangible and intangible realms of life, especially among Indigenous communities is sophisticated. This stems from the fact that Indigenous Knowledge Systems (IKS) are holistic and relational in nature. Such knowledge is grounded in a deep sense of the interconnectedness of the cosmos, nature and society. Thus, Indigenous communities perceive the landscape as a complex web of living, spiritual and physical things. Through use of metaphors involving mountains, trees, rivers, swamps, pools, groves, tunnels, caves, ancestral burial grounds, monuments and myriad cultural objects, the connections between people, physical environments and spiritual realms are consolidated. For generations, Indigenous communities have maintained this wisdom to preserve endangered ecosystems and entrench their shared identities and history within landscapes. Although the Rozvi (1685-1830) were quite notorious for this tradition, their complex landscape connections are yet to be thoroughly explored. While Rozvi metaphors are closely tied to numerous mountains, rivers, trees, pools and swamps, attached meaning(s) and value(s) remain obscure. Building upon notions of rational reconstruction, decolonial and African-centered paradigms, this paper critically reviews such realities. Furthermore, it challenges the compartmentalization of Rozvi heritage knowledge into strict scientific and spiritual/social categories that barely make archaeological sense, especially when it comes to defining elusive concepts like agency and ethnicity materially.

863 THE LIVES AND AFTERLIVES OF MEGALITHS: DIALOGUES OF PERSISTENCE, REINVENTION AND CHANGE

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Pereira Rocha, Leonor Maria (CHAIA/ University of Évora) - Martins, Ana (IHC-Polo Universidade de Évora / IN2PAST) - Whitefield, Andrew (National University of Ireland, Galway) - Meheux, Katie (University College of London) - Sebire, Heather (English Heritage)

Session format: Regular session

Megalithic monuments first appeared in the context of a major social upheaval which saw humans transition to agricultural subsistence and a more sedentary way of life. The monuments span multiple archaeological periods, and remarkably well-preserved examples remain in landscapes across Europe. The meaning and function of megaliths has been reinterpreted by every new generation. The architecture, contents and setting of the monuments have inspired legends and folklore, origin myths and group identities. In modern times, antiquarians and archaeologists have 'professionally' interpreted the monuments, and groups ranging from neo-Pagans and Druids to nation states have adopted the monuments as symbols of their ancestry. Dolmens, menhirs, cromlechs, and alignments continue to fascinate and intrigue tourists, and are among the most visited attractions in many countries. But who decides how competing interests are prioritised? Whose interpretations are right and true? Who owns the past?

This session will explore the ways in which megalithic monuments have been interpreted and reinterpreted through time, with a particular emphasis on the period from the nineteenth century to the present. We seek to compare and contrast perspectives from across Europe, examining motivations, approaches and outcomes. We particularly welcome contributions which consider:

- The development of archaeological investigations, and the resulting classifications and interpretations.
- Custodianship, management, preservation, access, protection, conservation and neglect.
- Authorised narratives: the presentation and interpretation of the monuments for public engagement, education and tourism.
- Contested narratives: the adoptions of megalithic monuments as symbols of social and political identity, religion and belief.
- The place of megalithic monuments in legend, superstition and folklore.
- The future of megalithic monuments.

The proposed outcome of this session is a published collection of essays on how megalithic monuments are understood in the present, how we got here, and what the future may hold.

ABSTRACTS

1 STORIES, LEGENDS AND REALITIES: CASE STUDIES IN THE MEGALITHS OF CENTRAL ALENTEJO (PORTUGAL)

Pereira Rocha, Leonor Maria (CHAIA/Universidade de Évora)

Megalithic monuments, such as dolmens or menhirs, were built to preserve memories and identities. Did the builders envision that these places would be preserved for many millennia, full of mysteries and superstitions?

Today, these monuments serve as important sources of information for archaeologists and anthropologists, shedding light on how ancient populations honored their dead, and providing insight into their religiosity and beliefs, about the afterlife.

The architecture and burial rituals of these sites can help us understand how death was experienced by populations in the Recent Prehistory (4th to 3rd millennium BC), in Central Alentejo. The monumentality of some of these sites has kept their identity alive in the memory of the living over the millennia, leading to the association of popular legends and superstitions. In some cases, their popular importance has led to their transformation or incorporation into religious buildings.

In this presentation, we will explore a set of megalithic monuments that are currently associated with other functions or legends, while also acknowledging their original purpose based on archaeological and anthropological evidence.

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2 SEARCHING FOR SPATIAL RELATIONS BETWEEN FUNERARY AND NON-FUNERARY SITES: A GIS APPROACH TO THE LATE PREHISTORY OF ÉVORA (SOUTHERN PORTUGAL)

Diniz, António (CHAIA/Universidade de Évora) - Faria, Nuno (Universidade de Lisboa/Faculdade de Letras) - Ribeiro, Inês (CHAIA/Universidade de Évora) - Almeida, Nelson (CHAIA - U. Évora / UNIARQ - U. Lisboa) - Branco, Gertrudes (CHAIA/Universidade de Évora) - Rocha, Leonor (CHAIA/Universidade de Évora)

Various researchers have dedicated their studies towards trying to understand the archaeological and spatial relationships between funerary and non-funerary archaeological sites. Regarding European Late Prehistory, these types of studies are of interest when dealing with funerary megalithic monuments, as is the case for dolmens and tholoi, and their possible connections to ditched and walled enclosures.

From a spatial point of view, some of the main questions commonly raised are if there is a "direct" relation between funerary megalithic monuments and enclosures/settlements, and how different variables, such as resources (e.g., lithology, hydrology), distances, and intervisibility, have influenced these relations.

The Évora district (Southern Portugal) is a privileged region to research these aspects due to a historically relevant amount of research and pieces of evidence related to Neolithic and Chalcolithic funerary and non-funerary sites. The location of dolmens, tholoi, ditched and walled enclosures in the Évora district allows us to discuss how the abovementioned variables might have influenced the relationships between these different types of sites. We aim to serve as a bridge between what has been done in this geographical area regarding the identification and surveying of archaeological sites, and what information can be obtained through the application of GIS.

3 THE ANDALUSI LIVES OF IBERIAN MEGALITHS

Lillios, Katina (University of Iowa)

The post-Neolithic lives of Iberian megaliths have been increasingly recognized by archaeologists in recent years (for example, Díaz-Guardamino et al. 2015). When Arab and Berber/Amazigh settlers populated the Iberian Peninsula beginning in the 8th century CE, they encountered a landscape that was not only inhabited by other people, including Christians and Jews, but also by countless numbers of prehistoric monuments, including megaliths. In this paper, I examine the evidence for Andalusí engagements with Iberian megaliths, such as Alberite, Menga, and Viera. I also explore the methodological challenges as well as the potential cultural insights gained in discerning the post-Neolithic lives of megaliths. The paper concludes with a consideration of the different words that archaeologists, such as the Leisners, have used to denote the Neolithic versus post-Neolithic 'afterlives' of monuments and their implications to hegemonic readings of the archaeological past.

*** Díaz-Guardamino, M, L García Sanjuán, and D. Wheatley, eds. 2015. The Lives of Prehistoric Monuments in Iron Age, Roman, and Medieval Europe. Oxford University Press.

4 MEGALITHS AND THEIR CONTEMPORARY RECEPTION IN PORTUGAL: ICONOGRAPHY, TERRITORY, AND COMMUNITIES

Martins, Ana Cristina (IHC - Polo da Universidade de Évora / IN2PAST)

Since at least medieval times, megalithic structures have aroused curiosity and given rise to various theories about their construction and functionality.

With the beginning of the formation of nation states, they became particularly interesting as they visually marked the territory and referred to a certain pre-Roman ancestry. A past that was reinforced as early as the 19th century.

Portugal is no exception to this movement, not so much because of political assertion, but because of the need felt by the pioneers of archaeology in the country to fit into the 'state of the art' of European research into prehistoric archaeology. From then on, this theme never left their horizons, but rather grew stronger according to the prevalence of personal (rather than institutional) agendas.

What we are interested in demonstrating and debating in this presentation, however, is the reception of megaliths, especially in iconographic terms, in a further testimony to the relationship that has always been maintained, consciously, between the production of knowledge and archaeological heritage and the sphere of the arts and literature.

We will therefore pay special attention to megalithic examples selected expressly to support, represent, or illustrate certain agendas - namely identitarian -, projects, territories, and communities, ending with their appropriation by political decision-makers and managers of the sustainable development of regions - especially of Évora, Alentejo -, whether on an individual or collective basis, privately or publicly.

Examples that will demonstrate the relevance of using a certain past to act in the present to guarantee a future.

5 THE MENHIRS IN THE PORTUGUESE ORAL TRADITION

Vieira, Alexandra (CITCEM – Center for Transdisciplinary Research Culture, Space and Memory)

The main interest of this research project focuses on the role of archaeological remains, in this case menhirs, as agents in the dynamics of constructing the memories of communities and contemporary landscapes.

This communication seeks to establish a series of relationships between Portuguese menhirs and some beliefs that have emerged or been created over the years by different communities in different regions of Portugal, as a way of interpreting or explaining these pre-existing materialities. We will consider historical documentation, legends and toponyms related to menhirs.

It also considers the new contexts in which some of these specimens have been placed, since many of them have been removed from their original sites. Some of these monoliths were reused and transformed into “statues-menhir”, probably during the Late Bronze Age, and are known by this name. Others were reused as markers to divide land or parishes, and in more recent times crosses were engraved on them. Finally, some of these monoliths were transported to the vicinity of public buildings, gardens, or cemeteries, where they remained as decorative elements.

6 MEGALITHS AND MODERNITY: CREATING NARRATIVES ABOUT MONUMENTS IN INTER-WAR BRITAIN

Meheux, Kathryn (University College London)

During the inter-war period, a new generation of British archaeologists worked to gain control of the discipline and control public narratives about the prehistoric past. The protection, excavation, curation, and interpretation of megaliths played a key role in their ambitions. In keeping with the contemporary emergence of mass commercial culture in wider society, new narratives were developed, designed to provide a ‘common’ archaeological culture about monuments and based on excavation, fieldwork and scientific techniques. This culture was marketed to the public using both traditional methods of scholarly communication, and the new mass market technologies of popular books, magazines, newspapers, official guidebooks, film, and radio.

This modernity of interpretation was intended to sever megaliths from their historic pasts, rooted in local folklore and antiquarianism. But megalithic pasts were more slippery than anticipated. Not only were older, historical and folklore narratives difficult to destroy, but the inter-war period saw the development of new, rival interpretations: pseudo-scientific mythologies, hyper-diffusionist fantasies, and yearnings for distinct and divergent national pasts.

This talk examines these modernist narrative battles fought over megaliths, with a particular focus on Avebury. Here we see how tensions swirling over heritage, scientific excavation, pseudo-science and monument protection found their way onto radio and into popular culture, coalescing in now forgotten attempts to create a rival ‘alternative’ pre-history movement. Whilst seen over by, amongst others, Gordon Childe, the twists and turns of interpretation, reveal that the interpretation of megaliths was never a straightforward battle between ‘correct’ and ‘alternative’ archaeologies, but an ever-changing collective experience of attitudes to the past expressed through multiple narratives.

7 ‘EVERY AGE GETS THE STONEHENGE IT DESERVES – AND DESIRES’(HAWKES 1967): 100 YEARS OF CONSERVATION AND RESTORATION AT STONEHENGE

Sebire, Heather (English Heritage)

This famous quote from archaeologist Jacquetta Hawkes nearly sixty years ago still has resonance today. The monument of Stonehenge has been in the care of the British government since 1918. Since that time programmes of research, conservation and some restoration have taken place under the aegis of state-run conservation bodies such as the Ministry of Works and later English Heritage. Stonehenge and its landscape have a complex and fascinating pre-history as recognised by UNESCO when it was granted World Heritage status in 1996 but it also has a long modern history that tends to reflect the mores of the time right up to the present day.

This paper will assess the history and significance of these conservation programmes which reflected the Stonehenge that was ‘desired’ at the time whether deserved or not. A case study will also be presented on a recent programme of conservation work which was needed as a result of the decay of works from the late 1950s, exacerbated by climate change. This work, although benign to the monument and gaining a favourable response from most visitors and members of the general public, caused a mini-furore among natural historians and some members of the public illustrating how easily ‘fake news’ can be generated and whipped up by social media. Is this really what Stonehenge deserves?

HAWKES J 1967 God in the machine Antiquity, XLI.

8 INTERPRETATION, PRACTICAL REUSE AND POLITICAL MISUSE OF THE CROMLECHS OF CARNAC (BRITTANY, FRANCE)

Perschke, Reena (Gerda-Henkel-Foundation research grant)

The Neolithic stone circles and menhir alignments in the surroundings of Carnac stand highly visible in the landscape of this scarcely wooded coastal region. Therefore, each new generation was challenged to form an opinion about these massive standing stones and their meaning for their predecessors.

The megaliths were repeatedly reused during Bronze Age, Early Iron Age, and Gallo-Roman Age. Beginning with written records, early medieval Church Councils damned the continued veneration of the Breton stone monuments. Since the 17th century, antiquarians and archaeologists began to interpret the cromlechs and alignments as mirrored zodiacs, procession sites, prehistoric calendars, druid groves, or fortifications.

The German conquest of Brittany in 1940 brought an enormous interpretation twist with a sudden ideological misuse of the Breton megaliths for National-socialist premises. German archaeologists measured and excavated the stone monuments of Carnac which were postulated as “proto-Germanic” settlement area. Therefore they were worth to be “reconquered” for the Third Reich – an active retrospective justification for the Wehrmacht’s occupation of France.

Till today, the stone alignments and dolmens are considered by tourists and folklore as ancient sacred complexes. Even the current official French guide of the Centre des Monuments Nationaux is labelled “Les Alignements de Carnac – Temples Néolithiques”. Neo-druids perform their rituals at the megalithic sites of Carnac and reclaim pagan ancestors’ rights. Due to their monumentality, inexplicability and significant visibility, the standing stones sacralise the landscape in many ways even in our enlightened era today. In 2024, geomagnetic investigations will bring new insights in the primary use of the stone circles. But it is to doubt if these scientific results will change the image of the “sacred” cromlechs in the public reception. People’s longing for sacred, ancient sites is hard to change by scientific results.

9 ROMANCE AND THE STONES: UNPICKING INTERPRETATIONS OF IRISH MEGALITHIC MONUMENTS

Whitefield, Andrew (University of Galway)

In medieval Ireland, megalithic monuments were mainly of local interest. They were interpreted through folklore, which usually associated them with supernatural beings and mythical heroes. Superstitious beliefs often prevented the contents of the monuments from being looted, although many were quarried for stone. As land improvements gathered pace during the eighteenth century, the vulnerability of the monuments increased, particularly in prime agricultural areas. The Enlightenment inspired the founding of learned societies, such as Royal Dublin Society (RDS) and the Royal Irish Academy (RIA), which promoted technological and scientific progress, alongside cultural studies such as antiquarianism. Antiquaries travelled to ancient monuments producing sketches and plans, and acquiring artefacts. Large collections were amassed by the RDS and the RIA, as well as some wealthy individuals.

This ‘scientific’ interest in megalithic monuments was tempered by Romanticism. The monuments were attributed to wild Irish savages yet to benefit from the civilising influence of British colonists, or the fallen heroes of an ancient Irish civilisation, depending upon the opposing sympathies of the British administration and the majority Gaelic Irish population. As the Gaelic Irish middle classes expanded in the nineteenth century, Celtic nationalism began to depose colonial narratives, and ancient monuments were adopted as symbols of Gaelic (Catholic) Irish identity. This paper examines establishment of megalithic monuments as icons of national identity, and the legacy of their politicisation on current archaeological interpretations.

10 MULTIPLE NARRATIVES, MULTIPLE ITINERARIES: THE INDONESIAN MEGALITHS IN IOWA CITY, IOWA

Watts, Corinne (University of Iowa)

The reuse, reinterpretation, and reconfiguration of megaliths are often ongoing processes. These changes demonstrate how power structures impact our use and understanding of these spaces and materials through the control of archaeological material, narratives, and meanings. However, competing and changing narratives call into question the exact nature of these power disparities. In this paper, I consider the case study of fifty megaliths at Harvest Preserve, a private sculpture garden and nature preserve in Iowa City, Iowa. Around 3000 BCE, these megaliths were erected on the island of Flores, Indonesia, where they remained for several millennia. In the early 2000s, the owner of Harvest Preserve purchased these pieces through a Chicago-based art and antiquities broker and installed them in Iowa City. This removal and subsequent reinstallation reconfigures how we understand these megaliths, particularly given their new context alongside numerous art pieces and nature trails with only a short plaque to discuss their geographical origin. In this light, I discuss the official narratives of the Harvest Preserve megaliths, their changing interpretations, and the role these megaliths play in larger discussions about the global cultural heritage trade.

11 THE FAIRY TALES OF MEGALITHS: EXPLORING ALTERNATIVE HISTORIES BEYOND ARCHAEOLOGICAL NARRATIVES

Zaleskaya, Liudmila (University of Edinburgh) - Lilley, Kirsty (University of Edinburgh)

The construction and use of prehistoric monuments is a worthy subject of study in itself, but the biographies of these sites extend far beyond their ascribed archaeological or historical period. In Scotland and in Sardinia, the monuments of the Neolithic and Chalcolithic have held an important place in history, folklore, and belief since their creation, with these 'alternative' stories often superseding archaeological explanations in the public perception. Yet, they are often marginalised in scientific narratives put forward by archaeological practitioners, producing a singular view of 'the past'. Should we therefore strive to find ways to capture and incorporate multiple understandings of prehistoric sites? 'The past' is being continuously produced – but who creates it? And why?

Drawing on two case studies – the chambered cairns of Caithness and Orkney, and the architecturally-embellished rock-cut tombs or 'houses of the fairies' of Sardinia – this paper considers the place of these monuments in collective imagination, and their reuse in different periods. In particular, it explores the differential interpretations offered through time by communities and non-archaeologists, the associated folk stories and legends, and strands that appear to transcend cultural and geographical boundaries. In doing so, it reflects on the multiplicity of 'the past' and how we might do more to recognise the many authors who contribute to it, and the tangible implications this has for the present and future care of the monuments in question.

866 CURRENT RESEARCH IN THE AMERICAS. INTERDISCIPLINARY RESEARCH BETWEEN PAST AND PRESENT

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Torras Freixa, Maria (Boston University; IAUB, ERAAUB, Universitat de Barcelona) - Pecci, Alessandra (ERAAUB, IAUB, INSA-UB, Universitat de Barcelona) - Campiani, Arianna (Sapienza-Università di Roma) - Vidal Lorenzo, Cristina (Universitat de València)

Session format: Regular session

Organised by EAA4Am Community for the third consecutive year, this regular session will continue showcasing the vitality and diversity of ongoing archaeological, heritage and ethnohistorical research in the Americas. These past experiences were very successful and requested the need to have common spaces to share current research and create new synergies between scholars and institutions.

The 2024 Annual Meeting motto is 'Persisting with Change', a statement about the links between past and present. In this session, we will embrace this motto offering insights from past or ongoing projects in the Americas, with a special interest in interdisciplinary approaches. We invite researchers who investigate subjects related to archaeology, ethno-history or heritage to submit their contributions. We want to create an open and welcoming space where Americanists can share their work in an inclusive, diverse, and engaging environment. This session will allow us to discover new projects, discuss current theoretical debates and methodological approaches, and enhance collaborations with fellows. Furthermore, this session will help to raise visibility of American Archaeology in European contexts and promote the EAA Community for the Archaeology of the Americas. No restrictions of themes or chronological periods are settled. Also, we are equally interested in applicants working anywhere in Mesoamerica, South America, and North America, including circumpolar regions.

ABSTRACTS

1 PREHISTORIC COLOMBIA. A CONTRIBUTION TO THE STUDY OF MATERIAL CULTURE IN THE OLDEST ARCHAEOLOGICAL SITES

Muttillio, Brunella (Università di Siena) - Lembo, Giuseppe (Ministry of Education, Italy)

Colombia, with its strategic location, represents the gateway to South America, the last continent to be colonized by our species at the end of the Pleistocene.

Despite its crucial role in the international debate on the first peopling of South America, the prehistory of Colombia is an under-researched field, with early human evidence still subject to controversy.

In this context, we present the objectives and outcomes of an ongoing archaeological project in Colombia, supported by the University of Siena (Italy) and the Ministry of Foreign Affairs and International Cooperation of Italy, in synergy with several Colombian universities and institutions.

The aim of this archaeological project is to enrich our understanding of the prehistoric evidence in the Colombian territory, contributing to the broader debate on the earliest human settlement of the Americas.

Specifically, the project aims to analyse and review the material culture of the oldest and most important Colombian sites, dating back to the transition Pleistocene/Holocene (approximately 12,500 to 10,000 years ago).

Since its starting in 2013, the project has provided an innovative contribution to the analysis of the archaeological collections. The results achieved so far, presented in national and international journals and conferences, are of interest for the advancement of research throughout South America. Additionally, the establishment of stable collaborations with institutions in the host country that work on research, conservation, and enhancement of archaeological heritage is relevant.

Moreover, the establishment of enduring partnerships with local institutions devoted to research, conservation, and the promotion of archaeological heritage highlights the project's extensive impact and significance.

2 ARCHAEOLOGY OF SOCIAL REPRODUCTION ON THE COAST OF TARAPACÁ: UNVEILING THE SECRETS OF PUNTA LOBOS

González-Ramírez, Andrea (Universidad Austral de Chile) - Carracedo Recasens, Robert (Universitat Autònoma de Barcelona) - Flores Fernandez, Carola (Universidad Adolfo Ibáñez) - Saez, Aruro (Universidad Austral de Chile)

The Punta Lobos district, located on the coast of the Atacama Desert in Chile, was excavated in 2023 by the Archaeology of Social Reproduction group (ARRESO). New findings reveal occupational diversity reflecting different production and social reproduction strategies among the coastal hunter-gatherer societies of the Tarapacá region. These discoveries enhance our understanding of the social and economic dynamics in the hyper-arid Atacama Desert.

The main objective of the project is to archaeologically document and correlate the proliferation and concentration of settlements with the emergence of new social and political ties between inland and coastal groups. Diversity in the production and use of social space serves as an indicator of these social reproduction strategies, which tend to diminish during the Late Archaic and Early Formative periods, coinciding with a more pronounced architectural standardization in Loa River mouth, known as the "Caleta Huelén 42 pattern."

The documentation of repeated but ephemeral occupations in rock shelters or lens-shaped shell middens in the site suggests seasonal or logistical movements of groups organized by aggregation or kinship. However, we propose that occupations documented in mound-shaped shell middens, some of which exhibited robust habitation floors characteristic of tent-ring architecture, may indicate forms of semi-permanent or permanent habitation.

Punta Lobos stands out for its unique preservation and the abundance of artifacts made from perishable materials, providing a detailed insight into the life and activities of these coastal societies. Moreover, materiality shows that mobility was not limited to the coast but also included movements towards fog oases, water sources, and the Cordillera to obtain vegetal, mineral, lithic, and ceramic resources, revealing a complex network of interactions and economic complementarity strategies with inland territories.

3 ARCHAEOLOGY IN THE INLAND SEA OF ÚLTIMA ESPERANZA (MAGALLANES, CHILE)

Carracedo Recasens, Robert (Universitat Autònoma de Barcelona) - García Piquer, Albert (Universitat Autònoma de Barcelona) - Navarrete, Vanessa (Institución Milá y Fontanals de Investigación en Humanidades. Consejo Superior de Investigaciones Científicas) - Prieto, Alfredo (Fundación Prisma Austral) - García, Christian (Independent archaeologist) - Franch Bach, Anna (Centro Austral de Investigaciones Científicas. Consejo Nacional de Investigaciones Científicas y Técnicas) - Aguilera, Nelson (Corporación Nacional de Desarrollo Indígena (Chile)) - Palomo Pérez, Antoni (Universitat Autònoma de Barcelona) - Piqué Huerta, Raquel (Universitat Autònoma de Barcelona)

Since 2018 archeological research has been conducted in the inland sea of Última Esperanza, near Puerto Natales and the Gulf of Almirante Montt (Chile), led through collaboration between researchers from Catalonia and Chile. The focus of the current investigation spans occupations from the Middle Holocene to the mid-20th century in an area that has received limited investigation and remains largely untouched by recent human activity. The landscape is characterized by channels and mountain mazes where the canoe people inhabited until recent times.

The main objective of the research is to characterize and understand the adaptability and resilience of hunter-gatherer strategies in temperate-cold coastal environments. Our aim is to unravel and characterize their social organization, socio-economic system rooted in the utilization and exchange of marine and terrestrial resources, as well as their relationship with space and mobility in the Patagonian archipelago.

The results are promising due to the quantity and variety of occupations in the form of shell middens of different shapes and new chronologies across all surveyed areas. Additionally, the research has unearthed lesser-known phenomena such as the utilization of portage routes by indigenous communities, cultural marks of bark peeling in native forests, fishing corrals, and new settlement routes have been observed and are under current discussion. This entire archaeological landscape forms an incredible context that goes beyond geographical and cultural boundaries, holding significant theoretical and methodological relevance for the study of coastal hunter-gatherer societies, both in Europe and in other parts of the world.

4 TOWARDS AN IMPROVED UNDERSTANDING OF HUMAN-ENVIRONMENT INTERACTIONS DURING THE LATE HOLOCENE AND ANTHROPOCENE IN THE SOUTH-CENTRAL PERUVIAN ANDES

Branch, Nicholas (University of Reading) - Handley, Josephine (University of Exeter) - Meddens, Frank (University of Reading) - Silva, Barbara (Natural England) - Aramburu, Danna (National University of San Cristóbal de Huamanga) - Mitchell, Joe (University of Reading) - Vivanco, Cirilo (National University of San Cristóbal de Huamanga) - Woodcock, Katie (University of Reading)

We present radiocarbon dated palaeoecological data from two wetlands situated in the Chicha-Soras Valley, south-central Peruvian Andes. Tocotocosa is a geogenous mire with a sedimentary sequence spanning the last ~4000 years, whilst Laguna Tocsacocha is a partially infilled lake basin with a ~1700 year sediment record. Based upon analysis of their sub-fossil pollen, microscopic charcoal and sedimentology, supplemented by preliminary testate amoebae data from Tocotocosa, they collectively provide an important insight into the pre-Hispanic and later land use practices, including the utilisation and management of the wetlands for pastoralism. These data are integrated with archaeological records, and pedosedimentary and phytolith data from nearby agricultural terraces of Middle Horizon and Late Intermediate Period age, and palaeoclimatic data from Peru. This has enabled a comprehensive reconstruction of the relationships between the settlement history of the Valley, agro-pastoral farming and climate variability. Finally, we consider the implications of the findings for future water security and agricultural sustainability in the Peruvian Andes.

5 ANDEAN LANDSCAPE LEGACIES: COMPREHENSIVE DIGITAL MAPPING OF ANCIENT SETTLEMENT AND CONNECTIVITY AND ITS POTENTIAL FOR SUSTAINABLE HERITAGE FEATURES (NW ARGENTINA)

Lazzari, Marisa (University of Exeter) - Oltean, Ioana (University of Exeter) - Oyaneder, Adrian (University of Exeter) - Scattolin, Maria (Instituto de las Culturas (IDECU), UBA-CONICET) - Pereyra Domingorena, Lucas (Instituto de las Culturas (IDECU), UBA-CONICET)

The south-central Andes region provides an exceptional record of high-altitude settlement and circulation of humans, goods, animals, and plants at various spatial scales. These practices have long been the focus of researchers, often drawing on the region's rich historical and ethnographic record as inspiration for modelling the past. Such approaches have highlighted the uniqueness of the Andes region compared to other high-altitude mountainous environments of the world, yet the uncritical extension of some of these models to the distant past has unwittingly obscured the rich variety of indigenous ancient settlement and mobility strategies. As the region continues to be sought after for its mineral wealth, knowledge of its diverse range of human strategies of land use and mobility may not only help us to better understand the region's past and protect its heritage (understood broadly), but also help towards co-designing strategies for sustainable features with its inhabitants.

Building on earlier aerial and field-based mapping, our paper presents the results of the first comprehensive digital mapping of archaeological features visible on the western slopes of the Aconquija Sierra (NW Argentina, South-Central Andes, 66° 15' Long W; 27° 15' Lat S). We applied a multi-scalar methodology using interpreter-led assessment of freely accessible and commercial multispectral satellite imagery and DSM data, as well as of fieldwork including UAV photogrammetric surveys and excavations at key locations on key connecting routes. The potential of these activities to contribute to collaborative heritage protection will also be discussed in the presentation.

6 RECONSIDERING A PRE-INKA BORDER ZONE: NEW RESULTS FROM EXCAVATIONS IN THE FAR-NORTHERN REGION OF PIURA, PERU

Martini, Sarah (Anthropology Department, Yale University) - Nicolas Lorenzo, Dennis (Universidad Nacional Pedro Ruiz Gallo de Lambayeque, Peru)

Archaeologists have argued that the modern border zone between Peru and Ecuador formed a boundary between two cultural areas (the Central and Northern Andes) as early as the final millennium BCE. However, the regions of far northern Peru and far southern Ecuador are poorly understood and documented from an archaeological perspective, particularly in periods preceding the arrival of the Inka empire in the late 15th century CE. Furthermore, there is ample evidence of cross-"border" interactions expressed in the distribution of animals and their products outside of their natural geographic ranges, as well as similarities in styles and technologies of material culture. Against this backdrop and using a long-term historical perspective, we present the preliminary results of our excavations and material analyses of two pre-Inka sites from the far northern Peruvian region of Piura: the highland site of Cerro La Plaza (prov. Ayabaca) and the piedmont site of Las Pampas de Panecillo (prov. Morropón). Drawing on our reconstructed occupational sequence and record of various funerary contexts, we will locate the position and roles of both sites in the existing archaeological landscape. We will present evidence of interactions at various scales and evaluate the utility

of the borderland framework for conceptualizing the relationship between the Central and Northern Andean cultural areas and the lives of the "borderlanders" through time.

7 PRESENTATION OF THE PROJECT "SOUTHERN ECUADOR AND NORTHERN PERU AS AN ANDEAN INTERFACE (AD 500 - 1532)"

Lara, Catherine (UMR 8068 Technologie et Ethnologie des Mondes Préhistoriques, France; Institut Français d'Études Andines - IFEA) - Cardarelli, Lorenzo (Dipartimento di Scienze dell'Antichità, University of Rome La Sapienza; CNR - Istituto di Scienze del Patrimonio Culturale) - Lago, Giancarlo (University of Bologna, Department of Economics) - Montalvo, Carlos (Museo de Arte Precolombino Casa del Alabado, Ecuador) - Tacconi, Samuele (Sainsbury Research Unit, University of East Anglia) - Constantine, Ángelo (Facultad de Ciencias Sociales y Humanísticas, Centro de Estudios Arqueológicos y Antropológicos, Escuela Superior Politécnica del Litoral, Ecuador)

It is assumed that, at least from AD 500, the territory between what is now southwestern Ecuador and northwestern Peru would have become a key interface between the Central and Northern Andes, based essentially on an exchange circuit of *Spondylus* shell and metal artifacts.

However, questions remain about crucial elements related to the functioning of this circuit, such as the origin of these objects, the identity of those who worked them, the directionality of their movement in space and their production contexts.

On the other hand, it is not known who exactly inhabited the settlements in the study area: was it a homogeneous or heterogeneous cultural space, were these settlements independent occupations or a periphery subordinated to the surrounding socio-political formations?

The aim of this paper is to present our project that seeks to help clarify these questions, mainly from a technological study of metallurgical, ceramic and malacological artifacts from the study area.

8 THE FORGOTTEN COAST: RECONSTRUCTING THE SETTLEMENT HISTORY OF NORTHEAST HONDURAS

Reindel, Markus (German Archaeological Institute) - Lyons, Mike (University of Bonn, Department for the Anthropology of the Americas) - Martinet, Adrien (University of Bonn, Department for the Anthropology of the Americas)

In recent years, the Isthmo-Colombian Area has become a focal point of research in Central America. The transition zone to Mesoamerica and the Caribbean region is of particular interest. The Archaeological Project Guadalupe/Colón is reconstructing the pre-Hispanic settlement and cultural history of this long-neglected region in northeast Honduras. Through systematic surveys using modern methods of remote sensing (satellite imagery, SFM drone photogrammetry, LIDAR), traditional prospection and excavation methods, as well as typochronological and archaeometric analyses of artifacts, a growing corpus of foundational archaeological data is being compiled. In this overview, we present the results of surveys and excavations of three settlement phases: Cocal (1000–1525 AD), Selin (300–1000 AD), and Betulia (250 BC–300 AD). The survey area comprises the Atlantic coast, the Nombre de Dios coastal cordillera, and the Aguán Valley to the south, as well as the Islas de la Bahía off the northern coast. So far, 66 settlements have been documented, among which a lively economic and cultural exchange took place during the different settlement phases. The work is being carried out in close cooperation with the Pech and Garifuna communities in Guadalupe, where the results of the archaeological investigations have been exhibited in a local museum since 2023.

9 THE LATE PRECLASSIC USULUTÁN CERAMICS OF HONDURAS. A TYPOLOGICAL STUDY AND NEW PERSPECTIVES FROM THE NORTHEASTERN COAST OF HONDURAS

Martinet, Adrien (University of Bonn; German Archaeological Institute)

"Usulután Wares" is a commonly used umbrella term for multiple diagnostic ceramic types with linear resist decorations prominently featured in Late Preclassic to Early Classic (500 BC to 400 AD) sites from eastern El Salvador and western Honduras, and to a lesser extent from the Gran Nicoya region as well as from the Guatemalan Lowlands. Their area of distribution is traditionally referred to as the "Uapala Ceramic Sphere", with a core spanning from the Gulf of Honduras to the Gulf of Fonseca.

Despite their omnipresence throughout Upper Central American ceramic assemblages, our understanding of these "Usulután Wares" remains superficial, particularly the relationships between the different regional varieties. Recent petrochemical investigations have identified locally manufactured compositional groups outside of the core area of the "Sphere" as well as new sites with access to Usulután-style wares beyond its borders, highlighting the need for a reexamination of the "Sphere" itself.

One of those sites is Bétulia, on the northeastern coast of Honduras. This settlement is currently the only known Terminal Preclassic site (250 BC to 300 AD) in this region, bridging the gap in this area between the so-called Cuyamel

phase (ca. 1200 BC to 250 BC) and the Selin phase (300 AD to 1000 AD). Its material assemblage is distinctively Late Preclassic and indicates its integration into larger interaction networks of this period in the western part of Central America and in southern Mesoamerica.

This study presents a morphotypological classification of Late Preclassic Usulután-style wares in Honduras, allowing for a clearer picture of their spread, influence, and evolution across Upper Central America as well as situating Bétulia's assemblage in those interaction networks. Furthermore, it proposes a new "Uapala Ceramic Sphere", more in line with the latest research results.

10 ECONOMIC EXCHANGE NETWORKS IN NORTHEAST HONDURAS: AN ARCHAEOMETRIC APPROACH

Lyons, Mike (University of Bonn, Department for the Anthropology of the Americas)

Northeast Honduras represents a burgeoning center of archaeological research as appreciation grows for its position as a transitional zone between three major regions in pre-Hispanic Central America: Mesoamerica, Southern Central America, and the Caribbean. In my doctoral research as part of the Archaeological Project Guadalupe/Colón, an archaeometric approach is applied to better understand how the Cocal-period (AD 1000–1525) inhabitants organized their economic system in terms of production, distribution, and exchange. Over the last several years, our project has conducted extensive surveys throughout the area, documenting known settlement sites and registering new ones when possible. Ceramic samples were collected from each surveyed site, while clay samples were collected from nearby natural sources. Each sample has been analyzed with geochemical techniques, such as XRF and XRD, as well as via thin-section petrography. The preliminary results indicate a wide variety of petrofabrics, with some clearly local and others likely imported. Based on this data, regional groups of production can be identified in which clusters of nearby settlements likely produced pottery together, acquired material from the same sources, or depended on a single or few local producers. In turn, interaction between the settlements of regional groups can be detected via non-local ceramics. The result is a complex network of interaction spheres between the various pre-Hispanic inhabitants of the northeast Honduras region, with an emphasis on the island, coastal, and near-coast hinterland valley regions.

11 INTOXICANT CONSUMPTION IN THE PRECOLONIAL CARIBBEAN - HOW TO IDENTIFY PLANTS AND MODES OF CONSUMPTION THROUGH AN INTERDISCIPLINARY METHODOLOGY

López Aceves, Judith Margarita (University of Leicester)

My research is concerned with the study of drug culture and its representation in the precolonial Caribbean (ca. 1500 BC – 1492 AD). Specifically, my work aims to examine and identify the intoxicants consumed by the indigenous communities along the Caribbean Islands, their contexts of use, methods of consumption, and how these were part or creators of their cosmovision and identity.

This project works across anthropology, ethnohistory, archaeometry and archaeology. Through ethnohistory and anthropology, it is possible to recover the wide array of plants that were (and still are) integral to the daily lives of the peoples who inhabited the Caribbean. While incorporating analytical chemistry, metabolomics, and lipid analysis to identify the compounds from the residues obtained from drug paraphernalia, by comparing the obtained compounds to reference material from botanical collections.

A dialogue between these disciplines and the artefacts is necessary to reach the following objectives:

- To identify the different range of intoxicants consumed in the precolonial Caribbean
- To examine original contexts of use, including the materiality of practices associated with the consumption of intoxicants.
- To understand how Indigenous populations prepared, consumed, and valued these substances before the conquest.
- To recognize what drugs meant for the Indigenous populations (cosmovision).
- To compare between the data obtained by analytical chemistry to the information obtained through ethnohistorical sources.
- To contribute to the history of drug cultures in the Americas.

12 NEW INSIGHTS ON ANCIENT MAYA CUISINE THROUGH MICROBOTANICAL REMAINS AND IMAGING TECHNIQUES

Cagnato, Clarissa (Ca' Foscari University of Venice) - Ponce, Jocelyne (Tulane University) - Longo, Laura (Ca' Foscari University of Venice) - Prasek, Marko (Elettra-Sincrotrone SCpA) - Longo, Elena (Elettra-Sincrotrone SCpA) - Tromba, Giuliana (Elettra-Sincrotrone SCpA) - Parisatto, Matteo (Ca' Foscari University of Venice) - Bonetto, Alessandro (Ca' Foscari University of Venice) - Badetti, Elena (Ca' Foscari University of Venice) - Marcomini, Antonio (Ca' Foscari University of Venice)

The study of ancient cuisines, from the specific ingredients used to the manner in which these were prepared, are invaluable if we are to fully understand past societies. Although our comprehension regarding ancient Maya diets has greatly advanced in the last decade, many questions remain, especially with regards to the nuances of the plant-based part of the diet. In this paper, we present some of the advances that are currently being made thanks to the application of multidisciplinary techniques such as chemoprofiling, and imaging through synchrotron radiation micro-computed tomography (SR- μ CT) and Scanning Electron Microscope (SEM). We focus on two main datasets: 1) amorphous carbonized objects (ACOs) that typically lack identifiable components and thus end up classified as "unidentified" or "unknowns", and 2) microbotanical samples taken from the interior of ceramic vessels and from the active surfaces of grinding stones. In this work we present evidence for different processing techniques of maize –a staple crop that has been of nutritional, ideological, and economic importance in the region for centuries– and also discuss the potential of ACOs for a more encompassing understanding of diet and other plant uses by the Classic Maya (AD 250–900). We argue that these datasets should not be set aside: in fact, when they are analyzed using appropriate techniques these can provide novel information on the ingredients used and the ways in which foods were prepared by the ancient Maya.

13 ARCHAEOLOGICAL PROSPECTION IN A NEIGHBORHOOD IN THE CENTER OF TEOTIHUACAN (MEXICO). SEASON 2023-24

Pecci, Alessandra (ERAAUB; IAUB; INSAUB, Universitat de Barcelona) - Moragas, Natalia (ERAAUB, IAUB, Universitat de Barcelona) - Barba, Luis Alberto (LPA, IIA, UNAM) - Ortiz Butron, Agustin (LPA, IIA, UNAM) - Blancas, Jorge (LPA, IIA, UNAM) - Bernal, Itzayana (LPA, IIA, UNAM)

We present an update of an interdisciplinary project to study a neighborhood in the center of Teotihuacan (Mexico), started in 2017 in co direction between the UNAM (A. Ortiz, L. Barba) and the Universitat de Barcelona (A. Pecci, N. Moragas), focusing on the results obtained during the last seasons.

The project is aimed at investigating an area located in the center of Teotihuacan, Mexico, between the river San Juan, the Sun Pyramid and the Street of the Dead, named by Millon "sectors N2E1 and N2E2", through the application of geophysical prospection techniques (georadar, electrical and magnetic studies), topography, aerial photography with drone, the study of chemical residues on the surface and the registration of archaeological materials to locate structures and indicators of human activities. The data obtained until now in selected portions of the two sectors, are compared to the map proposed by Millon in 1973 and allow to suggest preliminary hypotheses about the presence of buildings, their distribution and depth and the relationship of this area with the San Juan River.

The project is financed by the Spanish Ministerio de Cultura y Deporte (Ayudas a proyectos arqueológicos en el exterior) and the Fundación Palarq, and it is part of the activities of the Laboratorio de Prospección Arqueológica of the UNAM, the Institut d'Arqueologia of the University of Barcelona and the ERAAUB research group (2021 SGR 00696) of the University of Barcelona.

14 AFTER CLASSIC TEOTIHUACAN: LIVING AMONG THE RUINS

Torras Freixa, Maria (Gerda Henkel Foundation; ERAAUB, IAUB, Universitat de Barcelona) - Moragas, Natalia (ERAAUB, IAUB, Universitat de Barcelona) - Pecci, Alessandra (ERAAUB, IAUB, INSAUB, Universitat de Barcelona)

In 2021, granted by Gerda Henkel Foundation, we started a research project oriented towards the study of Teotihuacan after its decline ("Living in the ruins of Teotihuacan"). The main goal is to understand and offer insights into how people lived in abandoned urban areas also called lost cities. Rather than looking for the reasons behind the collapse of the Classic period city, we have focused on re-settlement evidence, transformation of the urban built environment and creation of new interactions with its ruins.

The primary aim of this contribution is to describe and discuss some of the results of the project. Mainly through the analysis of archaeological evidence recorded in dispersed literature and salvage excavation reports, and Early Colonial documents, we have been exploring the city's decomposition after 550 CE. This approach gives us hints into how people lived among the ruins of Teotihuacan when its regional leadership seemed to have disappeared. In fact, after its decline, the urban landscape was re-used and re-designed by different settlers and time periods to the present day.

15 'MEGALITHIC' ARCHITECTURE AND THE EARLY CLASSIC PERIOD AT SANTA ROSA XTAMPAK, CAMPECHE: STATE OF THE ART

Paap, Iken (Ibero-Amerikanisches Institut, Berlin)

During the surveys to verify the LiDAR images of Santa Rosa Xtampak in 2022, we documented a pyramidal basement (Building No. 168) connected to the monumental centre of the site by a wide elevated causeway. Its structural characteristics are similar to what is commonly referred to as 'megalithic' or 'petenera' architecture in the Yucatan Peninsula, suggesting a Late Preclassic (300 BC-250 AD) or Early Classic (250-600 AD) date. Our excavations in 2023 showed that, in this particular case, it represents an architecture that seems to have been heavily modified in the Late Classic period, probably on the basis of an older structure. This specific result raises questions both about the definition and history of the so-called 'megalithic' architecture and about the evaluation of the Early Classic period, a period that at Santa Rosa Xtampak (as at other sites in the region) is still underrepresented in the corpus of archaeological evidence, especially with regard to the ceramic material.

16 THE PALACE OF THE SERPENT OR THE CHANGE OF THE GAZE

Munoz Cosme, Gaspar (Universitat Politècnica de València; Universitat de València) - Vidal Lorenzo, Cristina (Universitat de València) - Huchim Herrera, José (Instituto de Antropología e Historia de México) - Horcajada Campos, Patricia (Universidad Complutense de Madrid)

The research that began in 2023 on the building known as the Palace or Temple of the Serpent in the Maya city of Uxmal has revealed the evolution of its construction and its change in orientation: that is, from its initial westward orientation to an eastward one. The study has sought to identify a relationship between the geometric and visual axes and the powerful structure of the Quadrangle of the Nuns.

The volumetric and architectural data obtained from the first surveys are making it possible to investigate the formal and stylistic characteristics of this primitive building, located in the centre of El Conjunto de las Columnas (the Group of Columns), so called because of the columns on its western façade, and thus to propose some initial hypotheses regarding its stylistic ascription and the possible evolution of its construction. In the beginning it may have been a small building comprising one or two vaulted galleries, to which was later added an upper floor accessed via a large staircase and the expansion of the north and south wings. This process was linked to the urban evolution of the environment in the heart of the city of Uxmal.

17 INFRASTRUCTURE, GROWTH AND NEGOTIATION AT PALENQUE, MEXICO: THE LATE CLASSIC BUILT ENVIRONMENT OF A MAYA CITY

Campiani, Arianna (Sapienza University of Rome)

During the Late Classic period of Mesoamerica (600-900 CE), Palenque was a busy Maya city able to concentrate events and peoples. In the VII-VIII centuries, more than eight thousand people were living and interacting within its limits. The daily interchange of persons and experiences was happening between city inhabitants, the people coming from its outskirts and beyond, but also at a more intimate level in the Palenque neighborhoods. For centuries, the Palenque environment was shaped by generations of inhabitants to sustain the actions and interactions of people and things, eventually leading, in the VIII century, to the city form we still appreciate today. In this paper, I will focus on three characteristics of Palenque urban form, its infrastructure, circulation, and neighborhoods. I consider that these interconnected features are able to highlight how city spaces were conceived, modified or used to promote or prevent movement, actions and interactions. Thus, their study bespeaks of city planning, and of the way spaces were designed to reinforce inclusion and seclusion, mainly in response to political and social agenda.

18 CHICHEN ITZA 3D ATLAS - CHANGE DETECTION, VISUALIZATION, AND ARCHIVAL SYSTEMS ENABLING MULTI-SCALAR AND MULTIDISCIPLINARY ANALYSIS AND COLLABORATION

mcavoy, scott (Cultural Heritage Engineering Initiative - University of California San Diego; OpenHeritage3D.org) - Rissolo, Dominique (Cultural Heritage Engineering Initiative - University of California San Diego; Scripps Center for Marine Archaeology) - Stanton, Travis (University of California Riverside) - Osorio León, José (Instituto Nacional de Antropología e Historia (INAH)) - Pérez Ruiz, Francisco (Instituto Nacional de Antropología e Historia (INAH)) - Kuester, Falko (Cultural Heritage Engineering Initiative - University of California San Diego)

Advances in 3D digitization and visualization technologies allow us to capture, contextualize, and analyze artifacts within site-wide LiDAR and aerial photogrammetry, and feature specific terrestrial/mobile LiDAR. In this project the authors extend a large scale interactive digital archive and web visualization framework enabling a fusion and contextualization of site, feature, and artifact data. This framework has been employed to enable collaboration between archaeologists, scientists, engineers, historians, and other specialists.

Chichen Itza is an extensive site containing a vast and distinctive corpus of monumental architecture, stone iconography, and painted murals. Since its initial excavation in 1913, artifacts have distributed widely between museum collections. Many are housed within the former Chichen Itza Museum, the Palacio Cantón Museum in Mérida, the Gran Museo del Mundo Maya in Mérida, and the Chichen Itza INAH archaeological camp. In 2005, CyArk undertook a comprehensive terrestrial LiDAR scan of 6 key structures. In 2014, 2017, and 2022 the National Center for Airborne Laser Mapping (NCALM) at University of Houston conducted aerial LiDAR surveys of the site and surrounding area. These LiDAR surveys provide a geo-reference to align all datasets. In 2018 and the Cultural Heritage Engineering Institute (CHEI) at UC San Diego, partnering with the Instituto Nacional de Antropología e Historia (INAH) Yucatan, performed 60 complementary large site and feature scale photogrammetric surveys contributing to the analysis of architecture and iconography within the Initial Series Group. In 2023, CHEI and INAH undertook three more field seasons, capturing 17 more structures via photogrammetry, 21 structures, substructures, and caves with mobile LiDAR, and over 200 artifacts, sculptures, inscriptions, murals, and rooms, using a sub-millimeter resolution structured light scanner. These datasets are joined together within a single collection, and made accessible online. We present this framework, along with several high-impact case studies for the use-and re-use of these data.

19 INITIAL INVESTIGATIONS INTO ANTHROPOGENIC LANDSCAPE MODIFICATIONS ON OSSABAW ISLAND, GEORGIA, UNITED STATES

Thompson, Amanda D. (University of Georgia) - Holland-Lulewicz, Isabelle (The Pennsylvania State University) - Holland-Lulewicz, Jacob (The Pennsylvania State University) - May, Kenzie (The Pennsylvania State University) - Keenan, Matthew (The Pennsylvania State University)

Ossabaw Island, Georgia in the southeastern United States contains an approximately 4 millennia long history of complex socio-ecological legacies during which Indigenous peoples sustainably managed and exploited Ossabaw's estuarine landscapes. Recent work demonstrates the presence of a canal system used during the island's Euro-American plantation-era economy, primarily for field irrigation but the timing of the initial construction of these features is largely unknown. Because Indigenous canal construction and anthropogenic landscape modification is present elsewhere across the Southeast, this paper offers preliminary investigations into newly identified anthropogenic landscape modifications identified and investigated through the use of historic maps, LiDAR, sediment coring, loss-on-ignition analyses, and AMS radiocarbon dating. These histories provide an excellent locale for the examination of how Plantation era occupations made decisions about landscape use. Indigenous management of the landscape likely heavily influenced and structured Euro-American settlement decisions, consciously or subconsciously. This work presents an overview of our recent work into these anthropogenic landscape modifications.

20 THEIR „TRADITIONAL ENEMIES“ - HOW THE SPANISH INTRUSION CHANGED THE RELATIONSHIP BETWEEN THE PUEBLO AND THEIR NEIGHBORS

Lewandowska, Magdalena (Jagiellonian University, Institute of Archaeology)

19th and 20th century ethnographical sources about the Pueblo people of the North American Southwest leave no doubt who their "traditional enemies" were: the Navajo, the Apache and other nomadic groups from the Great Plains. Specialized hunters who constantly tormented the Pueblo with raids, not giving them even a moment of respite. To quote one Taos Pueblo informant, questioned by Elsie Clews Parson: "They [the Navajo] were the worst.

Yet Spanish historical sources paint a completely different picture. While some raids did take place during early colonial times, the relationship between Pueblo and hunters from the Great Plains was often described as amicable. They've traded regularly to the point of creating a mutualistic exchange system and some Pueblo sought refuge with neighboring nomads – a good example of which is the El Cuartelejo site in central Kansas where the Apache and the Pueblo co-existed in one community in the second half of the 17th century.

So why has this relationship changed so dramatically in just two centuries? How did the Spaniards' intrusion into the Southwest disrupt a new macro-regional system that emerged after the 15th century? What role did the slave trade they introduced played in these changes? And what was the truth behind the relationship between the Pueblo and their "traditional enemies"?

The aim of this paper is to present the Pueblo and their neighbors' relationship in light of both archaeological and historical sources, as well as to demonstrate how Spanish arrival changed the whole dynamic in the North American Southwest.

21 MAPPING THE RELATIONSHIP OF THE SPANISH EMPIRE AND THE CARIBBEAN IN THE 16TH-18TH CENTURIES: CERAMIC ANALYSIS FROM CARTAGENA DE INDIAS

Pujals Blanch, Sonia (University of Barcelona) - Buxeda i Garrigós, Jaume (University of Barcelona) - Mentésana, Roberta (University of Barcelona)

Cartagena de Indias, in modern-day Colombia, was strategically located within the network of routes connecting the American continent to the Spanish metropolis. Originally a hub for looted resources from indigenous groups along the Caribbean, it later transformed into a colonial trade port connecting Europe and the Americas. Shaped by indigenous, creole, and colonial influences, the study of ceramics from Cartagena offers a unique view into the everyday life and practices, beliefs, and needs of the communities involved in their production, trade and use. This paper explores the impact of European colonialism in the Colombian Caribbean region through a study of post-contact ceramics from Cartagena de Indias. The research involves the analysis of ceramics from indigenous, European, and Creole traditions. Materials were sampled from a conventual (Convento de San Francisco), a military (Batería de San Ignacio), and a domestic (Museo del Oro Zenú) archaeological contexts. The techniques employed include X-ray fluorescence (XRF), X-ray diffraction (DRX), optical microscopy (OM), scanning electron microscopy (SEM), and energy-dispersive X-rays (EDX). Archaeometric characterization of these ceramics, primarily serving as transport ware, tableware, and domestic ware, such as bacines, lebrillos and candle holders, would allow us to reconstruct their manufacturing technology and provenance. The TecnoColonial project, of which this research is part of, incorporates a vast amount of archaeometric data from this context. Subsequent comparative analysis with its database would facilitate contextualizing these artefacts within the broader framework of the Spanish Atlantic trade with the Americas. This research is expected to help us in mapping the socioeconomic relations in the Caribbean and giving insights on the technological interinfluence between the Spanish and indigenous groups. Moreover, recognising pottery as a repository of traditions and cultural identities, the examination of these materials would enhance our understanding of the cultural dynamics and societal changes driven by Spanish colonialism in this region.

22 TRACKING THE EXPLOITATION OF MARINE RESOURCES IN POST-COLONIAL BRAZIL THROUGH CHEMICAL ANALYSIS OF POTTERY

Di Muro, Alice (Institute of Environmental Science and Technology (ICTA) and Department of Prehistory, Universitat Autònoma de Barcelona, Bellaterra, Spain; BioArCh, Department of Archaeology, University of York, UK) - Admiraal, Marjolein (BioArCh, Department of Archaeology, University of York, UK) - Fossile, Thiago (Institute of Environmental Science and Technology (ICTA) and Department of Prehistory, Universitat Autònoma de Barcelona, Bellaterra, Spain) - Borba, Fernanda Mara (Museu Arqueológico de Sambaqui de Joinville, Brazil) - Alves, Maria Cristina (Museu Arqueológico de Sambaqui de Joinville, Brazil) - da Rocha Bandeira, Dione (Museu Arqueológico de Sambaqui de Joinville, Brazil) - Craig, Oliver Edward (BioArCh, Department of Archaeology, University of York, UK) - Colonese, André Carlo (Institute of Environmental Science and Technology (ICTA) and Department of Prehistory, Universitat Autònoma de Barcelona, Bellaterra, Spain)

The Atlantic Forest coast of Brazil provided the arena for the first contact between Europeans, African slaves and native South Americans, together with the introduction of non-native crops and livestock and the establishment of one of the world's largest agricultural economies. In the post-colonial era (19th and early 20th centuries), new elites and economic forces emerged around coffee plantations, marking a pivotal moment in Brazilian history. Its coastline served as the country's primary gateway to globalisation, but little is still known about the coastal communities that contributed to the cultural diversity and economic resilience of early modern Brazil. These communities were primarily composed of small-scale fishers and farmers, who constitute some of the historically neglected population in the country. Ceramic artefacts are some of the most abundant remains in archaeological sites in coastal Brazil, and molecular studies have shown their potential for reconstructing past economies and ways of life in pre-colonial societies. Molecular studies, however, have never been performed on ceramic artefacts to enhance our understanding of post-colonial populations, their subsistence systems and livelihoods. In this study, we used organic residue analysis of household cooking pots from late 19th and early 20th century archaeological sites in Babitonga Bay (Santa Catarina), southern Brazil. Through the application of gas chromatography and stable isotope techniques on lipid residues extracted from dozens of ceramic artefacts, our results reveal a great diversity of foodstuff processed at these sites, from marine resources to agricultural and terrestrial mammal products. Furthermore, a comparative analysis of the lipid residue data from pre-colonial and post-colonial contexts shows a complete shift in the use of pottery and types of products processed. This is the first systematic study applying organic residue analysis in historical pottery in Brazil, and showcases the untapped potential of this source for historical information.

23 THE INVISIBILIZATION OF WOMEN IN THE ARCHAEOLOGICAL AND DOCUMENTARY RECORD OF CONTINENTAL PATAGONIA

Sacchi, Mariana (Universidad Católica de Temuco, Carrera de Arqueología, Chile; Universidad de Buenos Aires, Facultad de Filosofía y Letras, Argentina) - Saletta, María (Universidad Nacional de La Matanza)

In this paper, we propose to explore how Western systems of representation, both writing and archaeology, have subordinated the role of Tehuelche/Aonikenk women, through the invisibility of their work and the artifacts that they used. Systematic analysis of information provided by 46 authors that traveled across Southern Argentine and Chilean Patagonia from the 16th to the 20th century allows us to infer the differential patterns of representation among the tasks performed by indigenous men and women. The goal is to discuss this type of underrepresentation of work assigned to women in the written record in comparison with the overrepresentation of artifacts associated with some of those tasks in the archaeological record. We analyze the results obtained by analyzing ethnographic sources and different archaeological sites (published in journals, congresses and workshops) with chronologies from the post-contact period (16th to 20th centuries) in southern Continental Patagonia. For the written record, we will analyze quantitatively the mentions of the tasks performed by women in the manufacture and/or use of lithic and/or vitreous artifacts related to leatherwork. As for the archaeological record, we analyze the N and proportion of endscrapers and sidescrapers present in the sites. The focus is on certain industrial raw materials as indicators of mobility and the analysis of the formation processes in the written record using a gender perspective. Finally, it is considered that the underrepresentation of roles and tasks associated with women in the written record and its understanding through theoretical frameworks of structural archaeology can help us consider roles and tasks related to gender that can be considered beyond the ethnohistoric past and, consequently, can be used to analyze and interpret the pre-contact archaeological record.

24 EVERYDAY LIFE IN THE TROPICS CONTEMPORARY ARCHAEOLOGY AND THE SWEDISH IMMIGRANT COLONY IN BAYATE, CUBA (1905-1920)

Karlsson, Hakan (University of Gothenburg, Department of Historical Studies)

Swedish emigration to the US during the second half of the 19th century and the beginning of the 20th century is well documented by historians and statisticians, but this is not the case with Swedish emigration to Cuba, which is largely unknown. The paper introduces the contemporary archaeological project 'The Swedes in Bayate, Cuba. A forgotten emigration history', and the results of the fieldwork, carried out during 2022-2024, directed towards the material and immaterial remains of the former Swedish emigration colony of Bayate (existing between 1905-1920, in the province of Santiago de Cuba). The project uses a combination of historical, archaeological, anthropological, and botanical source materials, and the work carried out will be exemplified with building remains and artefacts from the colony, that gives us information about the social and material aspects of the everyday life of the Swedish colonists. This with a focus on their construction of identities owed to their cross-cultural interactions with the Cuban society, and how this interaction, in parallel, led to social and material continuity and change.

870 PRESTIGE AND LUXURY GOODS: A MATERIAL APPROACH TO GIFT GIVING AS A TOOL FOR DE-ESCALATION

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Andersen, Anna-Theres (ROOTS Cluster of Excellence, Kiel University; Leibniz Institute for the History and Culture of Eastern Europe (GWZO)) - Schneeweiß, Jens (ROOTS Cluster of Excellence, Kiel University; Centre for Baltic and Scandinavian Archaeology (ZBSA)) - Hardt, Matthias (Leibniz Institute for the History and Culture of Eastern Europe (GWZO)) - Zovko Sostaric, Valentina (Department of History, University of Zadar) - Lund, Julie (Department of Archaeology, Conservation and History, University of Oslo)

Session format: Regular session

In the field of conflict archaeology, research has mainly focused on material traces of violent encounters, leaving the quieter, but equally crucial, narratives of peaceful conflict resolutions on the sidelines. As mechanisms for alliance-building and peace negotiations, various de-escalation strategies have been used to stabilize relations by past societies. One of the strategic tools was the mutual exchange of valuable luxury goods, which has already been traceable in the early Middle Ages and is still observable today as the diplomatic gift exchange.

These gifts can be defined by certain characteristics, like uniquely styled artefacts, a high intrinsic value of materials, and high-quality craftsmanship. In this context, some groups of objects such as arm and neck rings, exotic animals, as well as precious textiles, among others, were particularly suitable as gifts. Gift-giving in intercultural contexts, often intertwined with the art of negotiation, holds the power to soothe tensions, foster goodwill, and engender peaceful coexistence between diverse entities, be they kingdoms, nations, or individuals.

This session explores the material perspective of social processes of negotiation, such as the practice of mutual gift exchange in past societies, by examining objects and/or places suitable for those collective actions of de-escalation.

As organisers, we warmly invite speakers with contributions from various epochs, backgrounds and geographical spaces, offering insights into peaceful conflict resolutions and their material traces.

ABSTRACTS

- 1 GIFT EXCHANGE - A KEY CONCEPT FOR EXPLAINING POLITICAL AND MILITARY RELATIONSHIPS IN PRE-MODERN TIMES?**
Hardt, Matthias (GWZO)
In the archaic world, the exchange of gifts was used both between the leaders of different communities and within individual groups to visually define rank as well as superiority and inferiority. The Roman and Byzantine emperors also used this system to organize their relationships with foreign groups outside and inside the borders of the empire. They used their immense reserves of precious metals from war, tax and fee revenues as well as the workshops of the Comes Sacrarum Largitionum and became role models for many barbarian kings and princes who also had access to such treasures. The lecture will use selected written records (Cassiodorus, Gregory of Tours, Liutprand of Cremona, Gallus anonymus) and archaeological finds (Childeric's grave at Tournai; Sutton Hoo) to illustrate the effectiveness of the exchange of gifts in structuring political relations in the first millennium AD and discuss it on the basis of its classification in ethnological theories (Marcel Mauss, Claude Levi-Strauss).
- 2 BRONZE AGE DIPLOMACY: GIFT-EXCHANGE AND RELATIONAL NARRATIVES**
Melheim, Lene (Museum of Cultural History University of Oslo) - Neumann, Iver (Museum of Cultural History University of Oslo; Fritjof Nansen Institute)
Bronze Age diplomacy is lively described in Mesopotamian, Hittite and Egyptian sources. From the vantage point of the Nordic Bronze Age, interaction between different polities has generally been referred to as political alliances, or, more specifically as guest-friendship (*xenia*). Diplomacy is, however, seldom discussed, and if at all, only in passing. Attempts at explaining how chiefly confederacies in northern Europe interacted with urban states in the Mediterranean region, have instead highlighted gift-giving and trade.
Our point of departure is that warfare and diplomacy are mutually constitutive. Diplomacy includes threats to go to war and takes some of its energy from perceived needs to avoid warfare. Warfare on the other hand, comes with expectations of how diplomacy will work when the war has ended. Bronze Age diplomacy must therefore be understood against the backdrop of martial innovations and increased militarization. But it was also a driver for exchange.
By combining archaeology with insights from the political sciences, this paper argues that diplomacy is an overlooked institution in prehistory, of major importance to understanding how Bronze Age communities forged and curated relations with other polities. Diplomatic systems rest on metaphors related to religion and kinship, the key underlying narrative being that sovereigns and eventually entire nations can be classified as kin. In order to better understand how outsiders can be conceptualized in the context of premodern diplomacy, we use Marshall Sahlins' concept of narrative sociability from "Historical Metaphors and Mythical Realities" (1981). We also argue that in the construction of such relational narratives, material culture and exotic gifts played a crucial role.
- 3 LASTING RELATIONS? SOCIAL VALUES AND TEMPORAL ASPECTS OF GIFT GIVING IN EARLY AND LATE IRON AGE SCANDINAVIA**
Lund, Julie (Department of Archaeology, Conservation and History, University of Oslo)
The paper explores two cases of gift giving and their social and material implications. Whereas analyses of social memory are often utilised to explore questions of social identities within a social group, the examination of gift giving may also throw light on the social relations between social groups. A group of Roman Period graves with Roman import points towards gift giving as a means of producing social bonds of alliances in line with previous analyses. The afterlife of this social relationship and of their affective dimensions have however not previously been examined. This case study provide insight into the length of such social obligations and their temporal and affective dimensions. The second case study examines a Viking Age hoard which contained objects presumably obtained through gift giving. The treatment of artefacts in this hoard points towards the changing social value of the objects, as they moved from one cultural context to another. The paper examines the social consequences that the alteration of value had for the social relations created by the gift giving. Further, it examines the temporal aspects of social relations created through gift giving and their potential to cause social effects.

- 4 BRONZE VESSELS FROM THE ROMAN PERIOD FROM THE SEAT OF THE ELITE IN ZOHORE AS AN INDICATOR OF ROMAN-BARBARIAN RELATIONS**
Elschek, Kristian (Archaeological Institute of the Slovak Academy of Sciences) - Jilek, Jan (Department of Archaeology und Museology, Masaryk university, Brno, CZ)
The Zohor site in SW Slovakia is located 14 km north of the Roman border at the Danube and about 25 km from the capital of the Roman province Pannonia - Carnuntum. The site represents the seat of the Marcomanni and Quadi elites of the Early Roman period from the 1st and 2nd centuries AD. To this central settlement and princely seat belonging rich elite graves, rich urn graves, many dwellings, pits, production objects of special function, ovens for ironworks, a deposit, a sepulchral object and especially a large number of Roman products. To this belonging bronze and luxury silver vessels, millefiori and terra sigillata vessels, gold and silver bracelets, gold and silver fingerings, fibulas, numerous silver and bronze coins, mirrors and Roman weapons. The aim of this paper is to show what role this site, which can be called a "port of trade", played in Roman-Barbarian relations. A suitable indicator are the bronze, silver and glass vessels which play a key role at this site on the Amber Road.
- 5 WARLORDS BENEATH THE SOIL: LEGACY OF PRESTIGE IN GRAVES WITH WEAPONRY ACROSS CENTRAL EUROPE DURING LATE ANTIQUITY**
Hrušovská, Barbora (Masaryk University)
Gift-giving as a tool of increasing prestige, rather than material gain, has been extensively studied in the contexts of Antiquity and the early Middle Ages. Grasping the intentions of donors and motivations of recipients remains archaeologically challenging, sparking inquiries into economic, and more precisely, political advantages, along with potential commitments by recipients. Based on the analysis of graves containing weapons from the 5th and 6th centuries in wider Central Europe, as part of a student's dissertation, this contribution aims to provide insight into the current interpretative possibilities and approaches to the question of luxury grave goods, particularly in connection with specific weaponry. For the purposes of a controlled comparative analysis, some burials without weapons will also be examined. Building on the aforementioned, luxury items will be considered as a possible ultimate reflection of known political gift-giving practices, while acknowledging the potential for alternative reasons for placing objects in graves. The primary goal of this contribution is to elucidate the social dimension of this activity, especially in graves often interpreted as 'warrior graves', however, current archaeology allows for a broader range of explanations and interpretations. Given that the presence of luxury goods in a grave indicates a presumed acceptance of a 'gift', it could be a certain expression of the will to build political relationships or structures as part of representing alliances. Moreover, since burials were usually public and somewhat ceremonial events, they provided donors with a suitable opportunity to demonstrate political commitments through gift-giving.
- 6 (EXOTIC) ANIMALS AS GIFTS IN DIPLOMATIC AFFAIRS?**
Schmölcke, Ulrich (Leibniz-Zentrum für Archäologie, Center for Baltic and Scandinavian Archaeology (LEIZA-ZB-SA), Schleswig, Germany) - Grimm, Oliver (Leibniz-Zentrum für Archäologie, Center for Baltic and Scandinavian Archaeology (LEIZA-ZBSA), Schleswig, Germany) - Yanish, Yevheniia (National Academy of Sciences of Ukraine, I. I. Schmalhausen Institute of Zoology)
Sometimes archaeological finds from prehistoric settlements contain the remains of animals that were not occurring in the region. The question arises as to what these "exotic" animals are all about. One option is that they were princely gifts brought by delegations from other parts of Europe. In the case of the aurochs, this is well documented during the early modern period - shortly before the species became extinct. We will explore this scenario in our paper with a particular focus on the Viking Age (800-1100 CE). In one case we will examine the discovery of a southern European species, the peacock, in Viking Age Norway, in a second case we will examine evidence of Scandinavian species in south-eastern Europe (falcons, walrus). We will also investigate the distribution of camels in early medieval centres of power. Our contribution will be rounded off by a look at historical sources. There, too, animals are sometimes mentioned as expensive and valuable diplomatic gifts.
- 7 UNRAVELING DIPLOMATIC STRATEGIES IN EARLY MEDIEVAL RUS': A CASE STUDY OF GIFT EXCHANGE AND DYNASTIC ALLIANCES**
Andersen, Anna-Theres (ROOTS Cluster of Excellence, Kiel University)
Diplomatic gift exchange and dynastic marriages have been recognised as crucial tools for forging alliances and stabilizing relations among political actors, shaping the socio-political landscape of early medieval societies. Despite their importance, limited archaeological studies have focused on these aspects.
This paper investigates the complex relationship between diplomatic negotiations, dynastic marriages, and gift exchange during the 9th and 10th centuries AD within the Rus'. This region served as a crucial transit zone for diverse

interconnected political entities spanning from the Baltic to the Black Sea. Although the Rus' had no written records of their own at this time, historical reports from their political partners provide insights into the highly ritualised court ceremonial, strategically planned marriages and diplomatic gift exchanges. Drawing upon both historical sources and archaeological evidence, this study illuminates the material manifestations of diplomatic interactions and dynastic marriages between the Rus' and their political partners.

Through a detailed examination of expected artefacts in diplomatic contexts, this case study sheds light on their significance and symbolic value. This research contributes to our understanding of diplomatic practices in early medieval societies, emphasizing the crucial roles played by diplomatic gifts and dynastic marriages in maintaining stable political alliances.

8 DIPLOMATIC GIFT EXCHANGE IN BYZANTIUM

Liveri, Angeliki (Independent Researcher)

This paper presents a selection of gifts exchanged between Byzantine and foreign dignitaries/officials in the West and East. We aim to demonstrate the offered gifts and their importance and significance for the contracting parties, focusing on silk textiles and clothes, jewellery (e.g. crowns) and other luxury objects. We will address the following topics: a) The leaders who had the initiative for these acts (emperors, kings, other officials or rulers), their envoys or ambassadors who undertook to carry out the mission. b) The places where took places the exchange. c) The goods/gifts and the aim of their offering. d) Where possible the contribution of these gifts to the relations between the countries. The gifts vary: from animals, luxury objects/goods (jewellery, silk textiles and clothes, relics and reliquaries etc.) to books and letters. The type of gift depended on the purpose and the person to whom it was offered. We will classify the gifts according the type and the date, the region (Europe-Asia or West-East) and the religion of the parties. We will combine literary sources and archaeological evidence.

9 LATE MEDIEVAL DUBROVNIK'S MATERIAL PERSPECTIVE ON DIPLOMATIC AMITY AND ANTAGONISM

Zovko Šoštarić, Valentina (University of Zadar)

The Republic of Dubrovnik in the Late Middle Ages did not possess significant military power; instead, its survival and further development were built upon a diplomatic network of alliances. However, in certain situations, tensions arose in relations with former diplomatic allies, sometimes leading to open warfare. In this regard, this presentation analyses the role of material artifacts in maintaining established connections and explores how diplomatic gifts were utilized when these relationships were strained or perhaps entirely severed, necessitating their re-establishment.

Special emphasis is placed on diplomatic gifts utilized for conflict resolution, encompassing their type, origin, production methods, as well as their artistic, economic, religious, and emotional value. This analytical framework is designed to provide a more profound understanding of the complex relationship between material reality and diplomatic friendships and conflicts. Through a nuanced interpretation of these factors, the study aims to gain deeper insights into the successfulness of Dubrovnik's authorities in navigating these complexities and discern whether they formulated specific strategies during this processes.

Interpretation will be based on several case studies reconstructed from archival series preserved in the State Archives in Dubrovnik. Specifically, these studies will primarily focus on administrative records and instructions sent by authorities to their ambassadors, who were authorized to represent them before influential political figures during the 14th and 15th centuries.

871 NOT JUST WEAR: THE SYNERGY OF TRACE ANALYSIS WITH OTHER DISCIPLINES AND NON-INVASIVE TECHNIQUES IN ARCHAEOLOGY

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Lemorini, Cristina (Sapienza University of Rome) - Venditti, Flavia (Tubinga University) - Caricola, Isabella (Haifa University)

Session format: Regular session

Trace analysis stands as a well-established methodology, contributing significantly to the interpretation of socio-cultural and economic aspects within ancient communities.

Understanding the importance of wear on the surfaces of archaeological remains —linked to technological and functional aspects— involves using shared protocols. These protocols include standardized procedures for both macroscopic and microscopic observation. Notably, over the last decade, there is been a growing emphasis on applying additional quantitative methods. These methods specifically investigate details of the microtopography related to wear.

While trace analysis can be individually applied to study archaeological remains, its value as an independent, non-invasive, and non-destructive analytical method is maximized when combined with other independent analyses (such as residue analysis, technological analysis and raw material studies) and/or related disciplines (including zooarchaeology, paleobotany, and anthropology). This holistic approach not only strengthens confidence in the interpretation of traceological results but also enhances the reliability of archaeological interpretations.

This session is aimed to involve the participants to discuss about:

1-the integration of traceological studies with other disciplines and/or techniques as an avenue for methodological improvements;

2-the benefits of using traceology integrated with other methodologies to identify and interpret the archeological evidence;

3-the limits and the critical aspects of combining different approaches and the suggestions for overcome these constraints.

We invite scholars to present cases studies from Paleolithic to Medieval Era dealing with multidisciplinary methodologies including macro and microscopic analysis of technological and/or functional aspects of material culture. We encourage contributions exploring materials beyond stone, such as ceramics, metal, hard animal materials, wood, and glass. Additionally, we invite submissions covering diverse surfaces, ranging from objects and artwork to architectural features.

ABSTRACTS

1 QUALITATIVE AND QUANTITATIVE NON-INVASIVE TECHNIQUES FOR THE STUDY OF USE-WEAR: APPLICATION TO LOWER PALEOLITHIC CHIPPED AND PERCUSSIVE STONE TOOLS

Lemorini, Cristina (Dep. Science of Antiquities, Sapienza University of Rome, Italy) - Germinaro, Luigi (Dep. of Geosciences, Padua University, Italy) - Ryder, Spencer (Dep. of Geosciences, Padua University, Italy) - Caricola, Isabella (Zinman Institute of Archaeology, University of Haifa, Israel) - Mazzoli, Claudio (Dep. of Geosciences, Padua University, Italy) - Finestone, Emma (Cleveland Museum of Natural History, Cleveland, USA) - Plummer, Tom (Department of Anthropology, Queens College, CUNY, NY USA) - Gopher, Avi (The Sonia & Marco Nadler Institute of Archaeology, Tel Aviv University, Israel) - Barkai, Ran (The Sonia & Marco Nadler Institute of Archaeology, Tel Aviv University, Israel)

Functional studies of archaeological artifacts benefit from the qualitative investigation of use-wear through the application of various non-invasive techniques based on optical (OM), digital (DM), SEM, and confocal microscopes, possibly coupled with micro-photogrammetry and 3D laser scanning. In the last decade, the increasingly frequent application of non-invasive quantitative techniques to the study of use-wear has been supporting the qualitative investigations for exploring past human behavior. Despite the technological progresses, the quantitative approach still faces several limits and has been applied mostly to experimental replicative materials so far. This contribution illustrates benefits and issues of the integration between the qualitative and quantitative approach, combining OM, DM, and SEM observations with 3D optical profilometry for the study of stone tools from the Late Lower Paleolithic and Early Stone Age. The selected archaeological materials include chipped flint blades from Qesem Cave in Israel (400-200 Ky) and percussive stone tools from Nyayanga in Kenya (3.032-2.581 Ma). Qualitative microscopic observations revealed on both assemblages use-wear patterns related to the processing of animal tissues and plants materials. The surface topography of the artifacts was investigated through the creation of 3D models and the quantification and statistical processing of their morphometric parameters, which were then matched with the qualitative results. The potentialities of profilometry for the textural quantification of different archaeological materials as integration to the qualitative approach are discussed, while highlighting the urge for standardization of analytical protocols and methods of data treatment.

2 COMBINING FUNCTIONAL AND TECHNOLOGICAL ANALYSIS TO INVESTIGATE THE ROLE OF CARINATED ARTIFACTS AND END-SCRAPERS IN THE AURIGNACIAN OF VOGELHERD CAVE

Schürch, Benjamin (University of Tuebingen) - Rots, Veerle (Université de Liège) - Conard, Nicholas (University of Tuebingen; Senckenberg Centre for Human Evolution and Palaeoenvironment)

The identification of cores and tools is essential for interpreting lithic assemblages. However, in the case of carinated pieces the identification as core or tool is not trivial. In the past, this was mostly done by typological or technological criteria. We aim to open a new perspective by combining functional analysis with technological analysis, statistical analysis of the dimensions and refits to discuss the role of carinated pieces and end-scrapers. We conducted functional analysis on over 100 artifacts from the Aurignacian of Vogelherd Cave. The site was excavated in 1931 and yielded deposits rich in finds. The Aurignacian layers IV and V date between 41,000 and 35,000 calBP and are

best known for its figurative art, personal ornaments, and music instruments. The re-excavation of the backdirt from Vogelherd Cave between 2005 and 2023 led to the recovery of additional Aurignacian artifacts that, while lacking optimal stratigraphic control, these artifacts greatly augmented the assemblages of the excavation in 1931 and further enabled refits.

Our results show that dimensions of the pieces used as cores and tools differ and, therefore, allow for a better identification of carinated pieces and end-scrapers as either tools or cores. We can also reconstruct the hafting arrangement of a sample of the end-scrapers. Both are backed up by refits that give more detailed insight into the chaîne opératoire of bladelet production and tool resharpening. With our analysis, we create a baseline to standardize the definition of this artifact group and to allow more pertinent comparisons of assemblages.

3 ON THE AUTHENTICITY OF TWO PRESUMED PALEOLITHIC FEMALE FIGURINES FROM THE ART MARKET: A SYNERGETIC APPROACH

Venditti, Flavia (Department of Early Prehistory and Quaternary Ecology, University of Tübingen) - Weiss, Rainier-Maria (Archäologisches Museum Hamburg und Stadtmuseum Harburg) - Schmidt, Patrick (Department of Early Prehistory and Quaternary Ecology, University of Tübingen) - Wolf, Sibylle (Department of Early Prehistory and Quaternary Ecology, University of Tübingen)

In March 2022 two female figurines made from mammoth ivory were sold by an auction house in Zurich, together with other prehistoric artefacts. This is a rare event because the scarcity and value of Paleolithic figurines have thus far limited their appearance in the international art market. To shed some light on the authenticity of the two figurines, we performed “in-situ” and non-destructive investigations. Through a combined analytical work including microscopic optical observations, spectroscopic investigations, and comparison with modern ivory figurine replicas we revealed the falsity of the specimens under study. These results stress the importance of carrying out preliminary scientific analyses before claiming the originality of any archaeological objects sold on the art market. Holistic studies such as the one presented here are extremely important because have the potential to stop the circulation of deliberate forgeries as originals on the art market, thus protecting and preserving the value of authentic archaeological and cultural heritage.

4 MULTIDISCIPLINARY APPROACH TO ANIMAL TRACES IN THE BELGIAN FINAL-PALAEOLITHIC AND MESOLITHIC – CASE STUDIES FROM THE MEUSE VALLEY

Halbrucker, Éva (Ghent University) - Pironneau, Camille (Ghent University) - Goffette, Quentin (Royal Belgian Institute of Natural Sciences) - Vandendriessche, Hans (Ghent University) - De Groote, Isabelle (Ghent University) - Abrams, Grégory (Ghent University; Scientific Department, Espace muséal d’Andenne) - Crombé, Philippe (Ghent University)

Archaeozoological analysis can provide a wide range of information not only on animal exploitation but also on activities carried out at archaeological sites and settlement organisation. Microwear analysis of lithic tools provides information on these aspects as well. However, the two methods are rarely linked. In our project, ROAM (Regional Outlook on Ancient Migration), we aim to understand the life (and death) of the Mesolithic population of the Meuse Valley in Belgium by combining the results of many disciplines, including archaeozoology and microwear analysis. In our presentation, we focus on the possibilities of the two latter complementing each other. We discuss the advantages and limitations of combining microwear results of (mainly) lithic implements with observations on faunal remains using a range of case studies. Technological and typological data of the lithics add a deeper understanding of subsistence strategies linked to animals and organisation of the archaeological sites. We explore, for example, the use of animal skins by interpreting the results of skinning seen on animal bones with hide-related traces on lithics, and examine what kind of tools were used to execute these activities. The outcome of residue analysis on the stone tools gives added value to our interpretations.

We also focus on the limitations of the interpretations of these combined methods and explore ways to overcome these.

5 QUALITATIVE AND QUANTITATIVE ANALYSIS OF NATUFIAN SICKLE BLADES: TRACKING SHIFTING CEREAL HARVESTING STRATEGIES AT EL-WAD TERRACE IN THE LEVANT

Cendrowska, Marzena (Wear Analysis Laboratory, Zinman Institute of Archaeology, School of Archaeology and Maritime Cultures, University of Haifa; SapienCE, University of Bergen) - Yeshurun, Reuven (Zinman Institute of Archaeology, School of Archaeology and Maritime Cultures, University of Haifa) - Caricola, Isabella (Wear Analysis Laboratory, Zinman Institute of Archaeology, School of Archaeology and Maritime Cultures, University of Haifa) - Weinstein-Evron, Mina (Zinman Institute of Archaeology, University of Haifa) - Groman-Yaroslavski, Iris (Wear Analysis Laboratory, Zinman Institute of Archaeology, School of Archaeology and Maritime Cultures, University of Haifa)

The el-Wad site in the Mount Carmel range, northern Israel, consists of a large cave and an adjacent terrace and is considered one of the key Natufian sites. Current excavations in the northeastern part of the terrace unveiled a ~3,000-year-long sequence (15–12 kya ago), representing the main four stages of occupation. It began with the earliest Natufian, followed by the massive building stage, through the Early Natufian post-architectural phase, and then the Late Natufian. The site provides an unprecedented record that enables conducting multi-focus, intra-site analyses of various aspects of change and development during the Natufian, showcasing the shifts in the sedentary life of these complex foragers

We present a use-wear analysis of 293 sickle blades sampled from the four chronologically ordered phases. Applying the qualitative approach of use-wear analysis, we described varying polish characteristics produced by cereal harvesting in each phase. Important differences between them were noted. Use-wear on sickle blades linked to the harvesting of mature cereals fluctuated (but exceeded 45% in all four periods), with peaks in the earliest Natufian phase and during the Late Natufian. Moreover, our analysis revealed that cereals were harvested frequently in mixed conditions ranging from semi-ripe to fully ripe. Observed traces were then linked to the results of experimental cereal harvesting in wild conditions at different ripening stages. Finally, the variation in cereal polish types was tested through a quantitative analysis of the sickle blades by the application of confocal microscopy.

Our large dataset on wear patterns has yielded novel insights into Natufian harvesting practices spanning both the Early and Late Natufian periods/phases. We interpreted identified shifts in cereal harvesting strategies in relation to changing site occupation intensity. These data open new scenarios and perspectives regarding cereal harvesting and dietary strategies adopted by Natufian hunter-gatherer communities in the Levant.

6 DRILLING DOWN – A TECHNO-FUNCTIONAL ANALYSIS OF NEOLITHIC DICKENBÄNNLI-DRILLS AT KOHLHAU ABRI, SOUTHWEST GERMANY

Huber, Hannah (Eberhard Karls Universität Tübingen) - Venditti, Flavia (Eberhard Karls Universität Tübingen) - Kind, Claus-Joachim (retired, previously State Office for Cultural Heritage Baden-Württemberg) - Tafelmaier, Yvonne (State Office for Cultural Heritage Baden-Württemberg)

The limestone beads found in Middle and Late Neolithic graves and settlements in Southern Germany and Northern Switzerland have been connected to key topics of Neolithic economy such as specialization of labor, surplus production, and supra-regional trade. So-called “Dickensbännli”-drills – small lithic drills with pronounced retouched shoulders – are frequently found in association with limestone beads. Yet, most drill and limestone bead assemblages are not investigated in detail and the drills’ use for beadmaking is often rather assumed than demonstrated. Additionally, all available detailed studies investigate materials stemming from settlement contexts, although multiple bead workshops at cave and rock shelter sites have been proposed.

Here we present the case study of Kohlhou-Abri, one such potential “workshop” site. It was excavated by the State Office for Cultural Heritage Baden-Württemberg between 2015 and 2018; seven find horizons were defined, spanning from the Late Glacial to modern times. In the Neolithic horizon 3, numerous Dickensbännli-drills were found, along with three limestone bead fragments. As part of the ongoing analysis of the site’s taphonomy and in-depth studies of various find categories, we conducted a detailed techno-functional analysis of the drills and the bead fragments to understand their production and use. A technological investigation of the drills was done to reconstruct the working steps undertaken in their manufacture. We then conducted a low- and high-power traceological analysis with an accompanying experimental series. In addition, Raman spectroscopy was applied to characterize residues on the drill tip. Our results provide use wear evidence for the working of limestone with the drills at the site, highlighting the investigative potential of detailed lithic analyses on this category of tools. Moreover, our holistic approach may serve as a reference point for the analysis of drill assemblages in other Holocene as well as Pleistocene sites.

7 FTIR- MICROSCOPY AS A TOOL FOR LITHIC RESIDUE ANALYSIS: AN INTEGRATED APPROACH

Thothiyil, Leanne (Sapienza University of Rome) - Lemorini, Cristina (Sapienza University of Rome) - Ciccola, Alessandro (Sapienza University of Rome)

Residue analysis plays an important role in determining the function of stone tools. Torre Della Chiesaccia is a Chalcolithic cemetery located in the south-eastern part of Rome, Italy and is dated to the second half of the 5th millennium BP. In the current study, foliate points from this site were analysed in-situ for use-residues with the help of non-destructive techniques and use-traces were examined to get a holistic perspective on the function of these points.

Digital Reflected Light Microscopy (RLM) was used as part of the preliminary assessment for the identification and mapping of the residues on the surface of the tools. Scanning Electron Microscopy (SEM), in environmental mode, was applied as a second step to further characterise the morphological features of the residues and obtain clearer images. For the chemical characterisation of the artefacts, SEM coupled with an X-Ray detector (EDX) and Fourier Transform Infrared Microscopy (FTIRM) were used.

The current study shows the potential of identifying use-residues with an integrated approach. It was possible to differentiate use-residues from modern contamination and residues originating due to taphonomic processes. The results of this study suggest that tools acquired from burial settings have lasting use-residues, and the combined use of instruments and use-wear analysis can be a feasible method for identification and in-situ analysis. The use of chemical analysis methods like FTIR-M shows that it is useful for identifying organic residues, even when some of the morphological properties of the residues aren't preserved very well.

8 CONVERGING NON-INVASIVE APPROACHES FOR IN-DEPTH MICRO-WEAR EXAMINATION ON BASALT

Asryan, Lena (TraceoLab, University of Liège, Place du 20-août 7, 4000 Liège, Belgium) - Rots, Veerle (TraceoLab, University of Liège, Place du 20-août 7, 4000 Liège, Belgium; F.R.S.-FNRS Research Director)

Micro-wear studies on basalt pose inherent challenges due to the diverse characteristics of raw materials in terms of mechanical and chemical properties, the resilient nature of basalt making trace formation patterns difficult to control, and the often-altered state of archaeological basalt assemblages. This research presents an innovative and non-invasive methodology for a meticulous examination of micro-wear on basalt tools.

Employing an integrated approach that leverages diverse analytical techniques, including optical, 3D digital, and scanning electron microscopy, our research aims to provide detailed insights into raw material characteristics, residue analysis, and the development of micro-wear on the edges of basalt tools. Additionally, this multi-technique approach addresses challenges posed by post-depositional alterations, enhancing the efficacy of use-wear analysis in archaeological basalt assemblages.

Our results offer valuable information on how variations in raw material impact the formation of use-wear on basalt tools. The combined utilisation of diverse microscopes enables a comprehensive examination of this complex raw material, allowing for a thorough characterisation of diagnostic micro-wear features such as edge damage, rounding, and polish.

The integration of these non-destructive and multi-technique approaches facilitates a multi-dimensional analysis, providing a deeper understanding of the processes influencing micro-wear formation on basalt. Beyond contributing to the field of traceology, our results hold significance for lithic technology and petrology, as they offer valuable insights that can inform advancements in the understanding of raw material utilisation, tool manufacturing techniques, and the broader characteristics and significance of basaltic rocks in the daily lives of early hominins.

9 A CLOSER LOOK AT THE SURFACE: A TAPHONOMIC STUDY OF PREHISTORIC LITHIC SCATTERS IN SOUTHWEST ASIA

Hilbert, Yamandú (Universität Tübingen Paläoanthropologie) - Geiling, Jeanne Marie (Grupo I+D+i EvoAdapta, Dpt. de Ciencias Históricas, Universidad de Cantabria, 39005 Santander, Spain) - Clemente-Conte, Ignacio (CSIC, Institución Milá y Fontanals de investigación en Humanidades, Archeology of Social Dynamics (ASD) Barcelona, Spain) - Uthmeier, Thorsten (Institut für Ur- und Frühgeschichte, Friedrich-Alexander-Universität Erlangen-Nürnberg, Kochstr 4/18, D-91054 Erlangen, Germany)

Stone tools (lithics) are the most durable of Hominin cultural expressions and are an abundant source of information on the productive activities undertaken by prehistoric populations. Due to their resilient nature lithics are sometimes incorporated into strata by processes such as erosion, deposit and redeposition and bear not only traces of their manufacture and use but also complex taphonomic alterations. By analysing traces on the edges of lithics we can gather data on a series of milestones in the development of different behavioural patterns thanks to the methodology instigated by Semenov and made proficient by many researchers over the years. As products of specific task-bound activities undertaken by anthropic agents, their interpretation can be a daunting endeavour due to their, at times,

chaotic nature. This is particularly true for artefacts exposed over prolonged periods to surface weathering processes, which are observed at most surface lithic scatters found across arid and semi-arid environments. The data that can be gleaned from such assemblages, however, is considerable and provides an additional layer of information on resource management, technical know-how, and, to some extent, landscape use. Given that geological processes throughout such environments have, in most cases, erased all sediment cover making an absolute chronological attribution of such surface finds impossible, alternatives for organizing surface lithic assemblages are needed. This presentation will show how recent advances in traceology, in particular confocal microscopy, may contribute to our understanding of prehistoric palimpsest sites. We make use of both qualitative and quantitative methods to classify and organize artefacts that share specific taphonomic features into meaningful samples that reflect relative chronological units, providing lithic technological analysis a new approach to sample organization.

10 A USE-WEAR ANALYSIS OF FIRED CLAY SICKLES FROM MESOPOTAMIA: AN "EXTRA" HAND OR AN ALTERNATIVE TO FLINT SICKLES?

Zagorodnia, Olga (British Museum)

Highly fired clay sickles belong to a well-known class of objects considered typical of the Ubaid period in southern Iraq, beginning with Ubaid 2 (c. 4800-4500 BC). There are 106 samples (complete tools, their fragments and wasters) in the British Museum. They come from the sites of Abu Shahrain, Ur, Tell Al-'Ubaid and Abu Salabikh. All of them have been examined by optical microscopy and scanning electron microscopy to determine their manufacturing and wear characteristics.

They are generally very uniform in shape and size. The length of the complete tools is about 15-20 cm. A technological study concluded that their colour range is typical of calcareous clays made by adding 25-33 vol% quartz sand and firing above 1120-1170°C. They were made in shallow open moulds. The working edge of the sickle was deliberately thinned before firing. The working edges of some sickles were twisted during firing. Some of them show traces of bitumen from hafting.

Use-wear has been recorded along the cutting edge. It consists of a smooth bright polish, flattening the surface, grain crushing and grain extraction. Tools with varying degrees of wear on the working edge have been recorded - from a sharp edge to severe damage from use.

Clay sickles are thought to have been used either to gather plants with an 'extra' hand, which were cut with a flint sickle held in the right hand, or as sickles in their own right (along with flint tools) to harvest plants. This use resulted in distinctive patterns of gloss on the working edges. However, there is no definitive conclusion as to their exact functional purpose. To answer this question we will carry out experiments using similar replicas for cutting grass, cereals, and aquatic plants and compare the resulting use-wear traces on experimental tools with archaeological ones.

11 FROM MACRO TO MICRO: MULTIDISCIPLINARY ANALYSIS OF SURFACE TREATMENT OF POTTERY VESSELS FROM EARLY COPPER AGE EASTERN HUNGARY

Solnay, Eszter (MTA-ELTE Lendület "Momentum" Innovation Research Group, Institute of Archaeological Sciences, ELTE Eötvös Loránd University; UMR 8215 Trajectoires; Paris 1 Panthéon-Sorbonne University, Doctoral School of Archaeology) - Borel, Antony (Histoire Naturelle de l'Homme Préhistorique, HNHP-UMR 7194 (MNHN, CNRS, UPVD), Alliance Sorbonne Université, Département Homme et Environnement, Muséum national d'histoire naturelle; Institute of Archaeological Sciences, ELTE Eötvös Loránd University) - Hrabák, Zita (Hungarian National Museum, National Institute of Archaeology; University of Szeged, Doctoral School of History) - Kreiter, Attila (Hungarian National Museum, National Institute of Archaeology, Archaeometry Laboratory) - Siklósi, Zsuzsanna (MTA-ELTE Lendület "Momentum" Innovation Research Group, Institute of Archaeological Sciences, ELTE Eötvös Loránd University)

Different surface treatments on pottery vessels result in highly variable surfaces. Traditionally, these surfaces are classified macroscopically into broad categories, such as smoothing, polishing, or burnishing. However, it is often difficult to clearly distinguish between these techniques and there is no universally accepted definition of them in pottery studies. Surface treatment can be carried out by various tools with numerous gestures on different levels of dried ceramic surfaces and on diverse ceramic pastes. Moreover, it can be applied before or after firing. Therefore, the final surface depends on numerous factors, where changing one parameter often results in a different outcome.

Thus, the multidisciplinary and multiscale analyses of pottery surfaces are essential to understand the underlying processes. In this contribution, we examined the various types of surface treatment in an Early Copper Age (4500-4000/3900 cal BC) pottery assemblage from Rákóczi-falva-Bivaly-tó Site 1/c (Eastern Hungary). This study is among the first few that attempt to combine macro- and microscopic studies on pottery vessels with thin-section analysis. Our aim is not only to outline different types of surface treatments but also to understand the fabrication procedures behind them (such as tools, levels of drying) and explore the effects of the various surface treatments on the external and internal structure of the vessels. Therefore, an experimental collection was created that provides an

indispensable reference for archaeological pottery surface analysis. The surface topography was studied on multiple scales; macroscopic examination and laser scanning confocal microscopy that allow both qualitative and quantitative analyses. These surface texture examinations are complemented with thin-section analysis of Copper Age vessels. Therefore, this multidisciplinary and multiscale approach strongly contributes to the comprehensive understanding of pottery surface treatments. Moreover, it helps to reveal the similarities and differences between macro- and microscopic, as well as qualitative and quantitative results.

12 POTTERY ANALYSIS: FROM MACRO- TO MICROSCOPIC AND PHYSICO-CHEMICAL INVESTIGATION. CASE STUDIES FROM THE MIDDLE BRONZE AGE IN EASTERN ROMANIA

Drob, Ana ("Alexandru Ioan Cuza" University of Iasi, Interdisciplinary Research Institute, Department of Exact Sciences and Natural Sciences, Arheoinvest Center, Iași) - **Bolohan, Neculai** ("Alexandru Ioan Cuza" University, Faculty of History, Iași) - **Vasilache, Viorica** ("Alexandru Ioan Cuza" University, Interdisciplinary Research Institute, Department of Exact Sciences and Natural Sciences, Arheoinvest Center, Iași)

The macroscopic analysis requires the application of standardised criteria that are known and accepted in the field of pottery investigation, allowing for objective and coherent observations. Establishing such a study model involves creating databases that enable comparative research and provide important data about various pottery assemblages. These can originate from the same or different sites, archaeometric analysis illustrating common or distinct features influenced by ceramic group interaction, technological skills, and the knowledge level of those conducting the analysis. This type of analysis yields valuable information about surface treatments, wear traces, colour, paste, decoration, inclusions, as well as processing and firing technology.

Microscopic investigations allow for detailing certain characteristics of the paste, establishing the microstructure, and mineralogical elements. Also, important information can also be obtained about surface treatments (ceramic slip, smoothing, polishing), porosity, paste homogeneity, and aspects related to the use of the vessel that can be observed on the surfaces of the ceramic fragment (cracks, residues, and traces).

Determining the chemical composition of ceramics is an important analytical objective that provides information about the raw materials, firing temperatures, and use-wear traces, with results often expressed in percentages. In this work, the interdisciplinary methods used in identifying the chemical composition are represented by SEM-EDX and FTIR.

The study of the ceramic surfaces can yield important results regarding the techniques involved in pottery manufacturing, the finishes and treatments applied, as well as data about use traces and residues. Illustrating these aspects will be done through case studies of the Costișa and Monteoru pottery from the Middle Bronze Age settlements in the Bistrița basin in the East-Carpathian region. Here, significant information has been obtained regarding various traces, such as pigments or organic substances, as well as data about the sources of clay used by these communities in pottery manufacturing.

13 RESIDUE ANALYSIS OF IRON AGE FUNERARY JUG FROM SAMREKLO, REP. OF GEORGIA

Gilb, Hannah (Freie Universität Berlin, Institut für Prähistorische Archäologie)

Pottery is one of the most prominent material grave goods found across all archaeological time periods. Despite its ubiquity, we still guess at the function performed by many of the catalogued types. Applications of analytical testing on archaeological artifacts – much like the analytical testing field itself – have developed exponentially over the past 20 years, providing essential supporting information on material culture that may be imperative to decoding its purpose. Residue analysis on pottery has traditionally been conducted on vessels from settlements to ascertain possible modes of subsistence, but conclusive results on residue analysis testing of pottery in grave goods, for example, may help to answer or eliminate interpretative possibilities within notable, unique, or otherwise unparalleled graves. At the very least, it can help inform funerary dynamics between anthropological, material, and structural configurations. I am undertaking analytical testing of residue analysis at the development laboratory at Pace Life Sciences in Woburn, MA, to help answer these questions. High-resolution LC-MS/MS, host-cell protein identification, and Total Lipid Extraction (TLE) analyses are being performed on a Late Iron Age jug found in a burial from Samreklo, Rep. of Georgia. By choosing analyses that address recovery of the likeliest analytes to be found in the type of jug and location/time period to which it belongs, results offer insight into the possible lifespan of the jug, what – if anything – it could have contained at the time of deposition, and whether these biomarkers could have any connection to the anthropological analyses of the interred child

14 A NEW HISTORY OF BRONZE: TOWARDS AN INTEGRATED APPROACH TO THE STUDY OF METALWORKING PROCESSES

Hitchcock, Matthew (University of Leicester) - **Sych, Dawid** (University of Leicester) - **Tsoraki, Christina** (University of Leicester) - **Crellin, Rachel** (University of Leicester) - **Harris, Oliver** (University of Leicester)

Our understanding of change in the deep past is fundamentally defined by metalworking. The British and Irish Bronze Age (c.2200-600 BC) was a time of technological and social transformation following the use of copper, bronze, and gold. These new materials changed lives, altered flows of knowledge and exchange, and restructured community and power relationships. Our Leverhulme-funded project, a New History of Bronze, at the University of Leicester, UK, takes an integrated approach to exploring and answering questions about who metal makers and users were, and how metals were exchanged, utilised, deposited and valued in the Bronze and Early Iron Ages.

In this paper we will set out our methods along with their technological and ontological limitations and showcase our interim results through a series of object case studies. Crucial to our approach is the integration of wear analysis with a range of other novel scientific techniques such as microXRF, residue analysis, SEM/EDS and experimental archaeology. The combination of different analytical techniques opens up new possibilities in exploring the various stages of the metalwork chaîne opératoire including analysis of the stone tools used in the production and maintenance of metal objects. Here we will demonstrate how new combinations of techniques and a theoretical lens of new materialism are allowing us to produce new narratives about the power and affordances of stone and metal, and their role in the formation and mediation of individual and communal identities in later prehistory.

15 ASSESSING TRACE VISIBILITY AND THE IMPACT OF CONSERVATION IN METALWORK WEAR ANALYSIS: A PILOT STUDY

Dolfini, Andrea (Newcastle University) - **Francone, Serena** (Museo delle Civiltà, Rome) - **Boccuccia, Paolo** (Museo delle Civiltà, Rome) - **Lemorini, Cristina** ('Sapienza' University of Rome)

In the last two decades, the principles and methods of traceological analysis have increasingly been applied to materials other than prehistoric stone tools. The analysis of copper-alloy objects – especially Chalcolithic and Bronze Age tools and weapons – has emerged as one of the most dynamic and fast-developing fields of microwear studies, to the point that it has now developed into a self-standing subfield of traceological research named 'Metalwork Wear Analysis' (Dolfini & Crellin, *Journal of Archaeological Science* 2016). Owing to the unique problems posed by archaeological metals, e.g., surface oxidation, Metalwork Wear Analysis features its own specific challenges to microscopic analysis and trace characterisation, which have not yet been explored fully. This paper, based on a pilot study recently conducted by the authors on Bronze Age and Iron Age collections from the Museo delle Civiltà, Rome, investigates the intersection of three under-researched factors affecting trace survival, visibility, and interpretation in archaeological metals: (1) surface corrosion; (2) conservation practices; and (3) surface staining by silicone casts taken for high-power microwear analysis. In particular, the assessment of conservation practices entailed a desk-based appraisal of conservation methods applied to prehistoric copper-alloyed artefacts and their replication on artificially oxidised modern replicas. The original data presented in the paper allow a better appraisal of researchers' ability to undertake Metalwork Wear Analysis on museum collections and call for better communication between analysts, museum keepers, and conservators working on ancient metals.

16 ADVANTAGES AND LIMITATIONS OF TRACEOLOGICAL RESEARCH ON EARLY MEDIEVAL CLOTHING COMPONENTS (9TH CENTURY SPHERICAL HOLLOW BUTTONS)

Krupicková, Šárka (Institute of Archaeology of the Czech Academy of Sciences, Brno) - **Fořt, Martin** (Czech Academy of Sciences, Institute of Archaeology, Brno) - **Plygawko, Michał** (Czech Academy of Sciences, Institute of Archaeology, Brno) - **Vlasatý, Tomáš** (Projekt Forløg) - **Olbert, Martin** (Czech Academy of Sciences, Institute of Scientific Instruments) - **Tihlaříková, Eva** (Czech Academy of Sciences, Institute of Scientific Instruments) - **Neděla, Vilém** (Czech Academy of Sciences, Institute of Scientific Instruments)

Metal jewellery and clothing components are essential archaeological material for the study of supra-regional elite contacts and testify to the socio-economic structures of early medieval Europe. In addition to traditional archaeological typological methods, the analysis of materials and production techniques has become standard. On the other hand, the detection of traces of wear is a research method that is not yet widespread. We have attempted to integrate this research method using a specific type of artefacts – spherical hollow buttons (in archaeological terminology called gombiks), which were widely used in Central Europe in the 9th century. These artefacts, made of silver, gold or gilded copper alloys, are an example of a broad cultural symbiosis. The morphology of the spherical hollow buttons refers to the buttons of Asian caftans and Byzantine pendants (pendilia). At the same time, the spherical hollow buttons adopt the chased ornamentation known from silk or the stone elements of Mediterranean church architecture. Due to the

lack of written sources, iconography or textile finds, this site- and time-specific type of artefact remains unknown in many respects. For example, we lack the elementary fact of the original function of spherical hollow buttons in the past living culture and the related formation of the origin of this elite symbol in the Central European milieu (in the Principality of Great Moravia). One of the possibilities for further research is the analysis of wear traces and the combination of this knowledge with other proven methods of elemental composition (using the SEM/EDS method) and production technology research. Methodologically, the presented research is based on the combination of the analysis of traces on original artefacts with the analysis of wear caused by experimental use of newly produced replicas.

17 UNWINDING THE BEADS: NOVEL APPROACHES TO GLASS BEAD USE AND PRODUCTION

Montanari, Eleonora (Newcastle University; AHG (Association for the History of Glass))

Due to their tangibility, mobility, and attractiveness, glass beads can be considered as highly personal objects, which often bore significant meaning for those who made, wore and used them. Glass is an artificial material, which means that properties such as colour, opacity and shape of the beads largely reflect intentional choices, which are regulated by the technological know-how and belief systems of a given society. Glass beads are versatile, as throughout their life cycle they can be arranged multiple times in a variety of fashions to form necklaces, bracelets, earrings or garments. When part of a costume, they can act as markers of gender, age or social affiliation through visual codes. Although glass beads are somewhat durable, they can also degrade over time, affecting their legibility as archaeological artefacts and thus leaving us with an incomplete picture.

Do bead manufacture and consumption occur within the same society? Is it possible to separate different configurations or life-stages for individual beads? What does their context of retrieval and broader archaeological background tell us about bead use and significance? What is the impact of glass corrosion on traces of wear by use and manufacture?

To provide an insight into the relationship between making, understanding, and using glass beads these questions will be addressed by examining glass beads from sites in the Wadi al-Ajal (Libyan Sahara) with a multi-method approach. This entails the novel application of use-wear analysis on archaeological and reference collections, alongside the interpretation of the chemical data and experimental bead-making with traditional technologies such as wood-fired furnaces. By taking into account any limitations provided by the dataset and the techniques employed, results are interpreted through the wider lens of production chaînes opératoires, ethnography and theoretical insights on object biographies, potential meanings and value.

880 PARIS OR PARADIGM SHIFT

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Martens, Vibeke (NIKU - Norwegian Institute for Cultural Heritage Research; CCH) - Taylor, Gillian (Teesside University) - Dawson, Tom (University of St Andrews; CCH)

Session format: Regular session

Preservation of Archaeological Remains In Situ (PARIS) was established as an interdisciplinary conference series in response to the Malta Convention/Valetta Treaty (<http://conventions.coe.int/Treaty/en/Treaties/Html/143.htm>) and the paradigm of trying to preserve as much archaeology as possible in situ. The basis for the Convention was to highlight preservation of archaeological heritage as a goal in urban and regional planning policies and set guidelines for funding of excavation and research work and publication of research findings. The Convention also deals with public access to archaeological sites, actions to develop public awareness of the value of archaeological heritage, and it constitutes an institutional framework for pan-European co-operation on the archaeological heritage.

These are all very important factors in modern European heritage management policies. However, when the Convention was written, no-one counted in the factor of Climate Change.

Climate change contributes to more rapid degradation and even complete loss of archaeological sites and/or material types. Decades of archaeological deposit monitoring have demonstrated that in many cases, in situ site preservation is no longer a real option but rather an illusion. Thus we suggest that it may be time for a paradigm shift – not disregarding all the constructive aspects of the Malta Convention, but adhering to the new European Standard on cultural heritage monitoring (EN 17652, 2022 <https://standards.iteh.ai/catalog/standards/cen/6814e478-dbcd-4a7b-a697-4312b260cfc0/en-17652-2022>) to evaluate if in situ preservation is a real possibility, or if threats to site preservation exceed possibilities of adaptation or mitigation and thus leaves preservation ex situ (excavation and documentation) as the only option to preserve the contextual site knowledge.

We invite papers on heritage research and climate change adaptation to think further and work towards solutions for sustainable work on preserving contextual heritage information either in situ or ex situ, enabling the experience of archaeology also for coming generations.

ABSTRACTS

1 ADVOCATING PARADIGM SHIFT

Martens, Vibeke (NIKU - Norwegian Institute for Cultural Heritage Research; CCH)

Climate change impacts the possibilities of preserving archaeological remains in situ. But how can we see or measure that trigger levels have been breached and we need to find ex situ preservation alternatives? At the outset, we need to know which archaeological sites or remains we have and how these might be affected by modern changes. Development, abandonment, or climate change, or a combination? We also need to set threshold values or trigger levels. If we don't, how may we possibly know when to act before it is too late? These values should be relative, and the outset must always be the heritage significance, the state of preservation of a site, and if possible, also environmental conditions. Long-term monitoring or repeated sampling can give information on occurring changes. All these measurements then lead to risk assessments and evaluation of possible adaptive or mitigating actions. The extreme mitigation action is preservation ex situ, by investigation and documentation

2 RESILIENCE, RESISTANCE AND ACCEPTANCE: IN SITU PRESERVATION AND THE PROPERTIES IN CARE IN SCOTLAND

Davies, Mairi (HES Historic Environment Scotland)

Scottish Ministers have, under the Historic Environment (Scotland) Act 2014 ('the Act'), delegated to Historic Environment Scotland (HES) their general functions of managing the 336 properties in care including ensuring their conservation, articulating and safeguarding their cultural significance, providing public access for current and future generations, and managing the associated commercial operations. Those current and future generations, however, will be subject to warmer, wetter winters; hotter, drier summers and increased intensity of rainfall on the wettest days, with sea levels continuing to rise to 2100 and beyond. This has implications for the conservation and safeguarding of the properties in care, and their presentation to the public, with changing climatic conditions altering and accelerating decay processes, increasing the challenge of preservation in situ.

HES and its predecessor organisations have been managing the impacts of environmental change on the properties in care for decades. Many, including the world-famous Skara Brae prehistoric settlement, were taken into care in the 1920s and 1930s and had sea defences installed that are now close to a hundred years old. These defences have provided a century of effective protection but require ongoing monitoring and maintenance and will come under increasing pressure as climate change intensifies. Adaptation and resilience options will be discussed based on principles of resistance or acceptance. This paper will examine how, within the parameters of the Act, HES might build on the last hundred years of conservation to manage, conserve, safeguard and present the properties, coastal and inland, for the next hundred years.

3 LOSING WHAT WE GAINED? A WANING

Groenendijk, Maarten (Green Archaeology)

I anticipate that most presentations in this session will showcase the (very real) dangers of climate change to archaeology. To balance this, my contribution aims to present a slightly different perspective on the subject: we may risk losing much of what we have gained in recent years if we continue to stress the risks of climate change in the way that we do now. With the establishment of PARIS, we have gained so much regarding the possibilities of preservation in situ. PARIS has led to an impressive increase in research on the subject, more information is available on the effects and problems of preservation of archaeological remains and as a result, many more sites are preserved. Today, preservation in situ is finally seen as a valid alternative to archaeological excavations at best, and 'something to consider' at worst. I strongly believe this is an extremely important development, yet in my opinion, the discussion on climate change in relation to archaeology, while warranted and needed, threatens to negate much of those gains. More and more, climate change is used (and misused, as I aim to show) as an argument against preservation in situ, even in cases where this is not a real issue and preservation would very well be possible. I am by no means implying that climate change is not a serious risk to archaeology: it absolutely needs to be considered when assessing the merits and achievability of preservation in situ. However, it is not a risk everywhere, and preservation in situ can still be a valid- or even the best option in many cases. If we don't explicitly stress that aspect, we risk losing much of what we gained, and much more than what we bargained for. How can we adjust our message to prevent this?

4 WHO PAYS? HERITAGE AND CLIMATE CHANGE

Dawson, Tom (University of St Andrews; SCAPE) - Hambly, Joanna (University of St Andrews; SCAPE) - Mitchell, Juliette (University of St Andrews; SCAPE)

The concept of developer-funded excavation is now commonplace, and in many regions, it is normal for the 'polluter pays' principle to be applied when the construction of a new road or building will disturb archaeological remains. The system works because there is a shared acceptance that archaeological heritage has a value, and despite its faults, developer-funded projects have led to an incredible growth in the number of archaeologists currently practicing the profession.

If we accept that our archaeological heritage is valuable and should be either protected or recorded before destruction, problems arise when laws can do nothing to protect sites, and when there is no developer to pay for archaeological intervention, including evaluation. As King Cnut demonstrated, natural process obey no laws; and a lack of a 'polluter' results in an imperfect understanding of buried remains that are under intense threat from climatic processes. Although there often being indications of where sites are located, for example, layers or structures seen protruding from eroding coast edges, it is often impossible to characterise the extent or significance of these remains. If we don't know what is buried, we can't ascribe a value; and without an indication of the worth of the site, it is hard to justify action to preserve the remains either physically or by record.

Although the problem is grave, it is not insurmountable, and collaborative action can make a difference. This paper uses twenty years of experience of looking at coastal sites to share lessons about the opportunities, and complications, of working with severely threatened resources for which no organisation has a statutory obligation to protect. Taking an optimistic view, it will consider values, including those held by communities, and will map out some possible avenues for working with sites threatened by climate change.

5 CHALLENGING PARIS: CASE STUDIES FROM NORTH AMERICAN HERITAGE AT RISK (NAHAR)

Miller, Sarah (Florida Public Archaeology Network)

In the United States the National Historic Preservation Act of 1966 created the current paradigm of historic preservation with the aim to preserve cultural resource in place. The process of consultation set forth in Section 106 of NHPA, mimicked in state legislation, required the identification of cultural resources, identification of potential adverse impacts, and a pathway to mitigation when preservation in place could not be maintained. From 1980-2010, statewide site stewardship programs and the later emergence of public archaeology networks, set similar goals to protect the buried past through education and outreach. Climate Change was not a part of the consultation or preservation through education and appreciation models. By 2010 planners working on long term management plans realized future impacts from Climate Change and raised the alarm. Climate Change then emerged as the number one threat to cultural resources as scholarship, society committees, and management strategies sought to address this need. Yet preservation policy today are the remnants of the old way of thinking about preserving sites in place. The North American Heritage at Risk (NAHAR) and global collective network are helping to push through the old paradigm of historic preservation. Case studies presented at NAHAR meetings from 2021 to present demonstrate the failure of the old paradigm and address the need for action in the face of the current preservation crisis.

6 SUSTAINABLE EARTH: TOWARD AN ADAPTIVE METHODOLOGY OF IN-SITU PRESERVATION AT VÉSZTŐ-MÁGOR, HUNGARY

Seifert, Jerrod (University of Oslo) - Lingle, Ashley (University of York) - Gyucha, Attila (University of Georgia) - Corton, Therese (Cardiff University) - Duffy, Paul (Christian-Albrecht University of Kiel) - Parkinson, William (University of Illinois - Chicago; The Field Museum of Natural History) - Ridge, William (University of Illinois - Chicago) - Riebe, Danielle (University of Georgia)

This paper discusses the innovative approach of in situ preservation applied to a sheltered excavation trench at the prehistoric site of Vésztő-Mágor, Hungary. The in situ preservation methodology involves the deployment of soil probes as well as temperature and humidity loggers to monitor the moisture dynamics within the archaeological context. By employing parallel strands of environmental monitoring strategies, the research seeks to enhance sustainability and adaptive preservation techniques in the face of climate change. The data collected through monitoring will be pivotal in underpinning the intricate relationship between moisture variations and the critical role that soil conditions play in the preservation of cultural heritage.

The use of soil moisture probes shows the dynamic relationship between pedological moisture content within the archaeological profiles and the atmosphere surrounding the exposed trench, impacting site statics. Such knowledge is instrumental in developing tailored preservation strategies that account for the specific environmental conditions at Vésztő-Mágor. The research aligns with the standards outlined in EN 17652:2022, ensuring a methodologically sound and internationally recognized framework for archaeological conservation practices. Moreover, the application of international standards (e.g. ISCARSAH & Salalah Guidelines), and European standards (e.g. Malta Convention),

emphasising the importance of integrated conservation strategies, underpins the study's commitment to holistic preservation.

Addressing the imminent challenges posed by climate change, the adaptive preservation approach advocated in this study highlights the need for strategies that can dynamically respond to evolving environmental conditions. By incorporating real-time data from monitoring, conservation efforts can be more effectively tailored to the site's unique requirements.

This research at Vésztő-Mágor represents a paradigm shift in archaeological preservation by integrating cutting-edge environmental monitoring and adaptive strategies. Project outputs meet several UN Sustainable Development Goals, thus contributing significantly to the broader discourse on sustainable and effective preservation of archaeological heritage in the face of a changing climate.

7 THE VANISHING WALL(S): HOW IS CLIMATE CHANGE AFFECTING HADRIAN'S WALL, AND WHAT CAN WE DO ABOUT IT?

Alberti, Marta (Vindolanda Trust) - Taylor, Gillian (Teesside University)

The Valletta Treaty was signed in 1995, only eight years after Hadrian's Wall had been inscribed on the UNESCO WHS list, and the year before the first Hadrian's Wall Management plan was produced. It is therefore unsurprising that the Treaty's emphasis on 'the conservation and maintenance of the archaeological heritage, preferably in situ', guided early efforts to manage the Wall. PARIS2, in 2001, marked the early recognition of the importance of environmental monitoring for archaeological preservation, and admitted that preservation in situ was only possible if no changes to the burial environment compromised it. 23 years later, only two sites on Hadrian's Wall feature a long-term buried archaeology environmental monitoring system, and a strategic plan to utilise it and develop it: Vindolanda and Magna, both managed by the Vindolanda Trust. This paper discusses the ways climate change is affecting the sites, through both empirical observations from continued excavation programmes, and data collected by a series of probes recording, amongst other factors, pH, Oxidation Reduction Potential (ORP) and rainfall. The paper stresses the importance of acting outside the archaeological silo and in cooperation with environmental scientists. It proposes that only through such cooperation the 'PARIS at all costs' approach can be replaced by MATHS: Monitor environmental preservation, Assess case by case, Targeted well-resourced excavations, Help each other, and share data.

8 CLIMATE CHANGE AND THE COASTAL ARCHAEOLOGICAL HERITAGE OF IRELAND

Pollard, Edward (The Discovery Programme: Centre for Archaeology and Innovation Ireland) - Corns, Anthony (The Discovery Programme: Centre for Archaeology and Innovation Ireland) - Shaw, Robert (The Discovery Programme: Centre for Archaeology and Innovation Ireland) - Davidson, Lesley (The Discovery Programme: Centre for Archaeology and Innovation Ireland)

From 2017 to 2023 the European-funded CHERISH (Climate, Heritage and Environments of Reefs, Islands, and Headlands) Project investigated the impacts of climate change on cultural heritage along the Irish and Welsh coasts. This gathered data on endangered archaeological sites including Bull Island shipwrecks in Co. Dublin, Glascarrig motte, Clonmines historic town, Kilmichael coast guard station and Rosslare Fort in Co. Wexford, promontory forts and mining heritage along the Copper Coast of Co. Waterford, and, Ballinskelligs, Reencaheragh and Ferriter's Castles in Co. Kerry. The project involved historical research, aerial surveys, uncrewed aerial vehicle modelling, palaeoenvironmental coring, geophysical survey, and laser scanning to record changes to archaeological sites. These are in contrasting coastal environments of intertidal zones, estuaries, islands, sand dunes, soft boulder clay and rocky faulted cliffs. This methodology recorded coastline change including the ongoing processes of erosion, flooding, subsidence, slumping and rock falls approaching and destroying archaeological sites. Outputs are including coastal zone assessment, best practice guidance to record and monitor erosion of heritage, maps of change and landowner management plans along with updated records and new sites to the SMR and NIAH records. The sites are further threatened by the wetter climate, storm surges and rising sea level, which could lead to increased erosion and disappearance of the sites.

882 SYNTHESIS, FACILITATOR OR HINDRANCE: SHOULD SYNTHESIS BE PART OF COMMERCIAL ARCHAEOLOGY OR LEFT TO THE ACADEMICS?

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Forrestral, Colin (ClfA RIG Special Interest group.) - Godfrey, Evelyne (ClfA RIG special interest group) - Joosten, Ineke (Rijksdienst voor het Cultureel Erfgoed (RCE)) - Bryant, Stewart (Society of Antiquaries of London) - Evans, Christopher (British Academy)

Session format: Regular session

The “synthesis” of research should ultimately contribute to archaeological narratives that impact on the public understanding of the past. When we talk about synthesis, this includes the masses of grey literature reports from commercial, community, academic or publicly funded archaeological investigations as well as formal publications. But how much should synthesis signpost and when does synthesis become a research agenda or framework?

This session will examine the needs of the different audiences such as researchers, curators, local communities, and the wider interested public - in terms of access to data, narratives and formats. Synthesis is vulnerable to time-lag, and to privileging certain perspectives, as it tends to be undertaken by senior staff, and due to the demographic profile of these staff, very often older, male staff. Whilst their experience and perspectives are valuable, so are those of others.

For some synthesis is about revisiting past data sets and narratives and updating in light with the results of more recent investigations so proving an improved paradigm, for others it's just about drawing together different strands of evidence from across the breadth of the archaeological profession and, more widely, from allied disciplines. Data may be from a single site or from multiple sites/locations, from different aspects of a single specialism or the collation of information from several specialisms.

This session asks:

1. What can synthesis achieve and what is the value of comparative analysis?
2. At what scale of analysis should we be considering synthesis; Regional, National, European or Global?
3. How do we decide on appropriate themes for synthesis?
4. How are synthetic studies used to plan future investigations?
5. How can we achieve more rapid synthetic studies; is there room for interim discussion papers?
6. Should adequate funding for Synthesis be budgeted for at the start of the process?

ABSTRACTS

1 WHAT IS SYNTHESIS? AN OVERVIEW OF OPINIONS GARNERED BY THE RIG GROUP AND IS UTILISING AI A WAY FORWARD

Forrestral, Colin (Independent Researcher)

This paper aims to cover the results of surveys undertaken by the Research and Impact group (RIG) membership in 2019 and various discussion in committee meetings since with contributions not only from individual members but also various commercial organisations. As will become clear there are many similar themes that emerge from these discussions and surveys but also a lot of disagreements on what synthesis was actually for and about.

It will show that on the whole commercial organisations do not see synthesis as part of their remit generally, but it could be asked if commercial organisations were given the funding to include synthesis if they would have the relevant skill sets or would they have to outsource to get the synthesis done. At the same time, will it look into how much should Data/Archive sit directly behind synthesis? Most commercial Project Managers would see synthesis as unacceptable project creep.

This paper will also highlight that within an organisation, different disciplines have different definitions of what synthesis is. They also ask at what level of detail should go into overview and at what stage of the process should be called Synthesis.

Finally, it will consider the option of using AI with the performance and capability increase in the recent past and how it could be used to assist in the synthesis process and its effect on the cost of the synthesis process.

2 THE VALETTA HARVEST PROJECT. SYNTHESIZING ARCHAEOLOGICAL DATA FROM DEVELOPMENT-LED RESEARCH IN THE NETHERLANDS ON A NATIONAL LEVEL

Groot, Tessa (Cultural Heritage Agency of the Netherlands) - Bazelmans, Jos (Cultural Heritage Agency of the Netherlands)

In the Netherlands, since the signing of the Valetta Treaty in the 1990s, archaeological research has been conducted primarily by commercial firms. The research results in hundreds of archaeological reports per year. These provide us with many small puzzle pieces of information, without interrelationship and without a complete picture. To ensure that this data is analyzed in context and provides new knowledge and insights about the past, the Harvest of Malta project was launched in 2012. The Cultural Heritage Agency of the Netherlands, part of the Ministry of Education, Culture and Science, has since initiated 20 projects, in which archaeologists from companies, universities and local authorities, often in close collaboration, have conducted research resulting in as many syntheses. Each of the studies focuses on a specific question from the National Research Agenda for Archaeology. The syntheses provide not only an overview of relevant reports and the knowledge derived from them, but also new research questions for future archaeological field research. As a result, the National Research Agenda for Archaeology is updated on a yearly basis.

In our presentation we will explain, using some examples of projects, how the Harvest of Malta project contributes to the cycle of archaeological heritage management and how we intend to continue to initiate relevant synthesizing research in the future.

3 TELLING DIFFERENT STORIES: AN EXPERIMENTAL APPROACH TO STORYTELLING AND SYNTHESIS ON LARGE-SCALE LINEAR INFRASTRUCTURE SCHEMES

Clough, Alice (MOLA (Museum of London Archaeology); University of Bristol)

Archaeological synthesis culminates with the stories we tell about the past. This paper will introduce ‘Telling Different Stories’, a collaborative doctoral partnership between the University of Bristol (UK) and MOLA (Museum of London Archaeology). The project looks at how archaeological interpretations are developed and communicated in the British development-led sector, looking specifically at some of the largest, most commercial endeavours in archaeology: infrastructure schemes.

In direct dialogue with MOLA’s fieldwork, post-excavation and management teams, ‘Telling Different Stories’ aims to understand the dominant tropes and approaches that inform large-scale development-led practice, and how these subsequently shape and influence interpretations of the past and approaches to synthesis. From there, the project is developing an approach to synthesis and storytelling geared towards multivocality and experimentation.

As with the British development-led sector more broadly, infrastructure schemes tend to produce very particular types of knowledge. ‘Telling Different Stories’ asks: which types of knowledge are privileged in the development-led process, and which are routinely omitted? How is archaeological storytelling influenced by the positionality of the storyteller? How can we know which types of knowledge will be inspiring to future generations? Is an ethical approach to synthesis one that privileges multiple ways of knowing?

4 DEVELOPING A HUB FOR COLLABORATIVE SYNTHESIS IN HUMAN EVOLUTION

Devevey, Godefroy (ICArEHB, University of Algarve) - Aldeias, Vera (ICArEHB, University of Algarve) - Marques, Catarina (ICArEHB, University of Algarve) - Cascalheira, João (ICArEHB, University of Algarve)

Synthesis is particularly adapted to scientific fields where data are typically gathered at a local and regional scale – such as archaeological sites. The synthetic integration of perspectives and primary data from multiple sources yields emergent patterns that would be impossible to achieve through studying a single site, or from a single perspective. The conclusions from synthesis are more generalizable and applicable, gaining considerable inference power, and reframing the theoretical debate. Appropriately, research synthesis both benefits and fosters the adoption of the principles of Open Science. Despite these benefits, there is still a lack of collaborative synthesis in the field of human evolution and prehistoric archaeology. The Interdisciplinary Center for Archaeology and Evolution of Human Behavior (ICArEHB), a research centre based at the University of Algarve (Portugal), has experimented with models to foster synthesis in recent years. Based on this initial success, we are now moving forward with the creation of a hub dedicated to Collaborative Synthesis in Human Evolution. We will host groups of scholars that will exchange knowledge, share data and cross perspectives to create broader archaeological narratives that are scientifically sound while advancing the cause of Open Science. In this talk, we will present our current model, discuss challenges and future pathways to promote collaborative synthesis in Human Evolution studies.

5 KNOWLEDGE-CREATION AND DEVELOPMENT-FUNDED ARCHAEOLOGY IN ENGLAND: HISTORY, CURRENT PRACTICE AND FUTURE DIRECTIONS

Bryant, Stewart (Society of Antiquaries of London)

Since the publication of Government planning guidance for archaeology nearly 34 years ago in 1990, developer-funded archaeology in England has become a successful industry with over 5000 excavations per year with a value of c£250million. However, it will be argued that this phenomenal success has also led to some fragmentation in terms of the public value obtained from publication and synthesis. The results of several recently published national synthesis reports will be looked at, both for the advances in understanding they have achieved, and the issues they highlight in terms of the value of evidence from current development-led excavations for synthesis. Case studies of syntheses from several smaller and more recent excavation projects will also be touched upon as examples of good practice.

Finally, the principal recommendations of The Promotion of Archaeological Synthesis' report will be looked at. These include the creation of a national advisory panel to promote and co-ordinate good synthesis and knowledge creation in England and ways to achieve greater collaboration across the sector, especially between the archaeological organisations engaged in development-led archaeology.

6 WHY SYNTHESIS IS HARD?

Altschul, Jeff (SRI Foundation) - Wait, Gerald (GWHeritage)

Development-led archaeology produces a huge amount of data on all sorts of past events and processes. In theory, this should lead to a boon in synthetic studies on such topics as heritage management, material culture, culture history, socio-environmental dynamics, and socio-cultural practices. Yet, synthetic research is not commonly conducted as part of development projects nor are the data generated by such projects incorporated in meaningful ways in academic research. There are several barriers to synthetic research involving development-led archaeology. First, there is the project-by-project nature of the enterprise in which the objective of project sponsors does not extend beyond the terms of legal compliance. Second, data recording techniques vary by project as does the willingness of stakeholders to allow data to be used in scientific research, making FAIR and CARE issues growing concerns. Finally, the reward systems for applied and academic archaeologists are different. There is little incentive—financial or career enhancement—for applied archaeologists to participate in synthetic research. Academic archaeologists, working with much fewer resources, have enough trouble interpreting their own data, much less incorporating data of others. For archaeology to move beyond the confines of site protection and culture history, we must overcome these issues. How we do so is the subject of this paper.

884 TRANSFER AND RECEPTION OF PUBLIC AND PRIVATE ARCHITECTURAL TYPES IN THE COASTAL SETTLEMENTS OF THE MEDITERRANEAN BASIN

Session theme: 6. The Mediterranean from Within

Session organisers: Ferritto, Roberta (Alma Mater Studiorum - Università di Bologna; University of Pennsylvania) - Lo Monaco, Viviana (Universidade de São Paulo, USP) - Fuduli, Leonardo (Universidade de São Paulo, USP) - Monseff Junqueira, Nathalia (Universidade Federal de Mato Grosso do Sul)

Session format: Regular session

For centuries, the Mediterranean has been the scene and crossroads of different peoples, cultures, customs, and religions. The ancient coastal settlements and access to various sea routes, played a key role in the dynamic of exchange between civilisations. Indeed, they acted as 'gateway settlements', between land and sea, funnelling goods and people in both directions. Public and private spaces, from the spatial organization of the city, from the forum to dwellings, are the product of common outcomes that link social structures, urbanization, and architecture, in a relational association. Throughout the Mediterranean, for instance, architectural types inspired by Roman patterns are present, both in public and private realms, such as basilicas, baths, honorary arches, and maritime villas. In spite of this, the influence of the local architectural tradition is frequently evident. This is due to several factors, including the employment of local craftsmen and architects trained in a different tradition, the availability of different raw materials, and the influence of neighbouring cultures at the periphery of the Mediterranean nations. This session therefore invites papers discussing the transfer and reception of architectural models in both private and public realms, identified between West and East of the Mediterranean basin, along coastal settings and their immediate hinterland. The session seeks to deepen our understanding of how specific local realities influenced later historical developments, to the point of having a strong impact on modern cultures. Therefore, we encourage contributions dealing with all chronological periods. We invite you to participate with contributions oriented towards the following issues and/or other similar ones, such as:

1. Coastal Architectural Features and Regional Variations
2. Factors Influencing the Diffusion of Architectural Features

3. Public vs Private Architectural Features
4. Local Architectural Patterns in the Mediterranean
5. The Interaction Between Architectures and Urban Systems
6. Socio-Cultural Implications of Architectural Choices.

ABSTRACTS

1 ROMAN INFLUENCES AND LOCAL TRADITIONS: A COMPARATIVE STUDY OF MARITIME VILLAS IN THE MEDITERRANEAN BASIN

Ferritto, Roberta (Alma Mater Studiorum - Università di Bologna; University of Pennsylvania)

The Mediterranean coastline and immediate hinterlands host a rich cultural heritage reflecting the intense and varied human activities occurring throughout centuries. Ancient maritime villas, a common feature of the Roman Mediterranean, approached varied architectural solutions. The Roman models identified in Italy, where maritime villas originated and were perfected, often influenced provincial models, where they often emulated the various Italian examples. In Istria, for example, villas are influenced by the central Tyrrhenian models, while in the Iberian Peninsula the 'linear plan type' imitates the open-sea front architecture of maritime villas represented in the painted views from Stabiae and Pompeii. However, local forms also exist, for example in Tripolitania, where the architectural design choices are clearly dictated by other factors, such as the local environment. In terms of monumentality and aesthetic, the majority of maritime villas along the Italian coasts displayed a high degree of grandeur, reflecting the lifestyle of the Roman elite. A symbol of wealth and power, Roman maritime villas represented the political and socio-economic achievements of their owners. Do we detect the same in the provinces? Is there any substantial difference in terms of dimension, function, building and decorative materials? The aim of this paper is to explore what kinds of Roman architectural influences can be identified in the provincial maritime villas, which models are instead inspired by local traditions, and if economic and socio-cultural implications dictated specific architectural choices.

2 THE RECEPTION OF HELLENISTIC ARCHITECTURE IN THE ROMAN MARITIME VILLA OF SOUTHERN CAMPANIA

Perrella, Rosaria (Museo Archeologico Nazionale di Napoli)

The architecture of the maritime villas of southern Campania in the Roman times looked to the most congenial building elements of Hellenistic architecture. The Hellenistic model was absorbed through the reception of public, private and sacred architecture. Each of these aspects was appropriated and reinterpreted in the layout of the Roman maritime villa: the porticoed courtyards of Hellenistic palaces are transformed into the more elaborate peristyles; the arrangement of the villas along steep slopes emulates the monumentality of terraced sanctuaries.

In particular, the Macedonian model of 'living', in both public and private buildings, is the one privileged in the planimetric choices of the maritime villas of southern Campania.

The phenomenon of the Roman villa in this specific territory interprets the Hellenistic model not only in architecture, but also deepens the Macedonian concept of the villa in its economic and social reality, specifically in its definition as a place of fructus.

The intrinsic relationship that the builder creates between the architecture and the surrounding natural landscape, in the constructions of the Hellenistic age, is transformed in the Roman maritime villa of southern Campania into a "bridge" between the structures and nature, in a heterogeneous range of solutions thanks to the complex use of opus caementicium.

3 PROPAGANDA AND PUBLIC ARCHITECTURE IN THE EASTERN SICILIAN COAST UNDER SEVERAN RULE

Fuduli, Leonardo (University of São Paulo)

During the Severan age, Sicily experienced a period of particular remarkable prosperity, and the imperial family had already established strong ties with Sicilian cities during the time when Publius Septimius Geta and Lucius Septimius Severus were proconsuls of the island, A.D. 188-190. Archaeological excavations as provided evidence of the construction of luxury private complexes in Palermo and Lilybaeum, as well as the development of new public buildings. Although the western cities of Sicily were generally more prosperous, the majority of architectural artifacts discovered come from the monuments of the eastern coastal cities.

The coastal cities of eastern Sicily underwent restoration work on some of their main buildings during this time, as for instance the theatre scaenae frons in Taormina, and the theatre in Catania, where an odeum was also built. Limited

information is available about other important cities, like Syracuse, where the last phase of the 'Gymnasium' is believed to have been completed during the Severian period.

Further research should be conducted to determine the origin of the workers involved in the restoration works and the value of these projects. The analysis of the architectural decoration of the monuments in the eastern coastal cities could provide valuable information about the models and craftsman involved in the construction. This analysis could also shed light on possible connections between these cities and Rome, as well as the potential origin of the marble used in these projects.

4 THE DOMESTIC FOUNTAIN OF THE ANCIENT ROMAN DOMUS

Monticolo, Antonio (Pisa University)

The environment of the ancient Roman domus can be seen as the place where the dominus manifested his culture, his desires and his aspirations. Elements such as fountains can be read as the decor of the domus and, therefore, inside ancient houses, fountains are important elements that can testify to the owner's taste. They also interact with the other elements of the house such as architecture, paintings, sculptures. In this sense, the contribution will propose a synthesis of the role of fountains in the structure of domestic buildings starting from the following factors: location, visibility, relationship with the rooms of the house, integration with pictorial and sculptural ornamentation (where reconstructible), relationship with the structure of the vegetation. In relation to this we will start from the extensive documentation of the domus of Pompeii, a city once closer to the coast and comparisons will be made with the ancient city of Cosa also near the Tyrrhenian coast

5 EXPLORING THE FUNERARY ARCHITECTURE OF MOIE DI POLLENZA: DESIGN AND CROSS-CULTURAL INFLUENCES

Ficcadenti, Benedetta (Universität Basel)

Moie di Pollenza, an important Picenum settlement strategically located along the Potenza River and in proximity to the Adriatic coast, experienced a long period of development and prosperity spanning from the late 9th to the 5th century BC. The archaeological finds, primarily discovered from burials, including Etruscan and Greek vases, Baltic amber ornaments, and glass paste objects from the eastern Mediterranean, testify that the city had extensive connections with the inland regions and Tyrrhenian coasts to the west, as well as with other Mediterranean cultures to the east.

In addition to the archaeological luxury artifacts from the site, the architectural analysis of burials is putting in evidence how influences from other cultures are also evident in the different burial typologies attested on the site. For instance, there are simple pit burials with side chambers that are influenced by the models of Tyrrhenian area, and monumental grave circles, intended for the local elite, which are typical of the central regions of pre-Roman Italy.

The aim of this paper is to explore the construction and design of the burials at the Moie di Pollenza site and compare them with similar types found in other territories. Are there differences in terms of dimensions and building materials? Are there unique features found only in the models of Moie di Pollenza? What kind of stylistic similarities exist between the monumental grave circles of Moie di Pollenza and those from other areas? This contribution seeks to outline the influence of other cultures on the funerary architecture of Moie di Pollenza, thus contributing to a deeper understanding of the site and its extensive connections with other Mediterranean civilizations established through both local and long-distance trade.

6 CULTURAL CONTACTS IN JUDAEA-PALAESTINA IN THE ROMAN PERIOD: STUDIES OF THE URBAN GRID AND MONETARY CIRCULATION IN TEL DOR, ISRAEL

Porto, Vagner (University of Sao Paulo)

In this communication we intend to present the results obtained so far in the research carried out at the archaeological site of Tel Dor, Israel. This research is an abroad inter-institutional program which aims to deepen our knowledge regarding the mechanisms of cultural contact and the processes of urban transformation in northern Israel during the Roman period. Tel Dor, locus of this study, is located 130 km north of Jerusalem. The project was divided into two distinct stages that complement each other: 1) aimed to analyze the coins found in the excavations of the archaeological site of Tel Dor, observing their finding places in the strata of Roman occupation. The unpublished material - the result of excavations carried out since the 1980s - which was used to carry out our research, is stored both in the Department of Archeology at the University of Jerusalem. Seeking to understand issues of urbanity of this period, we plotted the coins for better associate them with the finding places, and creating maps, we tried understand the monetary circulation in the city in Roman times. Thus, to better understand the level of monetization of society in that period and, eventually, shed light on possible interpretations of the use of the spaces in which the coins were found. The investigation was done through the survey of the archeological /numismatic data available in the excavation re-

ports and the available bibliography. 2) A fundamental part of this project was carrying out of systematic surveys in Tel Dor, with which we believe to have broadening our understanding of the urban organization of the city. We developed archaeological activities in the area (through the Ground Penetrating Radar technique) in order to identify the Roman city cardo and decumanus based on previous remote sensing studies.

7 THE USE OF ROMAN ARCHITECTURE FOR THE CONSTRUCTION OF RELIGIOUS IDENTITY IN TEL DOR, ISRAEL (I BC - III AD)

Aga Pereira Passos, Letícia (University of São Paulo)

The main subject of this study is the archeological excavation area of Tel Dor, located in the present-day region of Mount Carmel - coastal mountain in northern Israel. Both the historical sources and the excavation carried out at the site indicated that buried within Tel Dor were remains of four different cultures: (1) the Cannanites; (2) The Sikil (one of the Sea People); (3) the Phoenicians, who inhabited the city from 11th century BC throughout the Israelite, Assyrian, Babylonian, and Persian periods, and considerable part of the Hellenistic period; and (4) Greeks and Romans. On this basis, the city unfolds into a dynamic panorama for the study of cultural contacts, especially over the Roman period, allowing a rich analytical study of the transformation processes of the Roman way of life and the formation of the urban landscape in the new territories. The research aims to study the monetary evidence and its religious-iconographic analysis in an archaeological context, together with the urban structure of the city. With many of the features that characterized the cities of the Roman East, Dor had paved streets, squares, basilicas, theaters, aqueducts, decorated houses and monumental temples. Of the latter, one of the discoveries was a northern structure, a temple built on a podium with a temenos (sacred precinct) around it; similar to Roman temples, the earliest of which dates to the 1st century CE. We therefore propose to analyze the urban organization of Dor by focusing on the religious architecture of the city, questioning how religious identity could be connected with the urbanism that developed in the city. Understanding this political and religious relationship in the iconographic representation and urban architecture will allow us to hypothesize about the identity constructions of the population of Dor between the 3rd century BCE and the 3rd century CE.

8 "ENCASED LIKE A GEM". THE ARCHITECTURE OF THE SANCTUARY OF TAS-SILĠ IN MALTA THROUGH MILLENNIA, BETWEEN TRADITION AND RECEPTION

Bonzano, Francesca (Università Cattolica of Milan, Department of History, Archaeology and Art History) - Recchia, Giulia (Sapienza University of Rome, Department of Antiquities) - Semeraro, Grazia (University of Salento, Department of Cultural Heritage)

The paper will discuss the continuity, transfer and reception of architectural types in the sanctuary of Tas-Silġ in Malta through millennia, from the Late Neolithic to the Roman era.

This place of cult - located on the main island overlooking one of Malta's most important harbours, the port of Marsaxlokk - was built during the Late Neolithic and was in use throughout the Bronze Age and the Early Iron Age; when the Phoenicians colonized the Archipelago, the megalithic buildings were still visible, and the site was frequented. An important sanctuary dedicated to the goddess Astarte was established there; the fame of the place of worship increased during the Punic and mostly during the Roman period, when Malta was included in the Roman province of Sicily.

One of the most distinctive features of the sanctuary is the preservation of the main buildings of the Late Neolithic complex through the millennia, although almost totally "concealed" during the Roman renovation. Architectural elements and architecture reflect the extensive network of contacts of which the Maltese Archipelago was part, but also the preservation of the principal megalithic feature is a tangible sign of the conservatism that characterized the site throughout the historical period.

The Maltese Archipelago is located at the boundaries of different cultures; this was a source of dynamism, resulting in exposure to diverse influences. Together with its late prehistoric tradition and local peculiarities, Malta's multiplicity of cultural traditions reflects the religious identity of the sanctuary and of those who frequented it.

9 THE LIBRARY OF ALEXANDRIA AND ITS INTEGRATION INTO THE CITY'S LANDSCAPE FROM THE PERSPECTIVE OF GREEK TRAVELERS

Junqueira, Nathalia (Universidade Federal de Mato Grosso do Sul)

The production of knowledge in antiquity and its packaging was practiced in several ancient cities. Ancient documents show how observation and practice contributed to the development of research in astronomy, mathematics, geography, history, and many other fields of knowledge. These documents were in many cases available in archives and libraries all over the inhabited world. In this presentation we would like to provide some information about the Library of Alexandria, its location, and the place it occupied in the production of knowledge in the ancient world. To this end,

two travelers and their ethnographic works have been selected: the historian Diodoro Sículo (ca. 90-30 BC) and the geographer Strabo (ca. 64 BC – 23 BC), who lived in Alexandria for several years. The aim is to show how this space of knowledge production interacted in the urban landscape and what significance it had for the social dynamics of the city of Alexandria in antiquity.

10 PERIPHERAL ENVY SATIATED: A LATE ROMAN ELITE URBAN MANSION AT KOURION ON CYPRUS

Rupp, David (Department of Classics and Archaeology - Brock University)

In the 4th and 5th centuries CE the greatly expanded imperial administration, civil service and military in the Eastern Roman Empire created a new class of wealthy men. This aristocracy congregated in Constantinople, the provincial capitals, and the major commercial centers. There they vied with one another for status, power, and wealth. Their large, lavish residences in these key centers were one of the prime arenas for these competitions. In these urban mansions a distinctive architectural form evolved that mimicked both public and imperial prototypes and activities. The interiors had elaborate programs of decoration. In specialized spaces they received as patrons their clients (audience chambers) and entertained invited guests and peers (bath suites, reception halls).

In the Late Roman period the island of Cyprus was a peaceful, peripheral place. On its southern coast on the edge of the acropolis of the city of Kourion a sprawling structure was built in the 430s CE. It is known today primarily for its extensive polychrome mosaic floors with geometric compositions and six tessellated inscriptions. The fact that two of the inscriptions refer directly to Christ and Christian values has distracted most discussions from the exact function of the building. A third inscription, a “biography” of the commissioner, a man called Eustolios, indicates that he was originally from Kourion, had donated a public bath, and had constructed this residence.

The “House of Eustolios” adopted the architectural forms and the decorative schemes of the townhouses of his peers in the distant, important cities to create his version of the dominant aristocratic townhouse type, using traditional Cypriot building practices and materials. The impressive mosaic floors were executed by itinerant workshops from Syria. This was a systematic effort by Eustolios of self-representation of his status, wealth, power, *paideia* and Christian beliefs to his clients, peers, and family.

11 THE CULT OF YAHWEH IN THE MEDITERRANEAN BASIN: THE PRESENCE OF JEWS AND SAMARITANS ON DELOS IN THE ROMAN PERIOD

Almeida, Vítor (Museu de Arqueologia e Etnologia, Universidade de Sao Paulo)

This paper aims to understand, by the combination of material culture and textual sources, the multiplicity of religious experiences related to the Semitic god Yahweh and his circularity in the ancient Mediterranean world, from archaeological remains discovered on the island of Delos, Greece. During the period of 1912-1913, a scholar from the École Française D’Athènes named André Plassart came across a building, on the small island of Delos, in Greece, a place known for its wealth related to material culture and religious multiplicity. After the analysis Plassart concluded that the small building was a Synagogue (Plassart, 1914: 523-534). This conclusion made the presence of yahwists on the Aegean coast as early as the 2nd century BCE indisputable. In the years 1979-1980, Bruneau (1982), incidentally, found two marble inscriptions a little further north of the site, buried by a not very thick layer of soil in one of the roads. The finding indicated the possibility that the builders and visitors of the site would be of Samaritan/Israelite origin and not Jewish (Bruneau, 1982: 479). The investigation that followed indicated that a second renovation of the building was carried out in the first half of the 1st century BCE, with this evidence being a very useful element in understanding Yahwist practices in the Roman period, pointing out, with great probability, that the Synagogue was in operation until the second century CE (Levine, 2005: 107-108). The hypothesis raised in this work is that the cultural articulation between yahwists and polytheist populations was a reality in Delos, inserting the cult of Yahweh in a landscape of religious plurality, placed in an architecturally, archaeologically and culturally very important place for the Mediterranean studies.

886 THE ARCHAEOLOGY OF MASS GRAVES: NEW APPROACHES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Saqqa-Carazo, Miriam (Universidad Complutense de Madrid) - Baillie, Britt (Roskilde Viking Ship Museum) - Renshaw, Layla (Kingston University) - Sturdy Colls, Caroline (Staffordshire University) - Schroeder, Hannes (University of Copenhagen)

Session format: Regular session

Many war dead and victims of persecution, across Europe and beyond, lie in unmarked graves—deliberately concealed or forgotten over time. In ‘recent’ cases, archaeological evidence is used to prosecute criminals, ensure dignified

burials for the deceased, and provide answers for family members. In ‘historic’ cases, analysis can provide unique insights into the identities of the deceased, the trajectories of particular diseases, the movement of peoples, previously unknown battles, the make-up of armed forces, etc. This session will probe how new technologies, applications, or increased accessibility of such technologies (e.g. LIDAR, Satellite imagery analysis, smartphone video/photo analysis, data mining, ground penetrating radar, DNA analysis, isotope analysis, etc.) are improving the search efficiency for unmarked mass graves, easing access into difficult terrains, as well as providing new insights into the origins, movement, diet and disease of the interred individuals. As these technologies improve, at times they are able to be applied to assemblages excavated long ago or cold-cases to yield new results. As this field and its applied technologies develop, questions surrounding ethics, operating procedures, and the need for transparency continue to remain at the fore. Inattention to these details can result in miscarriages of justice as well as the political abuse of the results. Hence, this session seeks papers addressing the use of new technologies in the location, excavation, and interpretation of mass graves as well as reflections on the ethical implications of such uses.

ABSTRACTS

1 REMOTE SENSING AND THE IDENTIFICATION OF FAMINE AND OTHER UNMARKED INSTITUTIONAL GRAVES IN IRELAND

Tierney, John (Eachtra) - Davis, Stephen (UCD Archaeology Dept.) - Bhreatnach, Aoife (APEO Consulting)

Since 2011 we have been involved in the survey of over 800 Irish burial grounds as part of a community archaeology project (www.historicgraves.com). In this time we have noted the presence and morphology of unmarked graves in burial grounds and since 2020 we have tested techniques for the identification, recording and interpretation of these features, particularly in 19th/20th century institutional cemeteries. This work reveals an institutional tension between the use of common burial (both narrow and long) and single-use burial features.

Lidar survey in Cork District Cemetery (1847-1960s), Cork, Ireland, has identified three phases of unmarked graves across the 1.2 hectare site. Three different types of graves are also present. 1. mass/common graves of the Great Irish Famine (1847-1850) measuring 2.8m x 2.5m, against the northern boundary 2. early 20th C long graves measuring up to 20m in length x 2m wide. 3. narrow graves (a single grave space (1m wide)) in the western 20th century extension. This work is producing a new typology of institutional mass common graves in Ireland.

Since 2014 in Ireland field and forensic archaeologists have been involved in important and sensitive institutional burial projects, amongst others, those relating to the Mother and Baby Homes in Tuam, Co. Galway and Bessborough, Co. Cork. There are important lessons to learn from these high profile projects including the requirement for the rigorous use of appropriate archaeological assessment methodologies and a familiarity with contemporary burial practices and associated burial features.

In this talk we present our ongoing research focusing particularly on drone SFM and LIDAR surveys, in combination with the work of historians of 19th/20th century institutions, for the purpose of better understanding of burial practices for the anonymous poor. The work is part-funded by the Horizon 2020 EU Incultum project.

2 3D VISUALIZATION AND VIRTUAL RECONSTRUCTION AS TOOLS TO ANALYZE HISTORICAL AND RECENT MASS GRAVES

Mickleburgh, Hayley (University of Amsterdam; Forensic Anthropology Center, Texas State University)

Human graves are the result of a combination of human actions (e.g., digging of the grave, positioning and treatment of the body) and natural processes (e.g., body decomposition, grave formation processes), both of which affect the position of bones and evidence in the grave. The investigation of complex archaeological contexts such as mass graves relies strongly on understanding the significance and evidentiary value of these spatial relationships.

Technological advancements over the past three decades have created an array of options to use 3D modelling, Virtual Reconstruction and 3D animation as research tools to augment reconstructions of the past and test research hypotheses. Digital 3D data capture and Virtual Reconstruction methods allow researchers to analyze and visualize complex spatial relationships and provide new ways to reconstruct events leading up to burial, or to simulate hypothesized sequences of events. In this paper, I explore ways to harness the potential of 3D visualization to study mass graves in an ethically conscientious manner. Using examples of virtually reconstructed graves from the Mass Grave Project, I aim to demonstrate how 3D technology can advance the study of mass graves beyond standard 3D data capture of graves and in situ evidence during excavation (i.e. 3D scanning, photogrammetry). The Mass Grave Project is an interdisciplinary experiment simulating clandestine mass and single graves (primary and secondary) with human body donors at the Forensic Anthropology Center, Texas State University. It aims to contribute to the development, testing, and validation of scientific methods for mass grave investigation, and to train students and practitioners in excavation and field recording methods. The project uses 3D scanned data from experimental graves to create in-

teractive and immersive virtual environments to analyze spatial relationships, test taphonomic hypothesis and provide realistic virtual training tools.

3 INVESTIGATIONS MASS GRAVES OF HOLOCAUST-ERA IN UKRAINE: CHALLENGES AND PERSPECTIVES

Cherkaska, Daria (Staffordshire University)

Forensic and archaeological investigations of mass graves and other sites connected to the Holocaust has developed significantly, particularly over the last 40 years. Employing of archaeological approach for Holocaust studies in Ukraine is not terra incognita. However, the main limitation is a lack of local experts and infrastructure for training forensic archaeologists in Ukraine. There are also no Ukrainian forensic archaeologists are trained for legal or academic projects.

With the full-scale Russian war against Ukraine, the importance of the adaptation and broader application of forensic archaeological methods for investigating criminal acts of mass violence (including the investigation of mass graves) increased dramatically. Forensic archaeological methods were applied for the investigations of war crimes in liberated Ukrainian territories. In addition, it is also important to remember that Ukrainian soil is a multilayer landscape of various genocides and mass violence. This will become more important as more time passes, and it perhaps becomes less clear (in a visual sense due to decomposition) which period graves relate to. Moreover, the ongoing war actually increases the need to search for historic graves. Not only are these sites under threat from the conflict, being able to distinguish between them and more recent graves is imperative to avoid a situation whereby the victims are misidentified as belonging to one episode of mass violence or another.

Another important vector of research in Ukraine is remote sensing technologies. In the short to medium term at least, military operations may limit the resources available for searches for Holocaust-era mass graves in the future, whilst the war itself will also restrict access to these sites. This approach has been a strong impetus to the development in Ukraine since February 2022.

4 MASS VIOLENCE, AGE AND GENDER IN THE EARLY IRON AGE OF THE SOUTHWEST CARPATHIAN BASIN

Iraeta Orbegozo, Miren (Globe Institute, University of Copenhagen (KU); School of Archaeology, University College Dublin (UCD)); UCPH School of Archaeology) - Fibiger, Linda (School of History, Classics & Archaeology, University of Edinburgh) - Mylotamitaki, Dorothea (Globe Institute, University of Copenhagen (KU); CIRB, Collège de France, Université PSL, CNRS, INSERM) - Laffoon, Jason (Department of Archaeological Science, Leiden University) - Makarewicz, Cheryl (Institute of Prehistoric and Protohistoric Archaeology, University of Kiel) - Koledin, Jovan (Museum of Vojvodina) - Bruyère, Caroline (School of Archaeology, University College Dublin (UCD)) - Ramos Madrigal, Jazmín (Globe Institute, University of Copenhagen (KU)) - Schroeder, Hannes (Globe Institute, University of Copenhagen (KU); UCPH School of Archaeology) - Molloy, Barry (School of Archaeology, University College Dublin (UCD))

In this paper, we present the results of the bioarchaeological and biomolecular (re-)analysis of 77 individuals from the Early Iron Age of Gomolava. Situated within the Carpathian Basin in southeastern Europe, Gomolava occupies a position amidst intricate socio-spatial relations, divergent cultural norms and competing landscape-use ideologies. Employing a multidisciplinary framework, we suggest a model for the social context in which the violent events surrounding the death of those buried in Gomolava took place. We explore the cause of death through osteological analysis, discern mobility patterns and diet habits through isotope analyses, ascertain the age and sex distribution across the complete assemblage using a combination of osteological examination, genetic sexing and enamel peptide analysis and establish the age and time frame of the burial event using radiocarbon dating and micro-CT scanning. These findings contribute to our understanding of wider events not only for this transformative period in European prehistory but also, more broadly, on the evolution in complexity of selective violent practice in human history.

5 AN ARCHAEOLOGICAL APPROACH TO THE EXCAVATION OF TERRESTRIAL WW2 AIR CRASHES IN EUROPE

Errickson, David (Cranfield University) - Márquez-Grant, Nicholas (Cranfield University) - Dalton, Kevin (Henry Jackson Foundation) - Humphrey, Kenneth (Defense Prisoner of War / Missing in Action Accounting Agency)

Forensic archaeology has been employed to investigate 'air crash sites', often considered mass graves in their own right. The Defense Prisoner of War/Missing in Action Accounting Agency (DPAA), USA have a commitment to provide the fullest possible accounting for missing personnel from 20th century conflicts to their families and the United States. Over 72,000 of these missing individuals are from the Second World War, with many from the United States Army Air Force (USAAF) making up this number. An active partner of the DPAA, is Cranfield University whose

forensic institute specialises in actively searching, locating, recovering and identification, where possible, of human remains from a number of conflict sites. Cranfield University has been partnering with DPAA since 2018 and in the last three years alone post-Covid, it has contributed to 12 of these recovery missions, mainly in Italy and Germany.

This presentation focuses on two different air crash investigations where forensic archaeology has been employed to locate and recover missing WWII personnel where possible. These incidents were different in nature and pose different challenges. The first example is a B-17 crash site in Germany and the second, a B-26 crash site in Italy. These cases present the challenges faced by the forensic teams and approaches and improvisation in terms of recovery. The presentation focuses also on lessons learned which may help future missions of similar characteristics.

6 ADVANCED OSTEOLOGICAL TECHNIQUES IN THE EXHUMATION AND ANALYSIS OF A HISTORIC MASS GRAVE IN RONCESVALLES, SPAIN

Bonthorne, Emma (Aditu Arkeologia; Department for Continuing Education, University of Oxford) - Zurek-Ost, Andrea (Department of Anthropology, University of North Carolina) - Loe, Louise (Oxford Archaeology) - Griffiths, David (Department for Continuing Education, University of Oxford) - Schendzielorz, Sofie-Kristen (Centre for Anatomy and Human Identification, University of Dundee) - Valle de Tarazaga, Francisco (Aditu Arkeologia)

During excavations at the Silo de Carlomagno (Roncesvalles, northern Spain), a historic mass grave dating to the late 18th/early 19th century was uncovered in the semi-subterranean levels beneath a 12th century church. Although mass graves rarely present a straightforward challenge, the case of Roncesvalles was compounded by the complexity of the surrounding funerary contexts, composed of the heavily fragmented, commingled bone of the ossuary intermixed with articulated burials contemporary to the mass grave. Despite the theoretical and logistical challenges of this type of deposit, the mass grave represents an enormous source of information on the individuals who were involved in the numerous conflicts that took place in the region, and which remain largely absent from the local historic records.

This paper explores the excavation methodology and in-situ recording techniques implemented to track potential bone articulations that were tested in the temporary field laboratory. The incorporation of data from proteomics (specifically peptide analysis) and strontium stable isotope analysis aided in the interpretation of the conflict-related commingled deposits at the site, providing insights into the demographic composition and geographic area of origin of those interred in the grave. These results were further supported by osteological trauma analysis, which identified various examples of weapon-related skeletal trauma consistent with the chronology of the grave in both the commingled and articulated burials. With close to one million bones and bone fragments recovered over five seasons of excavation, the project represents one of the most exhaustive and large-scale investigations into commingled, multi-period deposits studied in the Iberian Peninsula. The presentation explores the integration of interdisciplinary approaches, including new techniques, to such a site and discusses methods of mass burial excavation and analysis within the wider context of the Convention and Napoleonic Wars (1793-1815).

7 ARCHIVAL FORENSIC ARCHAEOLOGY: A NOVEL APPROACH TO HISTORICAL EXHUMATIONS

Saqa-Carazo, Miriam (Universidad Complutense de Madrid)

Dealing with violence implies transiting spaces, but also times. What happens when mass graves have already been exhumed in the last century? What can forensic archaeology do about historical exhumation processes? What happens when the way to locate mass graves is to dig in historical archives? In this paper, I will explore a case study concerning an exhumation carried out by the Spanish Dictatorship in Madrid in 1942. In the Spanish context, the existence of mass graves, as well as the intervention on them, has a historical background that begins in the first year of the war. From a historical perspective, it is considered that part of the first phase of exhumations of mass graves in Spain was initiated on the corpses of the victors. For more than 15 years, the dictatorship carried out a process of locating, prosecuting and exhuming the corpses it considered to be its own victims (1936-1951). In this paper I will demonstrate how the use of a specific interdisciplinary methodology, applied to the study of historical and forensic archive documentation, is a novel approach to the location of mass graves and the study of their exhumations. This new approach allows for a joint assessment of several dimensions of the same event, focusing not only on the historical, forensic and archaeological aspects, but also on the political and social consequences and uses derived from the physical management of human remains in past conflicts.

888 FROM MATERIAL LANDSCAPES TO COGNITIVE LANDSCAPES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Verdonkschot, Jadranka (INCIPIT-CSIC) - Guénin-Carlut, Avel (University of Sussex; Kairos Research; Active Inference Institute)

Session format: Workshop

There is more to perception than meets the eye, literally. Although sight in many ways has been the preferred object of study for our understanding of how perception is shaped, our eyes are only one of the elements involved in the en-active process through which we experience the world we live in as a landscape of objects and opportunities for action. It is the engagement of an agent with its world, instantiated by the joint dynamic of the mind, body and environment, which constitutes and explains perception.

With this in mind, studying the duality of material culture and cognition in landscape archaeology holds great potential for uncovering patterns of thought in societies. The cognitive theory of Active Inference describes action and perception as an integrated process through which agents “infer” (and produce) their niche, given the prior knowledge about their world which is encoded in their own internal dynamics. This provides us with a powerful theoretical tool to relate the human actions we trace in a landscape to subjective patterns of perception and the underlying structures that guide the thought of society. Mind and action converge in the landscape. At the same time, it is necessary to recognise that the encounter between cognition and materiality is always historical. The temporally implied element of the historical, not merely contextual, existence of social relations is important.

This workshop consists of a keynote to frame the topic, followed by presentations and a round table of invited speakers for discussion. Participants are invited to present their own research and the implications of the study of perception in landscape. Ultimately, the aim is to build a common understanding of the convergence between theoretical neuroscience and archaeological practice, oriented toward the collaborative construction of novel methodologies and new support networks for future research.

893 PROFESSIONAL ARCHAEOLOGY IN EUROPE: THE STATE OF THE ISSUE

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Giorgio, Marcella (ANA - Associazione Nazionale Archeologi (Italian National Association of Archaeologists); Soprintendenza Archeologia, Belle Arti e Paesaggio per le province di Pisa e Livorno (Italian Ministry of Culture)) - Festa, Giovanni (University of Salzburg (Austria))

Session format: Discussion session (with formal abstracts)

The work of archaeologists has changed a lot in recent years, taking great strides towards a thorough professionalization and taking strides to be equal to more structured professions. This evolution, however, followed different stages and times throughout Europe, depending on the specific characteristics of the individual States and the legislation applied in them.

This panel will be a moment of reflection on the state of professional archaeology in Europe by presenting data that shows work and professional life of European archaeologists, how archaeology and its workers are perceived in society, what specific difficulties involve this field of work compared to other high scientific level professions.

We welcome reports that offer a deep and wide vision of the work of professional archaeologists in the various European States, aim to understand their real professional conditions and initiate a comparison which can be followed by the identification of shared collaboration strategies.

This session is organized in collaboration with the Italian National Association of Archaeologists (ANA), which is part of the Advisory Committee of the EAA 2024. The session would be an opportunity to show data of the 3rd National Census of Italian Archaeologists proposed by ANA during the fall/winter 2023-2024.

ABSTRACTS

1 COMMERCIAL ARCHAEOLOGY IN THE UK: MANY JOBS, FEW CAREERS?

Festa, Giovanni (University of Salzburg)

In the UK, more than three-quarters of the workforce working in archaeology is employed in the private sector. In recent years there has been a massive government investment in infrastructures for roads and rails such as the High Speed 2 project. This project has engaged many archaeological contractors in collaboration, forming several joint ventures working simultaneously in different locations of the same project.

On the surface, there was never a better time to get into commercial archaeology; the sector has faced, and is facing, a labour shortage due to several reasons, such as the falling student numbers in archaeology programmes, the lack of a sustainable career structure, the effect of the COVID-19 pandemic and the UK departure from the European Union. The presentation aims to set out an overview of the strategies adopted to satisfy the lack of a trained workforce and the approach adopted in the commercial sector to support individual archaeologists for a senior career trajectory.

2 PROFESSIONAL ARCHAEOLOGY IN IRELAND: THE STATE OF THE ISSUE

O Maolduin, Ros (Institute of Archaeologists of Ireland) - McCullagh, Niamh (Institute of Archaeologists of Ireland)

The IAI is the representative all-island organisation for professional archaeologists working in the Republic of Ireland and Northern Ireland. We aim, through the representation of our members, to advance and strengthen the profession of archaeology in Ireland. Our vision is that we will have a vibrant and sustainable archaeological profession that actively contributes to the protection of our archaeological resource, which in turn contributes to the social and economic well-being of the entire community. This paper will provide an updated overview of the archaeological profession in Ireland, drawing on recent surveys and strategies including Archaeology 2030 (NI) Archaeology 2025 (RIA) and the findings from an ongoing survey and development strategy commissioned by the Institute of Archaeologists and conducted by Mantra Strategy (2024) and DISCO (Cleary & McCullagh 2012-2014). It will set this within the context of the legislative framework in both the Republic of Ireland and Northern Ireland, and the complexities which that can entail.

3 FROM “STATE ARCHAEOLOGY” TO “PUBLIC ARCHAEOLOGY”: LOOKING FOR AN ITALIAN WAY TO LINK ARCHAEOLOGICAL HERITAGE AND SOCIETY

Knobloch, Roberto (Cooperativa Archeologia)

Public archaeology and cultural heritage management are two fields which only in recent times became subjects of extensive research in Italy, where the adjective “public” is generally referred to a State-owned asset, instead of a matter of public interest. All Italian archaeology is virtually a public archaeology, because the State is the owner of the new findings and the person in charge of heritage conservation and archaeological research. On the one hand, this State monopoly is the highest recognition of the role of archaeology as common good; by the other hand, it can become a noose which suffocates the active involvement of civil society and the economic and scientific freedom. This paper will focus on how Italian legislation addresses relations between public authority, local communities, scholars, volunteers, practitioners, traders and ordinary citizens, in an effort to strike a balance between the various stakeholders engaged in archaeological activities. Topics of the contribution will be divided in four main themes. The first (archaeology and local communities) will cover the role of local governments, municipalities and local history museums in archaeological heritage conservation and management, as well as the work of local historians, amateurs and volunteers. The second (archaeology and economics) will deal with contract archaeology and the role of professionals and contractors. The third (archaeology and research) will address the issue of freedom of inquiry, namely the license for archaeological excavations and the right to publish new data and findings. The fourth (archaeology and education) will focus particularly on open data and copyright of cultural heritage images.

4 WIND OF CHANGE: BEING AN ARCHAEOLOGIST IN ITALY BETWEEN REALITY AND PERCEPTION

Garrisi, Alessandro (Associazione Nazionale Archeologi) - Giorgio, Marcella (Associazione Nazionale Archeologi)

In the last 10 years an undeniable change happened in the world of Italian archaeology: an evolution that has affected every aspect of the archaeological profession. The 2014 Professional Recognition Law (Legge 22 luglio 2014, n. 110) and its Regulatory Decrees (2019) (D.M. 244/2019, allegato 2 “Archeologi”) have triggered a phase of change towards an evolved, modern and structured professional archaeology even outside the traditional area of the constructions sector. This is quickly moving archaeology towards new professional challenges.

But how has Italian archaeology changed or is changing? How are archaeologists perceived and how do they perceive themselves in Italian society? What challenges await Italian archaeologists for the continuous improvement of their profession? How are the Covid-19 pandemic and the PNRR (National Recovery and Resilience Plan) projects of recent years impacting this phase of change?

These are some of the questions that this panel wants to answer, also by showing new data from the 3rd National Census of Italian Archaeologists proposed by ANA - National Association of Italian Archaeologists during the first months of 2024.

895 PERCEIVING AND SHAPING LANDSCAPES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Schaefer-Di Maida, Stefanie (Institute for Pre- and Protohistoric Archaeology, CAU Kiel; CRC 1266) - Di Maida, Gianpiero (CCEHN Project – Niedersächsisches Landesamt für Denkmalpflege, Hannover) - Wollentz, Gustav (Nordic Centre of Heritage Learning and Creativity)

Session format: Regular session

The prehistoric use of landscapes is a fundamental field of study in archaeology that has recently been investigated by many interdisciplinary research approaches. But while it is often only about the reconstruction of certain sites and their subsistence and organization, with this session we would like to bring together different approaches to the perception of whole landscapes that have been actively divided, structured and shaped between the Palaeolithic and the beginning of our current era in Europe. As existing research has shown, landscapes have always been modified and used in different ways, be it through the creation of landmarks or places of memory (e.g., megaliths, burial mounds, towers), boundary lines (e.g., pit alignment, fortifications) or other functional as well as sacred sites (e.g., cooking stone pit areas, cult sites, deposition sites). In addition to such artificially created elements that shaped landscapes, natural features were also used, shaped and integrated into people's perception of their own environment, such as caves, forests, trees, bodies of water, wetlands, islands and mountains. While today – following a naturalistic world-view – western-educated scholars often make the distinction between artificial and natural landscape elements, for prehistoric societies this has to be concretely questioned and viewed from different angles.

For our session, we are interested in contributions that deal with prehistoric perceptions of landscapes from both theoretical and ethnoarchaeological perspectives and link these to archaeological evidence. Furthermore, we are interested in diachronic perspectives, which look in particular at phases of change in function and use or changes in the structuring and shaping of landscapes. Interdisciplinary discussions that also include landscape and land use reconstructions are very welcome. We are also interested in spatial analyses that focus, for example, on modelling or predicting landscape changes.

ABSTRACTS

1 NEANDERTHALS AND THE CAVE

Di Maida, Gianpiero (Niedersächsisches Landesamt für Denkmalpflege)

Caves are central elements in the folklore of many cultures of different regions and times. It is easy to imagine that their physical characters (dark, humid, with different acoustics) must have contributed to this aspect, also due to a radical different set of perceptions' stimuli toward their visitors in comparison with the upper world. These aspects together can help in explaining the prominent role that caves have played in both the lives and the collective imagination of humanity: from Teotihuacan to Cuma, caves have often been connected with rituals and religion, and some of them have resisted with similar functions until today (Amarnath). Examples of their relevance in symbolic contexts are also present in many and ancient written texts: it is not by chance that arguably the most famous analogy in the work of Plato features a cave in a very prominent position.

In Palaeolithic times, although we cannot know with precision the role they played for the different groups, it seems obvious to attribute to caves a central place. From shelter and everyday-life duties, to rituals and the elective place where art was made and enjoyed, it is difficult to argue with their centrality within the Palaeolithic lifestyle. Some cases though seem to reveal more than others do in this regard: as the Tuc d'Audoubert, or the Chauvet cave. Hence, the enormous relevance of caves in the history of our species is established. The importance and role they played in Neanderthal's communities is instead less clear, specifically in connection with the still hot-debated and very divisive topic concerning Neanderthals' cognitive abilities. This contribution will investigate the interaction between cave environments and Neanderthals, with the aim of unfolding Neanderthal's use of this specific landscape type. The case of the Einhorn cave (Germany) will be discussed in detail.

2 WHEN THE SHEEP GOES MARCHING IN. PERSPECTIVES ON THE PREHISTORIC SYLTHOLM FJORD, DENMARK

Groß, Daniel (Museum Lolland-Falster) - Koivisto, Satu (Museum Lolland-Falster) - Måge, Bjørnar (Museum Lolland-Falster) - Philippsen, Bente (Norwegian University of Science and Technology) - Robson, Harry (University of York) - Brinch, Marie (Museum Lolland-Falster) - Schmölcke, Ulrich (Leibniz Zentrum für Archäologie; Museum Lolland-Falster)

The prehistoric Syltholm Fjord is one of the best investigated prehistoric landscapes in Denmark, and the island of Lolland's only point that is visible from continental Europe. Long barrier islands formed a protected fjord landscape during the Stone Age, which served as a settlement and fishing locale particularly during the Neolithic.

In this presentation we will provide an overview of research into the former Syltholm Fjord and the surrounding landscape. We aim to discuss the area's relevance for Neolithic people and explore in which ways the water- and landscapes inform us about prehistoric decision-making and spatial understanding. This will be based on new analyses of faunal materials and extensive stationary fishing structures that will be contextualized within the wider region as well as selected snap-shot scenes from the Neolithic Syltholm Fjord, providing fascinating insights into past realities. We will attempt to incorporate the factual archaeological data into an interpretation of human self-perception against the background of the introduction of new technologies during the Neolithic period in southern Scandinavia.

3 NOW YOU SEE ME. INFLUENCE OF LANDSCAPE ON SETTLEMENTS FROM THE NEOLITHIC TO THE EARLY BRONZE AGE IN NORTH-EASTERN GERMANY

Raese, Hendrik (Institute for Pre- and Protohistoric Archaeology, CAU Kiel)

Following decades of surveys, field work and dedicated research projects especially in the course of large linear infrastructure projects (e. g. motorways and pipelines) numerous settlements from the Middle Neolithic to the Early Bronze Age (3500-1500 BCE) were identified in north-eastern Germany. This opens the possibility to search for changing settlement location preferences by means of pre- or postdictive modelling. While these models are traditionally based mostly on environmental variables (aspect, slope, soil type, etc.) they can be refined by including socio-cultural variables (visibility, previous occupations, transport networks, etc.). The focus will be here on three aspects of the visual perception of landscape: First, the location of burial mounds as these are interpreted as visible markers of interregional routes and considered to be built along an existing path network. Second, the total or cumulative viewsheds and visual neighbourhood configurations based on terrain and elevation as indicators of the general (in)visibility of a place. Third, the general vegetational land openness according to REVEALS models shows the direct impact of human activity on their surroundings.

These facets of land use and landscaping emerge or change during the analysed time period and will be investigated as possible influences on the settlement site selection criteria of prehistoric societies.

4 EVERYTHING HAD IT'S PLACE? SHAPING AND PERCEIVING BRONZE AGE LANDSCAPES IN NORTHERN GERMANY

Schaefer-Di Maida, Stefanie (CAU, Institut für Ur- und Frühgeschichte)

Everyday we are still confronted with elements of Bronze Age landscape formation (1800-500 BCE) in northern Germany, as the monumental burial mounds still stand out here and there - when they have been preserved and not yet levelled by agriculture. However, during the Bronze Age there were many more elements that organised, divided and highlighted landscapes, by sparking a certain perception. The transition from the Early to the Late Bronze Age, around 1300 BCE, brought with it many societal changes: e.g., change in burial ritual, settlement organisation, land-use. With it, new elements become visible in the landscape, which must have triggered a new perception of the surroundings. In addition to burial mounds, we can reconstruct urn cemeteries, cooking stone pits areas, Celtic fields, hoards and places of illumination in the landscape – all of them appear to be linked to specific time phases and sometimes to specific landscapes. The following aspects that characterise the different landscapes of a region are particularly striking: 1) places were consciously used and reused, 2) places were made visible, 3) places were used for special, non-everyday occasions, 4) places were associated with particular topographical or environmental positions. This contribution presents the various landscape elements of the Bronze Age in northern Germany and discusses their perceptive power against the background of the spatial-temporal development.

5 ANCESTRAL COMMONS: SHAPING THE INTERCONNECTED WORLDS OF BRONZE AGE PASTURES IN NORTHERN EUROPE

Houghton, Mark (Aarhus University) - Løvschal, Mette (Aarhus University; Moesgaard Museum)

New human-provoked and maintained landscapes emerged across Northern Europe during the third and second millennia BC: open stretches of heathlands affording grazing pastures and social opportunities. The commitment between humans and heathlands produced ancestral commons, literally and figuratively, understood as an entanglement between pasture, funerary barrows, and pastoral mobility. These ancestral commons revealed new social affordances which bound communities to landscapes in novel ways and strengthened senses of reciprocity and cooperation.

Focusing on key regions of Northern Europe, we combine palaeoecological and archaeological evidence to identify the character, strength, and temporal depth of these emergent links. Variations in this system are evident across these regions, with ancestral commons taking on distinctly local characters while remaining articulated with the overarching phenomenon. In this way, prehistoric landscape perceptions are revealed to have been broadly recognisable yet locally specific. We argue that an ancestral commons framework opens up our understandings of how the ancestral dead shaped pastoral landscapes and the negotiation and management of day-to-day land use practices. Considering the ancestral commons as deep-time more-than-human entanglement, we identify socially and economically important rhythms of return which contribute to a new, shared anthropogenic landscape horizon and an ancestral past.

6 STRUCTURE OR CHAOS? A TALE OF TWO COOKING PIT AREAS

Beck, Malene (Østfyns Museer)

On the central part of Funen two of the largest cooking pit areas known in Denmark are set within sight of each other. Both areas originally consisted of more than 1500 cooking pits but where one area is structured in long parallel lines the other area seems chaotic with no evident system. The cooking pit areas have different landscape connotations and probably express different functions or purpose, although they were in use simultaneously.

The structured area, with 16 parallel rows of cooking pits, is the locus classicus Rønninge Søgård, partly investigated by prof. Henrik Thrane in the 1970's and 80's. New excavations has provided a better understanding of the cooking pit area. The long rows seem to be the result of few larger gatherings conducted around 1000 – 800 B.C. coeval with a significantly high depositional activity in the area. The seemingly large and organized gatherings in connection with very prominent bronze age hoards could be interpreted as society handling some sort of stress or change.

3 kilometers west of Rønninge Søgård a chaotic looking cooking pit area encircles a hill in an otherwise flat landscape characterized by wetland areas, where numerous bronze age depositions have been discovered. The preliminary AMS dates indicate, that the area was in use throughout the Bronze Age, which makes it possible, that the cooking pits are the result of several minor events or visits to the site.

Landscape analysis indicate, that the two areas were interrelated, as the cooking pit lines at Rønninge Søgård were oriented and aligned according to the hill. The landscape analysis along with analysis of bronze age depositions and settlements raises questions about how the landscape was perceived, utilized and structured during the bronze age, and the paper tries to answer some of these questions.

7 FROM ARCHAEOLOGICAL EVIDENCE TO ENCHANTED WORLDS: A PROPOSAL TO EXPLORE PREHISTORIC LANDSCAPES

Díaz de Liaño, Guillermo (MOLA (Museum of London Archaeology)) - Gonzalez San Martin, Ana (Brown University)

The goal of this talk is to briefly explore some of the challenges, as well as the possibilities, of trying to infer how prehistoric landscapes could have been perceived by their prehistoric inhabitants.

The study of how landscapes were perceived in the past requires approaching not only the archaeological evidence, but perhaps, more dauntingly, the very cognition and ontological frameworks of prehistoric societies. Our proposal involves combining resources from several disciplines, including sociology and cognitive anthropology, to create a framework through which we are able to infer how the landscape was perceived, through the analysis of empirical archaeological evidence, particularly in relation to the social and economic complexity of past societies. Our proposal aims to break away from the conventions that structure Western ontological categories, and thus our conceptualisation of landscape includes a plethora of non-human entities, with varying degrees of subjectivity and power, that according to this framework would have inhabited the landscape alongside human beings.

This methodological proposal is briefly illustrated with case studies from two Mediterranean contexts: the southeast of the Iberian Peninsula, during the Chalcolithic and Bronze Age (3300-1550) and inland Bronze Age Cyprus (2600-1000).

8 ISLAND FORESTRY - AVAILABILITY, MANAGEMENT AND PERCEPTION OF WOOD RESOURCES ON ISLANDS FROM AN ARCHAEOLOGICAL AND ETHNOGRAPHIC PERSPECTIVE

Speciale, Claudia (Institut Català de Paleoeologia Humana i Evolució Social (IPHES); Universidad Rovira i Virgili (URV); University of Gothenburg (GU)) - Picornell-Gelabert, Llorenç (University of the Balearic Islands (UIB)) - Vidal-Matutano, Paloma (Universidad de La Laguna (ULL)) - Allué, Ethel (Institut Català de Paleoeologia Humana i Evolució Social (IPHES); Universidad Rovira i Virgili (URV))

Marine islands have more or less limited territories surrounded by the sea and their ecological balance is often more fragile than the one on the mainland. On islands, plant species and ecological associations can be very peculiar and sometimes human communities have developed local behaviors to address to these specific features. Furthermore, biodiversity and species niches can be under threat and biological resources can be rapidly eroded due to human and/or climatic pressure. There are several historical cases of fast erosion of plant species after human arrival and even more in the recent past in the Mediterranean with the phenomena of re-colonization of the 18th and 19th century (it is for example the case of Lampedusa and its exploitation as a charcoal kiln). Finally, despite being a crucial resource in the daily life of a community, arboreal plants and their availability are often underestimated in the evaluation of habitability of places, while their role was definitely of main importance, especially for the first communities colonizing and settling such new territories.

We present the data from small and bigger islands of the Mediterranean (Sicily and the circum-Sicilian volcanic islands), of Sri Lanka, Equatorial Guinea and the Canary Islands in a comparative framework. We collected the most significant historical and ethnographical data on the wood management, to understand the role that arboreal plants have or have had in the recent past, spacing from the practical to the symbolic significance. We want to understand if and how historical and ethnographical data can help in the reconstruction of the perception of wood resources on islands and their potential management among the human communities. Ultimately, we aim at using this information to adjust the interpretation of the anthracological data from archaeological sites and their role in the sustainable management of the island forestry.

9 PALSTAVES FACING THE SEA: EXPLORING COASTAL HOARDING TRADITIONS DURING THE TRANSITION FROM BRONZE AGE TO IRON AGE IN NORTHWESTERN IBERIA

G. Faro, María (Spanish National Research Council) - Armada, Xosé-Lois (Spanish National Research Council)

The hoarding of metals is one of the most characteristic practices of the cultural dynamics documented during the Bronze Age in the Atlantic region, especially in its final stage. Northwestern Iberia hoards are usually composed by palstaves with two rings and there is a highlighted concentration along the province of Pontevedra shoreline. Hoarding is a human practice that involves the deliberate removal of specific objects from consumption and circulation spheres and the intentional hidden in selected places. Hence, deposits are a symbolic materialization of the relationship between humans and the landscapes they were shaping through their practices.

The central question guiding this research was: Do coastal palstave hoard sites in northwestern Iberia follow a consistent pattern of selection of the site? However, the intrinsic characteristics of these archaeological discoveries present some challenges when attempting to analyse and recreate the cultural landscape to which they belong. This is due to the fact that most deposits appeared in poorly defined archaeological contexts and were often found by chance during agricultural activities many years ago, leading to uncertainty regarding the precise location of hoard sites. Nevertheless, despite being ancient discoveries, they remain in the collective memories of the inhabitants of the towns where they were located, and inquiries among local communities usually yield successful results in recovering information about these discoveries.

To address our question, we revisited the towns where palstave hoards were discovered along the shoreline of the province of Pontevedra (Galicia, Spain), aiming to enhance the accuracy of our data. Finally, we employed Geographic Information System (GIS) to conduct visibility analyses, exploring the decision-making processes underlying the selection of hoard sites. We have identified changes in the selection of hoarding sites traditions along the Late Bronze Age and the transition to Iron Age.

10 REIMAGINING MINING LANDSCAPES IN THE SIEGERLAND (GERMANY) - THEORY AND PRACTICE OF CULTURAL APPROPRIATION AND SHAPED SPACE

Stähler, Carmen (Ruhr-University Bochum)

The Siegerland (North Rhine-Westphalia) is thoroughly investigated research area for mining and iron production during the Iron Age in Germany (Stöllner, 2020). However, its landscape and settlement patterns are viewed from an ecodeterministic perspective only, due to its peripheral and climatically unfavourable location, the abundance of ore, and rare number of non-production-sites resulting from poor preservation and high detection filters. Thus, plural,

and diverse concepts of space and landscape besides the nature-culture-dichotomy and economical behaviour and perception have rarely been considered.

To approach this landscape differently, processes of settlement, mining, transport, etc. are conceptualized as practices of landscaping/making landscape (Ingold, 1993; von Rüden, 2022), meaning collective and intertwined practices and perceptions of and in space, which shape landscapes in a culturally specific way/habitus by appropriation. Thereby, it is possible to analyse landscaping quantitatively (GIS-tools e.g. least-cost-path, viewsheds), and qualitatively via social spaces, the practices of their appropriation (e.g. walking, sensing, mining), and the chances of their appropriation (e.g. accessibility). In this way, spatial practices from production- and non-production-sites can be compared within the framework of a Cultural Appropriation of Spaces and Things (CAST) (de Certeau, 1984; based on Hahn, 2004).

This paper will outline the theoretical and methodological background of CAST and present first examples of its application: By taking practice theory seriously, natural features or raw materials are not predetermined as (un-)favourable but checked against practices of appropriation such as walking by, digging through, looking at etc. Furthermore, smelting sites are dynamic spaces, not only on-site due to the duration of production and its residues, but off-site as well: They influence ways of moving about them (road networks) and thinking of them (e.g. places of social cohesion/memory/avoidance). This approach will shed light on how people experienced, shaped and constituted spaces and landscapes by and beyond mining.

11 GENDER AND COSMOLOGY IN EARLY IRON AGE MORTUARY MONUMENTS AND LANDSCAPES

Murray, Matthew (University of Mississippi)

This paper presents an exploration of gender and cosmology in the shaping and perception of mortuary landscapes during the early Iron Age (ca. 700-450 BC) in southern Germany. Monuments and their landscapes were simultaneously a metaphor for idealized social relations and a resource for social negotiations of those ideals. Maintenance of the social fabric of Iron Age society and its cosmological integrity were also intertwined, and both were concretized in physical acts of burial that embodied the earth with the agency of ancestors. Gender and cosmology are multilayered ways of ordering the world at different scales of complexity and integration from social beings to the entire universe. At times, these conceptual systems overlap. I briefly survey global anthropological literature that elucidates links between gender, cosmology, and landscape, and I use observations from early Iron Age mortuary landscapes at the Heuneburg, Magdalenenberg, and Glauberg in Germany to illustrate the notion that cosmological landscapes may be entangled with engendered landscapes. The way that human groups organize themselves can reflect fundamental ways that they perceive the organization of the cosmos, and mortuary landscapes are powerful settings in which people engage with these organizational structures.

12 WITHIN THE STORIES OF A LANDSCAPE

Karlsson, Anna-Karin (Kalmar County Museum)

The island Blue Maiden is located off the Swedish east coast between the mainland and the island of Öland. Huge boulders and steep cliffs provide a dramatic landscape. Weather phenomenon makes the visible experience of the island intriguing, with it vanishing, turning upside down and occasionally floating above the surface.

Archaeological fieldworks revealed extensive human activities in the Mesolithic. A rock shelter held massive cultural deposits containing lithic and osteological material. Charcoal from the deposits was radiocarbon dated to 7000 BC. In a cave nearby, a distinct ritual feature was identified. Around 4000 BC the activities on the island cease, and there are no traces of activities until medieval times. In the late 15th century, the island is mentioned for the first time in written sources, where it is said to be connected to powerful forces. Since then, the Blue Maiden has been associated with folklores related to bad luck, evil and witches.

Blue Maiden makes an interesting site for exploring how stories of the landscapes are created out of former inhabitants' dwellings and understanding of the landscape. The island holds archaeological sites with clear stratigraphical layers. Drawing on Tim Ingold it can also be argued that there are unearthing processes in play, where old patterns rise to the surface as new ones sink down. This results in a landscape where stories of today are created based on past perceptions and understandings of the world. But how far back can these stories be traced, and is that at all an important question?

901 UNDERSTANDING THE RESEARCH PROCESS AS A CHAÎNE OPÉRATOIRE

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Kaiser, Jessica (Uppsala University) - Huvila, Isto (Uppsala University) - Friberg, Zanna (Uppsala University) - Battle Baró, Sabina (University of Barcelona)

Session format: Regular session

As archaeologists, we are very familiar with gaps in the record. The data we collect for our research are often fragmented and incomplete. Imperfect data notwithstanding, we use the methods available to transform ambiguities to unambiguities in order to construct narratives about past societies. In the last few decades, this process has increasingly involved an array of digital methods and tools. Gone are the days when a site archive consisted of a large stack of papers languishing in the office of the site director. Not only are the final datasets digitized for preservation, but in many cases the data are born-digital without ever being put on paper. However, this new way of collecting and storing data raises new challenges in data curation and reuse. The focus of this concern has generally been the final dataset, with repositories specifying which types of metadata need to be included for its archiving. More recently, researchers have pointed out that data descriptions, conceptualized as paradata, need to accompany all stages of the research process, since choices made along the way can greatly affect outcome and results. We suggest envisioning the research process as a conceptual chaîne opératoire, where not every link is preserved. To understand archaeological knowledge production, it is crucial to pay attention not just to the rationale behind using a particular methodology, but also to the specific ways in which it is implemented during the research process. By applying the chaîne opératoire approach to trace the knowledge production process, we can make visible the practices that shape archaeological knowledge production today. We invite papers on any aspect of the research chain. We are particularly interested in papers that discuss methods for preserving and/or retrieving process- or paradata in order to facilitate the curation and reuse potential of archaeological data.

ABSTRACTS

1 CHAINED TO THE METHOD? HOW MIGHT DATA COLLECTION INFLUENCE POSTERIOR SHARING

Battle Baró, Sabina (Universitat de Barcelona)

More and more, archaeological data are collected with digital methods, both on the field and in the laboratory. This is allowing the creation of a higher volume of digital-born data. Obviously, these methods contribute to a more exhaustive record of the finds and can have important implications such as allowing big data analysis. However, it has been widely discussed in the literature the consequences this datafication has over the discipline and the way we work, manage our data, build interpretations, or even conceive science itself.

Understanding the archaeological research process as a chaîne opératoire helps us identify the choices we make in each step and can allow us to evaluate their implications. As one of the first links in the archaeological research process chain, data collection lays the foundations for the following stages. Moreover, it can shape our way of understanding the archaeological record and even rule the amount, type, and quality of the data we keep, and we dispose of. But are we aware of that when we choose to embrace digital methods? And how do our methodological choices influence further steps, such as data management and sharing?

In this communication, we will try to explore these questions using the insights derived from a series of in-depth, semi-structured interviews that delve into the habits and perspectives of Catalan archaeologists on data management, sharing and reuse. We will approach the different collection methods and the researchers' experiences when creating and managing the data, while trying to reflect on the impact those practices can have on the posterior sharing of the data.

2 PRACTICE AS (NOT) A SUM OF ACTIONS: MEETING TWO CHAÎNES OPÉRATOIRES HALF-WAY

Huvila, Isto (Uppsala University)

The notion of chaîne opératoire stands out as an interesting concept for thinking about archaeological work, knowledge production and its underpinnings in the archaeological stratum and its coming into being. Tim Ingold (2022, p. 262) asked a seemingly innocent question of whether it would be possible to conflate two chaînes opératoires: the one of the archaeological stratum and the one of its making, or in his example, a wall and the process of building it. The question was rhetorical in the sense that he dismissed the possibility straight out by noting that neither of them are series of discrete steps but rather "converging and diverging strands of a continuous braid", complicate rather than additive.

If we accept Ingold's view of the knotting of the multiple chaînes opératoires conceptualisable in archaeological knowledge work, there are several follow-up questions to ask. One is how the multiple chaînes opératoires come together.

Another is what implications the coming together have on using the concept of chaîne opératoire to understand archaeological knowledge production, and third, if and how archaeological knowledge production is documentable and approachable through the different ways intermingling chains of actions.

The presentation inquires into the nexus of multiple chaînes opératoires present in the archaeological knowledge production. Based on observations in several studies of the documentation of archaeological data creation conducted in the ERC-funded research project CAPTURE, it aims at detangling the relation of archaeological practices, knowledge production, the processes archaeology investigates, and how they are documentable and knowable. Discussing process documentation in terms of paradata, the presentation contributes to the on-going discussion on the documentation and communication of the practices and processes of data creation, processing and use that have been identified in the literature as crucial for future reuse of data.

3 PREREGISTERING ARCHAEOLOGICAL RESEARCH DESIGNS AND TESTING SHORELINE DATING

Roalkvam, Isak (University of Oslo)

Lewis Binford, among several archaeologists, criticised a failure in the discipline to distinguish between post hoc accommodative arguments – also called postdictive or hypothesis-generating research, and research designs aimed at testing these by evaluating their predictions against new or independent observations – often termed predictive or hypothesis-testing research. One tool that has seen increased use outside archaeology and some use within the discipline to maintain this distinction is the concept of preregistration of research designs. Preregistration is argued by its proponents to counteract so-called hindsight bias and the propensity of the human mind to inadvertently press data to meet a favored hypothesis. Detractors of preregistration, on the other hand, highlight the impossible task of foreseeing all analytical choices that have to be made in the course of a study, and worry that preregistration will instead function as an analytical straight-jacket.

I have recently proposed a formalised version of the somewhat idiosyncratic dating method known as shoreline dating, which is used for dating coastal Stone Age sites in Fennoscandia. This was based on an exploratory, postdictive study. To assess the reliability and precision of the method, further testing of the proposed implementation of the dating method is therefore necessary. To establish a transparent and sensible test, and to aid in the task of convincing myself and others that the method has been adequately confronted with independent data in such a test, the study design will be preregistered.

In my paper I will discuss some benefits and drawbacks of preregistration in general, and outline the approach I have used in an attempt at assembling a reasoned and not overly constraining preregistration of a framework for testing shoreline dating.

4 TRUE INTEGRATION: THE JOURNEY TO PRESENT ARCHAEOLOGICAL DOCUMENTATION WITH THE CRM FAMILY

Jansen, Jane (Arkeologerna; Intrasis) - Stead, Stephen (Paveprime Ltd; Open University)

This continuing integration study considers how the body of archaeological excavation databases of The Archaeologists (a department within the National Historical Museums of Sweden) is being prepared for integration utilising the CRMarchaeo and other extensions of the CIDOC Conceptual Reference Model (CRM). New details on how this will be done will be presented in this paper. We will show how CRMarchaeo will be applied on the Intrasis data model and how we will implement it on thousands of databases.

The Archaeologists create many new Intrasis-databases each year and the project is looking at making the full richness of both observations and interpretations available as a queryable resource. In addition the para-data of how the transformation from the internal Intrasis data-structure to the CRMarchaeo representation is being performed, is being modelled using the CRM family of ontologies. This enables the full digital provenance of any individual element of the full data-set to be assessed as well as understand the evolution of techniques used. This will allow scholars to consider both the archaeologically investigated past and the techniques used to manage the documentation of this past: the history of the discipline so to speak.

There is one further area of interest. It is the documentation of competing interpretations of primary evidence and the reasons for the selection of one interpretation over another. This is being done using CRMinf.

The presentation will showcase the work undertaken by Intrasis and Paveprime since last year to enrich both the archaeological record and the record of the documentation practice itself.

5 BROKEN LINKS OR PARALLEL CHAINS OF EVIDENCE? DIARIES AND PRO FORMA FROM A SPECIALIST PERSPECTIVE

Kaiser, Jessica (Uppsala University)

Diaries have been an integral part of the archaeological toolkit since the birth of the discipline. Early examples often weave together information on fieldwork and recent finds with colorful narratives of local happenings and scenery from the personal perspective of the author. In step with the pursuit of enhanced scientific credibility and objectivity of the discipline culminating in the processual archaeology of the 1960's, the focus shifted towards a more scientific approach, emphasizing objective data collection. The field notebook was repurposed as an instrument for empirical recording, ostensibly shedding its subjective nature. In the subsequent decades, the notebook has more and more given way to standardized pro forma, aimed at streamlining the archaeological process – some would say at the expense of interpretation. More recently, the post-processual emphasis on the subjectivity of archaeological practice has resulted in a number of archaeological projects (e.g. Çatalhöyük, Leskernick, Citytunneln) leveraging field diaries for reflexivity and advocating for an acknowledgment of the subjective underpinnings of knowledge creation. Subsequent studies have evaluated overlapping or disparate types of information contained in field diaries and standardized sheets from both academic and commercial archaeological projects (e.g. Berggren 2009, Mickel 2015, Sandoval 2021) as well as critique the purported spontaneity of published diaries (Anderson and Krstanovic 2008). However, while the acknowledgment of subjectivity has taken hold in archaeology in general, more 'processually' oriented specialists have perhaps been slower to follow suit. This paper aims at investigating whether similar interpretive disparities or overlaps can be recognized in specialist records, by comparing information from notebooks and pro forma produced by the bioarchaeological team at the Wall of the Crow Cemetery, Giza.

902 ARCHAEOLOGY OF WILDERNESS: HUMANS, ANIMALS AND LANDSCAPES THROUGHOUT THE HOLOCENE

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Vukovic, Sonja (Laboratory for Bioarchaeology, Archaeology Department, University of Belgrade - Faculty of Philosophy) - Larsson, Petter I. (University of Helsinki, Department of Cultures, Archaeology) - Marom, Nimrod (School of Archaeology, University of Haifa) - Živaljević, Ivana (University of Novi Sad – Faculty of Philosophy)

Session format: Regular session

Anthropogenic impact on the environment resulted in unprecedented crises, including climate change and biodiversity loss. Archaeology, with its deep-time perspective on humans and paleoenvironments, has become an active participant in the study of these dramatic Anthropocene changes. Identifying anthropogenic influences on ecosystems and separating these from natural processes is challenging. Bioarchaeological records sequester information on past multispecies communities. The refinement of methods for detecting and differentiating natural processes from human and livestock presence, such as sedaDNA, isotopes, biogeochemistry, and non-pollen palynomorphs but also archaeological and osteological approaches can provide a rich and diverse picture of the past and tell its stories in new ways. These allow us to push the boundaries of our knowledge and test old interpretations of past socio-ecological processes. They provide opportunities to develop new models about human-environment interactions and to examine challenging questions, like how well we can detect changes in disturbance regimes, track changes in the intensity of land use, identify low-intensity activities, Holocene extinctions, past translocations, the genetic diversity of wildlife, animal and plant domestication and the subsequent spread of agriculture, deforestation, urbanization and industrialisation.

This session aims to bring together speakers who apply innovative research designs to explore and communicate the interactions between culture and nature during the Holocene. We encourage the contribution of speakers from diverse fields (including environmental archaeology, multispecies archaeology, bioarchaeology, and archaeogenetics). The need for innovative methods and approaches to study socio-ecological processes is not only necessary for improving knowledge of past human-nature interactions and how these shaped landscapes; they can also help us to build more robust models and theories to connect archaeology and ecology, where answering many 'grand challenges' depends on our ability to think across human behaviour and ecosystem processes.

1 UNTANGLING THE ENIGMA OF ANTHROPOGENIC INFLUENCE ON VEGETATION COMPOSITION

Larsson, Petter Ingolf (University of Helsinki)

Here I present new data on anthropogenic modification on a landscape than can be described as marginal and unfavourable for agricultural purposes. The study is based on a pollen core from Lake Dalstråk in the northern parts of the Åland Islands (Finland). The region, with a hilly topography, offers an opportunity to get a good signal of understory proxies due to localised transportation of pollen and spores through surface run-off. The data is explored statistically through correlation analyses to resolve evidence of small-scaled anthropogenic land use and modification of the vegetation. The results, spanning from the end of the Bronze Age until the modern era (c. 740 BCE–1920 CE), suggest a previously unknown ecosystem modification of the landscape through low intensity agrarian practices. Due to the complex, non-equilibrate state of ecosystems, there is no single analysis that provides a holistic understanding underlying causation for variability and change in species composition. However, correlation analysis of apophyte pollen and spores against anthropogenic indicators and landscape openness indicators proves useful for interpreting palynological results and can be used as an interpretive aid in exploring the pollen signal while avoiding circular interpretations. Correlation analysis was also proved to be prolific in highlighting patterns that generally tend to remain obscured. Except for new knowledge on prehistoric land use on Åland, the study provides a relatively easy methodological approach that can be adapted and used on various sites on a global scale.

2 PALAEOENVIRONMENTAL CHANGES THROUGH THE HOLOCENE IN CACHEU (GUINEA-BISSAU): PRELIMINARY PALYNOLOGICAL AND FIRE RESULTS

Domingues Gomes, Sandra (UNIARQ - Centre for Archaeology, University of Lisbon) - Costa, Ana Maria (LARC - Archaeosciences Laboratory, DGPC - Directorate General for Cultural Heritage, Portugal; BIOPOLIS and CI-BIO; IDL-University of Lisbon) - Freitas, Maria Conceição (Dom Luiz Institute; Department of Geology, Faculty of Sciences, University of Lisbon) - Mendes, Patrícia (Archaeosciences Laboratory, DGPC - Directorate General for Cultural Heritage, Portugal) - Arvela, Rute (UNIARQ - Centre for Archaeology, University of Lisbon; Department of Geology, Faculty of Sciences, University of Lisbon) - Gomes Coelho, Rui (UNIARQ - Centre for Archaeology, University of Lisbon; Department of Archaeology, Durham University, UK)

The ECOFREEDOM interdisciplinary project aims to understand the social and environmental impacts of slavery and colonialism in the region of Cacheu, an important town-port in the transatlantic trade of enslaved people between the 16th-19th centuries. We hypothesize that the forced displacement of local populations left discernible imprints on the environment. To investigate palaeoenvironmental changes in this area, including human activity, we conducted palynological analyses on a sedimentary sequence in the Cacheu estuary (CH2).

The 3.9m sedimentary record of CH2, composed by intercalations of sandy mud and muddy sand, and rich-shelly layers, was retrieved from a mangrove area, adjacent to abandoned rice fields. An AMS radiocarbon date was obtained for the base of the core (ca. 8400 cal BP), with further dating efforts underway to refine chronological constraints.

Our analysis, employing an adapted protocol to maximize the recovery of organic material, revealed sporomorphs representing the local mangrove forest, indicative of relative stability of past vegetation, in this area. Notably, the evolution of fire history emerged as a significant aspect, albeit requiring additional dating to elucidate accurate temporal patterns. Concurrently, investigations have commenced on a second sedimentary sequence (CH3) with higher levels of organic matter, collected in a rice field. Future endeavors aim to explore inland lagoonal systems surrounded by transitional vegetation zones, to provide further insights into regional vegetation dynamics.

These studies hold paramount importance, as Guinea-Bissau lacks prior palaeoenvironmental data essential for contextualizing archaeological and palaeoecological research. Understanding the interplay between human activities and climate is imperative for disentangling their impacts. Moreover, given the susceptibility of low topography regions like Guinea-Bissau to the effects of global climate change, palaeoecological investigations play a pivotal role in elucidating vegetation resilience. Our findings contribute to a deeper comprehension of West African palaeoenvironments, emphasizing the significance of palynology in reconstructing past landscapes.

3

NEW FINDINGS ON HUMAN IMPACT IN GREATER POLAND DURING THE MIGRATION PERIOD BASED ON HIGH-RESOLUTION PALAEOENVIRONMENTAL RECONSTRUCTIONS

Czerwinski, Sambor (University of Gdańsk, Faculty of Oceanography and Geography - Department of Geomorphology and Quaternary Geology, Gdańsk, Poland) - Lamentowicz, Mariusz (Adam Mickiewicz University, Institute of Geoecology and Geoinformation - Climate Change Ecology Research Unit, Poznań, Poland) - Izdebski, Adam (Max Planck Institute, Institute for Geoanthropology, Jena, Germany) - Marcisz, Katarzyna (Adam Mickiewicz University, Institute of Geoecology and Geoinformation - Climate Change Ecology Research Unit, Poznań, Poland) - Niebieszczański, Jakub (Adam Mickiewicz University, Faculty of Archaeology, Poznań, Poland) - Hajdas, Irka (ETHZ, Laboratory of Ion Beam Physics, Zurich, Switzerland) - Gromig, Raphael (Max Planck Institute, Institute for Geoanthropology, Jena, Germany; University of Cologne, Institute of Geology and Mineralogy, Cologne, Germany; Simon Fraser University, Department of Earth Sciences, Burnaby, Canada) - Wagner, Bernd (University of Cologne, Institute of Geology and Mineralogy, Cologne, Germany) - Gałka, Mariusz (University of Lodz, Faculty of Biology and Environmental Protection - Department of Biogeography - Palaeoecology and Nature Conservation, Łódź, Poland) - Kołaczek, Piotr (Adam Mickiewicz University, Institute of Geoecology and Geoinformation - Climate Change Ecology Research Unit, Poznań, Poland)

High-resolution palaeoenvironmental reconstructions offer detailed insights into past anthropogenic impacts, aiding in updating archaeological knowledge. The shortage of archaeological and high-resolution palaeoecological data makes the Migration Period (MP, ca. 300–510 CE) in Greater Poland poorly understood. Climate deterioration and population displacement in Europe, characterized this period. Moreover, in Greater Poland - where the first structures of Polish statehood were formed - little is known about settlements before ca. 800 cal. CE. To fill this gap, we conducted a high-resolution investigation (pollen, selected non-pollen palynomorphs, micro and microcharcoal, plant macrofossils, and micro-X-ray fluorescence scanning) of two close sites (Kazanie mire and Lake Lednica, located approx. 9 km apart) in areas associated with the initial Slavic dynasty (Piast) state formation. This study aims to determine how the socioeconomic crisis during the MP before the appearance of Slavs in Greater Poland affected the local settlement (and whether it was continuous human activity) and how vegetation responded to this transition. The results reveal that at Lake Lednica, hornbeam was gradually selectively logged as early as ca. 600 cal. CE, leading to a substantial decrease in its proportion in forests until ca. 900 cal. CE. In Greater Poland, it was the time of establishing the first statehood. Our data for this period indicate an increased human impact, as evidenced by the rise in the percentage of various pollen types, including cereals and ruderals. At the Kazanie mire, the regeneration of hornbeam occurred as late as the beginning of the 6th century cal. CE and dominated in forests until the end of the 9th century cal. CE when low human impact was observed. The disparity in the hornbeam's response between the two sites may be attributed to local forest transformation by past societies, initiated much earlier at the Lednica site compared to Kazanie.

4

HUMANS AND LANDSCAPES IN THE MID-KAMA REGION THROUGHOUT THE HOLOCENE

Shumilovskikh, Lyudmila (Georg-August-University Göttingen, Germany) - Batalova, Vlada (Georg-August-University Göttingen, Germany) - Orlova, Elizaveta (Perm State University, Russian Federation) - Pereskokov, Mikhail (Perm State University, Russian Federation) - Sannikov, Pavel (Perm State University, Russian Federation) - Salova, Julia (University of South Bohemia, Czech Republic) - Mingalev, Vitaliy (Higher School of Economics, Perm, Russian Federation) - Vyazov, Leonid (University of Ostrava, Czech Republic)

The increasing pressure on nature with increasing human population size is often considered as a gradual process, however, human pressure on a regional scale can be related to the birth, flourishing and fall of a specific culture, its disappearance or transformation into a new culture adapted to a new environment. Thereby climate and environmental changes are often considered as triggers of cultural transformation in addition to political and socio-economic causes. Land use in pre-industrial cultures was constrained by habitat capacity, where overexploitation led to ecosystem devastation and social collapse. Conversely, non-human triggered events like (pre-modern) climate change or change in the hydrological regime could initiate population collapses and migration processes, leading to cultural re-adaptations. Such human-environment interplay is especially distinct at ecological borders of human existence, characterized by harsh climate conditions like in the boreal forest region. An exceptional example of human-environment interactions is provided by the societies in the boreal zone of the mid-Kama region of European pre-Urals. This region offers long-term settlement history covering the entire Holocene as well as numerous palaeoecological archives to trace human-environment interactions. Using multi-proxy analyses including pollen, non-pollen palynomorphs, archaeobotany, loss-on-ignition, radiocarbon datings, micro- and macrocharcoal, we investigate the changes in forest cover, fire activity, grazing intensity and agricultural practices of the region based on three peatland cores and archaeological sites from the region. All data are compared to population dynamics and subsistence economies of different cultures in order to evaluate the socio-ecological processes in the mid-Kama region throughout the Holocene.

5 HUMAN-ENVIRONMENT INTERACTION IN THE LIGHT OF WOOD EXPLOITATION BETWEEN SISTAN (IRAN) AND GUJARAT (INDIA) DURING THE IV-II MILLENNIUM BC

Minervini, Ignazio (University of Salento) - Madella, Marco (Pompeu Fabra University) - Fiorentino, Girolamo (University of Salento) - Primavera, Milena (University of Salento)

This contribution presents the results of anthracological analyses carried out at four different protohistoric settlements located between West and South Asia: Shahr-i Sokhta (Sistan-Iran, 3900-2000 BC), Bhandu Qubo (Sindh-Pakistan, 2800-1900 BC), Taloor Jee Bhatt (Sindh-Pakistan, 2600-1900 BC) and Loteshwar (Gujarat-India, 3600-3300 BC). For each site the charcoal assemblages were recovered in order to investigate the human-environment dynamics through the reconstruction of wood catchment basins. Anthropogenic impact on landscapes (land-cover), cultural influence on ecosystems and possible chronological variability of the assemblages were also considered in connection to regional and local climatic settings.

Although the sites are chronologically comparable, they show differences from several points of view. Shahr-i Sokhta represents an urban and industrial settlement of the Helmand Civilization, in the western part of the study area. It is located in the center of an extensive trade network and was influenced by the seasonal dynamics of the Helmand River. In the central part of the study area, Bhandu Qubo and Taloor Jee Bhatt, small urban settlements of the Indus Valley Civilization, were also integrated into productive and commercial networks. Bhandu Qubo is located in the central Indus Valley while Taloor Jee Bhatt sits at the edge of the Thar Desert; both were influenced by the seasonal dynamics of the river and the summer/winter rains. The easternmost site, Loteshwar, is a seasonal settlement linked to the Indus Valley Civilization but with an important influence from local cultural traditions. The site is located in an area of brief but periodic high humidity due to the Indian Summer Monsoon.

Examining the differences between anthracological data originating from the sites and located in areas with diverse climates and environmental features has provided the opportunity to assess the structure and dynamics of the woody vegetation and to investigate changes in terms of climatic and social pressures.

6 A WETLAND WILDERNESS AND ITS DESTRUCTION. THE DEVELOPMENT OF A PEATLAND FOREST IN THE WESTERN NETHERLANDS

Bazelmans, Jos (Cultural Heritage Agency, Netherlands (RCE), Ministry Education, Science and Culture)

In recent years, more than 500 bog oaks have been collected, sampled and dendrochronologically dated in the peatland area between the cities of Amsterdam and Utrecht. They provide a very detailed picture, with unique chronological resolution, of the late-prehistoric and early-historic development of an alder bog forest with oaks. Geological and palaeo-environmental studies allow the forest development to be placed within the long-term development of the area. The area first features extensive reed and sedge peatlands, with large lakes, and later reed, sedge and woodland peatlands cut by a Rhine tributary. The paper shows how forest development, in the absence of human presence in the area, initially, as of ca 1400 BCE, came about in interaction with the middle Dutch river area. Later, from the beginning of the late Iron Age, and especially in the early Roman period, human influence becomes visible in forest development. Felling, possibly also by the Roman army, leads in a short time to the complete and final destruction of the local oak stock.

7 ENVIRONMENT AND PLANT GATHERING AT THE MESOLITHIC LJUNGAVIKEN SITE IN SOUTHERN SWEDEN

Vanhanen, Santeri (The Archaeologists, State historical museums) - Lagerås, Per (The Archaeologists, State historical museums) - Persson, Carl (Carl Persson Fornforskaren) - Kjällquist, Mathilda (The Archaeologists, State historical museums) - Hammarstrand Dehman, Karina (Sydsvensk Arkeologi)

Around fifty Mesolithic huts and numerous other structures were found well preserved below lake mud and two meters of sand in southern Sweden at the Ljungaviken site in Blekinge. The lake mud and the sand had accumulated by the rising sea-levels of the Litorina-transgression sealing the site from later disturbances. More than hundred radiocarbon dates show that the site was relatively short-lived and occupied during centuries around 6500 cal BC, corresponding to the local Mesolithic period. Depositional circumstances allowed good preservation ancient plant material which was studied by pollen, macrofossil, and wood anatomical analyses. Plant material revealed aspects of local environment and gathering of wild plants for food and fuel. Analyses showed that people built their huts near the shoreline in woods dominated by pine, but further away lie areas with more broad-leaved trees, where hazelnuts and several other plants were gathered for food and probably medicine. Wood anatomical study of the charcoals showed negligible changes in the environment which indicate sustainable fuel gathering from the surroundings. Results of the study contribute to our understanding of human-environment interactions of prehistoric hunter-gatherers.

8 WILDLIFE IN THE LANDSCAPE: WILD ANIMAL AND PLANT SPATIO-TEMPORAL DISTRIBUTIONS DURING THE HOLOCENE IN SERBIA

Sabanov, Amalia (University of Belgrade - Faculty of Philosophy) - Radinović, Mihailo (University of Belgrade - Faculty of Philosophy) - Mladenović, Teodora (University of Belgrade - Faculty of Philosophy) - Radišić, Teodora (University of Belgrade - Faculty of Philosophy) - Marković, Dimitrije (University of Belgrade - Faculty of Philosophy) - Pavlović, Nemanja (University of Belgrade - Faculty of Philosophy) - Vuković, Sonja (University of Belgrade - Faculty of Philosophy)

Human activities such as agriculture, deforestation and urbanization, and other factors like climatic fluctuations, altitude variations and demographic shifts have influenced the distribution of wildlife over millennia. By examining the dynamics of human-wildlife conflict, the ARCHAEOWILD project aims to elucidate the intricate relationships between humans, animals, and landscapes in the context of changing socio-economic and environmental conditions throughout the Holocene. This presentation introduces a synthesis of all (un)published data on wild mammal and plant remains from archaeological sites across Serbia throughout the Holocene, encompassing various periods from the Mesolithic to Medieval times. Utilizing information sourced from all available publications, we conducted statistical analyses and spatial mapping using QGIS to discern spatio-temporal patterns in wildlife distribution. We aimed to identify and understand the possible trends of wild species distributions between individual sites, site types, regions and periods. Our work contributes to the broader theme of the Archaeology of Wilderness, shedding light on the nuanced interplay between human societies and their natural surroundings over time and providing an exclusive overview of the spatial and temporal distribution of wildlife during the Holocene. Findings presented here give valuable insights into the long-term impacts of human civilization on wildlife populations and ecosystems, highlighting the importance of interdisciplinary approaches in understanding past landscapes and informing contemporary conservation efforts.

9 EXPLORING THE INTERPLAY OF CLIMATE, BIODIVERSITY, AND HUMAN SOCIETIES IN NORTHEAST AFRICA THROUGH SPECIES DISTRIBUTION MODELS

Lazagabaster, Ignacio (University of Liverpool, Department of Evolution, Ecology & Behaviour, Liverpool, United Kingdom; National Research Center for Human Evolution (CENIEH), Burgos, Spain) - Thomas, Chris (University of York, Department of Biology and Leverhulme Centre for Anthropocene Biodiversity, York, United Kingdom) - Spedding, Juliet (University of Liverpool, Department of Archaeology, Classics and Egyptology, Liverpool, United Kingdom) - Ikram, Salima (The American University in Cairo, Department of Sociology, Egyptology and Anthropology, New Cairo, Egypt) - Snape, Steven (University of Liverpool, Department of Archaeology, Classics and Egyptology, Liverpool, United Kingdom) - Solano-Regadera, Irene (University of Liverpool, Department of Evolution, Ecology & Behaviour, Liverpool, United Kingdom) - Bro-Jorgensen, Jakob (University of Liverpool, Department of Evolution, Ecology & Behaviour, Liverpool, United Kingdom)

Understanding the intricate relationship between climate change, biodiversity shifts, and human activity is crucial for unravelling the complexities of ecological dynamics throughout history and contextualizing historical events. The rich zooarchaeological record of Holocene northeastern Africa provides a unique opportunity to investigate long-term biodiversity trends amid significant climatic fluctuations and societal changes in ancient Egypt. Here, we integrate species distribution models (SDMs) with zooarchaeological records and insights into past human ecology to discern the roles of climate-driven shifts and human activities, such as overexploitation and agricultural practices, in shaping biodiversity patterns over millennia.

We conducted SDMs using current distributions of 56 large (>10 kg) wild mammalian taxa present or likely present in northeastern Africa during the Holocene, encompassing species like bovids, giraffes, felids, and hyenas. Employing modern occurrence data from online repositories and range distributions, we used Bayesian additive regression trees (BARTs) to assess variable (climatic and topographic) importance and nine different algorithms to generate distributions of habitat suitability. The paleoclimatic simulation utilized encompasses the last 8000 thousand years and is tailored to recreate the northern influence of the African monsoon during the African Humid Period (AHP).

Our findings indicate a decline in suitable habitats for species requiring relatively high humidity and dense vegetation in favour of arid-adapted taxa over time, particularly towards the end of the AHP. Maintenance of environmental suitability for species beyond their extinction date suggests that human impact was likely a significant contributor to various species' declines. Stacked community projections illustrate a general reduction of suitable environments in the region's western deserts, with favourable habitats moving southward in tandem with increased human settlement around the Nile. We further use the zooarchaeological record to discuss the resulting environmental suitability projections within the context of societal transitions in Ancient Egypt and regional climate change.

10 **MODELLING PAST FORAGING STRATEGIES IN ARID ECOSYSTEMS: BRINGING TOGETHER TRADITIONAL ECOLOGICAL KNOWLEDGE AND COMPUTATIONAL ARCHAEOLOGY**

Paliou, Eleftheria (University of Cologne) - Angourakis, Andreas (University of Cologne; Ruhr University Bochum)

Simulations of hunter-gatherer mobility and behaviour are frequently used in archaeology to shed light onto the subsistence strategies, survival resilience and social development of early human societies. Integral to these models are foraging practices that would have been determined by socio-ecological dynamics. Nonetheless, the archaeological record offers only sparse and indirect evidence of such practices, which makes theory and model building on foraging behaviour particularly challenging for archaeologists. Despite numerous ethno-archaeological studies, several aspects of human-environment and human-animal interactions in the context of traditional hunting practices (i.e. hunting on foot, with a bow and arrow as opposed to firearms, and without orientation instruments) are still poorly understood. This paper will discuss how quantitative and qualitative datasets on traditional hunting practices, obtained in the framework of an interdisciplinary and collaborative project that brings together archaeologists and indigenous hunting experts, can inform theoretical and computational models of hunter behaviour in arid ecosystems. The project offers a rare opportunity to capture using geospatial technologies the movements of Ju/'hoansi and Hai//kom San game tracking experts during hunting bouts in arid landscapes in Namibia. During five field seasons, which took place between 2019 and 2023, a variety of georeferenced quantitative data (including movement trajectories, heart rate, caloric expenditure, and wind data) were collected. Furthermore, valuable qualitative insights into traditional ecological practices (i.e. controlled small-scale fire practices aiming at increasing plant and animal resources) were gained during fieldwork. This paper will discuss how these datasets can be used to support simulations of foraging behaviour, and especially agent-based models that seek to explore the interplay between environmental changes and foraging decisions in arid ecosystems. We conclude that Traditional Ecological Knowledge can contribute to a better understanding of past socio-ecological processes, and encourage advancements in modelling past human ecosystems.

11 **AS TIME GOES BY: HUMAN-WILDLIFE DYNAMICS IN THE DANUBE GORGES THROUGHOUT THE HOLOCENE**

Markovic, Dimitrije (Laboratory for Bioarchaeology, Department of Archaeology, Faculty of Philosophy, University of Belgrade) - Živaljević, Ivana (Department of History, Faculty of Philosophy, University of Novi Sad) - Vuković, Sonja (Laboratory for Bioarchaeology, Department of Archaeology, Faculty of Philosophy, University of Belgrade)

The Danube Gorges in Serbia, commonly referred to as the Iron Gates, showcase not only breathtaking landscapes but also hold significant archaeological importance, with traces of prehistoric settlements and numerous Roman and Medieval fortifications along its banks. It boasts rich biodiversity, providing a habitat for diverse flora and fauna along the river course. Optimal hunting and fishing conditions, i.e. particular types of whirlpool fishing, proved to be of crucial importance for the initial human settlement in the early Holocene. Since the Roman period, the Danube Gorges have witnessed the imprint of human activity, from the engineering marvels of emperor Trajan's preparations for the Dacian wars to the contemporary reshaping of the region with the construction of the Iron Gates Dams. By analyzing mammal and fish remains from archaeological sites, as well as by looking into the data regarding the biodiversity of the modern-day National Park in this area, our research will shed light on how these immense anthropogenic activities have shaped the biodiversity of the Danube Gorges. The research mostly relies on data collected within the ARCHAEOWILD project, that is, the published material from different period sites, as well as on the archaeozoological analyses done by the authors themselves. Key species such as red deer, brown bear, wild boar, aurochs, and beluga fish take center stage, providing a nuanced understanding of historical coexistence and the enduring impact of human societies on the region's fauna.

12 **PERSISTENCE, DISAPPEARANCE, REDISCOVERY: THE EXTINCTION DYNAMICS OF THE EUROPEAN WILD ASS AND AUROCHS IN THE NORTH-CENTRAL BALKANS**

Živaljević, Ivana (Department of History, Faculty of Philosophy, University of Novi Sad) - Mladenović, Teodora (Laboratory for Bioarchaeology, Department of Archaeology, Faculty of Philosophy, University of Belgrade) - Marković, Dimitrije (Laboratory for Bioarchaeology, Department of Archaeology, Faculty of Philosophy, University of Belgrade) - Radišić, Teodora (Laboratory for Bioarchaeology, Department of Archaeology, Faculty of Philosophy, University of Belgrade) - Radinović, Mihailo (Laboratory for Bioarchaeology, Department of Archaeology, Faculty of Philosophy, University of Belgrade) - Popović, Danijela (Laboratory of Paleogenetics and Conservation Genetics, Centre of New Technologies, University of Warsaw) - Vuković, Sonja (Laboratory for Bioarchaeology, Department of Archaeology, Faculty of Philosophy, University of Belgrade)

Whereas an unprecedented number of megafauna species became extinct during the late Pleistocene, some of them – such as the European wild ass (*Equus hydruntinus*) and aurochs (*Bos primigenius*) – persisted in selected Holocene refugia. The Pannonian Plain and the Balkan Peninsula proved to be such refugial and biodiversity hotspots. Nevertheless, their populations dwindled, becoming particularly vulnerable to human predation, and eventually perished by the

middle and late Holocene respectively. In this paper, we explore the extinction dynamics of the two species, including their changing environment and relationships with humans, from various strands of evidence obtained by archaeozoological and aDNA analysis, radiocarbon dating, ethology, palaeoclimatic reconstructions, and from archaeological and historical records. During the late Pleistocene, the wild ass predominantly inhabited the Eurasian steppe-tundra and forest steppe regions, whereas its survival in the Pannonian Plain in the Holocene is corroborated by its sporadic occurrence in faunal assemblages from Early Neolithic sites. By using one of these sites as a case study, we conducted archaeozoological and aDNA analysis and radiocarbon dating of wild ass bones to infer the date of their latest survival in the region, and contextualize them within other *hydruntinus* populations and human foraging practices. On the other hand, the aurochs roamed the forests across vast expanses of Eurasia during the Pleistocene and into the Holocene. The archaeozoological record suggests that it was commonly hunted in the Balkans in prehistory, with its numbers greatly diminishing from the Bronze Age onwards, and persisting up to the Medieval period only sporadically. Our research included radiocarbon dating of the youngest aurochs bone finds to establish a terminus post quem for their extinction in the region, as well as a study of their morphological variability through time and possible links with anthropogenic pressure.

13 **REVEALING THE NATURAL AND CULTURAL HISTORY OF THE BROWN BEAR (URSUS ARCTOS) IN THE CENTRAL BALKANS THROUGH ARCHAEOLOGY AND ARCHAEOGENETICS**

Vukovic, Sonja (University of Belgrade - Faculty of Philosophy) - Popović, Danijela (Laboratory of Paleogenetics and Conservation Genetics - University of Warsaw) - Dimitrijević, Vesna (University of Belgrade - Faculty of Philosophy) - Marković, Nemanja (Institute of Archaeology, Belgrade) - Mladenović, Teodora (University of Belgrade - Faculty of Philosophy) - Marković, Dimitrije (University of Belgrade - Faculty of Philosophy) - Dimitrijević, Ivana (Institute of Archaeology, Belgrade) - Orton, David (BioArCh, Department of Archaeology, University of York) - Zorić, Bojana (Institute of Archaeology, Belgrade) - Živaljević, Ivana (University of Novi Sad - Faculty of Philosophy)

Brown bear, the strongest and the largest animal native to Europe, experienced a large population decrease during the Holocene, and even regional extinctions. In the Central Balkans, in present-day Serbia, brown bear populations are declared as strictly protected mammal species and are subjected to regional protection measures. The analysis of a large number of faunal collections from Holocene archaeological sites in the region revealed that brown bears were regularly hunted throughout (pre)history, which suggests that they inhabited the local woods in the long term. However, due to anthropogenic pressure, the local environment and consequently the brown bear habitats, underwent significant changes throughout the Holocene. Introduction of domestic plants and animals in the Early Neolithic and the subsequent spread of agriculture, large scale deforestation and urbanisation from the Roman era onwards, as well as hunting of the beasts for fun and pleasure, must have impacted the brown bear populations in the region. To understand the population history of brown bears in the Central Balkans, within the ARCHAEOWILD project (funded by the Science Fund of Serbia) we conducted a genetic study of ancient brown bears in this region for the first time. The study of mitogenomes of brown bears revealed three known European subclades in the dataset from the Central Balkans, with the addition of a new haplogroup not previously discovered elsewhere. We will use the obtained archaeogenetic data from diachronic and regional perspectives to discover the possible trends of brown bear population changes. Furthermore, we will link the genetic dataset with specific archaeological contexts, as well as taphonomic features of the bones, which tell individual stories about human-bear interactions. We believe that the results regarding the past populations can stimulate current conservation efforts in the management of brown bears.

14 **ANCIENT ENVIRONMENTAL GENOMICS UNCOVERS EXTIRPATED FISH SPECIES AND VEGETATION DYNAMICS IN THE CARPATHIAN BASIN**

Zampirolo, Giulia (Section for Molecular Ecology and Evolution, The Globe Institute, University of Copenhagen) - Penezić, Kristina (BioSense Institute, Novi Sad) - Ruter, Anthony (Centre for Ancient Environmental Genomics, The Globe Institute, University of Copenhagen) - Orton, David (Department of Archaeology, University of York) - Živaljević, Ivana (Faculty of Philosophy, University of Novi Sad) - Pedersen, Mikkel (Centre for Ancient Environmental Genomics, The Globe Institute, University of Copenhagen)

The arrival of farming communities in the Central Balkans (~6200 cal BC) initiated profound environmental transformations in the region that continued throughout the Holocene. Here, the Danube meanders with their periodic floods provided ideal conditions for agriculture and access to water resources in the lowlands of the Great Pannonian Plain. Evidence from the faunal record dating back to the Early Neolithic (~6200-5300 cal BC), as well as historical records from later periods, attests to the importance of animal husbandry and fishing activities, however, tracking the impacts of such practices over time represents a major challenge. Ancient environmental genomics has shown to provide new insights into the long-term dynamics of past aquatic and terrestrial ecosystems. In this study, we present metagenomic results from two old river deposits (also referred to as paleo-meanders) of the Danube and two archaeological contexts spanning the mid-Holocene to the modern era. We detect extirpated sturgeon (*Acipenser* sp.) at Donja Branjevina (Bačka district, Serbia), where we also detect other fish taxa. In addition, we find evidence

of agricultural and grazing activities at Magareći Mlin (Bačka district, Serbia) and in both archeological and river deposits at Donja Branjevina. This work demonstrates the successful application of ancient environmental genomics to paleo-meanders and archaeological contexts within a multidisciplinary framework, in which, paleo-genomics, archaeology, and paleoecology synergise to untangle the complex human-environment interactions across different temporal scales.

15

UNRAVELING THE GENETIC HISTORY OF CATTLE: THE GABRIDGE PROJECT

Sosic Klindzic, Rajna (University of Zagreb Faculty of Humanities and Social Sciences) - Tomac, Goran (University of Zagreb Faculty of Humanities and Social Sciences) - Grguric Srzentic, Maja (University of Zadar) - Krznaric Skrivanko, Maja (Vinkovci Municipal Museum) - Drzaic, Ivana (University of Zagreb Faculty of Agriculture) - Brajkovic, Vladimir (University of Zagreb Faculty of Agriculture) - Ferencakovic, Maja (University of Zagreb Faculty of Agriculture) - Curik, Ino (University of Zagreb Faculty of Agriculture) - Miracle, Preston Thor (McDonald Institute for Archaeological Research University of Cambridge) - Cubric-Curik, Vlatka (University of Zagreb Faculty of Agriculture Laboratory for Archaeogenetics)

The GABridge project is a continuation of the collaboration between geneticists and archaeologists initiated by the Mendthegap project (H2020-TWINN-2015-692249). The Mendthegap project addressed research capacity gaps in archaeology and genetics in Croatia, culminating in the establishment of the Laboratory for Archaeogenetics at the University of Zagreb Faculty of Agriculture for conducting archaeogenetic analyses. Building upon this foundation, GABridge focuses on studying the origin and history of cattle in Western Balkans. The project assembles a multidisciplinary team comprising experts in molecular genetics, population genomics, animal breeding, computer science, and archaeology. This diverse expertise allows for a comprehensive investigation into the genetic diversity of cattle over time. GABridge sets out several research objectives. Firstly, it aims to determine the genetic diversity of ruminants in the Paleolithic era to gain insights into the genetics of pre-domesticated cattle. Additionally, it seeks to contribute to understanding the domestication processes of cattle during the Neolithic period in Western Balkans. The project also aims to resolve the chronology of cattle expansion through the analysis of ancestral recombination graphs and to explore the genetic origins of modern Croatian cattle breeds. The methodology of GABridge involves utilizing next-generation-sequencing, specifically sequencing mitochondrial and whole genomes of ancient cattle, to achieve its research goals. The analysis will extend to examining over 12,000-year-old cattle bones. The project also emphasizes theoretical advancements, including the assessment of genetic introgression, effective population sizes, and individual admixture. By leveraging interdisciplinary expertise and cutting-edge technologies, GABridge seeks to provide valuable insights into the domestication processes, genetic diversity, and population dynamics of cattle, while fostering collaboration between archaeologists and geneticists for ongoing exploration of the past.

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PALAEOPROTEOMICS OF ANDEAN CAMELID FIBERS

van den Hurk, Yuri (UMR 7209 Archéozoologie, Archéobotanique - Sociétés, Pratiques et Environnements (AASPE), Centre national de la recherche scientifique (CNRS), Muséum national d'Histoire naturelle (MNHN)) - Dufour, Elise (UMR 7209 Archéozoologie, Archéobotanique - Sociétés, Pratiques et Environnements (AASPE), Centre national de la recherche scientifique (CNRS), Muséum national d'Histoire naturelle (MNHN)) - Goepfert, Nicolas (UMR 8096 Archaeology of the Americas (ArchAm), Centre national de la recherche scientifique (CNRS), University Paris 1 - Panthéon-Sorbonne) - Zirah, Séverine (UMR 7245 Molécules de Communication et Adaptation des Micro-organismes (MCAM), Centre national de la recherche scientifique (CNRS), Muséum national d'Histoire naturelle (MNHN))

Large numbers of Pre-Hispanic Andean textile specimens have been recovered during various excavations from Peruvian archaeological sites dating from the Mochica culture (CE 100-850) area in modern Peru. These textiles are both works of art and also represent a unique biocultural archive with the potential to provide deep-time data regarding the social, cultural, ideological, and ecological history of the past Mochica society and the animals they interacted with. Understanding the cultural choices that governed the design and usage of textiles necessitates to document the nature of the animal fibers used.

Camelid fibers were used for the creation of the textiles, which can either derive from the domesticated llama (*Lama glama*) or alpaca (*Vicugna pacos*), or their wild ancestors, the vicuña (*Vicugna vicugna*) or guanaco (*Lama guanicoe*). Fiber morphology does not allow to differentiate between the four taxa and by extension therefore limits assessments of past exploitation of South American camelids in Peru.

Palaeoproteomic analyses of keratin and keratin associated proteins (KAP), which are robust and potentially species specific proteins in animal fibers, can provide insight into the past exploitation of these four taxa and reconstruct the interaction between the Mochica culture and South American camelids. Although palaeoproteomic research on keratin and KAPs is not as well developed as similar research on collagen, some species specific peptides for the four different taxa have been identified.

Through palaeoproteomic analysis, using LC-MS/MS, on archaeological textile remains we answer cultural historical, zooarchaeological, and historical ecological questions as well as provide novel approaches relating to the rapidly evolving field of palaeoproteomics.

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?WHAT DOES POTTERY TELL US?? INTERPRETING THE NEOLITHIC LIFESTYLE IN THE SOUTH OF EUROPE: TRADITIONS, CULTURAL IDENTITY AND INTERACTIONS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Espada-Martín, Estibaliz (Universidad Autónoma de Madrid) - Cattiaux, Méline (Laboratory TRACES (UMR 5608); University Toulouse 2-Jean Jaurès) - Turini, Mailys (Université Côte d'Azur de Nice, laboratoire du CEPAM (UMR7264, CNRS))

Session format: Regular session

The Neolithic was a crucial period in the history of humankind due to all the transformations that took place from economic, environmental, social and symbolic spheres. However, the neolithization was a complex phenomenon that covered various experiences depending on the geographical and socio-economic context.

In the South of Europe, the emergence of the early agro-pastoral societies is likely related to a coastal demic diffusion from East to West. The Neolithic period (6th – 3rd millennia cal BCE.) is characterised by a population increase, the multiplication of longue-distance contacts and specialisation of craftwork.

One of the most abundant sources of information available for this period is pottery. Because of the technological and cultural implications involved in it, pottery, at every step of its manufacture, such as the choice of raw material or the addition of temper, can be a proxy in the understanding of societies. Hence, this remains allow us to explore continuities/ruptures in time, cultural affinities and influences between neolithic groups.

Recent methodological approaches in ceramic studies, like the systematization of technological studies (based on the chaîne opératoire concept), the increase of experimental references or the development of biomolecular analyses, have helped us to update our comprehension about manufacturing process and uses of pottery and, in consequence, about the social implications of this technology.

Therefore, the aim of this session is to create a space for a multidisciplinary debate in where researchers can draw up alternative narratives about the cultural dynamics of Neolithic societies. Some of the possible issues that can be discussed are the following ones:

- Ceramic traditions: know-how, social identities and cultural boundaries.
- Interactions: diffusion of items/knowledge, imitation, acculturation and conservatism.
- Manufacture continuities and innovations through time.
- Raw materials studies.
- Residue analysis: culinary patterns, craft activities, symbolic aspects,

ABSTRACTS

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CONCEPTUAL METAPHOR THEORY IN ARCHAEOLOGY: SEEKING METAPHORS AND SYMBOLS ON PAINTED POTTERY FROM MIDDLE NEOLITHIC CENTRAL GREECE

Angeli, Effimia (Maria Curie-Skłodowska University)

Within the realm of human expression, there exists a utilization of conceptual metaphors in various forms and modalities, one of which takes the shape of material culture. While conceptual or cognitive metaphors are closely tied to cognitive linguistics, abstractions about nature and structure can serve as a means for metaphorical reconstructions through and/or from archaeological evidence originating from nonlinguistic communities. The primary focus of this investigation is centred around the figurative and symbolic implications found within specific decorative themes present in the Middle Neolithic Red-on-White pottery discovered in Central Greece. Additionally, this study seeks to establish a clear distinction between the terms 'symbol' and 'metaphor' by drawing upon the principles of cognitive archaeology and cognitive linguistics. As a result, the chosen methodological approach endeavours to demonstrate that certain cultural meanings embedded within the archaeological record may be deciphered in an alternative manner, surpassing the interpretations they have thus far received. While the context in which archaeology is conducted undoubtedly plays a crucial role in interpretation, it is important to recognize that human cognition operates through universal processes. Pottery, as a tangible artefact of material culture, can convey metaphorical representations of knowledge and memory. Additionally, the repetition of distinct patterns within a specific geographic area can provide insights into social identities and delineate stylistic boundaries.

2 OCULADOS: THE EYES, WIDE OPEN

Andina, Fernando (Universidad de Granada) - Gámiz Caro, Jesús (Universidad de Granada)

Oculados - the eyed idols - are one of the most iconic and extended Neolithic-Chalcolithic symbolic representations of the Iberian Peninsula (5500-2250 cal. BC). The same motif, the wide open eyes, was carved on several types of materials like stone, "betilos", bone, wood and were painted in rock shelters. Also, the direct relationship between pottery and Oculados found in funerary contexts reveals its symbolic character. Still, the origin of these figures remains unclear, with no consensus among the researchers (Soler Díaz, 2020).

Our work is about the origin of Oculados. We focused on a ceramic vessel with an Oculado carved on it, as case study. It was found at Costamar (Castellon, Spain), an archaeological site located by the Mediterranean sea. This was one of the earliest Neolithic communities of the Iberian Peninsula (VI millennia BC). The vessel was a functional 16 litres capacity container, discovered in a domestic context and with a very different size from the small ritual or votive pottery with Oculados found so far (Flors, 2009). We also added a paleogenetic research about European first Neolithics. Such study states a direct link between farmers from Aegean Sea and first Iberian Neolithic communities, supporting a "Leapfrog" model of colonisation. It also reveals the complex interaction between these pioneers and the local Mesolithics. (Hofmanová, 2016; Horejs, 2021)

Pottery was not only one of the technologies brought by the first farmers to Iberia. It also seems to have been vehicle of a complex system of beliefs. From a diachronic perspective, pottery is the proof of the survival of symbolic representative patterns.

3 STYLE VS. TECHNIQUE: EARLY NEOLITHIC POTTERY FROM AMZABEGOVO (BARUTNICA), NORTH MACEDONIA

Burke, Clare (Dept. of Archaeology, University of York) - Stojanovski, Darko (Austrian Archaeological Institute)

North Macedonia is a key region for understanding the transition to Neolithic ways of life, linking pioneer areas with the rest of Europe. Archaeological data suggests several Macedonian regions saw the establishment of early settlements by different agricultural groups, who have been defined in relation to the distribution of settlement types and particular pottery styles. However, whilst pottery has formed a key evidence source for defining chrono-cultural groups and boundaries, there is little information about the use of these containers, or lab-based analyses to address foundational questions relating to the raw materials and technological choices used to make them.

This paper will present one of the first studies of Neolithic pottery from North Macedonia to use an integrated programme of analysis combining traditional archaeological and lab based approaches. It will discuss the typological, macroscopic, and petrographic analysis of pottery from the key site of Amzabegovo (Barutnica) - the type-site for the formation of the Amzabegovo Culture. Through reconstructing the chaîne opératoire of pottery crafting and including the full repertoire of shapes and styles present in the assemblage, it has been possible to see shared choices in terms of raw materials, with the consistent use of silicate rich sandy raw materials and organic tempering, alongside shared techniques of slab hand building methods, across different pot styles. This suggests a strong overarching technological tradition and shared concept for making a wide repertoire of vessels. It has also been possible to identify a close relationship between the technology and materials used for the production of ceramic containers, and those for architectural daub. Some of the results from Amzabegovo share similarities to data from Early Neolithic pottery analysed from other areas indicating that some aspects of potting knowledge had a wide distribution that crossed perceived cultural boundaries, alongside more individualised innovations and adaptations.

4 BREAKING BONES. NEW INSIGHTS ON NEOLITHIC POTTERY PRODUCTION IN NORTHEAST ITALY (6TH AND 5TH MILLENNIA CAL. BCE)

Ciela, Marika (University of Trento) - Amicone, Silvia (Archaeometry Research Group, Eberhard Karls University of Tübingen; Institute of Archaeology, University College London) - Salzani, Paola (Superintendence of Archaeology, Fine Arts and Landscape of the Provinces of Verona, Rovigo and Vicenza) - Pedrotti, Annalisa (University of Trento)

The Early Neolithic period in northern Italy (c.a. 5400-4800 cal. BCE) is characterised by the presence of a mosaic of distinct material cultures defined on the basis of extensive pottery typological classifications that traditionally shaped our understanding of cultural manifestations and their developments. Fiorano material culture, which extends mainly from Emilia Romagna to Veneto region is one of the most significant phenomenon of this period.

The neolithisation of the Po Valley and the development of Fiorano material culture is object of a continuous debate that needs now to be readdressed through a more nuanced approach to the knowledge and skills behind pottery making. This paper presents the results of a technological study conducted on a collection of ceramics from various contexts in the western Veneto plain (north-eastern Italy). The aim of the study is to reconstruct ceramic production traditions with a particular emphasis on the selection and processing of raw materials.

To achieve this, a comprehensive macroscopic examination was undertaken and more of 100 samples from four different sites were selected for ceramic petrographic analysis. These specimens represent the typological and technological variability observed in the assemblage under study.

The results of petrographic analysis show a variety of tempering strategies at different sites that seems to be driven both by ecological constraints and cultural choices. The identification of ceramic fabrics marked by bone tempering in all the sites under investigation seems to be particularly relevant to discuss the exchange of technological know-how among the communities who lived in the Veneto plain and their external relationships.

Overall, this study represents an important contribution to the study of Early Neolithic in northern Italy and the neolithisation of the Po Valley as offers for the first time new and fresh insights into ceramic production and socially related aspects through a interdisciplinary approach.

5 TRACING NEOLITHIC PATHWAYS: INVESTIGATING CLAY RESOURCE EXPLOITATION IN CENTRAL ITALY

Chiarabba, Emma (Sapienza University of Rome) - Medeghini, Laura (Sapienza University of Rome) - Capriotti, Sara (Sapienza University of Rome) - Forti, Luca (University of Milan) - Conati Barbaro, Cecilia (Sapienza University of Rome)

The Neolithic period is characterised by significant socioeconomic, environmental, and cultural changes. Neolithic groups had to have varied degrees of mobility and adaptation to their surroundings.

This research proposes a multidisciplinary approach to investigate the exploitation and circulation of clayey raw materials during the Neolithic using ceramic indicators. This will be achieved through the identification, mapping, and petrographic characterization of clay deposits between Sabina (Latium region) to Abruzzo. The study areas are the Grotta Battifratta site in Sabina and the Teramo area sites (Grotta S. Angelo, Ripoli), which share many ceramic features. The characterization analyses performed on the different classes of ceramic paste found at different sites combined with the landscape analysis allow us to understand the provenance of clay raw material between the late 6th and 5th millennia B.C.

To date, the lack of Neolithic data and archaeometric investigations in this region poses a significant barrier to the understanding of resource exploitation practices and settlement dynamics of the Neolithic. This study is the first step towards reconstructing Neolithic transapennine pathways and possible interactions between different human communities in order to increase our understanding of social dynamics inside Neolithic societies.

6 POTTERS WITH THEIR TOOLKIT: IDENTIFICATION OF POTTERY PRODUCTION TECHNIQUES AT CORO TRASITO CAVE THROUGH SURFACE TRACEOLOGY

Díaz-Bonilla, Sara (Departament de Prehistòria. Universitat Autònoma de Barcelona.) - Gassiot-Ballbè, Ermengol (Departament de Prehistòria. Universitat Autònoma de Barcelona) - Rey-Lanaspa, Javier (Dirección General de Patrimonio Cultural del Gobierno de Aragón) - Clemente-Conte, Ignacio (Institución Milà y Fontanals. Consejo Superior de Investigaciones Científicas)

The creation of experimental programmes in archaeology makes it possible to better understand the production process of prehistoric pottery. It is an excellent way to obtain information about economic the activities of ancient societies. At the same time, it also contributes to the development of new ways of analysing pottery at the macro- and microscopical level.

Surface production traces have rarely been approached from a global and experimental perspective. For this reason, an experimental program has been developed for the interpretation of identifiable traces on pottery surfaces. This approach find sense in the archaeological record. Therefore, in this communication, we present the first results of the application of the traceological proposal to the study of the ceramic assemblage from the Coro Trasito.

The Coro Trasito cave is located in the Central Pyrenees. It is a quite permanent settlement, where activities such as livestock herding and farming practices have been reported in the area around the site. The site was occupied during two different periods: Early Neolithic and Bronze Age. Tools related to the production of new pottery vessels have been identified at this site, especially in the Neolithic period. The aim of this research is to reinforce the knowledge about working processes and pottery tools involved in the production. In addition, the analysis of surface production traces provides an insight into the identification of the use of tools with perishable materials.

7 CERAMIC TRADITIONS AND SALT PROCESSING IN NORTHERN IBERIA: THE EARLIEST NEOLITHIC EXPLOITATION OF SALT VALLEY OF AÑANA IN WESTERN MEDITERRANEAN

Cámara Manzaneda, Javier (Departamento de Geografía e Historia, Universidad de La Laguna) - Weller, Olivier (CNRS, UMR 8215 Trajectoires. De la sédentarisation à l'État) - Plata Montero, Alberto (Fundación Valle Salado de Añana) - Gomart, Louise (CNRS, UMR 8215 Trajectoires. De la sédentarisation à l'État) - Camarero, Cristina (Qark Arqueologia SL) - Martínez Torrecilla, José Manuel (Qark Arqueologia SL) - García Martínez de Lagrán, Íñigo (Departamento de Prehistoria y Arqueología, Universidad Nacional de Educación a Distancia)

The Salt Valley of Añana has become a new representative site for understanding the development of the Neolithisation process in the north of the Iberian Peninsula, and for gaining a better understanding of the economic strategies of these first farming communities around one of the oldest salt exploitations in the European continent. The launch of the NéoSAL research project, led by a French-Spanish team, has revealed an exceptional stratigraphic sequence linked with the salt exploitation and processing dating back to at least 5200 cal. BCE, which has yielded a large quantity of potsherds associated with several Early and Middle Neolithic layers (more than 500kg).

Through the lens of technological traces, and particularly the restitution of the technical gestures hidden behind the pots, this paper aims to characterise which were the potential contact networks of the early agropastoral groups from Añana and whether they shared or not the same idiosyncratic ceramic traditions (i.e., coiling sequences & spiralled patchwork technology) as the Neolithic communities of the Mediterranean sphere. Similarly, by examining the use-wear traces left on the surfaces of the vessels (e.g., abrasions, salt incrustations & post-firing drillings) this work addresses how the vessels were used for salt processing and in which phase of the process they were potentially involved. The combination of these two approaches provide new insights into how ceramic artifacts were integrated in the early salt productive processes and whether the exploitation of this mineral resource was carried out by one or several groups of producers.

8 NEW CONTRIBUTIONS TO THE UNDERSTANDING OF THE EARLY NEOLITHIC IN CENTRAL IBERIA: RECENT DISCOVERIES AND FORTHCOMING APPROACHES

Espada-Martín, Estíbaliz (Universidad Autónoma de Madrid)

Through the years, the different early Neolithic pottery groups in Iberia have been determined by their characteristic decoration. Thus, the Cardial ware from the coastal areas can be easily distinguished from the southern Almagra pottery type or from the Epicardial of the interior.

Nevertheless, the gradual increase that regional studies experienced from the 1960s onwards led to unequal research. The Mediterranean coast of Iberia and its distinctive Cardial ware became the main focus of investigations, overshadowing other areas such as central Iberia.

The middle Tagus Basin is a good example of this situation. Due to several factors, this area was supposed to be hardly inhabited by human groups and always depending on the Mediterranean coast. This river is the largest one in Iberia, crossing it from East to West and, therefore, might have a relevant role in the neolithization of inland Iberia, as a geographical link between the Atlantic and Mediterranean areas.

Fortunately, new evidence was discovered at the beginning of this century: new sites, a greater amount of evidence and some additional dates have notably increased the data set available on the Neolithic from the middle Tagus Basin.

The aim of this communication is to present those new sites inventory and the first results of my research on the technology and typology of Early Neolithic pottery from this area, mainly the macroscopic and morphological studies, but also the new methodology to be implemented in the analyses of those ceramics.

904 MOBILITY, MOVEMENT AND INTERACTION IN THE ANCIENT WORLD: NEW AVENUES OF INTERPRETATION

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Hamilton, Derek (SUERC, University of Glasgow) - Monnereau, Aurore (Globe Institute, Section for Molecular Ecology and Evolution, Faculty of Health and Medical Sciences, University of Copenhagen) - Díaz-Zorita Bonilla, Marta (University of Tübingen) - James, Hannah (Vrije Universiteit Brussel) - Soncin, Silvia (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAReA) centre, Sapienza Università di Roma)

Session format: Regular session

Scholars have long engaged in debates regarding patterns of movement and migration of past populations. The uncovering of migration routes, identification of interactions with local populations, and the evolution of social identity via shared cultural and social experiences has relied primarily on the examination of material artefacts and historical

records. Nevertheless, the precise demographic nature of these events is still hotly debated, notably in terms of mobility and interaction between incomers and local populations.

Nevertheless, the past decade has seen rapid developments in the field of bioarchaeological scientific techniques (isotopes, proteins, aDNA). Those methods have enhanced how we approach and understand the complex cultural dynamics associated with movement and mobility. With the growth of Big Data approaches, new quantitative modelling methods, and the use of multi-proxy techniques, archaeologists are gaining insights into cultural practices, genetic diversity legacies, interactions between communities, and kinship. However, we would argue the speed at which the science is moving has been impacting archaeology by creating big datasets without the 'space' necessary for reflection and the generation of new discourses.

This session aims to engage researchers in an interdisciplinary conversation, to discuss mobility using different techniques and considering alternative ways of mobilities. It also aims to discuss interaction between communities, as well as exploring the concept of identity evidenced by material culture and biological evidence. We welcome researchers that investigate these topics using bioarchaeological techniques and are especially interested in case studies from across European contexts, from the Mediterranean world to Scandinavia and all the places in between.

ABSTRACTS

1 INVESTIGATION OF CHANGES IN POPULATIONS IN CENTRAL ANATOLIAN IN THE NEOLITHIC PERIOD

Vural, Kivilcim (Middle East Technical University) - Kazancı, Duygu (Middle East Technical University) - Yorulmaz, Sevgi (Hacettepe University) - Özbaşaran, Mihriban (Istanbul University) - Duru, Güneş (Mimar Sinan Fine Arts University) - Mustafaoğlu, Gökhan (Ankara Hacı Bayram Veli University) - Baird, Douglas (University of Liverpool) - Ancient DNA Team, METU/Hacettepe (Middle East Technical University)

Central Anatolia played an important role in the Neolithic Transition in West Eurasia, which involved diverse cultural exchanges with neighbouring regions that shaped a new way of life based on sedentism. In addition to such cultural exchanges, previous analyses of ancient genome data from this region suggested different episodes of population admixture that occurred between the Epipaleolithic and the Late Neolithic, involving neighbouring populations from the Levant, North Mesopotamia, Caucasus/Zagros, and the Aegean/Balkans. However, these mobility and admixture processes still wait to be detailed.

This study uses ancient DNA data to investigate the dynamic changes in population demographics and genetic compositions within Central Anatolia between c.13,000 to 6,000 BCE. In addition to published paleogenomes from Central Anatolian Epipaleolithic and Neolithic sites, we analyse newly generated paleogenomes from the sites of Aşıklı and Boncuklu from the Early Neolithic period, and also the first genomes from Balıklı, a contemporaneous settlement from the Cappadocia region. Our study tackles the persistence of population structure between the Konya Plain and Cappadocia regions from the Early to the Late Neolithic, and also the contribution of these regional populations to Çatalhöyük. We also investigate the timing of eastern admixture in Central Anatolia. Our findings contribute to a deeper understanding of the demographic processes that shaped Central Anatolia during the Neolithic era and provide insights into the interplay between local and regional population dynamics during this critical period of human history.

2 ARCHAEOGENETICS IN THE TRAISEN VALLEY: MOBILITY AND SOCIAL STRUCTURE DURING THE IRON AGE IN NORTHEAST AUSTRIA

Carlhoff, Selina (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology) - Mötsch, Angela (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology) - Ramsil, Peter (Department of Prehistoric and Historical Archaeology, University of Vienna) - Lamnidis, Theseas (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology) - Novotny, Friederike (Department of Anthropology, Natural History Museum Vienna) - Wiltshcke-Schrotta, Karin (Department of Anthropology, Natural History Museum Vienna) - Schifffels, Stephan (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology)

Extending from Eastern France to the northern Balkans, the Early La Tène culture of the Central European Iron Age is associated with high levels of artistic crafts, as well as intensification of long-distance trade relationships with groups from Scandinavia to the Mediterranean. The Traisen valley in northeastern Austria is one of the core regions of the Early La Tène period, where proximity to important trade routes along the Danube and mountain valleys supported a high density of La Tène settlements and associated cemeteries. The archaeological assemblage has been studied extensively and provides excellent background for archaeogenetic case study of community structure within a Central European microregion and its cross-regional connections. We extracted ancient DNA from 235 individuals from seven sites within the Traisen river valley to understand connectivity from the local to continental scale. We deter-

mined close and distant genetic relationships within and between sites, including several groups of closely-related individuals buried in close proximity to each other and second-degree relationships spanning across different sites. We also characterised the genetic diversity of the ancient individuals, which includes individuals most closely related to northern as well as southern Europe. Finally, we combined genetic, isotope and archaeological information to assess long-distance mobility patterns and understand the role of the Traisen valley in the cross-European trade networks.

This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement number 851511) and the Austrian Science Fund (P36086-G "CATA").

3 EXPLORING CULTURAL DYNAMICS AND HUMAN MOBILITY DURING THE BRONZE AGE IN THE FRENCH UPPER SEINE VALLEY

Chevallier, Solène (Inrap Siège; LAMPEA UMR 7269, CNRS, Aix Marseille Univ, Ministère de la Culture; Archaeology, Environmental Changes & Geo-Chemistry) - **James, Hannah** (Archaeology, Environmental Changes & Geo-Chemistry) - **Peake, Rebecca** (Inrap Centre-Ile-de-France; Artheis, UMR 6298, Université de Bourgogne, CNRS, Ministère de la Culture) - **Herrscher, Estelle** (LAMPEA UMR 7269, CNRS, Aix Marseille Université, Ministère de la Culture) - **Snoeck, Christophe** (Archaeology, Environmental Changes & Geo-Chemistry)

The recent evolution of palaeogenetic and isotope analyses over the last few decades has provided us with a new perspective to examine past human mobility and interactions. In the Upper Seine Valley, in north-eastern France, previous studies have unveiled a change in cultural influences, especially during the transition from the Middle to the Late Bronze Age, based on the observation of a shift in population dynamics and funerary practices. In an area where links to the Atlantic sphere were strong, the expansion of cultural groups from the east known as the tumulus culture at the end of the MBA marks a decisive change and heralds a new era. These diverse influences see the emergence of a new material culture and funerary practices that suggest greater social interactions and human movements. To better understand mobility and contacts during this period of transition, we conducted strontium isotope ($^{87}\text{Sr}/^{86}\text{Sr}$) analyses on human cremated bones from archaeological sites located in the Upper Seine Valley. By directly working with the osteoarchaeological collection, we aim to place the human back at the center of study. 103 human samples from 8 sites, with a maximum distance of 25 kilometers between them, and 97 plants, covering an area of 1600km² around the sites, were analysed. The results show two distinct human groups based on the Sr values. The plant based local baseline of bioavailable strontium will help understanding the population movement and landscape management. The identification of these two distinct groups enables us to apprehend the social interactions and the cultural influences in this restricted area.

4 UNCOVERING POPULATION CHANGE AND REGIONAL DIVERSITY IN THE CENTRAL LEVANT FROM 2ND TO 1ST MILLENNIUM BCE THROUGH ANCIENT DNA ANALYSIS

Freilich, Suzanne (Max Planck Institute for Evolutionary Anthropology) - **Feldman, Michal** (University of Tübingen) - **Eisenmann, Stefanie** (Humboldt University of Berlin) - **Skourtanioti, Eirini** (Max Planck Institute for Evolutionary Anthropology) - **Mittnik, Alissa** (Max Planck Institute for Evolutionary Anthropology) - **Schultz, Michael** (University of Göttingen) - **Krause, Johannes** (Max Planck Institute for Evolutionary Anthropology) - **Stockhammer, Philipp** (Max Planck Institute for Evolutionary Anthropology; Ludwig-Maximilians-University Munich)

The 2nd and 1st millennium BCE in the central Levant have been studied extensively, revealing how the region was greatly influenced by Hittite, New Kingdom Egypt, Neo-Assyrian, Babylonian, and Persian empire expansions, triggering significant human mobility. However, due to the dearth of genetic data available, particularly from inland sites in the 1st millennium BCE, it remains unclear if population genetic patterns reflect the cultural and demographic changes noted in historical and archaeological records. To address this, we have analyzed ancient human DNA from 28 individuals who were buried at the tell site of Kamid el-Loz in the Beqa'a plain of present-day Lebanon, dating to two distinct periods: the Middle Bronze Age (c. 2000-1500 BCE) and the Persian-Hellenistic period (c. 539-63 BCE). This site, identified as Kumidi in Late Bronze Age textual sources, and overlooking important trade routes, developed into a fortified city during the Middle Bronze period, and potentially acted as the Egyptian administrative seat in the 14th century BCE. The site shrank in importance during the Iron Age I and II and was extensively used as a cemetery during the Persian-Hellenistic Periods. Through this new genomic dataset, we report evidence of diverse ancestries and population structure between Kamid el-Loz and the nearby contemporaneous coastal site of Sidon in the Middle-Late Bronze Age, and detect gene flow at Kamid el-Loz after the Bronze Age, bringing Iranian- or Caucasus-like ancestry. These findings extend our genetic knowledge of the region to inland sites, and shed new light on regional patterns of demography, genetic structure and mobility in the 2nd to 1st millennium BCE central Levant.

5 HUMAN MIGRATION IN THE ANDES: ISOSCAPES AND PALEOGENOMICS

Barberena, Ramiro (Centro de Investigación, Innovación y Creación, Universidad Católica de Temuco; CONICET) - **Tessone, Augusto** (Instituto de Geocronología y Geología Isotópica (INGEIS); CONICET) - **Le Roux, Petrus** (Department of Geological Sciences, University of Cape Town) - **Santana, Francisca** (Pontificia Universidad Católica de Chile) - **Lucero, Gustavo** (Facultad de Ciencias Sociales y Humanidades, Universidad Católica de Temuco) - **Cardillo, Marcelo** (CONICET; Facultad de Filosofía y Letras, University of Buenos Aires) - **Luisi, Pierre** (CONICET; Institut Pasteur) - **Rascovan, Nicolas** (Institut Pasteur, Unit of Microbial Paleogenomics)

Migrations are an intrinsic aspect of human societies in the present as in the past and occur across levels of socio-political complexity from small-scale mobile societies to ancient states. The combination of strontium isotopes and paleogenomics offers a robust interdisciplinary approach to the study of the spatio-temporal dynamics of human migration. We develop a bottom-up approach to human life-histories in the southern Andes of Argentina and Chile (30–34° S) between 1200–1420 AD (Late Intermediate Period), a period characterized by prevalent migration preceding the Inka conquest. Here we present the results of an ongoing project seeking to build an isoscape of bio-available strontium across by means of a recently developed random forest modelling approach (Bataille et al. 2020). We integrate this with results for ^{18}O to produce dual geographic assignments of the migrants. Through stable carbon, and nitrogen isotopes we characterize the isotopic niches of the migrants compared to those of local groups. We link the isotopic results produced at a micro-scale (individual and groups) with the macro-scale (populations) revealed by paleogenomics from the migrant communities. This research contributes to the larger endeavor of understanding the development of highly diversified human socioecological niches during the last 2000 years, and how migration contributed along the way.

6 THE GOTHIC TRIBES OF EAST-CENTRAL EUROPE THROUGH THE LENS OF ARCHAEOGENOMIC DATA

Chylenski, Maciej (Institute of Human Biology and Evolution, Adam Mickiewicz University, Poznań) - **Juras, Anna** (Institute of Human Biology and Evolution, Adam Mickiewicz University, Poznań) - **Ehler, Edvard** (Laboratory of Genomics and Bioinformatics, Institute of Molecular Genetics of the ASCR)

The migrations of Goths and their consequences were undoubtedly one of the most significant events shaping European history in the Roman Iron Age. They have always attracted the attention of academics and history enthusiasts alike. These events are not only associated with major historic processes but are also believed to have been accompanied by significant cultural and demographic transformations.

In the territories of modern-day Poland, the Goths are associated with the Wielbark archaeological culture. The presence of stone structures (stone circles and pavements) on its commentaries in Pomerania region, in its early stages, is frequently interpreted as evidence of its Scandinavian origin, where the best analogies for such structures can be found.

Here, through the analysis of more than 300 genomes (including more than 100 newly reported) of individuals dated to the Roman Iron Age, we show that the majority of them differ significantly from earlier and later populations from East-Central Europe. However, that lack of predating, first millennium BCE, genomic data from the Pomerania region hinder our ability to pinpoint the moment this population arrived or formed in this region. Nevertheless, our data show that when the population expanded south-east, somewhere in the 3rd century AD, with minimal admixture with local populations. Similarly, later early medieval populations from East-Central Europe seem primarily represent a population of different origin with only a small degree of admixture from Gothic tribes associated with Wielbark culture.

7 RESIDENTIAL MOBILITY IN EARLY NEOLITHIC BRITAIN: NEW EVIDENCE FROM STABLE SULPHUR ISOTOPE ANALYSIS

Ostrum, Brett (Department of Archaeology, Durham University) - **Gröcke, Darren** (Department of Earth Sciences, Durham University) - **Scarre, Chris** (Department of Archaeology, Durham University) - **Fowler, Chris** (School of History, Classics and Archaeology, Newcastle University) - **Montgomery, Janet** (Department of Archaeology, Durham University)

The nature of residential mobility patterns in Early Neolithic (c. 4000–3400 BC) Britain has primarily been investigated isotopically through the analysis of strontium and oxygen isotopes in tooth enamel. The temporal resolution of bulk enamel, however, is not high enough to identify multiple instances of movement unless several teeth with different formation times are analysed.

Stable sulphur isotope analysis of incremental tooth dentine offers another avenue to examine past mobility. Unlike strontium and oxygen isotope analysis on bulk enamel—which only relate to the time period over which a tooth crown developed—stable sulphur isotope analysis of incremental dentine can cover the entire period of a tooth's formation.

Temporal resolution is also increased with the incremental dentine technique, as each subsample typically reflects an isotopic average over a number of months rather than several years. This extended timeframe with improved resolution over bulk enamel allows for the possibility to identify instances of short-term movement and/or multiple episodes of movement.

Here, we present stable sulphur isotope results from incremental dentine for several Neolithic sites in Britain to explore mobility at different levels of focus, including individual life histories of residential movement, mobility patterns within groups, and comparisons between sites. For some sites, we will discuss how the evidence for mobility (or lack thereof) may be connected to sociocultural aspects of identity, such as age, biological sex, or kinship. By combining a high-temporal resolution technique with varying scales of focus, we hope to expand our interpretations of earlier Neolithic mobility patterns, particularly at the individual and community levels.

8 THE NOAIDI OF KITKA - THE LIFE OF A 16TH-CENTURY SÁMI RITUAL SPECIALIST FROM NORTHERN FINLAND

Peltola, Sanni (Faculty of Biological and Environmental Sciences, University of Helsinki; Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology; Department of Biology, University of Turku) - Moilanen, Ulla (Department of Archaeology, University of Turku) - Salmela, Elina (Department of Biology, University of Turku; Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology) - Majander, Kerttu (Department of Evolutionary Anthropology, University of Vienna) - Arppe, Laura (Finnish Museum of Natural History, University of Helsinki) - Oinonen, Markku (Finnish Museum of Natural History, University of Helsinki) - Sarkkinen, Mika (Department of Archaeology, University of Turku) - Sajantila, Antti (Department of Forensic Medicine, University of Helsinki) - Taavitsainen, Jussi-Pekka (Department of Archaeology, University of Turku) - Onkamo, Päivi (Department of Biology, University of Turku)

In 1970, a shallow burial dating to the turn of the 16th and 17th centuries CE was discovered in Kuusamo, North-East Finland. The burial contained the remains of a middle-aged male and artefacts associated with Sámi culture, such as a drum hammer and bronze rings thought to be ritual objects that, according to ethnographic accounts, danced on the drum. The individual was interpreted as a noaidi, a Sámi ritual specialist. During the individual's lifetime, Kuusamo was home to the Kemi Sámi, an indigenous group who spoke a now-extinct variant of the Sámi language. Finnish immigration from the 17th century onwards led to the eventual disappearance of the local Sámi communities.

We examined the life history of the individual through archaeology, ancient DNA and stable isotope analyses. We found that the individual's ancestry is consistent with their cultural connection to Sámi. Despite the genetic similarity, the present-day Sámi carry more West European ancestry than the noaidi does. We also analyzed IBD sharing between the noaidi and the contemporary population of Finland, and found the highest levels of IBD sharing in eastern Lapland, but relatively low in Kuusamo.

The isotope analyses indicate that the noaidi had changed their place of residence during their lifetime. While the Sr values representing early childhood are consistent with the bedrock of Finland, the values reflecting the individual's place of residence during adolescence are highly unusual for Finland and may suggest a place of residence elsewhere. The low values of O, together with dietary modelling hint towards northern marine environments.

Our study provides valuable information about the indigenous populations of northern Fennoscandia in the Post-Medieval period. Even though the study concentrates only on a single individual, it reveals important details about the genetic background, ways of living, and cultural interactions of the Sámi.

9 DECIPHERING MOVEMENTS WITHIN AN ISLAND: TRACING MOBILITY PATTERNS AT MENORCA'S BRONZE AGE THROUGH OXYGEN ISOTOPE ANALYSES IN DOMESTICATED ANIMALS

Marciales, Mauricio (University of Tübingen) - Diaz-Zorita Bonilla, Marta (University of Tübingen) - Timm, Monice (University of Tübingen) - Escudero Carrillo, Javier (University of Tübingen) - Ramis, Damiá (Museu de Menorca, Menorca, Balearic Islands, Spain) - Ferrer, Antoni (Institut Menorquí d'Estudis. Maó. Balearic Islands, Spain) - Leon, Maria (Museu de Ciutadella, Menorca, Balearic Islands, Spain) - Baten, Jörg (University of Tübingen)

Oxygen isotopes serve as proxies for environmental conditions and water sources, offering insights into animal movement and potential human behaviour. By examining animals from distinct locations, researchers aim to uncover shifts in husbandry practices, trade networks, and human settlement patterns. Variations in isotopic signatures among species and sites may indicate differing grazing habits, herding practices, or the importation of livestock, providing valuable context for understanding ancient socioeconomic dynamics, including resource management, cultural exchange, and territorial expansion.

Menorca provides a unique environment that could reduce the variation of oxygen samples due to its meagre hydrology and low altitude. The study investigates oxygen stable isotopes in cattle, caprine, and suids across two Menorcan

sites—Cornia Nou and Cala Morell—dating during the Bronze Age to the Iron Age. Through isotopic analysis, the research aims to discern patterns of mobility among these animals and, by extension, their human counterparts.

Preliminary results from our interdisciplinary approach, which integrates archaeology, archaeometry, and animal ecology, offer valuable insights into seasonal mobility patterns, breeding and nourishment practices, and diverse sources of water intake among domesticated animals in island contexts. Through meticulous oxygen isotopic analysis and contextual interpretation, our study enriches ongoing dialogues concerning prehistoric mobility, land use strategies, and the interconnectivity of ancient societies. This comprehensive framework for reconstructing past human-environment interactions contributes significantly to our understanding of ancient cultures and their adaptation to environmental conditions.

10 INVESTIGATING ANIMAL MOBILITY IN THE ROMAN WORLD. A GEOMETRIC MORPHOMETRIC STUDY OF FAUNAL REMAINS FROM NORTH-EASTERN IBERIAN AND ITALIAN PENINSULAS

Strolin, Laura (Institut Català d'Arqueologia Clàssica (ICAC)) - Colominas, Lúcia (Institut Català d'Arqueologia Clàssica (ICAC)) - Petrucci, Gabriella (Free Researcher)

In Roman times, a wide interconnected system involving economic and cultural aspects reached a high stage of development. Animals, as product of subsistence and trade, were also part of this system. The present study analyses faunal remains as proxies of connectivity and management strategies applying a novel methodology to zooarchaeological evidence: shape analysis through Geometric morphometrics (GMM). Morphological analysis indeed detects the signature of the different animal populations at an intraspecific level and as such enables to trace animal mobility.

In this paper, faunal remains from inland and coastal sites in the north-eastern Iberian Peninsula and the north-eastern Italian Peninsula are studied in terms of shape for understanding connectivity and animal mobility in different areas of the Roman system. A comparative perspective is applied not only between sites located in different landscapes in each area but also at a broader level between distant areas to reveal common practices and local specificities.

11 UNRAVELLING HUMAN IDENTITIES THROUGH STABLE ISOTOPES: EXEMPLIFIED FROM IDENTIFICATION OF AJNALA SKELETAL REMAINS OF 1857

Sehrawat, Jagmahender (Panjab University, Chandigarh, India)

Several heinous crimes committed against humanity have decimated mankind existence as identification of numerous unknown skeletal remains recovered from disguised locations have posed a serious challenge for their identification. Stable isotope analysis of unidentified human remains has proven to be an important forensic provenance tool to reveal their geolocation, mobility patterns, dietary habits, occupations etc., and hence their past geographical life trajectory (Batelink et al 2018).

In one such incident, 282 soldiers were killed, and their bodies were dumped in an abandoned well situated underneath a religious structure at Ajnala (Amritsar, India) in 1857 (Cooper, 1859). Thousands of badly damaged and commingled human remains along with numerous personalized items like coins, medals, bracelets, rings etc., were excavated non-scientifically from this site in 2014. Multi-disciplinary approaches of anthropological, odontological, radiological, molecular, chemical techniques (including stable isotope analyses) have been employed to establish the identity of Ajnala skeletal remains. It was hypothesized that Ajnala individuals were non-local to the site and male soldiers recruited from specific Indian states.

In present study, the dentine collagen and enamel samples collected from third mandibular molars were subjected to detailed multi-isotopic analyses ($\delta^{13}C$, $\delta^{14}N$, $\delta^{18}O$ and $87Sr/86Sr$) using Isotope Ratio Mass Spectrometer with the objective of narrowing down their potential geo-locality, identity affiliations, dietary status and mobility history. The isotope concentrations of carbon and nitrogen varied from -18.7‰ to -22.9‰ and $+7.6\text{‰}$ to $+11.7\text{‰}$, with average of $-20.49 \pm 1.2\text{‰}$ and $+9.31 \pm 1.1\text{‰}$, respectively, $87Sr/86Sr$ values varied from 0.7175 to 0.7277 (Avg. 0.7223). The mean $\delta^{18}O$ value for the studied molar teeth was found to be $14.3 \pm 7.27\text{‰}$ (VSMOW); with values ranging from 16.77‰ to 0.40‰ . The multi-isotopic analyses didn't support the local affinity of Ajnala skeletal remains and attributed their locality to Indian states of eastern Uttar Pradesh, Bengal, Bihar, Orissa and some north-eastern Indian states.

NEW GENOMIC DATA ILLUMINATE COMMUNITY ORGANIZATION AND MOBILITY IN THE LATE NEOLITHIC AND EARLY COPPER AGE CARPATHIAN BASIN

Szecsényi-Nagy, Anna (HUN-REN Hungarian Research Network, Research Centre for the Humanities, Institute of Archaeogenomics) - Anders, Alexandra (ELTE Eötvös Loránd University, Institute of Archaeological Sciences) - Raczky, Pál (ELTE Eötvös Loránd University, Institute of Archaeological Sciences) - Virag, Cristian (Satu Mare County Museum, Romania) - Hajdu, Tamás (ELTE Eötvös Loránd University, Department of Biological Anthropology) - Szeniczey, Tamás (ELTE Eötvös Loránd University, Department of Biological Anthropology) - Pinhasi, Ron (Department of Evolutionary Anthropology, University of Vienna) - Reich, David (Department of Genetics, Harvard Medical School, Boston; Department of Human Evolutionary Biology, Harvard University, Cambridge; Howard Hughes Medical Institute, Boston; Broad Institute of MIT and Harvard, Cambridge) - Siklósi, Zsuzsanna (ELTE Eötvös Loránd University, Institute of Archaeological Sciences, MTA-ELTE Lendület "Momentum" Innovation Research Group)

The field of archaeogenetics is evolving with new methodologies that offer scholars fresh perspectives on the connectivity of past communities. Unlike the previously common allele-frequency based population genetic approaches, starting from 2022-2023, the analysis of chromosome segment sharing based on identity by descent (IBD) for ancient DNA has been adapted. This advancement enables the construction of networks that map the biological relatedness between genomes (certain individuals) and communities. As the repository of ancient genomes expands, it enhances network analyses, leading us toward fine-scale examinations of community organizations. This progress is dependent on data quality and sufficiently dense sampling across specific territories and eras.

A case study illustrating this approach is presented, focusing on the Late Neolithic and Copper Age populations of the Carpathian Basin. We discuss human genomic data from archaeological sites from the Upper Tisza region, such as Polgár-Csőszhalom, Polgár-Nagy-Kasziba and Tiszapolgár-Basatanya. Here, we demonstrate the continuity of the Late Neolithic population amidst archaeologically significant cultural transformations around 4500 BCE. By juxtaposing ancient DNA data, previous isotope results and archaeological theories, we reinterpret the connectivity and mobility patterns of individuals associated with distinct archaeological ceramic styles.

Conversely, contemporaneous Early to Middle Copper Age sites from the broader cultural landscape exhibit a variety of community organizations and diverse biological composition (such as Urziceni-Vamă in Romania). These observations caution against making sweeping cultural conclusions, yet they pave the way for new perspectives in addressing archaeological questions of significance.

The archaeological evaluation of the Polgár-Csőszhalom site is funded by a grant from the National Research, Development and Innovation Fund (Grant K124326).

905 MODERNITY AS A COLONIAL PROCESS FROM WITHIN: THE MATERIAL IMPACT OF INDUSTRIALIZATION ON EUROPEAN SOCIETIES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Tejerizo, Carlos (University of Salamanca) - Martínez-Panizo, Laura (Real Academia de España en Roma)

Session format: Regular session

Modernity is a very tricky concept. While considered by many as one of the defining features of the emergence of the contemporary world (Giddens, Habermas...), others have harshly, and fairly, criticized its colonial roots (Bhambra, Butler, Quijano, the Comaroffs...) and its ontological limitations (Latour, Bauman...). All in all, it is still a widespread notion and, moreover, one increasingly used by reactionary movements, which use the emergence of modernity and its inherent characteristics, such as industrialization, as key elements for the expansion of "Western" ideas to the rest of the world. Still, we argue that the concept of modernity nonetheless remains a highly useful and critical theoretical tool. It constitutes a worthy analytical tool not only to understand the current state of things, but also to delve into the complex historical process by which pre-modern and pre-industrial societies have been integrated into external dynamics coming from the western economic and political centres in a long, complex and non-linear process. Thus, we propose an understanding of modernity as a colonial process, one whose introduction different ontologies and communities have reacted against, adapted to and often resisted, alongside those other characteristically modern elements such as capitalism, surveillance, imperialism or racism. Furthermore, we consider that industrialization was one of the most relevant vehicles for the development of this dialectical process, and that it had a deep material impact on both past societies and landscapes which can therefore be successfully tackled through archaeology. In this session, we would like to discuss the validity (or invalidity) of modernity as a theoretical concept through the analysis of case studies addressing the impact of processes of industrialization on prior local societies from the 16th century onwards, hoping to invite further reflexive and theoretical contributions.

ABSTRACTS

1 CONSTITUTIONS AND RAILWAYS. ARCHAEOLOGY OF THE AGE OF REVOLUTIONS

Martin, Gorka (University of the Basque Country) - Carrasco-Gómez, Pablo (University of Barcelona)

The 19th century is the cornerstone of the implementation of Modernity. During this century the liberal regime was imposed in the western world. This dynamic had two main foundations. On the one hand, there was a revolution of ideas, the Liberal Revolution, and on the other hand, there was a significant technological transformation, called the Industrial Revolution. One of the major consequences of this process were crucial changes in many aspects that also affected the material culture. However, it was a non-linear and non-homogeneous transformation. The arrival of Modernity caused several controversies, dichotomies, and problems that, more than once, were solved in the battlefield. The French Revolution of 1789 started as a result of conflicts in which revolutionaries and reactionaries ended up confronting their differences. This resulted in a multiplication of civil wars during the 19th century.

The kingdom of Spain was dragged in this international and interconnected context. The conflicts of the 19th century, both international and civil wars, marked the Spanish political arena for the whole century. This long and bloody period had an important impact in the archaeological record. Hence, this material culture represents the consequences of the arrival of Modernity. The oral presentation analyzes the changes caused by the implementation of 19th century's material culture through the data gathered from various archaeological sites. The subject presented focuses on various archaeological sites from the Peninsular War (1808-1814) to the Second Carlist War (1872-1876).

2 « L'ARCHÉOLOGIE DU COLONIALISME N'EXISTE PAS » ANGLOPHONE HISTORICAL ARCHAEOLOGIES LOST IN TRANSLATION IN FRENCH POLYNESIA

Perez, Emilie (University of French Polynesia) - Flexner, James (University of Sydney) - Claret, Moanatea (University of Sydney)

Anglophone traditions of historical archaeology have long focused on the role of European colonialism as a driving force in the shaping of the modern world. Colonialism serves as the umbrella term for a set of interlinked processes. The introduction of numerous diseases, species, mass migration as well as economic, cultural and religious concepts from the Old World /or "introduction of Christian evangelism and capitalist economy"... caused large transformations and reshaping of indigenous societies and landscapes.

Historical archaeology has examined all of these processes, including in the francophone world. However, francophone scholarship generally draws a narrower boundary around « colonialisme » which is seen to be very specifically about imperialist expansion and resulting state-sanctioned dispossession and violence. Drawing on our current archaeological fieldwork in French Polynesia, this paper outlines an argument in favour of a more broadly defined « archéologie du colonialisme » precisely at a time when European countries, including France, reckon with their imperialist past. An archaeology of colonialism should not only focus on state institutions, but also other institutional powers, such as the Catholic Church, that were instrumental to the expansion of European colonial frontiers from the 17th century onwards. Modernity was not only about empire, but also about changing ideologies, worldviews, and material practices, which often transformed long before the official arrival of imperial powers. Archaeology plays an instrumental role in finding and interpreting the material evidence for the colonial processes that set the pre-conditions for imperialist expansion.

3 HISTORICAL ARCHAEOLOGY AND FRANCOPHONE COLONIALISM FAR BEYOND THE ATLANTIC WORLD: CATHOLIC MISSION SITES IN THE MANGAREVA ISLANDS

Claret, Moanatea (University of Sydney) - Flexner, James (University of Sydney) - Perez, Emilie (Université de Polynésie française)

Connections between the Atlantic and Pacific worlds expanded dramatically over the course of the 19th century. With a few exceptions, historical archaeology in the Oceanic region has focused largely on British colonialism, particularly in the settler societies of Australia and New Zealand. Recent work has expanded this research, both to include recently independent Pacific nations, and non-Anglophone colonialism in Spanish, French, Japanese, and Russian sites. Francophone colonialism in Oceania expanded hand-in-glove with Catholic missionary activities. Current research has just begun to understand the material remnants of the large-scale and widespread Catholic expansion in Polynesia.

The earliest and best preserved Catholic mission sites in Polynesia are located in the Mangareva Islands, about 1600km southeast of Tahiti. There are over 100 standing buildings dating from between the 1830s and the 1890s. These include still-used churches, the ruins of separate boys' and girls' schools on different islands, industrial sites, a royal palace for the highest ranking chiefly family, and dozens of 'are po'atu (stone cottages) inhabited by Mangarevans. The technology of mortared stone construction was rapidly adopted by Mangarevan people, who made this kind

of architecture their own, along with industrial pearl cultivation which continues today. The remote Catholic outpost in Mangareva simultaneously represents material connections to the francophone Atlantic world thousands of kilometers distant. Evidence from surface artefacts and excavations demonstrates not only French industrial production, but also trade goods from Great Britain, the Netherlands, and the United States. These sites provide material to reflect on the historical dynamics produced when the Atlantic and Pacific worlds met, including the adaptations of local people to the colonial milieu.

4 THE MATERIAL IMPACT OF INDUSTRIALIZATION IN THE RURAL WORLD. A CASE STUDY FROM NORTHWESTERN IBERIA

Tejerizo, Carlos (University of Salamanca)

The process of modernity can be understood as the historical passage through which societies acquired its main characteristics, such as capitalist economic relations, consumerism, radical individualism or mass production. This process had particular developments in the rural world, which was incorporated into modernity at different paces, sometimes in long historical processes and, in the cases of marginal or peripheral societies, in sudden and radical events. In order to tackle these particularities for the general process, I will propose to approach the question of modernity from a bottom-up approach, using the changes in materiality as the fundamental vector of inquiry. Moreover, and following other scholars such as the Comaroffs or Bhambra, I will understand modernity from a post-colonial point of view, as a dialectical encounter of different cultures with creative and unique outcomes. For this matter, I will be using a case study located in northwestern Iberia, focusing on the material changes operating in the territory of a little village named Casaio, in current Galicia. The impact of modernity in this territory had a major moment of change during the 1930s and 1940s due to the confluence of several historical processes, which includes the so-called "tungsten war" - a diplomatic and economic war around the exploitation of tungsten, used as a military resource by the nazis. In this paper I will analyse how social relations of production, materialities and the environment changed as a consequence of the implementation of tungsten mining. Thus, the deep and sudden impact of industrialization and internecine conflict lays the foundation of an exceptional case study to understand the main nature of the process of transformation from rural to industrial and capitalist societies, that is, of modernity.

5 MEMORIES OF TRANSITION: THE ARCHAEOLOGICAL LANDSCAPE OF MODERNITY IN SARDINIA

Sanna Montanelli, Mattia (University of Cagliari) - Pinna, Fabio (University of Cagliari)

From the archaeological perspective, reflections on modernity as a colonial process find fertile ground in the analysis of material culture expressions in Sardinia. This island, with its rich history of both external and internal colonizations, offers an exceptional case study to explore the material impact of industrialization and modernization processes on previously agricultural or pastoral societies.

Due to its geographical and historical specificities, Sardinia has experienced forms of internal colonization that manifest through the introduction of industrial practices in areas traditionally linked to agriculture and pastoralism. These changes have left tangible traces in the landscape and material culture, from the remains of mines and abandoned industrial infrastructures to changes in settlement patterns and land use.

Archaeology in Sardinia has the potential to reveal how these dynamics of power and economic change have influenced the daily lives of local populations. Through the study of abandoned industrial sites, dwellings, tools, and other everyday objects, archaeologists can reconstruct the stories of adaptation, resistance, and transformation of Sardinian communities in the face of modernization pressures.

In this context, citizen archaeology emerges as a promising approach for sharing and protecting the more fragile and non-monumental archaeological testimonies. Engaging local communities in the research and conservation of their archaeological heritage can not only increase awareness of the historical and cultural value of these sites but also stimulate a critical reflection on modernity and its consequences for traditional societies.

6 THE CONSOLIDATION OF MODERNITY IN ITALY AND SPAIN: THE ARCHAEOLOGY OF COAL MINES DURING THE AUTARCHY

Martinez, Laura (Real Academia de España en Roma)

This research is based on a comparative reflection of social history on the politics adopted by Franco's regime in Spain and fascism in Italy for the exploitation of coal mines and their social consequences. In both countries, the establishment and consolidation of this industry results in transformation of the area, not only in terms of the uses of its landscape, but also socially, generating a social attachment to the mining activity.

The proposed areas of study are part of what are known as just transition territories, those geographical areas that have been immersed in decarbonisation processes in recent decades. These are the Leonese regions of Bierzo and Laciana in the case of Spain and the island of Sardinia in the case of Italy.

Both contexts are immersed at the beginning of the 20th century in the arrival of modernity, as a result to the processes of centralisation of coal production and distribution. Which will result in important urban transformations and contribute to a mass production that will lead to an important exodus of population towards these production centres. This would also bring with it the creation of a network of infrastructures including housing, roads, railways for transport, electrification of the territory, etc.

7 FROM PLANTATIONS TO PRISONS: EXAMINING THE ROLE OF FORCED PRISON LABOR IN ENABLING LATE MODERNITY

Westmont, V. Camille (University of Cambridge)

The rapid industrialization of the US South in the decades following the end of the Civil War has been hailed for the massive social, cultural, and economic transformations that it initiated. However, a closer examination of the social relations embedded within the transformation reveals that white elites effectively re-established a system of extractive colonialism within the region that they maintained through legally sanctioned racialized terror. This paper examines the development of late modernity in the US South through a consideration of the postbellum legal system and the Southern convict lease system in the US state of Tennessee. Looking at the case study site of the Lone Rock Stockade (40GY78), a late 19th-century convict labor prison, the paper explores the ways government institutions have arisen and evolved to manage 'surplus' populations, whether as the result of poverty (Wacquant) or strange-ness (Bauman), that arise in the anxiety-riddled modern world. Using landscape-scale analyses, the material consequences of labor exploitation are interpreted as inextricable side effects of modernity as process.

909 INTEGRATING DATA ON ANCIENT WINE AND OIL PRESSES: CHALLENGES AND INTERPRETATIVE POTENTIAL

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Van Limbergen, Dimitri (Ghent University) - Waliszewski, Tomasz (University of Warsaw)

Session format: Discussion session (with formal abstracts)

In recent years, the field of ancient wine and oil studies has seen major developments in data and methods, with new archaeological, historical, and interdisciplinary approaches now able to extract more and better information out of our datasets. Unavoidably, however, exploiting these developments to the full demands evermore systematization and optimization of the data themselves.

Given the prominence of wine and oil in the ancient world, facilities for their production are a major archaeological proxy for studying the nature, scale, and performance of the ancient economy. Their full potential, however, remains hampered by a profound lack of systematic geographical inventories, insufficient insight into regional and global patterns in site nature and distribution, and the existence of many, non-complementary terminologies, typologies and classifications (in technology, press components, architecture, etc.).

Without doubt, a concerted effort to bring together these data in a database format that allows for detailed questions on 1) the nature, scale and chronology of production, 2) the technology used in these installations, and 3) the relation of installations to settlement, will be a major step forward in our understanding of the ancient economy, from the Bronze and Iron Age to Late Antiquity.

This session brings together regional specialists and expert colleagues currently working on ancient wine and oil production in the Mediterranean and beyond. The first aim is to acquire an overview of current work in the field, and to identify common technical, methodological, and interpretative issues when integrating individual sites and regional datasets. Second, the session also serves as a starting point for a long-term, collaborative network, meant to guide and streamline future work, and to set up a common research agenda.

ABSTRACTS

1 236 : OLEVUM ET VINUM ADRIATICVM

Kopácková, Jana (Archaeological Museum in Zagreb, Croatia)

During the last decades, the study of ancient agriculture and economy has progressed greatly in both methods and approaches. It is now abundantly clear that the production of wine and olive oil was one of the most profitable branches of ancient agriculture, with facilities widely present in both rural and urban contexts. Still, the eastern Adriatic has long remained a blank spot on the map of ancient wine and olive oil production, with old theories of marginal and/or small-scale production reverberating in scholarly literature. This situation has changed significantly in the last decade, and there is now evidence of wine- and/or oil-making for at least 236 sites across Histria and Dalmatia. This also means, however, that there is now an enormous amount of data - including archaeological remains, architectural

elements, texts, archival material, and photographs - awaiting classification and systematization for better contextual and interpretative use. With research ongoing, and new sites regularly being added to this growing corpus of data, the integration in a wider online database with the possibility of constant editing offers an optimal solution for these and other areas in the Mediterranean and beyond. This talk reflects on some of the challenges that come with this new initiative, illustrated through examples from the Adriatic.

2 THE TECHNOLOGICAL VARIATION OF THE SALONA PRESS

Stojkovic, Bozidar (Institut für Klassische Archäologie - Universität Wien)

While literary and archaeological sources now provide a good picture of wine and oil production in ancient Dalmatia, much less attention has been devoted to the typological study of individual press parts and mechanisms. Since the end of the 19th century, excavations have repeatedly shown the technological adoption and use of screw and winch mechanisms in this area of the Mediterranean, while also shedding light on the serialization of the pressing units. The Salona lever press forms a most representative case, where a winch mechanism was positioned between two stone posts. Similar adapted technical details have been attested in numerous press installations in and around Salona, but also further afield across the Istrian peninsula to the southern part of Dalmatia. From a broader territorial perspective, it is clear that the Salona press has similar technological adaptations as those installations found in the villa of San Rocco in Italy and Passoir in France, while the latter two also differ in substantial ways from the Salona exemplar. This paper reflects on these links and variations in technology, by scrutinizing the technical details of this press mechanism and providing a possible reconstruction.

3 REGIONAL TRADITIONS AND TECHNOLOGY OF ROMAN PRESSING INSTALLATIONS IN CENTRAL AND SOUTHERN ITALY

Bäse, Sonja (German Archaeological Institute)

In recent years, the long-held theory of a gradual development in press technology from windlass to screw has been questioned. Taking a look at central Italy, in the modern regions of Lazio and Campania, there is only rarely evidence of changes in existing installations, and most presses seem to have continued being used without innovations. Instead, the evidence points to the importance of local resources for their construction, and to a prominent role for customs and knowledge of local artisans and farmers. This is in line with the evidence from other areas in the Mediterranean, where studies have attested to the use of regional and local types of press technology and counterweights. This talk will take a closer look at the Roman press installations in Lazio and Campania, taking into account over 200 sites to scrutinize construction materials and operating mechanisms, so aiming to identify local and/or regional characteristics, and to understand better possible distributions and developments of technology. In Campania, four regional clusters with distinctive press mechanisms can be identified, showing, for example, differences in lever-and-drum presses between the area around Vesuvius and northern Campania, and in lever-and-screw counterweights between two other zones. Clusters are less clearly discernible in Lazio, in part due to less preserved evidence, but the importance of local resources is obvious, as is the use of different variations of lever-and-drum presses, and occasionally direct screw presses.

4 ECONOMIC SUSTAINABILITY IN A ROMAN CITY OF THE ANCIENT VASCONES: NEW DATA ON WINE PRODUCTION

Lorente Sebastián, Paloma (Universidad de Navarra) - García de la Barrera, Luka (Universidad de Navarra) - Larequi Fontaneda, Javier (Universidad de Navarra)

The Roman town of Los Bañales de Uncastillo (Zaragoza) in the territory of the ancient Vascones is one of those urban and economic paradigms of the so-called *parva oppida* that characterized and sustained the Roman Empire in the 1st-3rd century AD. Recent excavations and surveys in the surrounding territory have resulted in the identification of three wine presses to the south of the town, and two vats for wine production within the northern urban quarter, thus revealing a new facet of urban economic power. In this talk, we will discuss the new data of the wine presses found at El Huso y la Rueca and La Figuera, focusing on their analysis and contextualization, as well as their typology, functionality and chronology. This reveals, within the territory of the town, the existence of a possible industrial belt of winemaking facilities around Los Bañales, well-embedded within the management and exploitation of natural resources in the area. This paper so advances our insights into the economic functioning of this agrarian community, serving as an example of the role of these *parva oppida* in the provinces of the Roman Empire. Our talk concludes with a discussion on how to best extrapolate these data and contextual parameters to use and integrate into an Empire-wide database of ancient wine and oil presses.

5 IS IT POSSIBLE TO RELIABLY IDENTIFY THE FUNCTION OF ANCIENT PRESSES THROUGH ORGANIC RESIDUE ANALYSIS?

Polla, Silvia (Freie Universität Berlin)

Characterizing the nature of ancient agricultural production, that is, by capturing the function and use of press installations, is far from straightforward, especially when the archaeological traces are inadequate and the distinctive crushing tools are no longer preserved. The issue is complicated even further by the real possibility of multi-purpose installations (Mattingly 2009). Recently, the rise of organic residue analysis has introduced the use of chemical data into the debate. In particular, samples of *opus signinum* used for coating and waterproofing vats in pressing installations can be analyzed by Gas Chromatography-Mass Spectrometry (GC-MS) techniques (Pecci et al. 2013). This paper critically evaluates the potential and limits of organic residue analysis for identifying reliable biomarkers related to the functioning of wine and/or oil presses against the background of archaeological and environmental characteristics.

Mattingly, D. J. (2009). 'A new study of olive oil (and wine?) production in northern Tunisia'. *Journal of Roman Archaeology* 22: 715-720

Pecci A., Cau Ontiveros M.A., Garnier N., Identifying wine and oil production: analysis of residues from Roman and Late Antique plastered vats, *Journal of Archaeological Science*, 40,12, 2013.

6 PRESSING ISSUES IN THE NILE VALLEY. PROBLEMS AND POTENTIAL IN RESEARCH ON WINE INSTALLATIONS IN EGYPT AND SUDAN

Dzierzbicka, Dorota (Polish Centre of Mediterranean Archaeology, University of Warsaw)

Sources concerning wine production in the Nile Valley offer significant potential for studies on ancient winemaking. Dozens of pressing installations dating from the Graeco-Roman period have been identified, and most have been published at least in a preliminary fashion, providing relevant material for comparative studies and geographical considerations. Textual sources, most remarkably documentary papyri, offer unique insights into the social and economic aspects of the winemaking industry, shedding light on not only local but also more universal, Mediterranean practices. These texts also provide groundwork for establishing and comparing terminologies. In addition to significant potential, however, the dataset from the Nile Valley also has its methodological peculiarities and caveats, which should be taken into consideration when using it as comparative material in broad-scope studies on Mediterranean winemaking. The paper briefly presents the state of the art and dataset, indicates the local specifics of winemaking in the Nile Valley, lists some challenges in dealing with material from this region, and points to potential research avenues and questions that may be addressed using this dataset in future studies.

7 GEOSPATIAL AND CHRONOLOGICAL ANALYSIS OF WINE AND OIL PRODUCTION IN ROMAN HISPANIA

Gruber, Henry (UNC Chapel Hill)

Wine and oil production were two of the keys of the Roman economy in Hispania from the late Republic until at least the third century CE. However, the duration and scale of production of both these liquid commodities beyond the so-called "Third Century Crisis" and into late antiquity is debated. This paper presents a first look at a dataset of 305 Iberian olive press / production sites, 143 wine production sites, and 229 unspecified presses gathered from a systematic survey of published (and some unpublished) literature. The facilities are all geolocated, and associated with site types, datable material culture, and other criteria for analysis. Above all, the dataset seeks to move beyond typology and towards chronology to track medium-term trends in production. The paper therefore begins by discussing the construction of the dataset, before considering three ways to date production. This is especially important for those sites that have only been surveyed. Two promising and complementary ways to date production are to date activity through the presence of dated material culture (coin, ceramics), and to restrict the dataset to stratigraphically excavated. There is also a brief discussion of the problems in seeing late amphora types in the published record. With the chronological reflections done, the paper turns to diachronic analysis. It presents the presses active over time, and two recently excavated sites that show production into late antiquity. It argues that the production of these commodities continued well into the late Roman period before abruptly coming to an end in the early fifth century CE. Whether this represents a crisis of demand as the markets for these products collapsed, or is the result of a supply-side crisis caused by instability in the peninsula itself, remains to be determined.

8 MULTI-SCALAR AND MULTI-REGIONAL COMPARISONS OF SPECIALIZED OLIVE OIL PRODUCTION IN THE ROMAN EMPIRE

Rice, Candace (Joukowsky Insitue for Archaeology and the Ancient World)

Multi-scalar and multi-regional investigations studies of oil production inform debates on Roman economic life as they provide links between locally specific strategies and broader imperial-scale patterns. While much of the Mediterranean basin was capable of growing olives, only a handful of regions actually did so at a substantial scale. This paper draws on my own investigations into specialized oil production across four different regions of the Roman Empire: Sabine Italy, Istrian Croatia, Lycian Turkey, and Narbonensian France to illustrate both the benefits and challenges of working across multiple scales and geographies.

My excavations at the Roman villa of Vacone have revealed a large, specialized olive oil production facility with four oil presses constructed during the early empire. By the mid-Empire, however, specialized production was replaced by diversified production of oil and wine. The excavation of both domestic residence and pressing installations allows for a detailed look at a local response to wider economic change, both as the owner of the villa invested in specialized infrastructure for olive oil and then later diversified to keep up with changing market demands. In 2024, I begin excavations at the oil production facility at Barbariga (southeastern coast of Istria). Explorations in the early 1950s, published only through plan, revealed a large oil production facility with at least eight olive presses. Initial geophysical results demonstrate that substantially more of the pressing facility remains, emphasizing the remarkable size of the facility and raising further questions about the organization of production.

Comparing these two ongoing projects to previously published but newly collated data from regional case studies, here including Lycia and Narbonensis, allows for further insights into scale and strategy. These case studies highlight differing economic decisions related to the same industry and emphasize the diversity in approach to one of the cornerstones of the Mediterranean economy.

9 APAO: AN ONLINE ATLAS ATLAS OF PRESS FACILITIES IN ANCIENT OCCIDENT FOR THE ANR MICA PROJECT

Bernigaud, Nicolas (CNRS ASM - UMR 5140) - Bouby, Laurent (ISEM) - Peña Cervantes, Yolanda (UNED) - Pérez Jordà, Guillem (Alicante University) - Rocca, Elsa (Université Paul-Valéry Montpellier 3) - Séjalon, Pierre (INRAP) - Mauné, Stéphane (ASM - UMR 5140 CNRS) - Carrato, Charlotte (Mosaique Archéologie)

As part of the ANR MICA project (2023-2026), we undertook to build an online atlas of ancient press facilities in southern Gaul and the western Mediterranean (Iberian Peninsula, ancient Morocco). The objective is to bring together the various existing archaeological datasets to model the geography of ancient winegrowing and/or olive-growing regions using spatial analysis methods. The creation of the online atlas is based on an analysis of published sources. The attribute table of the vector layer includes about ten fields that mainly provide information on the nature of the remains (counterweight, area, mola olearia, etc.), their location and their chronology. The analysis work is currently concentrated in southern Gaul and in the western part of the Mediterranean basin. The aim is to perpetuate this atlas after the MICA project. In the longer term, it could integrate data from other geographical areas (notably those of the Eastern Mediterranean), to produce an online map of ancient press installations on the scale of the Roman Empire. In this paper, we will present this atlas, first results of analysis and discuss its future development in a collaborative network.

10 RECONSIDERING PLINY THE ELDER'S PERSPECTIVE ON WINE: HOW MUCH HAS HIS VIEW IMPACTED US?

Falaschi, Eva (Eberhard Karls Universität Tübingen)

Pliny the Elder's wine books (NH 14, 17, 23) have been compulsory read to find information on viticulture and wine production in ancient times and compare it to the archaeological data. The idea of the *Naturalis Historia* as an encyclopaedia that cannot and should not be read from its first to its last page, but can be excerpted to extrapolate single pieces of information has deeply impacted the modern use of this text. However, new studies on the *Naturalis Historia* have shown the strong presence of an author who chooses, selects, organizes and manipulates information to propose his vision of the Roman Empire to the reader. How can our studies on wine production in ancient times change, if we consider this new perspective? How did Pliny and his personal view influence our reception of wine production and our research? Philology and archaeology must reflect on this issue and reconsider their use and study of literary sources on wine. And if you imagine an archaeological database on wine production, can the literary data find a place there? If yes, how? What are the possibilities and the limits of their inclusion?

915 3D HERITAGE. DIGITAL HUMANITIES FOR DOCUMENTATION, ANALYSIS, AND DISSEMINATION OF MATERIAL CULTURE

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Rouco Collazo, Jorge (Institute of Heritage Sciences (Spanish National Research Council)) - Maldonado Ruiz, Alexis (University of Leiden) - Carrero Pazos, Miguel (University of Santiago de Compostela)

Session format: Regular session

In the last decade, 3D analysis and processing techniques have undergone significant theoretical and technical advancements. The quality and quantity of data obtained through various 3D techniques have marked a substantial leap forward, and Archaeology is no longer a mere bystander. As a result, their application has become increasingly common, where various techniques are employed to document, analyze and disseminate cultural heritage in three-dimensional ways.

In this regard, the huge variety of 3D methodologies and techniques allow to apply them in a wide range of work, from macro to microscale. These go from satellite imaging and remote sensing through airborne photogrammetry on Unmanned Aerial Systems (UAS) platforms or airborne LiDAR, among others, to close range photogrammetry for small objects. All these techniques have gained significant relevance in the field. The adoption of these innovative methodologies has brought about a methodological revolution, with profound theoretical implications on how we study material culture and how to research in Humanities in the Digital Era.

This session aims to be a space for presentation and debate of the state-of-the-art 3D methodologies for documentation, analysis and dissemination of the landscape. The primary objective is to engage in discussions about methodologies, application challenges, new theoretical perspectives, and the future directions. Thus, papers on methodological and theoretical issues on 3D applications for the study of the Landscape will be welcomed, including case studies of methodological relevance.

The outcome of this session will be an up-to-date overview of a field constantly undergoing significant methodological updates within Archaeology and Digital Humanities, thereby fostering discussions of considerable value for the exploration of current applied methodologies and the advancement of theoretical debates.

ABSTRACTS

1 ANALYZING SYMMETRY IN ACHEULEAN HANDAXES: A TECHNOLOGICAL AND GEOMORPHOLOGICAL APPROACH

Rosolani, Erica (International Master in Quaternary and Prehistory) - Ollé, Andreu (Insitut Català de Paleocologia Humana i Evolució Social (IPHES); Departament d'Història de l'Art, Universitat Rovira i Virgili, Tarragona, Spain) - Arzarello, Marta (Sezione di Scienze Preistoriche e Antropologiche Dipartimento di Studi Umanistici Università degli Studi di Ferrara) - García Medrano, Paula (UMR 7194 Département Homme et Environment, Museum National d'Histoire Naturelle, Paris, France; Department Britain, Europe and Prehistory, British Museum, London, United Kingdom; Insitut Català de Paleocologia Humana i Evolució Social (IPHES); Departament d'Història de l'Art, Universitat Rovira i Virgili, Tarragona, Spain)

Since their discover, Acheulean handaxes have been considered by archaeologist as one of the first hints of symmetry perception in the human lineage and have opened a heated debate in which different positions are taken regarding their meaning, functionality and the cultural role they might have played. During the last decades, these tools have been approached through different type of analyses, from more classical technological analysis to the use of software for the evaluation of 2D and 3D images. In this work, we present the application of both technological and Geometric Morphometric analyses on materials coming from three different key European sites: Galería (Atapuerca, Spain), La Noira (Centre Region, France), and Guado San Nicola (Molise, Italy). All sites are dated within Marine Isotopic Stage 12/11 and were selected because they document a significant technological change between their early Acheulian occupation and the following ones. The sample of the study is composed by handaxes and cleavers from the sub-unit GIIa of Galería, Stratum c of La Noira, and SU C of Guado San Nicola. Geometric Morphometric analysis applied on the latter has been performed with Artifact GeoMorph Toolbox 3D (AGMT-3D), together with a deep technological analysis, allowed us to have a complete view over the assemblages variability. The aim of this study is to expose both the methodology and the results obtained comparing the three assemblages to provide a contribution within the study of human occupations in south-western Europe during MIS 11.

2 DIGITAL PHOTOGRAMMETRY IN SERVICE OF UNDERWATER ARCHAEOLOGY: CASE STUDIES FROM THE BULGARIAN BLACK SEA

Georgiev, Pavel (Centre for Underwater Archaeology, BG; Centre for Maritime Archaeology, UK)

With digital archaeology becoming more accessible, it has established itself as a major tool for documenting underwater archaeological sites. However, the water environment presents a different set of challenges such as low visibility and floating particles. To overcome them, a flexible approach must be adopted to achieve fast and reliable results. In this paper is presented, a cost-effective methodology that can provide them. It has been successfully applied in several underwater archaeological sites researched by the Centre for Underwater Archaeology along the Bulgarian Black Sea coast. They range from the submerged fortifications in Nessebar, the fragments of which are spread over a large area; to the inundated prehistoric settlement at the bay of Ropotamo River, whose archaeological remains are more than 2 m deep into the seabed; and the Urdoziva shipwreck in Kiten, a 24 m long ship which is well preserved almost to main deck. To document them a set of action cameras was used that are attached to a common frame and shoot at a different angle. That way enough overlap is produced even in the lowest of visibilities. Afterwards, the images are corrected in open-source software and processed in Agisoft Metashape. The workflow is adapted to remove interference from the seawater. That gives us ready-to-use results on the next day.

3 UNCOVERING LOST DETAILS: ENHANCING ANCIENT INSCRIPTIONS THROUGH COMPUTER VISION AND DEEP LEARNING

Aioanei, Andrei (Strasbourg University) - Manz, Marian (University of Basel) - Hunziker-Rodewand, Regine (University of Strasbourg) - Fornaro, Peter (University of Basel)

This paper introduces an innovative visualization framework to enhance the readability of ancient inscriptions and facilitate automatic analysis. We apply our methodology to the 8th century BCE Panamuwa inscription from the Hadad statue (KAI 214), which poses interpretive challenges due to surface erosion and subtle edge details. We generate a high-fidelity 3D model of the inscription to enable in-depth geometric analysis and provide a substrate for image enhancement. Image processing algorithms accentuate obscured glyph features such as soft edges. We further augment the visual data with depth maps and other representations to underpin our deep learning architecture for recovering eroded inscription elements. Our framework entails successive phases of epigraphical enhancement enabled by digital techniques: 1) Creating an accurate 3D model, 2) Applying image processing for feature enhancement, 3) Generating synthetic representations to expand available inscription data, and 4) Leveraging neural networks to reconstruct missing details. This research aims to enhance visualization and uncover lost knowledge for researchers, revealing new insights. It establishes computational epigraphy at the nexus of archaeology, computer vision, and digital humanities - setting a new standard for exploiting 3D/2D models, image enhancement, depth mapping, and deep learning to analyze archaeological artifacts.

4 UNVEILING THE PAST: EXPLORING THE EPONIMOUS SITE OF CUCUTENI CULTURE THROUGH 3D DOCUMENTATION AND PUBLIC ARCHAEOLOGY

Brunchi, Radu (Alexandru Ioan Cuza University, Arheoinvest) - Asandulesei, Andrei (Alexandru Ioan Cuza University, Arheoinvest) - Tencariu, Felix-Adrian (Alexandru Ioan Cuza University, Arheoinvest) - Brasoveanu, Casandra (Alexandru Ioan Cuza University, Arheoinvest)

The Chalcolithic culture of Cucuteni is renowned for its exquisite painted ceramics, reflecting exceptional artistic skill. Equally remarkable are the remnants of residential structures unearthed in archaeological digs. These constructions often bear the signs of intense fire damage, sometimes causing the clay walls and floors to vitrify. Despite this destruction, significant traces of daily life and ancient spirituality are preserved within. However, excavating and accurately documenting these layers of destruction pose considerable challenges.

Thankfully, advancements in 3D documentation techniques have revolutionized the recording process, enabling faster and more objective preservation of archaeological data. Our methodology begins with comprehensive 3D scanning of the site's surroundings, providing crucial context. Subsequently, we focus on meticulously documenting the layers of destruction within the archaeological trench, creating detailed 3D models.

For our study, we selected a dwelling located within the eponymous Cucuteni settlement of Cetățuia in northeastern Romania. This structure features extensively burnt walls, collapsed atop a suspended floor, which overlays a ground floor containing various artifacts such as loom weights and ceramic vessels. Without the aid of photogrammetry, recording these materials in situ would have been arduous and time-consuming. The 3D models generated not only facilitate academic research but also serve as valuable tools for education and public engagement. Through a freely accessible online portal, we integrate all collected data—including photographs, archaeological surveys, and illustrations—adopting a Public Archaeology approach to broaden accessibility and understanding of the site.

5 VIRTUAL ARCHAEOLOGY AS A METHOD OF PROMOTING THE PHOENICIAN-PUNIC HERITAGE OF THE BAY OF CADIZ (SW, SPAIN)

Sicre-González, Pablo (Universidad de Cádiz)

This proposal implements Virtual Archaeology as a technique and methodology for the historical-archaeological analysis and study of Phoenician-Punic elements of the coastal landscape of the Bay of Cadiz. These elements are the wall of Cerro del Castillo (Chiclana de la Frontera, Cádiz), the necropolis of the city of Cádiz and the wall of Castillo de Doña Blanca (El Puerto de Santa María, Cádiz). We will present the final results of the virtual reconstruction carried out in the first of these cases; the methodology to be followed in the work we are currently carrying out on the necropolis of Cádiz; and we will conclude with the proposal of our Master's Final Project on the defensive system of the last construction phase of the site of the Castillo de Doña Blanca. All these works of analysis and studies conclude with a powerful graphic section, essential for the enhancement of the coastal cultural heritage of the Bay of Cadiz.

6 LET THERE BE LIGHT. 3D DOCUMENTATION AND VISUALIZATION OF STEĆI TOMBSTONES: A COMPARISON BETWEEN DIGITIZATION USING PHOTOGRAMMETRY AND STRUCTURED LIGHT

Škerjanec, Luka (Research Centre of the Slovenian Academy of Sciences and Arts, Institute of Anthropological and Spatial Studies)

Stećci are medieval tombstones scattered across the landscapes of the Western Balkans. Out of approximately 60,000 known stećci, current research suggests that only 8% of them are adorned with various bas-relief decorations, and inscriptions dedicated to the deceased have been documented on fewer than 400 tombstones. Despite their large number, the stećci seem to be disappearing from the landscape. The deteriorating conditions are particularly evident in the pronounced weathering of certain tombstones, exacerbated by the prevalent use of local limestone as the primary carving material. This material choice, combined with environmental factors, has significantly degraded the quality of the iconography and inscriptions on these monuments. A series of tombstones from the area of the medieval Dabar parish were scanned. The capture methods encompassed photogrammetry (Structure from Motion) and scanning with structured light (Structure from Light). The main goal of the research was to compare the results of these two three-dimensional documentation methods and evaluate their suitability for visualizing highly degraded inscriptive and decorative surfaces of these tombstones. Several techniques exist for visualizing stone carvings with 3D models. Those that are applied to mesh geometry, generating a visualization based on various shading techniques; and those in which height information, in the form of a raster DEM is extracted from the surface of the 3D geometry that is then used to apply GIS visualization techniques. The most comprehensive evaluation of a surface requires combining the results of different visualization methods to ensure a thorough assessment.

7 EVOLVING PRACTICES IN EXCAVATION METHODOLOGY: 3D ANALYSIS OF A SLAVIC CREMATION BURIAL MOUND

Stepnik, Jakub (University of Warsaw)

The archaeological research conducted for nearly a decade by the Chodlik Archaeological Mission has been characterized by a focus on modern digital documentation techniques applied during the excavations of the Early Medieval Slavic cremation burial mounds. These techniques aim to preserve knowledge about the structure of monuments and examined features, forming the basis for scientific inference. Since the beginning of excavations in 2011, digital orthophotography has been a key tool in field documentation. However, recent advancements have introduced photogrammetry, opening up new research possibilities.

Leveraging the full potential of photogrammetric documentation allowed the creation of a multi-level digital database resembling a computed tomography of the site. However, the database created was not a final goal but the beginning for 3D-aided research of the burial mound.

A significant departure from similar projects is the use of Blender software dedicated to 3D graphics instead of GIS-related programs. Due to its characteristics, it allowed greater interaction with 3D models by adding possible interpretations of contexts. Creating a 3D "research hub" enabled a holistic analysis of stratigraphy along with the planigraphy of artifacts, allowing the formation of new questions and hypotheses otherwise impossible to be formed using traditional documentation. The utilization of 3D databases in archaeology opens up various possibilities that, if fully embraced, can potentially revolutionize the processes of excavation, analysis, and teaching.

8 AUGMENTED REALITY APPLIED TO THE SILVER WAY AND ITS POWER DYNAMICS IN LATE ANTIQUITY AND EARLY MEDIEVAL TIMES

Barja-Márquez, Carlos (University of Vigo)

RurAllure is a European project (H2020) led by the University of Vigo (Spain) that promotes an understanding of the cultural heritage sites traversed by different paths that lead to pilgrimage landscapes and routes in Europe.

As a member of this team, I focus on late antiquity and early medieval worship buildings that due to their significance were not abandoned but are not located in populated areas. These buildings, namely churches, must be understood as an expression of power dynamics that transformed the territory. My research addresses such dynamics proposing augmented reality methodologies as an approach to the topic to digitally recreate that territory and its history.

In this contribution, I will discuss two case studies of two churches, namely Santa María de Mixós and Santa Mariña de Augas Santas, to present their potential for studying territorial power dynamics within the Silver Way of the Camino de Santiago by documenting, contextualizing, and analyzing their data. The main aim of my research seeks to have an impact on society by providing a historical narrative about these sacred buildings and their value.

All in all, the use of the augmented reality in this project intends to create an alternative to physical interactions in historical buildings in order to protect and preserve them from damage.

9 OSTEOGRAMMETRY: APPLICATIONS FOR SFM MODELING IN BIOARCHEOLOGY AT SAN DONATO DI LAMON

Vail, Alexander (Northwestern University) - Fiorin, Elena (Sapienza Università di Roma) - Forlin, Paolo (Università di Bologna; Northwestern University)

Structure-from-motion (SfM) photogrammetry has been employed in archaeological research for several decades to document sites, contexts, and artifacts, demonstrating the advantages of its metric accuracy and simple process. However, bioarcheological applications have been largely limited to modeling in-situ burials. A standard method for close-range photogrammetry to model previously excavated human skeletal remains has been largely unexplored. To remedy this, we critically examine the suitability of SfM photogrammetry for investigating human skeletal remains in bioarcheological research contexts by applying the method to a case study using material from the medieval cemetery at San Donato di Lamon, Veneto, Italy. We examine three samples of skeletal elements exhibiting unique paleopathological characteristics. These elements were modeled on site, and later measured and analyzed exclusively using the SfM models. This serves as a practical application of the method to an ongoing excavation and demonstrates the non-metric and paleopathological potential of SfM models. Each of these samples demonstrate how SfM models can be used to investigate and analyze non-metric skeletal features such as congenital and traumatic pathologies. This case studies demonstrate that SfM models, when created with a standardized and suitable method, can serve as an accessible replacement or supplement for handling skeletal material in-person. Results from our study demonstrate the potential of digital methods in the osteometric and paleopathological analysis of human skeletal remains, expanding the methodological repertoire of bioarcheology. Moreover, our findings illustrate how the use of SfM skeletal models offers potential solutions to the unique ethical and logistical challenges surrounding the study and display of human remains. We also begin a broader discussion surrounding how these models may be employed in public cultural heritage projects, such as an upcoming museum installation in Lamon, as an alternative to displaying real human skeletal material.

10 POINT CLOUDS AND CULTURAL LANDSCAPES: METHODOLOGY AND PROBLEMS OF 3D TECHNOLOGIES IN EARLY MEDIEVAL CONTEXTS

Gallego-García, Mar (Universidad de Alcalá) - Diarte-Blasco, Pilar (Instituto de Historia. Consejo Superior de Investigaciones Científicas (IH-CSIC)) - Castro-Priego, Manuel (Universidad de Alcalá)

This work presents the main results of the research group Archaeology: Landscapes, Colonialism and Cultural Heritage of the University of Alcalá, which have been carried out in recent years, within the methodological application of new technologies. Among them, those that have played a central role have been the use of terrestrial 3D Laser Scanner, LIDAR and photogrammetry, in diverse archaeological spaces, ranging from large medieval spaces endowed with a strong monumentalisation, to specific contexts in excavation processes. The research carried out stresses the need for planning prior to data collection, as a way of avoiding misleading results, in which the ultimate aim must also be present from the start of the project. On the basis of the data obtained, the methodological difficulties observed, the main problems in the management of the documentation, as well as a reflection on future aspects of the development of laser technologies and their deepening in new areas of analysis are discussed.

11 SUB-MILLIMETRIC SFM 3D SCANNING OF MEDIEVAL ARCHITECTURE: PHOTOGRAMMETRIC DIGITAL TWIN OF THE DURHAM NORMAN CHAPEL FOR CONSERVATION AND HERITAGE MANAGEMENT

Jansen, Alexander (Durham University, Department of Archaeology) - Rennie, Gillian (Durham University; University Library and Collections, Durham University; University College, Durham University)

This paper presents a new workflow and improvements to optimise the quality and resolution of archaeological 3D photogrammetric data, and aims to promote a higher degree of standardisation in 3D scanning practices across the fields of archaeology, conservation and heritage management.

This will be presented through the case study of the Norman Chapel. Constructed around the year 1080 CE the Norman Chapel is among Durham Castle's most important spaces and the city's oldest building, and part of the Durham Castle and Cathedral World Heritage Site. In September 2023, the discovery of water damage in its interior required fast action to protect our cultural heritage. Following the discovery of a leak, the author of this paper was immediately tasked to 3D scan the entire ceiling of the chapel at a sub-millimetric spatial resolution. Due to the height and shape of the chapel, a custom workflow had to developed to optimise the scanning process.

The purpose of this 3D scan is the creation of a digital twin of the ceiling, both to digitally preserve it and to serve as a reference point for comparing future 3D scans against. This will allow us to monitor the state of the chapel over the years, track potentially expanding cracks, identify damage by salt and moisture, track erosion of the sandstone, and (through colour analysis) to inspect possible degradation of medieval plaster.

To ensure the captured 3D data is suitable for these purposes, it should meet a large number of requirements. The first 3D scan of the roughly 7 by 10 metre ceiling was rendered as a dense point cloud and a 550 Megapixel orthomosaic ceiling plan with a spatial resolution of ca. 800 pixels per square centimetre, a level of detail that even allows us to pinpoint all the tiny spiders on the ceiling.

12 FLYING CASTLES. SFM PHOTOGRAMMETRY FOR THE DOCUMENTATION, ANALYSIS, AND DISSEMINATION OF THE MEDIEVAL CASTLES OF THE ALPUJARRA (GRANADA-ALMERÍA, SPAIN)

Rouco Collazo, Jorge (INCIPIT)

Aerial Structure from Motion photogrammetry, using unmanned aerial vehicles, has been a revolution in the three-dimensional documentation of archaeological remains, especially those that are difficult or inaccessible. This has been fundamental in its application to the fortifications of the Alpujarra, located on the southern face of the Sierra Nevada (Granada and Almería). This area has an intense rural settlement with several fortresses during Middle Ages.

This is an area with an abrupt mountainous orography, which conditions life in the region and also the methodology to be applied. The fortresses are located on rocky plateaus, often on cliffs, so the only way to document them is through the use of UAS.

In this presentation we will explain the workflow for the documentation of these fortifications with precision 3D models and their interesting applications as a basis for research on built heritage. But also the possibilities of the 3D format as a basis for its use in the conservation and dissemination of this fortified heritage.

13 THE USE OF DIGITAL TECHNIQUES FOR AN INTERDISCIPLINARY ANALYSIS OF URBAN TRANSFORMATION: THE NORTHERN NEIGHBORHOOD OF ALULA OLD TOWN (SAUDIARABIA)

Torre Guibert, Manon (Archaïos) - Soubira, Thomas (Archaïos; Laboratoire Traces UMR5608) - Quentinet, Colin (Archaïos) - Lesaichere, Anaëlle (Archaïos) - Vernet, Apolline (Archaïos; Laboratoire Orient et Méditerranée UMR8167)

This presentation explores how digital technology, beyond its function of transmitting heritage to the general public, is a useful tool to understand the changes of an urban neighborhood through time. The use of georeferenced photogrammetry of current elevations and buried masonry not only provides a basic 3D visualization of the actual remains, it allows the comparing of the numerous data collected at different research stages by underground archaeology, geophysical survey, architectural study, and building archaeology, through 3D restitution hypotheses, connecting macroscopic urban observation to microscopic stratigraphical details and integrating the scientific inputs of each specialist into the historical reading of urban transformations.

The northern neighborhood of AlUla Old Town, a heritage site located in northwest Saudi Arabia and abandoned in the 1980s, is a perfect case study. In this area, the construction in 1956 of a mosque, Al Zahra Mosque, visibly modified the general layout of the neighborhood. Indeed, earlier urban planning has been identified in the surrounding buildings' façades. Archaeological data and stratigraphy provided by excavations in the mosque and adjacent streets also attest to several phases of occupation and abandonment. Radiocarbon dating and material studies contribute to completing

the chronological sequence of the neighborhood, with an occupation as early as the 10th century AD. Digital technology, through the development of volumetric hypotheses, makes it possible to simultaneously read scientific data gathered from different research angles on a common medium for each occupation phase and allows us to witness the evolution of the urban context over time.

This research is part of the interdisciplinary MuDUD project carried out by Archaios since 2021, funded and steered by the French Agency for the Development of AIUla (Afalula) in partnership with the Royal Commission for AIUla (RCU).

14 UNVEILING SOUTHAMPTON'S PAST: DIGITAL NARRATIVES, AUGMENTED REALITY, AND COMMUNITY ENGAGEMENT FOR ACCESSIBLE PRESERVATION

Pedrotti, Felix (Southampton Marine and Maritime Institute, University of Southampton) - Grant, Michael (Ocean and Earth Science, University of Southampton) - Strutt, Kristian (Department of Archaeology, University of Southampton) - Cooper, Neil (Department of Archaeology, University of Southampton)

Southampton's Old Town is a historic centre in the city of Southampton, showcasing impressive medieval archaeology and standing structures. These include the Bargate, the Tudor House, and many hidden vaults that provided storage for the town's burgeoning trade in wine and wool. These remains are augmented by a substantial array of objects preserved within Southampton's designated Museum Collections. These legacies serve as an invaluable resource, unveiling the crucial role of Southampton as a prominent maritime gateway. Unfortunately, many of these monuments and objects remain largely inaccessible to the general public due to various barriers, including linguistic, geographic, mobile, and financial limitations, as well as preservation needs. In response to these challenges, a transformative project was initiated by the authors in collaboration with Southampton City Council (SCC), and funded by the Southampton Institute of Arts and Humanities (SIAH). The goal is to preserve and showcase Southampton's archaeological heritage, making it accessible to both local and international visitors through digital narratives and Augmented Reality (AR) experiences.

Between 2021 and 2024, this project has identified suitable methodologies for creating a digital record of historical monuments, artefacts, and documents that speak to Southampton's past. Early events in 2023 showcasing this data at the Southampton Science and Engineering Festival and the National Heritage Open Days served as pilot studies. In 2024 the project promoted Knowledge Exchange between SCC, Southampton's residents and historical societies. It also enhanced the local Historic Environment Record by providing 3D recorded models of historic monuments, ensuring the preservation of these sites through digital archives and web-based experiences, including Augmented Reality. This presentation will illustrate how this project came together and how various methodologies used during this project developed a better framework within public engagement, contributing to a better understanding of modern society, archaeological connectivity, and cultural awareness.

15 THE ACCESSIBLE PAST. VIRTUAL MUSEUM OF THE ANCIENT SPEZIERIA OF SANTA MARIA DELLA SCALA, ROME

Vázquez de Ágredos Pascual, María Luisa (Universitat de València) - Muñoz Cosme, Gaspar (Universitat Politècnica de València) - Vidal Lorenzo, Cristina (Universitat de València) - García López de Andújar, Vanesa (Universitat de València) - Horcajada Campos, Patricia (Universidad Complutense de Madrid) - Durá Martínez, Esther (Universitat de València) - Tardi, Simona (Universitat de València) - Martínez García, María Julia (Independent Scholar)

Between the 11th and 19th centuries, the city of Rome housed around 300 apothecaries of religious origin that were associated with convents, monasteries, and hospitals. These establishments played a significant role in Rome's history during the High and Late Middle Ages, the Renaissance, and the Baroque period. Many of them began to close as secular pharmacies gained increasing prominence and leadership. At the beginning of the 20th century, two of these religious apothecaries still remained in their original locations: one within the Benedictine Monastery of Santa Cecilia and the other at the Convent of Santa Maria della Scala, belonging to the Order of Discalced Carmelites. However, since March 12, 1936, when the first one was moved to the Vatican Apostolic Library, only the apothecary (spezieria) of the Convent of Santa Maria della Scala remained in its original place. This makes it the sole testament to a distant and recent past in which these establishments actively participated in the daily life of Rome. Ten years ago, we initiated a project to study and enhance the ancient spezieria of Santa Maria della Scala. In its current phase, the project combines the use of new 3D technologies, augmented reality, and information and communication technologies (international thesaurus of materia medica) for the development of its Virtual Museum. This museum will also integrate innovative museographic narratives based on the results of recent years' archaeological, physicochemical, historical, historical-artistic, botanical, and mineral research on the hundreds of drugs, fragrances, and colors preserved there. This conference presents, as a preview, an advancement of the aforementioned Virtual Museum.

16 CASTELO D'ARROXO. A DIGITAL AND MORE INCLUSIVE PERSPECTIVE OF A MODERN AGE FORTIFICATION AT AS FIGUEIRAS (CASTROPOL, ASTURIAS)

Maldonado Ruiz, Alexis (University of Santiago de Compostela; Universiteit Leiden) - Busto Zapico, Miguel (University of Granada) - Lara Piñera, Francisco (Universidad Nacional de Educación a Distancia)

The present work is the first attempt to digitise one of the most important Modern period fortifications in the area of As Figueiras (Castropol, Asturias). It is considered very possible that this fortification, built during the 18th century, acquired a certain prominence in 1806, during the events of the War of Independence, when, in connection with Ribadeo, a defensive line of the Eo estuary was created.

During the archaeological interventions of 2022 and 2023, it was decided to carry out a systematic three-dimensional documentation of the structure, the excavation probes and the immediate surroundings.

For this task, it was decided to use photogrammetry by Unmanned Aerial Vehicle, supported by terrestrial photogrammetry. On this digital data we did several spatial analyses and a partial three-dimensional reconstruction of the structure. The results were subsequently processed for the creation of physical typhological replicas adapted for visually impaired people. These adapted replicas were subsequently printed using 3D printers based on.

17 VISUALISING HERITAGE: USING DIGITAL TWIN TECHNOLOGIES FOR CONSERVATION, REGENERATION AND OUTREACH

Wilson, Andrew (University of Bradford) - Sparrow, Thomas (University of Bradford) - Moore, Joe (University of Bradford) - Gaffney, Christopher (University of Bradford) - Croucher, Karina (University of Bradford) - Ichumbaki, Elgidius (University of Dar es Salaam) - Bates, Richard (St Andrews University) - Becker, Katharina (University College Cork) - Evans, Adrian (University of Bradford) - Booker, Olivia (St Andrews University)

Visualising Heritage is a research group responsible for the development of 3D capabilities for imaging and visualisation at the University of Bradford, UK. Recent infrastructure investment from the Arts and Humanities Research Council has extended the scale and reach of these possibilities, in particular with use of mobile mapping technologies (incl. Leica Pegasus TRK 700 EVO and Mosaic Viking 360 camera) and use of immersive spaces that will be discussed in this presentation.

These new digital twin capabilities have been brought to bear upon challenging city-scale and townscape heritage applications that have responded to varied needs in the UK, Ireland and Tanzania – from city-wide digital twins, to healthy highstreets and community-scale interventions. Collectively these represent opportunities to serve place-based research – helping to anchor humanities-based narratives that connect people, heritage and place; address regeneration, monitoring and conservation needs; whilst also signposting to different outreach opportunities including heritage for identity and wellbeing; discovery and interpretation; and in support of tourism and the creative economy.

18 A REFERENCE DOCUMENT FOR THE STUDY OF 19TH CENTURY NAVAL ARCHAEOLOGY

Silveira Martins, Adolfo António (C.E.U.-Cooperativa de Ensino Universitário; Universidade Autònoma de Lisboa) - Rodrigues Pereira, José (Portuguese Navy. Retired) - Martins, Adolfo (História, Territórios e Comunidades. CFE. Universidade de Coimbra)

The aim of this paper is to present and preserve a handwritten document from 1830, produced to assist the shipbuilders of the French naval port of Brest, and the results of the developed comparative study between the ships included in this manuscript and the Portuguese frigate D. Fernando II e Glória, exhibited in the Lisbon Maritime Museum. The document is of great importance for the study of mid-19th century naval archaeology. The manuscript is entitled 'Dimensions des Mâture et Plans de la garniture des mâts pour les Bâtiments de chaque rang', with the reference Cx. 1, 17450, and is part of the Leite Vasconcelos archival collections at the Portuguese National Archaeological Museum.

The document highlights a number of peculiarities and specific milestones in 19th century shipbuilding as an instrument of social and political modernisation. The manuscript contains detailed drawings of hull dimensions/proportions and rigging for each class of ship: liner, frigate, corvette, brig and schooner.

In this way, the research team has recorded the information contained in the manuscript in detail and converted it into a 3D digital environment for more comprehensive cultural practices, in order to clarify the differences between the established rules and practices of the time, and to compare them with the features of the Portuguese frigate D. Fernando II e Glória, now a historical ship in the Lisbon Maritime Museum. The results of this research will be presented in the form of comparative tables illustrating the differences identified in dimensions and proportions, the use of digital technologies where the two ship models (3D models) are set aside, and the overall conclusions.

916 INTEGRATING NEANDERTAL LEGACY: FROM PAST TO PRESENT. FROM SCIENCE TO SOCIETY

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Mihelic, Sanjin (Museum of Arts and Crafts, Zagreb) - Janković, Ivor (Institute for Anthropological Research, Zagreb) - Leskovar, Tamara (University of Ljubljana) - Romagnoli, Francesca (Universidad Autónoma de Madrid) - Rivals, Florent (Institut Català de Paleoeologia Humana i Evolució Social)

Session format: Regular session

Since the discovery of Neandertals in the Kleine Feldhofer Grotte in Neander Valley, Germany, in 1856, they have remained at the forefront of scientific debates and captured the public imagination as our favourite 'cavemen.' Despite the evolving perspectives—from brutish beings to potential evolutionary links to humanity—the term Neanderthal has never faded from relevance. In recent years, numerous discoveries of their physical and cultural remnants have shed new light on our understanding. Genomic data extraction from fossils and sediments, coupled with innovative analytical methods, has provided profound insights into their biological legacy. Concurrently, research efforts across various disciplines have highlighted their diverse behaviours across space and time, fostering collaboration among scientists and driving the field forward.

Beyond academia, Neandertals have emerged as invaluable assets in heritage preservation, tourism, and education. This session serves as a platform to showcase the latest findings from diverse scientific fields related to the Neanderthal legacy. By encouraging interdisciplinary discussions and addressing pertinent issues, this session aims to bridge the gap between different disciplines. Moreover, it will spotlight best practices, fostering engagement with diverse audiences beyond the scientific community.

The session is organized within the framework of the COST Action 19141 Integrating Neanderthal Legacy: From Past to Present (iNEAL).

ABSTRACTS

1 INTEGRATING NEANDERTAL LEGACY: FROM PAST TO PRESENT (SLIGHT RETURN)

Mihelic, Sanjin (Museum of Arts and Crafts, Zagreb) - Janković, Ivor (Institute for Anthropological Research, Zagreb)

The year 2020 marked the starting point of a four-year Action entitled Integrating Neanderthal Legacy: From Past to Present (iNEAL) (CA19141), financed through the European Cooperation in Science and Technology (COST). The Action is aimed at assessing and addressing biases in Neanderthal legacy and creating a pan-European, and wider, network of scholars involved in Neanderthal research. The ever-growing datasets related to Neandertals (archaeological, fossil, genomic etc.) resulted in specialization of scientists of different disciplines that often have less than adequate understanding of other fields involved with Neanderthal research. Further, socioeconomic factors and different trajectories of development of scientific disciplines in different countries resulted in biases toward the 'western countries', while many of the sites in e.g. the former 'Eastern bloc' were poorly represented or published. The iNEAL Action is addressing these and other biases through its working groups (WG1: Fossil data; WG2: Cultural data; WG3: Molecular data; WG4: From Past to Present). Special attention is given to training of young researchers where disciplines are underdeveloped. Further, among the Action Goals is bridging the gap between scientists and other interested parties (general public, touristic sector, museums, business, legislators etc.) in order to utilize socioeconomic aspects of various types of Neanderthal legacy.

2 THE TOURTOIRAC ROCK SHELTER: A "FORGOTTEN" LATE MIDDLE PALAEOOLITHIC AND EARLY UPPER PALAEOOLITHIC SEQUENCE WITH CANNIBALIZED NEANDERTHAL REMAINS

Doyon, Luc (CNRS UMR5199 PACEA) - Crevecoeur, Isabelle (CNRS UMR5199 PACEA) - Armand, Dominique (CNRS UMR5199 PACEA) - Beauval, Cédric (Archéosphère) - Bosq, Mathieu (GéoArCQ) - Rosso, Daniela (Universitat de Valencia) - Royer, Aurélien (UMR6282 Biogéosciences) - Rufà, Anna (Universidade do Algarve) - Michel, Alexandre (Conseil départemental de la Dordogne) - Vaissié, Erwan (Paléotime)

The Tourtoirac rock shelter is known since the end of the XIXth century but was only formally excavated by Henri Laville between 1968 and 1972. The site remains largely undocumented, being only briefly cited in regional syntheses. No reappraisal was carried out until 2021, when new excavations began with a multidisciplinary team.

The Tourtoirac rock shelter presents a complex stratigraphy including three units without reaching the bedrock. US1 yields a lithic assemblage attributed to a Middle Gravettian occupation while the US2 and 3 contain stone technology assigned to the Levallois and Quina Mousterian. The faunal assemblage is dominated by Reindeer throughout the sequence and includes numerous bone retouchers, albeit they are more frequent in Middle Palaeolithic contexts.

Over twenty human remains were discovered in recent excavations and when studying old collections from Laville. The anthropological assemblage mainly includes hand phalanges, metacarpals, and lower limb bone fragments. Two decidual teeth were also identified. In total, they are attributed to four individuals: two adults, one adolescent and one child. Most human remains were found in association with Mousterian occupations, except for a single decidual tooth found in the Middle Gravettian level.

Complete and/or diagnostic human remains from Mousterian occupations are all attributed to Neanderthal. Interestingly, they often bear evidence of anthropogenic modifications such as cut marks as well as percussion notches and flaking suggesting long bone breakage to access marrow. Some human long bone fragments were used as bone retouchers and other expedient tools. Together, these modifications are similar those documented at Goyet, Belgium, where mortuary practices associated with commensal cannibalism were identified (Rougier et al., 2016). Our results question the implications of recurrent cooccurrences of specific mortuary practices and technological behaviour involving human remains documented in Quina Mousterian contexts at a regional scale (e.g., Mussini, 2011; Verna & d'Errico, 2011).

3 LA ROCHE-COTARD (LANGEAIS. FRANCE). UNE GROTTTE ORNÉE PAR NEANDERTAL

Marquet, Jean Claude (Chercheur associé GeHCO (Lab. de géologie. Fac. Sciences. Tours); ORCID 0000-0001-6250-4720; CITERES. Lab. Archéologie et Territoires. Tours) - Wojtczak, Dorota (Integrative Prehistory and Archaeological Science, University of Basel, Suisse.; ORCID 0000-0002-3259-0792) - Freiesleben, Trine Holm (Department Physics, Technical University of Denmark, Roskilde, Denmark)

Cette grotte a été découverte lors de travaux en 1846. Elle a été vidée des deux couches moustériennes qu'elle contenait en 1912, à la base un Moustérien typique à débitage Levallois et au-dessus un Moustérien de tradition acheuléenne. Les panneaux de tracés digitaux et de ponctuations digitales, connus depuis longtemps, n'ont été soumis pour validation à un spécialiste de l'art préhistorique qu'en 2008 puis présentés à une table-ronde de l'EAA à Budapest en 2022. Les principaux panneaux ont été présentés dans un article (<https://doi.org/10.1371/journal.pone.0286568>) en juin 2023. Certains de ces panneaux attestent d'une intentionnalité très forte de la part de l'homme ou de la femme Néandertal qui les a réalisés.

Une approche de la datation de ces panneaux a été obtenue grâce à la méthode OSL (Luminescence Stimulée Optiquement). Le dégagement de l'entrée de la grotte en 1846 et la fouille de 1912 ont préservé localement les sédiments qui se trouvaient autour de l'entrée. Le diagramme bayésien obtenu à partir des nombreuses datations a permis de dater la fermeture de l'entrée de la grotte de 57 000 années.

L'objectif de cette présentation est de montrer aussi d'autres productions graphiques également réalisées dans la grotte, récemment étudiées et de les croiser avec celles déjà connues.

Jean-Claude Marquet, Université de Tours (France)

Dorota Wojtczak, Université de Bâle (Suisse)

Trine Holm Freiesleben Technical University of Denmark.

4 UNDERSTANDING THE SITE FUNCTION AND NEANDERTHAL SUBSISTENCE STRATEGIES THROUGH THE MICRO-WEAR ANALYSIS OF THE STONE ARTEFACTS FROM LA ROCHE-COTARD SITE

Wojtczak, Dorota (IPNA, Basel University) - Marquet, Jean-Claude (Chercheur associé GeHCO Lab. de géologie. Fac. Sciences. Tours)

Stone objects are often the best represented and conserved cultural remains at Palaeolithic sites. Stone artefacts as an assemblage and individually retain a unique story covering the time from being picked up, all the way through their lifecycle; manufacture, use, and possibly recycling, and finally discard. Stone tools related to many aspects of the everyday survival of prehistoric people and as such are remarkable sources of insight into their lives. Here we present results of the micro-wear studies undertaken on stone artefacts originating from the Middle Palaeolithic occupations during MIS 5, 4 and 3 at the La Roche-Cotard (LRC) site in France. The site was occupied several times by Mousterian hunters, which were roaming the environs of the Indre-et-Loire region and left some remarkable evidence of both engraved abstract patterns on the cave walls and hundreds of stone artefacts, which have been thoroughly examined by low and high-power microscopic analyses. These results contribute to interpretations on the site function and reveal a broad-based subsistence strategy of their producers. Moreover, the data also advocates that tasks undertaken on site were not limited to graphic production on the cave walls alone. These conclusions help progress the current discussion on the complexity of Neanderthal technological behavior and their cognitive skills.

5 THE UNUSUAL FRONTAL BONE MORPHOLOGY FROM HAHNÖFERSAND, GERMANY

Röding, Carolin (Paleoanthropology, Senckenberg Centre for Human Evolution and Palaeoenvironment, University of Tübingen, Germany; Institute for Archaeological Sciences, University of Tübingen, Germany) - Profico, Antonio (DFG Centre of Advanced Studies 'Words, Bones, Genes, Tools', University of Tübingen, Germany; Department of Biology, University of Pisa, Italy) - Merkel, Michael (Archäologisches Museum Hamburg und Stadtmuseum Hamburg, Germany) - Harvati, Katerina (Paleoanthropology, Senckenberg Centre for Human Evolution and Palaeoenvironment, Eberhard Karls University of Tübingen, Germany; Institute for Archaeological Sciences, Eberhard, Karls University of Tübingen, Germany; DFG Centre of Advanced Studies 'Words, Bones, Genes, Tools', Eberhard Karls University of Tübingen, Germany)

Frontal bone morphology is considered informative concerning phylogenetic and taxonomic affinities in hominin fossils. For example, a clear delimitation between the brow ridge and a flattened trigonum supraorbitale is viewed as a typical feature of *Homo sapiens*. In contrast, a flat frontal squama and prominent supraorbital region are characteristic of Neanderthals and Middle Pleistocene individuals from Europe and Africa. The evaluation of individual frontal bone features can lead to contradicting results between studied features.

The enigmatic frontal bone from Hahnöfersand, Germany, is one example that shows a mix of modern human and supposed Neanderthal features (Bräuer, 1980). The well-preserved frontal bone was originally dated to ca. 36 ka and interpreted as a potential hybrid between Neanderthals and modern humans. However, a later revision of the dating to ca. 7.5 ka warrants a new look at this specimen (Terberger, Street & Bräuer, 2001).

Here, we aim to analyze the ectocranial morphology of the frontal bone from Hahnöfersand using the method of surface registration. This almost landmark-free approach allows us to study the entire preserved morphology. Our comparative dataset included Neanderthals, Middle Pleistocene individuals from Europe, and a diverse *Homo sapiens* sample. Multivariate analyses (PCA) show the greatest morphological affinity between Hahnöfersand and *Homo sapiens*. In addition, Hahnöfersand is closest to Holocene modern humans in overall shape based on Procrustes distances. Our results showed no effect of the reported mix of features in the frontal bone from Hahnöfersand on its clear affinities to *Homo sapiens*. Therefore, our morphological re-evaluation is consistent with the revised date for this individual.

The surface registration method has great potential for the study of isolated and fragmented fossil remains. Here, we showed that this potential extends to relatively large and well-studied anatomical features whose shape might be difficult to capture in its entirety using traditional geometric morphometrics.

6 TAXONOMIC ASSESSMENT OF THE HUMAN REMAINS FROM THE MIDDLE PALEOLITHIC SITE OF GROTTA DEL POGGIO (CILENTO, SOUTHERN ITALY)

Piccirilli, Erica (Department of Cultural Heritage, University of Bologna, Italy) - Sorrentino, Rita (Department of Biological, Geological and Environmental Sciences, University of Bologna, Italy) - Seghi, Francesca (Department of Cultural Heritage, University of Bologna, Italy) - Belcastro, Maria Giovanna (Department of Biological, Geological and Environmental Sciences, University of Bologna, Italy) - Talamo, Sagra (Department of Chemistry G. Ciamician, University of Bologna, Italy) - Harvati, Katerina (Paleoanthropology, Senckenberg Centre for Human Evolution and Palaeoenvironment, Eberhard Karls University of Tübingen, Germany; Institute for Archaeological Sciences, Eberhard Karls University of Tübingen, Germany; DFG Centre of Advanced Studies 'Words, Bones, Genes, Tools', Eberhard Karls University of Tübingen, Germany) - Ricci, Stefano (Department of Physical Sciences, Earth and Environment, Unità di Ricerca di Preistoria e Antropologia, University of Siena, Italy) - Moroni, Adriana (Department of Physical Sciences, Earth and Environment, Unità di Ricerca di Preistoria e Antropologia, University of Siena, Italy) - Benazzi, Stefano (Department of Cultural Heritage, University of Bologna, Italy)

Grotta del Poggio is a key site for the Middle Paleolithic of southern Italy as it contains a pivotal anthropogenic deposit (layers 2-13) which has been referred to the MIS6 on geological basis. This deposit is part of a more than 20 m thick stratigraphic sequence that continues in the adjacent shelter. Excavations at the cave were carried out between 1964-1974 by Palma di Cesnola. After an erosional event, the cavity was used as a burial cave during the Bronze age. Thermoluminescence dating from layer 17 of the shelter sets a terminus ante quem for the cave's series at 111.800±9.500 BP. A human upper left first molar in situ in layer 6 and a human left talus hypothetically attributed to layer 4 were found in 1967. No archaic features were observed on the talus, thus questioning its attribution to Neanderthal. Conversely, the molar exhibited an evident Neanderthal-like morphology (i.e., taurodontism, strongly expressed hypocone, Carabelli's trait) and crown diameters fell within the Neanderthal variability range.

This contribution shows the geometric morphometrics (GM) and radiocarbon analyses aimed at clarifying the taxonomic attribution of these findings. Routine workflows were performed to create 3D models of the molar and talus. Then, GM analyses were conducted on the molar 2D crown outline and on the talus 3D shape. Additionally, the talus was subjected to radiocarbon dating to elucidate its absolute age.

The GM analysis on the molar crown outline confirmed its taxonomic attribution to Neanderthal, while the talus resulted to belong to recent *Homo sapiens*. The radiocarbon dating directly obtained on the talus corroborated this attribution, giving the authors the chance to hypothesize that this bone could have accidentally slipped down from the uppermost layers containing the Bronze age occupation during the excavation of layer 4.

7 INVESTIGATING NEANDERTAL SUBSISTENCE AT THE ROMUALDOVA PEĆINA (CROATIA) SITE THROUGH A MULTIDISCIPLINARY APPROACH TO FAUNAL REMAINS

Vidas, Lia (Centre for Applied Bioanthropology, Institute for Anthropological Research, Zagreb, Croatia) - Radović, Siniša (Institute for Quaternary Paleontology and Geology, Croatian Academy of Sciences and Arts, Zagreb, Croatia) - Silvestrini, Sara (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main, Frankfurt am Main, Germany; Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Modena, Italy) - Sommella, Eduardo (Department of Pharmacy, University of Salerno, Fisciano, Italy) - Salviati, Emanuela (Department of Pharmacy, University of Salerno, Fisciano, Italy) - Marin-Arroyo, Ana (Grupo I+D+i EvoAdapta (Evolución Humana y Adaptaciones durante la Prehistoria), Departamento Ciencias Históricas, Universidad de Cantabria, Santander, Spain) - Benazzi, Stefano (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Janković, Ivor (Centre for Applied Bioanthropology, Institute for Anthropological Research, Zagreb, Croatia)

Neandertal subsistence has been a subject of investigation on a global scale for many years. Yet, there are gaps in our understanding of specific patterns of their subsistence in both temporal and geographical settings. One of the poorly understood regions is the Eastern Adriatic. This is at least partially due to the scarcity of the sites and relatively poor preservation of faunal remains. However, some sites hold important information about Neandertal diet, use of space, and other related issues. One of these is Romualdova pećina on the western coast of the Istrian peninsula. The cave is relatively simple in morphology and lies on the southern slope of a relict river gorge (the Lim Channel) today filled with sea. Excavated since the 1960s, it provides evidence of occupation of Neandertals and later, Upper Palaeolithic humans, but was used mainly by carnivores, such as bears and hyenas. Untangling the dynamics of these interchanging occupations on the site is a complicated but much-needed task. Here we investigate the faunal assemblage of the Middle Palaeolithic layers (6-21, trench 3; 9-13, trench 2) of the cave through morphological, taphonomic and palaeoproteomic approaches. Although highly fragmented, the assemblage has proven rich in faunal taxa. Even though carnivore activity is frequent, the lithic assemblage suggests an anthropogenic factor in the formation of the site as well. Apart from the open-air site of Campanož in southern Istria, where no organic material is preserved, this is the only Middle Palaeolithic site in the region. Therefore, a better understanding of Neandertal occupation in this area is of extreme importance for a complete understanding of Neandertal behaviour on a larger scale. The work presented here is in accordance with the aims of the CA19141 iNEAL and was done as a part of the ERC SUBSILIENCE and PREHISTRIA (IP-2019-04-7821) projects.

8 NEANDERTHAL OCCUPATION OF THE IONIAN ISLAND OF KEPHALONIA, WESTERN GREECE. PRELIMINARY RESULTS OF THE ASHORE PROJECT

Elefanti, Paraskevi (University of the Peloponnese) - Marshall, Gilbert (University of the Peloponnese) - Yiannouli, Evyenia (University of the Peloponnese)

For ten years, the diachronic ASHORE project has focused on the southeastern part of the Ionian Island of Kephallonia, during which over a thousand Middle Palaeolithic chipped stone artefacts were recovered. They include Levallois-Mousterian flakes, cores and tools, mostly related to raw material provisioning using beach pebbles, comparable to the so-called Pontinian industries of western Italy.

Most of the material was recovered from around 18m above sea level, with the richest concentrations from marine terraces formed in weakly cemented shallow marine deposits to the south of the village of Poros. Rich in fauna, these sediments were easily eroded, resulting in the formation of the distinctive platform that we see today. Based on OSL dating, recent geological modelling of marine formations in southern Kephallonia has attributed the 18m terrace to the MIS 3c interstadial, around 53ky. Relating geo-chronology to the phasing of the Middle Palaeolithic is difficult, given the lack of clear temporal markers. Ongoing fieldwork should help us to establish whether similar, although much smaller scatters from other terraces in the sequence, can also be interpreted as raw material provisioning during earlier phases, or simply the isolated traces of contemporary subsistence on higher ground.

Complex interaction between sea level change and tectonic uplift within the Ionian zone has led to the preservation of terraces on which Levallois-Mousterian chipped stone artefacts were recovered, pointing to the use of more remote islands. The size of Kephallonia would have proved a strong pull factor, while the beach pebble raw materials would have encouraged a coastal focus, resulting in the substantial assemblages recorded by the ASHORE project. In contrast, convincing Upper Palaeolithic or Mesolithic evidence has so far been elusive, possibly a result of inundation during the post-glacial period.

9 BEYOND THE MODEL: CHALLENGES IN DISTINGUISHING TYPES OF OCCUPATION IN LATE NEANDERTHAL SITES

Lubrano, Valentina (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB)) - Blasco, Ruth (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili (URV)) - Rufà, Anna (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB); Univ. Bordeaux, CNRS, MCC, PACEA) - Rivals, Florent (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); ICREA) - Rosell, Jordi (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili (URV))

The exploration of Late Neanderthal behaviour is a central topic in archaeological research, with a primary focus on unraveling the complexities of Middle Palaeolithic archaeological sites. Behavioural analysis plays a pivotal role in revealing the diversity of sites, providing crucial insights into occupation typology and site functionality. Additionally, it plays a key role in elucidating mobility patterns, social interactions, and the group sizes inhabiting caves and shelters.

The typology of a site is intimately connected to its function and the nature of sustained occupation. Determining the duration of Neanderthal occupations presents a significant challenge, given the complexities of distinguishing between long-term and short-term occupations. This challenge stems from the fact that archaeological assemblages are often palimpsests, potentially leading to erasure of information or partial preservation, accumulation, and transformation of subsequent activities.

Several factors have been identified to assess the duration of Late Neanderthal occupations, including the volume of archaeological remains, knapping sequences, evidence of butchering activities, extent of carnivore damage, taxonomic diversity, hunting spectrum, spatial distribution, and overall extent of the occupied surface. Despite the formulation of a general model based on these criteria to differentiate and identify occupations at the end of the Middle Palaeolithic, diverse data from various archaeological sites challenge this general paradigm. This diversity shows that the criteria for defining types of occupation are not homogeneous within the scientific community, creating a need for a comprehensive literature review. The objective of the present study is to scrutinize existing literature, elucidating the strengths and weaknesses of specific features within the current model used to classify types of occupation. By doing so, the study also aims to contribute to a more nuanced understanding of Late Neanderthal behaviour and the complexities associated with interpreting archaeological evidence from this period.

10 HOW CAN I HELP? NEANDERTHALS AS A CHANNEL FOR PUBLIC ENGAGEMENT. INSIGHTS FROM PORTUGAL

Pereira, Telmo (C.E.U.-Cooperativa de Ensino Universitário)

It is widely acknowledged that scientists often exert minimal effort or lack the capacity to communicate their research comprehensively, resulting in a significant gap in public understanding. This deficiency impacts awareness and interest and leads to misinterpretations of scientific results, including about the human past.

Most people exhibit limited awareness of the importance of comprehending prehistoric times and how such awareness would be helpful when addressing many contemporary phenomena (e.g. migration, environmental changes, etc.).

Neanderthals emerge as a compelling bridge to connect with the public. Their universal appeal generates curiosity, making them an ideal subject for public discourse. Over the years, effective communication about Prehistory, including Neanderthals, has proven to be a strategic means of securing local support, funding, and people and student involvement. This success often stems from personal interactions rather than relying solely on competitive grants.

In an era where financial resources are increasingly scarce and directed towards more pragmatic areas, emphasizing how Prehistoric Archaeology and Paleoanthropology can help with the present and prepare the future may be achieved through empathy rather than solely relying on academic brilliance.

Drawing on personal experiences in Portugal, this presentation will give examples of tangible outcomes of successful communication strategies in Neanderthal studies. We hope to inspire effective communication approaches, fostering a deeper connection between the scientific community and the public and, ultimately, having fun.

11 BREAKING THE EDUCATIONAL ONE-WAY ROAD: THE PALEO EXPERTS

Welper, Dustin (Stiftung Neanderthal Museum)

It's usually a dream: an in-depth dialogue with a group of visitors about the Neanderthal life style! But fluent conversations within tours and workshops are usually only brief and rare encounters. Within museums, the exchange of knowledge is mostly one-sided. Like a waterfall, years of study and learning paleolithic archaeology and human evolution pour down on the visitors, but you learn nothing about their opinions and feelings about what they have just learned. It is not easy to break up this one-way road.

The research project "Neanderthals and us" (2022-2025) is a cooperation between the Erasmus University Rotterdam (with Prof. Hub Zwart, PhD Student Susan Peeters), Leiden University (with Prof. Marie Soressi and PhD Student Karel Kuipers) and the Neanderthal Museum. It investigates the question of how our image of humanness changes when we learn more about Neanderthals. Within this project, Neanderthal Museum has decided to take a different approach to communication: by organizing the citizens' panel the "Paleo experts".

In exciting workshops, not only do our "Paleo experts" learn something about paleolithic archaeology, Neanderthals and the museum, but also, we as researchers learn something from them. The participants add their different perspectives, new impressions and let us draw on a much larger and diversified pool of knowledge. This makes them an essential part of "Neanderthals and us".

Over the next 1.5 years, the "Paleo experts" will participate in the interactive events of "Neanderthals and us", while meeting and discussing different researchers and artists from the field of philosophy and archaeology. In addition to the workshops, they are also invited to participate in blogposts and other documentation activities of the project.

In this talk, we will introduce the project and the Citizen panel, as well as the methods, workshops and insights of the participants.

918 PUBLIC BENEFIT: SHARING, CRITIQUING, BRAIN-STORMING AND BLUE-SKYING EXPERIENCE AND IDEAS TO HELP ARCHAEOLOGY BENEFIT WIDER SOCIETY IN THE FUTURE

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Lewis, Carenza (University of Lincoln) - Schulke, Almut (University of Oslo) - Fernández Fernández, Jesús (University of Oviedo) - Rummel, Christoph (Römisch-Germanische Kommission des Deutschen Archäologischen Instituts)

Session format: Public Benefits of Archaeology Advisory Committee

To retain public support, archaeology's wider benefits must be felt and recognised as widely as possible. This session explores how well we are doing this, and how it might be done better in the future by sharing case studies, ideas, issues and opportunities. Reflecting the five key priorities of the EAA's Public Benefits of Archaeology Advisory Committee, we welcome papers that:

1. Present and assess case studies which show how archaeology has benefitted people and places and/or the range of approaches being used to do this, including benefits to tourism, visitor economies, employment, places, place-making, heritage assets, regeneration, education, health and wellbeing, communities and connectedness, the environment and more.
2. Explore the commonalities and differences across Europe in the understanding of, aspirations for, and achievement of public benefit from archaeology, including attitudes in archaeology/heritage sectors; different approaches to presenting archaeology; different opportunities for public engagement; different awareness/perceptions of archaeology in wider society.
3. Consider our understanding of the means, mechanisms and processes through which archaeology benefits people and places, including the use of new discoveries, new data, new approaches, new types of benefit, and new approaches to transnational sharing.
4. Identify emerging opportunities and threats impacting the capacity of archaeology to benefit - or harm - wider society, including changing public attitudes; social cohesion; education; health priorities; political change (at local, national and/or international levels) including devolution and conflict; legislative change; economic perturbation, headwinds and policy change; environmental change and climate crisis and more.
5. Offer strategies for disseminating awareness of the public benefits of archaeology so it can inspire archaeological practice and inform policy-making that will increase archaeology's capacity to benefit society in the future.

The session will include ample opportunities for open and inclusive discussion.

ABSTRACTS

1 ARCHEOLOGY MATTERS

Host-Madsen, Lene (Museum Skanderborg)

During the last ten years, Museum Skanderborg has worked strategically to develop new communication formats that release archaeology's potential and benefit wider society. Museum Skanderborg wants to reach beyond the physical framework of the museum building. Archaeology is everywhere in the city and in the landscape. We work to break

down hidden barriers for whom archeology is relevant. We do this through collaboration. We develop strong concepts together.

We wish to present and discuss some of the work we have done by presenting case studies ranging from development of new residential areas' through place branding and settlement strategies, which creates a better framework for attachment and communication between old and new residents. To the The eScape project that is all about combining art, archaeology, past and present on archaeological sites. To Archaeological excavations conducted in cooperation with the public. And finally ending at the new Museum on the Train Station Platform One. "The cultural Waiting Room". We put the museum right where people are. With the location at the train station, the museum becomes both a place where you learn about the past and a living meeting place. The ambition is that the physical setting will change the way we think and use museum experiences.

Our projects are based on the desire to utilize archaeology's superpower and create very special experiences across institutions, professional bases, social approaches and geographies in an equal dialogue.

This paper will put forward the concept as an inspiration for others and seek to evaluate on the weaknesses and strengths in the projects so far and finally line out a vision for future works.

2 THE PUBLIC BENEFITS OF HUNTER-FISHER-GATHERER COASTAL HERITAGE - THE HORIZON MSCA DOCTORAL NETWORK ARCHE AND ITS PAST-PRESENT-FUTURE APPROACH

Schülke, Almut (Museum of Cultural History University of Oslo)

Hunter-fisher-gatherer remains in the varying coastal areas across Europe are highly endangered through destruction by climate change, coastal erosion or intensive development in areas of agglomeration. Today situated under water or on land these fragile, and often merely visible remains gain little public attention and are under-communicated. However, they are highly important for our understanding of the human past. They thus have a large potential of being put at the heart of present and future public benefits. The newly started HORIZON Marie-Sklodowska-Curie Doctoral network "Archaeological Coastal Heritage: past, present and future of a hidden prehistoric legacy" (www.arche.uio.no) trains 10 PhD students in the scientific and public value of the hunter-fisher-gatherer legacy across Europe. This talk will present the objectives of this training network, with special focus on the prospects of public benefits inherent in it. These encompass aspects such as:

- The administrative integration of cultural and natural heritage in coastal areas to benefit sustainable landscapes and their use – both for inhabitants, visitors/tourism and other stakeholders,
- Public participation and sharing through dialogue on and communication of this unique heritage and its meaning, and
- More sustainable coastal economies – in the light of this fragile heritage and through knowledge, which draws on sustainable hunter-fisher-gatherer practices.

3 COMMUNICATING THE PUBLIC VALUE OF ARCHAEOLOGY IN ESTONIA

Lillak, Anu (National Heritage Board)

The Heritage Conservation Act in Estonia states that archaeological survey must be based on the principle of minimum intervention and is financed by the party responsible for the damage to heritage. The number of rescue excavations is rising, meaning that most new excavations are financed by developers. At the same time the term minimum intervention can be redetermined for every new project as formulation of guidelines and standards for archaeologists is still an ongoing process in Estonia. Consequently, the amount of intervention, the choice of methodology as well as sampling strategies are too often under dispute as the opinions on the best available practices differ and the developer is interested in paying as little as possible.

The expression of wider benefits of archaeology are therefore of utmost importance explaining the developers the reasons behind their, sometimes unwilling, investment in archaeology. Communicating its numerous benefits helps with "translating" archaeological heritage even to the people who are not personally interested in it. Presentation of archaeology, especially in novel ways, also aids with the ongoing discussion about the best available practices and helps us reach balance between the scientific and public interests as well as the developer's concerns.

I will briefly discuss the current situation in Estonia and present a few examples. The first will show how small-scale archaeological watching brief may grow into research changing our understanding of the Viking Age and benefit the local community years after the initial discovery. The second example will discuss how fascinating presentation of archaeology stimulates the creativity of archaeologists, helps to engage the public, and prevents misunderstandings and misconceptions.

4 ARCHAEOLOGY ON THE FRONTIER: ENHANCING EDUCATIONAL PROGRAMS IN REMOTE ISLANDS

Arciero, Roberto (Leiden University) - Maggiulli, Ornella (UCL - University College London) - Genovese, Martina (Stazione Zoologica Anton Dohrn; University of Messina) - Torreggiani, Irene (University of Oxford) - Capriotti, Martina (University of Camerino)

Lampedusa and Pantelleria rank among the most secluded islands in the Mediterranean Sea, situated between Sicily and the African coast. Educational programs often require tailored approaches compared to those on the mainland of Italy, as students on these islands frequently face limitations regarding available resources, such as materials and teachers. Moreover, the considerable geographical distance exacerbates their isolation. Whether it involves museum visits, theater events, or any educational program, meticulous preparation is necessary, often requiring students to travel to the mainland with significant obstacles. In short, the geographical location of these islands presents significant challenges to education.

In 2023, a team of researchers from various institutions and disciplines collaborated to co-develop an education-focused project (RESPIRE) for the islands of Pantelleria and Lampedusa. The RESPIRE project aimed to engage experts on the islands to develop initiatives that could inspire the younger generation. Likewise, it provided students with opportunities to explore their islands through diverse research activities encompassing marine biology, botany, geology, and archaeology. The present contribution specifically highlights preliminary results from the archaeological aspect of the project.

The archaeological investigation of the RESPIRE focused on the Anthropocene heritage of Lampedusa island through plastic objects studied on selected beaches. The objective was to analyze these objects using archaeological methods to understand their origins, chronological, and social significance. Importantly, during the first field season a group of high school students actively participated in this contemporary archaeological research alongside the authors of this paper, showcasing how archaeology can effectively contribute to shaping education programs in remote areas.

All in all, this paper wants to underscore the meaningful involvement of high school students in archaeological research and highlights the potential impact of archaeology on education initiatives in remote locations.

5 EDUCATIONAL AND OUTREACH PROGRAMS IN THE ATHENIAN AGORA

Viktoratou, Io (Steinmetz Family Foundation Fellow, the American School of Classical Studies at Athens)

The American School of Classical Studies at Athens (ASCSA) employs various methods to engage the public with archaeology, ranging from educational initiatives to outreach programs. This paper examines the evolution of educational programs in the Athenian Agora initiated by the ASCSA and under the auspices of the Ephorate of Antiquities of Athens, focusing on their role in making archaeology accessible to society.

The Agora, located in the city center of modern Athens, and the second most visited archaeological site in Greece, has for the first time educational and outreach programs for the local community. Emphasizing the significance of engaging local people of all ages residing near the archaeological site, the paper explores methods for initiating and maintaining public support, including the provision of online accessible materials, such as open access to artifacts from the Agora. It demonstrates how archaeological datasets are utilized for educational purposes, fostering learning, storytelling, and enjoyment in contemporary society. Moreover, the paper highlights the role of educational programs based on the Athenian Agora archaeological material in fostering a sense of ownership and involvement among the community in heritage management.

Central to these efforts is the development of educational programs tailored to the educational Systems of the various countries involved. The aim is to create programs with compelling central themes, incorporating materials relevant to interests of the participants. Preliminary findings from evaluation forms bring to the fore the educational themes that resonate with children and teenagers, informing the design of future educational materials. The ASCSA aims to enhance engagement and learning outcomes in archaeological education initiatives.

6 ABRISKETA: A PUBLIC BENEFIT ENCOURING ARCHAEOLOGICAL PROJECT

Campos-Lopez, Teresa (University of the Basque Country (UPV/EHU)) - Fernández Carvajal, José Ángel (Ondare Babesa) - Elorza, Lorena (Ondare Babesa) - González, Aitziber (Ondare Babesa) - Valle, Amaia (Ondare Babesa) - Ortega, Ander (Ondare Babesa)

Abrisketako Done Peri/San Pedro de Abrisketa is an initiative aimed at researching and preserving the historical and cultural heritage of Arrigorriaga, locality located in the Basque Country, Spain. Specifically, it involves enhancing the value of a medieval church through archaeological research, dissemination, and education, in an initiative developed by the community, with institutional, corporate, and participation of the Academia.

This element has been of archaeological interest due to its historical and architectural significance. However, scientific approaches to it had not been undertaken until now. In fact, it has always been surrounded by a halo of mystery due to its historical importance and its location in a privileged natural and geographical area.

Thanks to this project, led by a local association, various archaeological research and interventions have begun, yielding interesting results. Alongside this, efforts in socialization, dissemination are being developed, involving work in school, high school, and engagement with different audiences. This has resulted in an unexpected social response and has led the local people to connect with their heritage -elements they had previously overlooked-, thinking they lacked any heritage of interest.

The future presents numerous challenges: the element lacks legal protection, owned by a company, and with great value to the community. In this regard, opportunities and challenges will test the capacity of archaeology to work for the benefit of this community, generating networks, social cohesion around the project and local heritage. The aim is also to improve the necessary legislative changes for its conservation, promote strategies to be a driving force in the development and advancement of the locality, favour the reduction of tensions among stakeholders. However, the goal remains to develop strategies for disseminating awareness regarding the societal benefits of archaeology, with the aim of sparking interest in archaeological pursuits and offering valuable perspectives for policymaking.

7 CULTIVATING SUSTAINABLE CHANGE: ARCHAEOLOGICAL IMPACTS AND BENEFITS IN RECENT PROJECTS BY THE UNIVERSITY OF OVIEDO AND LA PONTE-ECOMUSEM

Garcia, Victor (University of Oviedo) - Cerra Gonzalez, Lucia (University of Oviedo) - Fernandez, Jesus (University of Oviedo)

This paper provides an overview of some projects recently carried out by the University of Oviedo and La Ponte-Ecomusem in Asturias, Spain, focusing on their public benefits. This initiative is characterized by combining a scientific approach to its work with significant community engagement. This connection is established by designing research programs that encompass both fundamental research, conducted through archaeological excavations, and applied research, delivering evident public benefits. A representative project in this line is “Escandalera, which focuses on recovering cultivable seed varieties of the same species unearthed in archaeological sites. Today, these varieties are nearly lost due to the industrialization of production processes. How have we achieved this? Firstly, through fundamental research, via archaeological excavations in medieval sites and thorough studies in environmental archaeology, we identified the varieties cultivated in the region during the Middle Ages, approximately 800 years ago. Secondly, this knowledge has been employed to search for current varieties through ethnographic work. They are then reproduced using agro-ecological techniques through experimental cultivation. Finally, as a result, the ecomuseum will establish a free public seed bank of high ecological value, suitable for local and quality production processes. This aligns with the objectives of the 2030 Agenda, emphasizing its contribution to the development of sustainable agriculture and biodiversity. Thus, it underscores the crucial role of archaeology in generating tangible and significant benefits for society. By rescuing and preserving historical seeds, it not only contributes to the conservation of genetic diversity but also promotes sustainable agricultural and economic practices. This innovative approach, surpassing the traditional boundaries of archaeological research, demonstrates how archaeology can have a direct impact on improving the quality of life and well-being of the community, solidifying its position as a relevant discipline committed to the present and the future.

8 ARCHAEOLOGY, PLACE AND WELLBEING – JOINING THE DOTS CONNECTING PUBLIC PARTICIPATION IN ARCHAEOLOGY AND WELLBEING IN INDIVIDUALS AND COMMUNITIES

Lewis, Carena (University of Lincoln) - van Londen, Heleen (University of Amsterdam) - Marciniak, Arek (University of Poznan) - Vareka, Pavel (University of West Bohemia) - Verspay, Johan (University of Amsterdam)

Evidence for the impact of public participation in archaeology on personal wellbeing has become increasingly widely apparent in places where public participation is possible. This includes the UK, where there are few restrictions on who can take part in archaeology, and more recently other countries where access has previously been more restricted, including the Netherlands, Czech Republic, Poland and Germany, where researchers have instigated participatory programmes specifically in order to investigate the impact on wellbeing. However, while there is a growing body of literature showing the positive psychological impacts on individuals, other aspects remain less well understood, including the reasons why archaeology specifically confers the benefits it does, and the impact on community as well as personal wellbeing.

This paper will explore the role of place in increasing wellbeing at individual and community levels by reviewing data from projects in which members of the public in four European countries took part in archaeological excavations seeking evidence for the pre-modern development of the rural villages where they lived. Across Europe, millions of people live in (or have connections with) rural communities, whose archaeology and heritage are often overlooked, overshadowed by more conventional ‘authorised’ heritage of ‘the great and the good’ or in towns and cities.

We will review qualitative data from feedback surveys in order to explore the impact of participation on respondents’ attitudes to place and consider the likely impact of this on personal wellbeing. We will also review quantitative data from a recently published experimental psychology survey into the same activity in order to consider how this activity increases community wellbeing.

923 METALS AND METALWORKING I: COMPOSITIONS AND ORIGIN

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Noergaard, Heide (Moesgaard Museum, Department of Archaeology) - Wärmländer, Sebastian (Stockholm University, Department of Archaeology and Classical Studies) - Neiß, Michael (Lund University, Department of Archaeology and Ancient History) - Kmošek, Matěj (Institute of Archaeology of the Czech Academy of Sciences, Brno) - Saage, Ragnar (University of Tartu)

Session format: Regular session

Archaeometallurgy is a multidisciplinary field where researchers with different expertise and different traditions come together to answer questions related to ancient metals and metalcraft. Most research in this field is based on metallurgical analyses, but studies that involve typological seriation, experimental archaeology, or material provenancing are also common. For this session, we welcome full-length papers that investigate metal compositions and metal origins in a very broad sense. Measurements of trace element compositions or isotope compositions are often used to estimate the geographic origins of metals and metal ores. However, origins can also be determined with other methods, such as visual analyses focusing on certain techniques and styles. We also encourage presenting papers addressing artefact origin in a more traditional archaeological way to foster discussion among the participants. Analyses of bulk elements remain important and are often conducted with pXRF instruments on large samples such as coin hoards or collections of copper-alloy objects. In such studies, big data statistical methods can be useful, and their presentation within this session is especially welcome. Ideally, the papers should connect with the EAA meeting theme “Persisting with change”, but this is not an absolute demand. We welcome contributions from all geographic regions and time periods and encourage students and young researchers to present their ongoing research projects.

ABSTRACTS

1 NORTHERN NEOLITHIC COPPER: SOURCES AND CONNECTIONS

Gebauer, Anne Birgitte (Independent researcher)

Southern Scandinavia is exceptionally rich in copper artefacts from the Early Neolithic period of the Funnel Beaker culture, dating to 4000–3300 BC. Copper artefacts were brought here in such large quantities that, in terms of weight, the quantity of metal far exceeds the amount found in the Alpine region and the areas between Scandinavia and the Alps. Evidence in the form of a holding crucible and a possible tuyère from Lønt and the deliberate fracture of a flat axe from Neunkirchen has shown that metallurgy was mastered and practised in the north during the Neolithic. The importance of copper artefacts on the Northern European Plain and in Southern Scandinavia, and their origins have been intensively discussed for decades not the least because local copper deposits were not exploited during the Neolithic or Bronze Age, so that any raw material would have to have been imported. Recently details of the source of the raw material for Early Neolithic copper artefacts from the north have been reassessed and point to Southeast Europe rather than the Alpine area as region of origin. This paper reviews the new information on the origin of the early Neolithic copper, the innovation of copper pyrotechnical processing, and the consequences for the involvement of the north in the reconstructed copper-based, pan-European network of raw material exchanges.

2 PROJECT UŠKIANI: THE IMPORTANCE OF ARMENIAN GOLD FOR BRONZE AGE CAUCASIA

Kunze, Rene (Seminar for Oriental Archaeology and Art History, Martin-Luther-University Halle-Wittenberg) - Bobokhyan, Arsen (Institute for Archaeology and Ethnography, National Academy of Sciences of the Republic of Armenia, Yerevan) - Meliksetian, Khachatur (Institute for Geological Sciences, National Academy of Sciences of the Republic of Armenia, Yerevan)

The Gegharkunik region, on the south-eastern edge of Lake Sevan (Armenia), is a part of the southern Caucasus uniquely suited to demonstrating the intensive interaction between prehistoric settlement and gold mining. Initial approaches have revealed outlines of prehistoric settlement patterns, which can be related to contemporary gold mining in a clearly delineated natural corridor along this supra-regional communication and trade route. The spatial distribution of placer gold and its quantity suggest that prehistoric gold extraction was possible from the sediments of the rivers in the study area. The presence of placer gold in several local rivers, as well as ancient mining traces, has already been demonstrated. The gold deposits can be clearly distinguished from other South Caucasian gold deposits on the basis of their major and trace element concentrations. More than 80 gold objects from various recent exca-

vations and museums have been geochemically analysed. Conclusions can be drawn about the possible origin of the Bronze Age gold from Armenia, together with the geochemistry of natural gold in the area.

The presentation will give an overview of the results of a joint Armenian-German project in Eastern Armenia with a special focus on gold analysis using laser ablation ICP mass spectrometry.

3 THE TRAPEZOID BLADE CONNECTION: GIVING SHAPE TO THE NORDIC BRONZE AGE AND ITS CONNECTIVITY THROUGH A MULTI-PROXY APPROACH

Cornelis, Bart (Curt-Engelhorn-Zentrum Archäometrie) - Wittke, Andreas (Curt-Engelhorn-Zentrum Archäometrie) - Berger, Daniel (Curt-Engelhorn-Zentrum Archäometrie)

The Nordic Bronze Age period Ib (1600-1500 BC) is regarded as the breakthrough of bronze metallurgy in Northern Europe based on a boom in metal supply and the appearance of bronzes in regional styles. This encompasses the Sögel-Wohlde metalwork as well as styles belonging to Fårdrup and Valsømagle. The majority of these styles are influenced by metalwork from the Carpathian basin by incorporating decorative motifs belonging to Hajdúsámson-Apa style. The blades of type Sögel are a prime example. However, type Wohlde blades are an exception, as they tend to be slender variants with trapezoidal hilt plates often lacking decorations. As a result, their sphere of influence is ascribed to the northern Alpine region or the adjacent foothills, where multiple types of trapezoidal hilt plate blades have been identified. However, the relationship between the Nordic and Alpine types remains unexplored.

The research project "Origin, development and technology of the Sögel-Wohlde-Kreis" attempts to disentangle the relationships between these blade types by determining the chemical composition and lead isotope ratios, as well as tin and copper isotope values of ca. 100 trapezoidal blades. The use of multi-proxy data lies at the forefront to check for possible correlations between artefacts by applying statistical methods and mathematical models. The aim is to identify the potential origins of raw materials, relationships between blades as well as metal groups and mixtures of copper types or bronze batches. Results of the chemical and lead isotope analysis show that the Wohlde blades have been made of low-impurity chalcopyrite copper mainly from the Alpine Mitterberg and the Slovakian Ore Mountains, yet sources from Great Orme and the southern Alps are also represented. The question whether the Nordic Wohlde blades are archaeometrically related to their northern Alpine equivalents, and show significant correlations, will be presented based on future data.

4 REVISITING THE BRONZE ARTIFACTS EXCAVATED BY THE FRENCH EXPEDITION AT ENKOMI

Grabar, Edi (Department of History and Archaeology, University of Cyprus) - Pappasavvas, George (Department of History and Archaeology, University of Cyprus) - Charalambous, Andreas (Department of History and Archaeology, University of Cyprus)

The French expedition, led by Claude Frédéric-Armand Schaeffer, excavated at the site of Enkomi in Cyprus during the middle part of the 20th century, from 1934/1946 until 1970. Furthermore, the French continued the excavations until 1973, under the leadership of O. Pelon. Even though several of the many bronze artifacts from these excavations have been published, numerous other examples were not studied and remained unpublished. The repertoire of the Late Bronze Age bronze finds in Enkomi is vast, including numerous types of tools (axes, adzes, chisels, awls, drills, knives, sickles, and shovels), weapons (swords, spearheads, daggers, and arrowheads), vessels (mainly hemispherical bowls and other vessel types), objects of personal use (spiral rings, bracelets, pins, fibulas, mirrors, tweezers, and razors), statuettes, and even ingot finds. There is an additional problem in this situation that the excavation records do not preserve sufficient information on their contexts. This is why the revision of these bronzes, stored in the Cyprus Museum in Nicosia, including detailed interpretations, measurements, and metal analyses of well-preserved specimens, will largely contribute to the interpretation and reconstruction of the social and cultural environment of Enkomi and Cyprus in general. To reach the best possible and most reliable outcome, it is important to include and combine traditional methods and available typologies, together with more recent methodological and scientific approaches, in the study of archaeological material. With the introduction of X-ray fluorescence analysis in this research (pXRF), it will be possible to obtain crucial data on the elemental composition of the bronze artifacts and the provenances of the raw materials, which will provide new insights into metalworking activities and achievements.

5 FROM CYPRUS TO SWITZERLAND? ANALYTICAL EVIDENCE FOR CYPRIOT AND ALPINE COPPER IN THE MIDDLE BRONZE AGE SETTLEMENT OF MÖRIKEN

Berger, Daniel (Curt-Engelhorn-Zentrum Archäometrie Mannheim) - Höpfer, Benjamin (Archaeological Service, Canton Aargau) - Maise, Christian (Archaeological Service, Canton Aargau)

Alpine deposits have long been taken into consideration for the copper supply of Switzerland during the Bronze Age. Notable among these are the mineralisations in the Val d'Anniviers in the western Alps (Valais), the Oberhalbstein area in the central Alps (Grisons), and the renowned mining districts of the Mitterberg area in the eastern Alps (Salzburger Land). However, the precise roles and interconnections of these potential sources remain largely elu-

sive, particularly concerning the Middle Bronze Age, for which obtaining viable metal samples presents considerable challenges. A remarkable opportunity arose with the rescue excavations in Möriken-Wildeggen carried out by the Swiss Archaeological Service of the Canton of Aargau during 2021 and 2022. These excavations unearthed not only the well-preserved remains of a Middle Bronze Age settlement dating to around 1400 BC but also a substantial quantity of metal finds. Besides several finished products, the Möriken assemblage also contains pieces of raw materials. Seven fragments of copper ingots or casting cakes along with one fragment of a bronze sickle were analysed for their chemical, lead and copper isotope composition, which yielded unexpected results. In addition to copper from the Mitterberg district and the South Alpine deposits in Alto Adige, Trentino and Veneto, several pieces of raw material displayed distinct signatures associated with Cypriot copper mines (Apliki mine) reminiscent of oxide ingots. This latter result holds significant importance, notably because evidence for copper from Cyprus in the region north of the Alps is exceptionally rare. It underscores a broader distribution of copper from the island than previously acknowledged, and shows its use and processing in small rural settlements around 1400 BC in Switzerland and potentially beyond.

6 VIKSØ HELMETS REVISITED: LOCALLY MADE OR IMPORTED FROM THE SOUTH?

Noergaard, Heide (Moesgaard Museum, Department of Archaeology)

It is true, the Vikings did not wear horned helmets! But did the Bronze Age people wear them? Science has recently confirmed what Bronze Age archaeologists have always known: the two horned helmets from Viksø in Denmark were made and used in the Late Bronze Age, more specifically before 857-907 BC. We know many contemporary parallels from figurative art, where horned helmets adorn a warrior's head. In addition, over the last 20 years, we have acquired new knowledge about Bronze Age armour so that we can now create not only stylistic but also technical typologies. A technical comparison between the known helmet types and the artefacts from Viksø will shed light on the question of whether the helmets from Viksø should be considered the insignia of a true warrior. The results of an ongoing project will be presented that aims to clarify whether these helmets were local Danish products or imports from the expanding Hallstatt culture. The interplay between a technical analysis, identifying local technical knowledge, and the comparison of archaeometallurgical data from the helmets, local artefacts and Late Bronze Age workshop signatures will give a state-of-the-art answer to the question of local or foreign.

7 INVESTIGATIONS INTO THE DISTRIBUTION NETWORK OF RAW AND WORKED COPPER(-ALLOYS) DURING THE FIRST AND SECOND IRON AGE

Schmidt, Jonathan (Goethe-Universität Frankfurt)

The transition from the Bronze to the Iron Age in Europe marks a significant shift in material culture, usually associated with the collapse of long-distance trade networks and central fortified hilltop settlements. Despite the emergence of iron as the primary material, copper-alloys continued to play a crucial role in crafting personal ornaments and other artifacts during the Iron Age. Especially from the late Hallstatt period onwards, a period of remarkable craftsmanship with a need for high quality copper(-alloys) is evident.

While the prevailing assumption has long been that scrap metal recycling was the sole source of raw material during this era, recent evidence suggests the presence of Iron Age copper mining sites, such as those in Oberhalbstein (Graubünden, Switzerland). This research aims to analyze previously unpublished analytical data alongside existing chemical analyses of Iron Age artifacts from various regions, including France, Germany, the Czech Republic, and northern Italy. Utilizing multivariate statistics, I seek to characterize the raw materials used at selected sites.

By combining these distributions with differentiated typological and technological analyses, this research tries to discern patterns that may reveal workshop circles and craft traditions. Through a nuanced understanding of distribution networks of both raw materials and finished bronze objects, the aim is to contextualize their cultural and historic significance during the first millennium BCE.

8 INTEGRATED ARCHAOMETRIC INVESTIGATION OF CELTIC BIPYRAMIDAL INGOTS FROM THE SCHIFFERSTADT DEPOT (SOUTHWESTERN GERMANY): PROVENANCE, TECHNOLOGY AND AGE DETERMINATION

Stepanov, Ivan (Curt-Engelhorn-Zentrum Archäometrie gGmbH) - Brauns, Michael (Curt-Engelhorn-Zentrum Archäometrie gGmbH) - Wintel, Johannes (Curt-Engelhorn-Zentrum Archäometrie gGmbH) - Friedrich, Ronny (Curt-Engelhorn-Zentrum Archäometrie gGmbH) - Marquart, Markus (Museen der Stadt Aschaffenburg, Aschaffenburg)

Celtic bipyramidal ingots are common finds in northeastern France, Switzerland, and southern Germany, providing evidence of iron trade carried out via river routes during the 9th-4th c. BCE. Since these ingots were mostly found without associated artifacts, information about their archaeological context can be reconstructed only through typological analysis, ¹⁴C dating, and provenance analysis. Such an integrated archaeometric approach was applied to

a depot of 20 ingots discovered in Schifferstadt (4 km from the Rhine bank). All ingots are typologically similar and can be identified as type BLS 4 (Berranger 2014). Metallographic analysis reveals that all Schifferstadt ingots, except one (No. 16), are composed of phosphoric iron. Carburized areas were found only in three ingots, where they showed heterogeneous distribution, indicating against deliberate use of steel. The investigation of trace element composition of slag inclusion (LA ICP-MS), metal matrices (ICP-MS), and Os isotopic analyses (NTIMS) generated consistent results, indicating a common origin of all ingots except No. 16. The average Os isotopic composition ($^{187}\text{Os}/^{188}\text{Os}$) of most of the ingots is 0.68, whereas ingot No. 16 has a less radiogenic isotopic signature (0.36).

As no Celtic iron workshops are known near Schifferstadt, and all, except one, analyzed ingots have the same provenance, they were likely produced in the same workshop, which closely cooperated with at least one major and one supplementary supplier of ores/blooms. The workshop must have subsequently sold the batch of ingots to a trader who shipped them down the Rhine. However, apart from the main ore source exploited near the workshop, other deposits were probably also used, as suggested by the presence in the depot of outlier No. 16. The ongoing research on bipyramidal ingots from Germany will allow to better understand the organization of iron trade during the Iron Age.

9 PROVENANCE STUDY ON BRONZE COINS MINTED AT VELIA, ITALY: THE ISSUES ZEUS/OWL AND ATHENA/OWL

Ercoles, Isabella (Dip. Scienze della Terra, Università La Sapienza di Roma, Piazzale A. Moro 5, 00185, Rome (RM), Italy; CHNet, rete per i beni culturali dell'Istituto Nazionale Fisica Nucleare (INFN), Laboratorio Nazionale del Gran Sasso (LNGS), Via G. Acitelli 22, 67100, Assergi (AQ), Italy) - **Castorina, Francesca** (IGAG, Istituto di Geologia Ambientale e Geoingegneria del CNR, Sezione di Roma "La Sapienza", 00185 Rome (RM), Italy; Dip. Scienze della Terra, Università La Sapienza di Roma, Piazzale A. Moro 5, 00185, Rome (RM), Italy) - **Nisi, Stefano** (CHNet, rete per i beni culturali dell'Istituto Nazionale Fisica Nucleare (INFN), Laboratorio Nazionale del Gran Sasso (LNGS), Via G. Acitelli 22, 67100, Assergi (AQ), Italy) - **Carbone, Federico** (Università degli Studi di Salerno, DISPAC, Via G. Paolo II 132, 84084, Fisciano (SA)) - **Trincherini, Pier Renato** (LIMS, LNGS-INFN, Via G. Acitelli 22, 67100, Assergi (AQ))

The project concerns a study on the geographic origin of 65 bronze coins depicting Zeus/owl and Athena/owl, dating back to the 3rd century BC ca., and coming from the Greek colony of Elea/Velia, in Southern Italy. The coins are part of a broader project of research promoted by the University of Salerno. The chemical elemental compositions and the Lead isotope analyses were carried out at the CHNet (Cultural Heritage Network) department of the Laboratori Nazionali del Gran Sasso-INFN by using ICP-MS (Inductively Coupled Plasma Mass Spectrometry) and TIMS (Thermal Ionization Mass Spectrometry) techniques. The primary goals of this study involve discerning a reliable metal provenance for the examined coin samples and investigating the geochemistry of the mining districts. Lead isotope ratios were compared with those from several ore deposits of the main Mediterranean areas (Spain, Italy, Greece, and Cyprus) to fingerprint the sources of the investigated coins. Most of the coins obtain a certain source, overlapping clusters belonging to Greece, Attica (Laurion mines) and Aegean areas (Cyclades islands of Siros, Kea, Antiparos, Serifos and Sifnos). Some coins match with Spain South-East, in particular Cartagena-Mazarron and Almeria areas. Furthermore, a small portion of the coins exhibits uncertain provenance, suggesting the possibility of metal recycling. The provided information aids in reconstructing the trade routes for the supply of metal and understanding the socio-economic relationships of Velia and the role played by low-value coins at Velia.

10 COMPOSITION OF GOLD OF THE JEWELLERY OF THE NORTH PONTIC AREA (7TH CENTURY BC - 2ND CENTURY AD)

Velychko, Yevheniia (National Museum of the History of Ukraine)

Jewellery from Scythian burial mounds of the forest-steppe and steppe zones (dated 7th - 4th centuries BC), from Sarmatian burials of the steppe zone (dated 2nd century BC - 2nd century AD) and Greek cities (dated 1-2 centuries AD) from the collection of the Treasury of the National Museum of the History of Ukraine (former the Museum of the Historical Treasures of Ukraine) have been examined. The metal composition was determined using non-destructive X-ray fluorescence analysis (XRF). These are preliminary interim results as this work has been suspended due to the current military situation in Ukraine.

The general results demonstrate that the metal of jewellery of the Sarmatian period generally has a higher gold content (about 75 - 90%) than in the previous Scythian era (about 50 - 80 %). However, decorations from royal Scythian tumuluses are distinguished by a high gold content (more than 90%).

The main components of the alloy in all studied varieties are gold, silver and copper. Other elements that are most characteristic of gold alloys are platinum and cadmium. The cadmium concentration ranges from 0.07 to 3.7%; the platinum concentration ranges from 0.8 to 8.2%; platinum is more common in gold jewellery of 1-2 centuries. Iron is fixed often. For alloying, additives of copper, nickel, and tin were used, which increased the wear resistance of products. A higher concentration of tin was observed in the solder areas.

As for the use of gold for different elements of the same object, in most cases, the metal of the same composition was used. Only in some cases, there is a discrepancy in the composition of the metal, particularly for the manufacture of loops and twisted wire.

The results of this research will help determine the origin of the metal in the future.

11 TO SAMPLE A COUNTRY: IRON PROVENANCING STRATEGY IN ESTONIA

Saage, Ragnar (University of Tartu)

The aim of the project fundamental research for iron provenancing in Estonia (RAUR) is to establish the conditions for the provenance analysis of iron. This is a highly significant question, as iron was the only metal produced locally in Estonia during prehistory and medieval times.

In 2023, it was demonstrated that it is possible to investigate the origin of iron in Estonia using slag analysis (combined SEM-EDS and LA-ICP-MS approach), but this study only covered some of the iron smelting sites in Estonia. To enable comprehensive research across the entire country, it is necessary to sample and analyze the remaining unexplored iron-smelting locations.

Provenance analysis through chemical composition will allow us to associate finished objects with known iron-smelting sites throughout Estonia, providing answers to whether the iron used was local or imported. More broadly, scientists will have the opportunity to address entirely new research questions that significantly enhance our understanding of past craftsmanship, trade, and culture.

This paper covers the first stage of this project and answers quite an ambitious question – how to sample an entire country. Hence I will explore the decisions of sampling in archaeological collections and during fieldwork.

12 ROMAN OR RENAISSANCE? A METALLURGICAL INVESTIGATION OF A FOLDING KNIFE WITH A PUZZLING ICONOGRAPHY

Søndergaard, Louise (Museum Skanderborg)

The popularity of metal detectors in Denmark results in new types of find on a regular basis. One such find was a complete example of a folding knife. The knife consists of two copper-alloy side plates riveted together around a rusty iron blade. The figural handle had an enigmatic standing figure, that no one could identify with certainty.

The opinions were split: Renaissance or Roman? The knife type seemed Roman, but despite a thorough search in articles, exhibitions, collection catalogues and numerous e-mail requests around all of Europe, not a single parallel to this motive had been found in a Roman context.

Suddenly a new fragment of a similar knife was found by a Danish metal detectorist, and as this one actually looked almost recent, it felt safe to expose it to metallurgical investigations. Multiple chemical as well as lead-isotope analysis were performed on the fragmented side plate and on an in-situ rivet to clarify its composition and possible provenance. The analysis confirmed it to be a high zinc brass that is highly comparable and consistent with published chemical and isotopic data from Roman brasses, especially Early Roman brass analyses. But does this make it bullet proof Roman?

924 ROADS, PASSES AND VALLEYS ? RECENT DISCOVERIES AND PERSPECTIVES IN CAUCASUS ARCHAEOLOGY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Eloshvili, Mariam (ILIA STATE UNIVERSITY; Society of Young Archaeologists) - Chilingarashvili, Gia (Tbilisi State University; Georgian National Museum) - Rahimi, Maryam (Tehran University)

Session format: Regular session

The Caucasus is one of the attractive regions for archaeological investigations. Despite 100 years of research, many questions remain unanswered. It is important to understand the Caucasus with surrounding areas and create a unified perspective of the past.

The session is intended for researchers of Caucasian Neolithic, Chalcolithic, EBA archaeology, we want to get acquainted with discoveries and new studies, rethinking and understanding previous studies and attempt to introduce modern technologies and methodologies in archaeological research of the three very important periods of human history.

- Migration and Mobility - (What was the purpose and means of the migrations, and what were the results of the mobility?);

- Trade and exchange - (What kind of raw materials or products could Caucasus offer to neighbour regions and how did the interest and need change over time?);

- Chaîne opératoire - (Material production techniques, technology and path taken from raw material to waste)
- Ecology, environment, landscape - (How does man use the diverse nature of the Caucasus?);
- Household - (Perception of the house in different archaeological cultures of the Caucasus?);
- Bioarchaeology - (Abstracts related to zooarchaeology, palynology, palaeobotany, and human remains can be submitted in this thread);

The topics selected for the session are universal, and researchers will be able to present their studies on the chosen topics listed above. Through the session, we will once again be able to hold a broad discussion about the Neolithic, Chalcolithic, and EBA of Caucasus Archaeology. By incorporating a wide range of multidisciplinary methods (technology, bioarchaeology, archaeology), archaeological evidence (ceramic, bone and lithic productions, human, faunal and floral remains etc), archaeological and ethnological approaches, this season will further explore the socio-economic and cultural aspects of past societies.

ABSTRACTS

1 FIRST RESULTS OF NEW JOINT INVESTIGATIONS AT GARDABANI KURGAN FIELD

Rova, Elena (Ca' Foscari University of Venice) - Eloshvili, Mariam (Ilia State University, Tbilisi)

In 2023, a new joint project of Ca' Foscari University of Venice in collaboration with Ilia University of Tbilisi was launched in the Gardabani district of Southern Georgia. Its first aim is the investigation of a large barrow field located on a small plateau north of the present border with Azerbaijan, close to the village of Lemshveniera, in an until recently archaeologically nearly unknown region. A preliminary field season (autumn 2023) was dedicated to a pedestrian survey of the whole site and to the production of a photogrammetric plan and DEM of the whole area and of detailed plans of all the visible kurgans (which are more than 60 in number). This allowed to understand the general layout of the cemetery and the distribution of the funerary installations (kurgans and possible auxiliary features), to evaluate their general state of preservation, which seems to be rather good, possible date(s) etc. The paper will discuss the results of the preliminary season and the multidisciplinary strategy planned for the investigation of this important site, and integrate them with the results of the first excavation season (planned for June/July 2024), which will be dedicated to a geomagnetic prospection of the cemetery and to the excavation of two or three barrows.

2 BUILDINGS FROM THE KURA-ARAXES HEARTLAND: REGIONAL BUILDINGS WITH A COMMON TRADITION?

Claut, Sebastiano (Università Ca' Foscari Venezia)

The paper will present the results of the study of ca 250 buildings from 47 sites in the Kura-Araxes heartland. It is based on data concerning building materials, techniques, size and plan types collected from a bibliographical survey. It is common knowledge that Kura-Araxes architecture is characterised by a strong formal heterogeneity, due to the use of simple but very different building materials, as well as the adoption of a great variety of planimetric forms. Buildings almost invariably appear as simple mono- or bi-cellular structures and do not show any clear element suggesting social or functional differentiation. The study tries to map the distribution and mutual associations of the different aspects mentioned above in order to highlight possible regional features and/or chronological developments. Based on the results, at least six different geographical areas can be tentatively distinguished: the Middle-Kura valley; the Armenian-Georgian plateau; the Kvemo Kartli region; the Middle-Araxes valley; North-western Iran and North-eastern Anatolia.

3 FIGURING OUT KURA-ARAXES CLAY FIGURINES

Saribekyan, Mariam (Institute of Archaeology and Ethnography NAS RA; History Museum of Armenia)

During the emergence and expansion of the Kura-Araxes tradition in the South Caucasus, there was a notable advancement in architectural solutions and economic practices. This period also witnessed significant progress in pottery craftsmanship, leading to the creation of diverse clay objects, as well as the appearance of zoomorphic and anthropomorphic figurines in various cultural sites of this era.

The practice of crafting clay figurines began in the Neolithic period, but during this era, anthropomorphic figurines were more prevalent and they are mostly mentioned in the territory of nowadays Turkey, Levant, Turkmenistan. Later, in the Chalcolithic period Narimanov mentions 2 anthropomorphic statuettes in Shomutepe, 21 more figurines in Khramis Didi-Gora, and several anthropomorphic statuettes in Arukhlō. R. Torosyan notes 1 bear-shaped statuette in Teghut. While some of these sites have been extensively investigated, most of the objects excavated especially from the Early Bronze Age site of Harich, which has the largest collection of figurines(347), did not receive the attention of researchers post-excavation and remained unstudied and unpublished for many years. Since 2020, efforts have

been underway to initiate a fresh examination, digitization, and publication of the archaeological artifacts from this monument driven by the recognition that the archaeological material.

The vast majority of figurines represent cattle statuettes, predominantly bulls, rams, and sheep, characterized by highly detailed features. They are crafted from the same type of clay, and exhibit a similar firing technique, using fine-grained clay, occasionally mixed with sand or plant residues.

Later, during the transition to the Late Bronze-Early Iron ages, the earlier small-sized clay figurines crafted with rudimentary techniques gave way to bronze miniatures. These figurines provide valuable insights into the lifestyle and beliefs of the people of that era and studying the technology of their making and distribution serve as a resource for unraveling the Kura-Araxes tradition.

4 TECHNOLOGICAL PRACTICE OF THE LEYLATEPE COMMUNITIES: GROUND STONE TOOLS FROM THE LATE CHALCOLITHIC SETTLEMENTS OF THE KURA RIVER BASIN

Hruby, Karolina (Postdoc Fellow of the Minerva Stiftung, Eurasia Department, German Archaeological Institute, Im Dol 2-6, Haus II, 14195 Berlin, Germany) - Iserlis, Mark (Eurasia Department, German Archaeological Institute, Im Dol 2-6, Haus II, 14195 Berlin, Germany) - Almamedov, Khagani (Institute of Archaeology, Ethnography and Anthropology of the Azerbaijan National Academy of Science, H. Javid pr. 115, AZ1073, Baku, Azerbaijan) - Jalabadze, Mindia (Georgian National Museum, 3 Shota Rustaveli Ave, 0105, Tbilisi, Georgia)

The Late Chalcolithic (c. 4,000-3,500 BC) and the emergence of the Leylatepe phenomenon are turning points for the development of social differentiation, specialized craft industries, and interregional product exchange within the southern Caucasus and south-western Asia in general. The Leylatepe settlements emerged in the diverse landscape of the southern Caucasus with a set of attributes with Upper Mesopotamian associations: architecture, pottery, copper objects, and burial traditions – all very different in nature from earlier Caucasian traditions. And yet, the preliminary evidence from recent excavations in the Karabakh Steppe (Azerbaijan) attests to complex diachronic and site-to-site dynamics within the phenomenon, which stands in contrast to the traditional view of Leylatepe communities as a homogenous migrant population.

A deeper understanding of the phenomenon has been hampered by a shortage of reliable fieldwork data and publications. Preliminary research has been done so far only on pottery and metals from selected Leylatepe sites. This paper summarizes the early results of our research on ground stone tool collections from the Leylatepe sites in the Karabakh Steppe and up the Kura River: Leylatepe, Janavartepe, Sarijali 2 (Azerbaijan) and Berikldeebi (Georgia). Ground stone tools were typically used by the late prehistoric communities to perform a variety of mundane subsistence tasks as well as in specialized crafts developed during the Late Chalcolithic. However, during the 20th-century excavations, they were often omitted or discarded, which led to the paucity of data and collections. The project brings together unpublished material from recent and past excavations to identify technological and raw material choices and patterns of use of Leylatepe ground stone tools. Assessing material from various habitation phases of settlements developing in different environmental settings enhances our understanding of the internal dynamics of the Leylatepe communities and sheds light on their resource management strategies and technological habitus.

5 IRMIS RKA SETTLEMENT: THE FRONTIER SITE OF THE KURA-ARAXES CULTURE: LOCAL TRADITIONS AND REGIONAL NETWORKS

Chilingarashvili, Gia (Georgian National Museum; Tbilisi State University)

The Irmis Rka settlement is situated in South Georgia, within the Samtskhe Javakheti province, near the Turkish border. Positioned atop a natural mountain, with a panoramic view, the site controls the hinterlands and main valleys of the area. Geographically, its strategic location supported the long-term existence of the settlement. It is a multi-layered site that encompasses all stages of the Bronze Age. Currently, based on the preliminary results, the earliest occupation corresponds to the Kura-Araxes culture, which is the most extensively reflected in the settlement. Within the cultural layers and secure contexts of this period, a variety of artifacts have been found that bear strongly developed local signs. Furthermore, there are materials and features that provide evidence of regional networks during this time. A notable example, aside from pottery, is the discovery of a clay hearth with inner projections, which represents the first finding outside of the Shida Kartli region in Georgia.

6 SHAPING LIEUX DE MÉMOIRE IN THE SOUTHERN CAUCASUS: A COMPARATIVE ANALYSIS ON THE KURGAN FROM EASTERN GEORGIA AND WESTERN AZERBAIJAN

Fiori, Stefania (ROOTS Exzellenzcluster; Institut fuer Ur- und Fruehgeschichte Kiel)

During the late fifth millennium BCE, significant socio-cultural transformations occurred in the Southern Caucasus, marked by the increased utilization of metallurgy and the emergence of specialized practices (Sagona 2017). These developments were notably reflected in funerary customs, particularly the tradition of burying the deceased within

burial mounds, known as kurgans, which became widespread throughout the Southern Caucasus. This tradition, spanning from the Late Chalcolithic period (4000 BC) to the Iron Age (1000 BC), persisted for almost three millennia, shaping the region's landscape as enduring lieux de mémoire. Various factors may underlie the location of kurgans, including proximity to natural features, community territories, sources of construction materials, and the presence of ancestral burials. In specific parts of this territory, the use of kurgan grounds and the reuse of kurgans for new burials are not rare phenomena, highlighting the continuous attachment of the populations to ancestral burials. These practices underscore the enduring significance of kurgans, emphasizing the deep-rooted connection between communities and their funerary customs across generations.

This study unveils the results of two comprehensive spatial investigations conducted on the kurgans located in Western Azerbaijan and Eastern Georgia. By integrating data from remote sensing analyses, field surveys, and previously published studies, this research investigates the temporal evolution of the archaeological landscape. Through an in-depth analysis of natural landscape features and the archaeological record, the study delves into unraveling the intricate relationship between these kurgans and their immediate landscape, exploring the formation of lieux de mémoire.

7 BIOMOLECULAR INSIGHTS INTO EARLY HUMAN LIFEWAYS DURING THE CHALCOLITHIC PERIOD OF THE LESSER CAUCASUS

Antonosyan, Mariya (Department of Archaeology, Max Planck Institute of Geoanthropology) - Maurer, Gwendoline (School of Archaeology, Geography & Environmental Sciences, University of Reading) - Saribekyan, Mariam (Institute of Archaeology and Ethnography NAS Armenia) - Mkrtchyan, Satenik (Institute of Molecular Biology, NAS Armenia) - Azatyan, Karen (Yeghegnadzor Regional Museum, Armenia) - Yepiskoposyan, Levon (Institute of Molecular Biology, NAS Armenia) - Roberts, Patrick (Department of Archaeology, Max Planck Institute of Geoanthropology) - Amano, Noel (Department of Archaeology, Max Planck Institute of Geoanthropology)

The late fifth to fourth millennium BCE, corresponding to the Late Chalcolithic in the Caucasus region, is considered to be a time of increasing social differentiation and connectivity that reshaped early farming societies. This period is characterised by a shift from the exclusive use of stone tools towards early extractive copper metallurgy, a technological revolution that prompted increased productivity, growth of social stratification, together with the development of long-distance trade leading to cultural exchange and diffusion. This period also witnessed the intensification and extensification of land use, the introduction of new forms of agriculture, and changes in animal exploitation by wider use of animal products beyond meat.

Despite the growing research efforts in the region, questions related to subsistence dynamics, herding strategies, animal exploitation practices, the use of secondary animal products, as well as adaptation to various environmental conditions during the Chalcolithic still remain to be fully elucidated.

To complement existing knowledge and expand our understanding of lifeways during this key period of human history, we endeavoured a multidisciplinary exploration of the recently discovered Yeghegis-1 rock shelter in southern Armenia. A series of twelve radiocarbon dates reflects an occupation of about five centuries, spanning from the late 5th to the 4th millennium BCE, placing it as one of the latest Chalcolithic occupations in the region.

Here we present a detailed assessment of the taxonomic composition of fauna at the site by combining traditional zooarchaeological approaches and novel zooarchaeology by mass spectrometry (ZooMS) identification of animal remains. We also zoom into the environmental conditions of the region and gain detailed insights into herd management strategies through stable carbon and oxygen isotope analyses of faunal tooth enamel.

8 THE "DESERT KITES": NEWLY INVESTIGATED EXCEPTIONAL MONUMENTS IN THE CAUCASUS

Shakhmuradyan, Mariam (Institute of Archaeology and Ethnography of Armenian Academy of Sciences)

"Desert kites" are large-scale stone structures of different forms, consisting of two or more long rows of stones, of an enclosure that can reach several hectares with cells attached to the latter. These structures were first discovered in the early twentieth century in the deserts of Syria and Jordan by World War I pilots. One of the pilots, looking down on these buildings, likened their appearance to child toy kites, which is why they came to be called "desert kites".

In recent decades, kites have been actively investigated in different regions of the world (Armenia, Turkey, Syria, Jordan, Saudi Arabia, Kazakhstan), but there are still many gaps and issues in determining their function and chronology. According to the current data, the earliest "kites" were built in the Early Neolithic period and were continuously used until the Middle Ages. Different hypotheses have been suggested on their function, including that they were hunting traps for wild ungulates, or were used for livestock or religious purposes.

In the framework of this presentation, the current state of the research of Armenian kites, their geographical and cultural landscapes, morphological peculiarities, as well as the issues of dating and function will be presented. The preliminary results of the excavations of the Aragatsavan and Tlik kite complexes will also be presented, discussing them in the context of Caucasian archaeology.

9 KHRAMIS DIDI GORA - PROFILE CLEANING AND DATING THE LAYERS

Eloshvili, Mariam (Ilia State University)

Khramis Didi Gora is a late neolithic settlement located in the Southern Caucasus, in Kvemo Kartli, Georgia. The settlement has been excavated in 1970-80-is by Georgian Archaeologists Aleksandre Javakhishvili and Tamaz Kiguradze. The settlement has very interesting patterns of traditional Shomu-Shulaveri culture and also plays with unique contributions to it. The Gora is the largest among the Shomu-Shulaveri culture hills and consists of 9 building horizons. This paper will give the chance to the Khramis Didi Gora, to bring the site into scientific discussions.

New 2023 investigations of the settlement will bring the new series of radiocarbon data to the table. The Renewed archaeological excavations on the Khramis Didi Gora took place in October, aiming to clean the trench from previous examinations. The team cleaned the Southern profile for C14 analysis and rebuilt the plans and photos of the last archaeological dig. The 2023 season brought interesting results, which will be an important input to the Neolithization processes of the Caucasus Region.

10 ARCHITECTURAL STRUCTURE AND SUBSISTENCE CONDITIONS OF NEOLITHIC SOCIETIES IN THE SOUTHERN CAUCASUS AND THE IRANIAN PLATEAU

Rahimi, Maryam (Archeology Institute of University of Tehran)

This study investigates how architectural plan influenced neolithisation in the Near East and the Caucasus. The research question is: How did the spatial organization and structures of the Neolithic settlements reflect and impact the social, economic, and environmental changes associated with the transition to farming and domestication of plants and animals? this paper uses a comparative and interdisciplinary approach, combining archaeological data, and ethnographic analogy. The results show that the architectural plan varied according to the regional and local contexts, such as climate, resources, population, and cultural factors. the research also reveals that the architectural plan had significant implications for the social structure, economic activities, and environmental adaptation of the Neolithic societies. examination contributes to the understanding of the Neolithic period and the factors that shaped its cultural diversity and complexity.

Some of the main differences in the architectural plan between the two regions are the shape and size of the buildings, the degree of spatial differentiation, and the presence or absence of communal structures. In the Southern Caucasus, most of the Neolithic sites have circular buildings, often arranged in clusters, with little evidence of internal division or public architecture. In contrast, in the Iranian Plateau, most of the Neolithic sites have rectangular buildings, There is also evidence of the use of circular architecture.

11 CAUSATION WITHOUT LOCATION? RETHINKING KURA-ARAXES SPATIO-TEMPORAL DYNAMICS THROUGH CONTEXTUAL BAYESIAN CHRONOLOGIES

Passerini, Annapaola (Cornell University; Einstein Center Chronoi)

The Kura-Araxes (KA) phenomenon was one of the most enduring and expansive archaeological cultures in Southwest Asia during the Early Bronze Age (3500-2500 BCE). The KA is marked by a distinctive cultural "package" that is found over a vast area including the South Caucasian "homeland", but also in eastern Anatolia, the southern Levant, and northwestern Iran. Because of its geographic extent, studies in the KA have obsessed with the detection of its "origin" and "end" to understand its emergence and expansion through space and time. Among other factors, scholars have called on climate change as the ultimate cause of the KA migration, drawing a sharp line between "core" and "diaspora" communities. However, former attempts have failed to compile a coherent picture for the KA due to their overemphasis of monolithic explanatory models in combination with scarce chronological control. High-resolution radiocarbon dating and Bayesian chronological modeling provide us with optimal tools to build syntheses that are adherent to the contextuality of KA existence. This paper discusses the implications of a series of Bayesian models that were compiled for a subset of KA sites in the "homeland" as part of my doctoral project. Unlike traditional "lumping" approaches, contextual Bayesian chronologies allow us to reconstruct a much more nuanced scenario, addressing dynamics of habitation at specific places and at specific times. In addition to improved chronometric precision, these results also enable us to relate the South Caucasus with broader socio-cultural and environmental challenges that affected Southwest Asia during the 4th and 3rd millennia BCE. Specifically, I will address how occupational dynamics may inform broader perspectives on KA resilience, as seen in the diversity of settlement reconfiguration and endurance across the South Caucasus and beyond.

926 BRIDGING PAST AND PRESENT: EXPLORING COLLABORATIVE APPROACHES IN COMMUNITY AND CITIZEN ARCHAEOLOGY

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Vandeveld, Ségolène (UMR8212 LSCE (Laboratoire des Sciences Du Climat et de l'Environnement, Paris Saclay, France; Université Du Québec À Chicoutimi, Qc, Canada; Université de Sherbrooke, Qc, Canada) - Sanna Montanelli, Mattia (University of Cagliari) - Plourde, Noémie (Université du Québec à Chicoutimi, QC, Canada) - Pinna, Fabio (University of Cagliari)

Session format: Regular session

This session seeks to delve into the multifaceted relationships between archaeologists and diverse communities. In an era marked by growing interest in the democratization of archaeological knowledge, this session aims to critically examine the role of archaeology in meeting public demands and fostering collaborative partnerships. We would like this session to discuss the political implications of our work (memory, recognition, regional development, etc.), including understanding and mitigating the potential culture shock that may arise when working abroad, with non-academics, or with local populations (indigenous or not). Additionally, the session is welcoming presentations on innovative participatory approaches to archaeological research, including in particular those in the framework of 'citizen archaeology'. The public demand (and not just the sharing of knowledge with the public) will be addressed, as a potential future for our discipline, particularly since commercial/preventive archaeology activities could decline with possible measures linked to the ecological transition. Ultimately, this session aspires to contribute to the ongoing discourse on community and citizen archaeology, connecting theories, methods, and experiences and investigating operational protocols and social impacts. Our goal is to discuss the tangible impact of archaeology, a discipline that takes place in society, for society.

ABSTRACTS

1 BUILDING A EUROPEAN CITIZEN ARCHAEOLOGY: KNOTS TO UNRAVEL AND POTENTIAL STARTING FROM THE ITALIAN CASE

Pinna, Fabio (University of Cagliari) - Sanna Montanelli, Mattia (University of Cagliari)

In 2014, the Oxford English Dictionary defined citizen science as the scientific practice carried out by citizens "in collaboration with," or "under the direction of," professional scientists and scientific organizations. Since then, partly due to the activism of authoritative international associations, citizen science has achieved an advanced level of theoretical formalization. In the context of archaeology, however, the field's peculiar regulatory limits, which can vary significantly from country to country, have often hindered its global establishment, except in specific instances of Heritage crowdsourcing. Furthermore, relationship issues between professionals and volunteers continue to pose challenges: while power, authority, and responsibility (expressed in terms of control over a project and its resources) are crucial in fostering these relationships, certain definitions of citizen science do not clearly address such asymmetries. This contribution aims to explore the potential and peculiarities of Citizen Archaeology in Mediterranean Europe, with a focus on the Italian case. Indeed, over the last quarter-century, "Archeologia pubblica" (public archaeology) in Italy has seen a wide array of experiences, evolving alongside theoretical advancements. Yet, it has not reached the development of a structured framework or the identification of shared tools that can effectively combine research objectives with well-designed social initiatives. Through analyzing the journey thus far, it is possible to identify several points of concern that need to be addressed. These emerge from regulatory issues and a series of established practices. Moreover, it is crucial to systematize specific dimensions, such as the widespread recognition of the country's rich cultural heritage (and its regional variations) as not only a political and economic resource but also as a catalyst for genuine engagement, despite the associated risks. This requires effective management and activation.

2 AN EXPERIMENTAL COMMUNITY-BASED ARCHAEOLOGICAL PROJECT IN NORTHERN-GREECE

Zorzin, Nicolas (National Cheng Kung University (Taiwan); Paris 1 Panthéon-Sorbonne, UMR 8215 Trajectoires) - Shackell, Graham (Goldsmiths College University of London)

Since the inception of the Toumba Serron Research Project in 2021, a significant emphasis has been placed on establishing a collaborative initiative that addresses the demands of various audiences. While initially contemplating the concept of 'Citizen archaeology,' our team explored diverse ideas. The primary focus was on initiating a thoughtful examination of environmental crises and the adaptability of Neolithic populations in the area. This involved creating a dialogue with the present-day farming community, understanding the challenges they currently face and anticipate in the future. To accomplish this, an ethnographic study was initiated, involving active engagement with local people to understand their interests and ascertain their demands regarding the historical and present aspects of their living en-

vironment. Simultaneously, an artistic performance was prepared and presented in 2023 in the village of Toumba. The performance presented both details of archaeological data arising from the excavation and a tour d'horizon of the human experience and methodology deriving from participation in the project, whether as student, director, or worker. The performance also explored a possible thematic interpretation of contemporary performance during the inhabitation of Toumba in the Late Neolithic. The reception of the artistic displays and performance varied widely, eliciting reactions ranging from great enthusiasm to total scepticism. Nevertheless, the team's actions and commitment to closely involve local populations have begun to manifest a discernible impact on society. It's important to acknowledge that the effects, although minimal at this point, are anticipated to yield more significant results in the long term.

3 LANDSCAPE OF THE FOLKTALES: TOOLS FOR PARTICIPATORY ARCHAEOLOGY IN THE MONTI LUCRETILI AREA

Rossi, Matteo (Università degli Studi di Roma "Tor Vergata") - Bottoni, Margherita (Università degli Studi Roma Tre)

In Italian archaeological projects, the importance of the community engagement is becoming increasingly evident in the last years. This involvement, as defined by the Faro Convention, is no longer limited to share research activities but aims at making local communities an active and aware part of the data building process, to foster a recovery of their cultural identity.

In the rural and seemingly marginal context of the Monti Lucretili (Latium - Italy), the archaeological survey activities of the MoLuLaP (Monti Lucretili Landscape Project - Roma Tre University) go together with those of participatory archaeology and participatory mapping, focused on the live dialogue with local people, understanding how historical memory - condensed in the oral testimonies of the local population - is crucial, especially in areas where other types of sources are lacking.

In this perspective, a questionnaire was developed to meet two needs. On the one hand to investigate knowledge, awareness, and perceptions that local communities have of the space-time continuum of their territory, and on the other to encourage the strengthening of the social fabric through the reappropriation by communities of a heritage that is often forgotten and compromised.

The questionnaire aims to investigate the views of the inhabitants of the Monti Lucretili on their heritage and their willingness to be engaged, together with aspects related to archaeological knowledge, socio-economic activities and traditions that have shaped the history of the area.

By reflecting on the making of the questionnaire and analysing its answers, this paper seeks to raise two questions that are worth - and necessary - reflecting on: how can these data be useful to local communities? And to what extent can they come to represent scientific knowledge?

4 DISCOVERING THE PAST TO OPEN THE WAY TO RECONCILIATION WITH THE FIRST NATIONS

Plourde, Noémie (UQAC)

The current turn towards reconciliation between the Canadian Government, the settler population, and the First Nations, has seen the emergence of numerous research projects aimed at fostering indigenous self-determination. These projects now include all fields of inquiry, from the social and natural sciences to the humanities. Archeology is no exception.

The discovery in 2017 of traces of human occupation reaching back to 5000 BP on the territory of the community of Mashteuiatsh by members of the Innu Nation has initiated, in partnership with the Université du Québec à Chicoutimi, one such project. But how can we teach community members about their prehistory without participating in the colonialism inherent in the relationship between First Nations and non-natives?

At the junction of the academic and indigenous cultures of transmission and teaching, this project offers the condition of a renewed dialogue between past and present. Allowing a diversity of voices to be heard, this project opens a new way towards reconciliation amidst the rediscovery of the traces a community's past.

5 CINEMA, TOURISM AND ARCHAEOLOGY, THE CURSED ALLIANCE? IF YOU CAN'T BEAT THEM, JOIN THEM!

langevin, erik (Université du Québec à chicoutimi) - Alexandre, Dubé (Université du Québec à chicoutimi)

Over the past thirty-five years, numerous series and fiction films have been filmed, whether from Quebec, Canada or the United States, which have taken the regions of Quebec as their setting, and have erected their sets there. Whether they are series testifying to the distant past or more recent one, these settings have aroused the interest of the communities which welcomed them, attracted by the promise of significant tourist benefits. These hopes have largely been disappointed. After all, many of these filming locations often have only a tenuous connection with the subject of the fiction they host.

What is particular in the present case is the desire, by those who operated this fictional site, to get closer to science and gradually move away from “spectacle” to get closer to playful documentary. The New France Site quickly sought to increase partnerships with the academic world, in order to diversify its contributions to the historical imagination of its visitors. This is where archeology comes into play.

Archaeology, like history, are also works of imagination, a bet on the capacity of the present to represent what has disappeared forever. This communication seeks to explore the history that can be made, despite the difficulties, between the false walls of these ephemeral settings. It is there, on the banks of the Saguenay Fjord, that a reproduction of the hamlet of Quebec was created, evoking the first moments of French colonization. It is also there, that 25 years of archaeological excavations have documented thousands of years of human occupation. The bridge between professional archaeology and community has been filled allowing scientific archeology to win the OSCAR for the coolest scientific discipline.

6 HEALING ARCHAEOLOGY BETWEEN CITIZEN SCIENCE AND WELL-BEING

Megale, Carolina (Museo Archeologico di Rosignano M.mo; Fondazione Aglaia) - Fusi, Martina (Past in Progress srl) - Grella, Marika (Past in Progress srl)

Public, open and inclusive archaeology today represents one of the most important opportunities for the development of the discipline. Archaeology can provide various chances for creative engagement, entertainment, education; scientific evidence shows very clearly that this kind of involvement is good for health. Through interaction with citizens, participative activities adopting an archaeological approach can stimulate physical and psychological well-being, providing a service for the entire society.

Over the last decade, archaeological museums and parks have started creating and delivering programs targeting people suffering from mental illness and dementia, and their carers, introducing the concept of healing museum. The most innovative projects are undoubtedly those involving interdisciplinary teams. These teams are composed of archaeologists, educators, associations and volunteers collaborate with psychiatrists, psychologists and health workers to develop programmes in which archaeology becomes a tool for dealing with problematic situations in the contemporary world, supporting mental health pathways and the treatment of overt discomforts. Under this perspective, archaeological museums appeal as potential resources for new welfare based on prevention and recovery and might become a structural asset for territorial healthcare.

This paper aims to explore the recent developments and experiences in this area, conducted at the Parco di Archeologia Condivisa di Poggio del Molino, al Museo etrusco di Populonia e al Museo Civico Archeologico di Rosignano M.mo (Sistema di Musei e Parchi Partecipativi della Toscana).

7 CIPAMUR PROJECT: INNOVATING FROM COMMUNITY PROCESSES AND NETWORKING IN CULTURAL HERITAGE AND MUSEUMS FOR THE LATIN CONTEXT

Castillo, Alicia (Departamento de Prehistoria, Historia Antigua y Arqueología. Grupo de Investigación Gestión del Patrimonio Cultural. Universidad Complutense de Madrid) - Menéndez, Sonia (Gabinete de Arqueología. Oficina del Historiador de La Habana. Cuba) - Reynoso, Citlalli (Instituto de Ciencias Sociales y Humanidades “Alfonso Vélaz Pliego”. Benemérita Universidad Autónoma de Puebla) - Corpas, Nekbet (Grupo de Investigación Gestión del Patrimonio Cultural. Universidad Complutense de Madrid) - Pastor, Ana (Grupo de Investigación Gestión del Patrimonio Cultural. Universidad Complutense de Madrid) - Segovia, Constanza (Grupo de Investigación Gestión del Patrimonio Cultural. Universidad Complutense de Madrid.)

The Project “Care, People and Archaeology in a resilient world..” (CIPAMUR. Years: 2023-2026) aims at looking into the social dimension of museums and archaeological sites in an innovative and pro-active way, as well as into the role of museums to mitigate conflicts and to promote social values based on diversity, interculturality and education. This work emerges out of the design of methodologies and the contribution of results helping in new professional opportunities as well as strategic changes of the entities/institutions responsible for heritage management. This project stands out from others because of its focus on people to understand their relationship and perception on museums/heritage sites and their archaeological and/or anthropological narratives, as these contribute to the sustainability of local communities. In order to do this, several case studies have been selected (Cuba, Mexico and Spain). The relationship between museum/archaeological sites and territory will be promoted with the subsequent reorientation in heritage policies. Significantly, assessment will not be limited to the final stage of the research but instead it will be part of the whole process.

Our starting hypothesis is that Heritage Management Networks including different local stakeholders have become established in globalized discourses. These seldom take into account changing cultural contexts. Expert groups in archaeology and other heritage sciences aim at mitigating these gaps through participatory studies. Yet, we frequently fail in working with methodological frameworks capable of producing short- and long-term solutions for the stakeholders while empowering surrounding communities. Additionally caring and gender perspectives are seldom included

in these studies that lack in complex thought. How can we improve methodologies in heritage management so they can contribute to creating spaces of wellbeing and care in the main spaces of heritage dissemination: museums and archaeological sites?

*Project supported by the competitive call of the Spanish Ministry of Science, Innovation and Universities.

8 EMPOWERMENT AND CONTROVERSY: GENDER PERSPECTIVES IN ARCHAEOLOGY

Algrain, Isabelle (Université libre de Bruxelles)

Gender archaeology has revolutionized archaeological research by challenging conventional narratives and offering new insights into ancient societies. This paper explores the political ramifications and applications of gender archaeology, highlighting its potential to illuminate complex societal structures and engage modern communities. Amid debates over its legitimacy, gender archaeology has proven to be a tool for social justice, amplifying marginalized voices and driving regional development, thereby extending its influence beyond academia to effect real-world change.

This analysis examines gender archaeology’s dual nature: its capacity to empower communities and the risks associated with its politicization. By showcasing case studies, the paper illustrates how gender archaeology acts as a conduit for political expression, supporting transformative initiatives or sparking controversy. By championing a ‘citizen archaeology’ approach enriched with gender perspectives, this paper advocates for the democratization of archaeological knowledge, aiming to enhance the discipline’s relevance and societal impact. By fostering an inclusive and participatory archaeological practice, gender archaeology underscores the importance of connecting theoretical frameworks with community engagement, promoting a discipline that is both socially engaged and impactful.

9 CONTEMPORARY HERITAGE AND ARCHAEOLOGICAL APPROACHES - OPPORTUNITIES AND BARRIERS FOR COLLABORATION

Benetti, Francesca (Independent Researcher)

Metal detecting is a divisive subject in Italy. A hobby for some people, it is viewed with suspicion or disapproval by many archaeologists. According to the Legislative Decree 42/2004, archaeological research is reserved to the Ministry of Culture (art. 88), which may allow other bodies to carry out research. Occasional finds must be reported within 24 hours of their discovery (art. 90), keeping them where they are found. Metal detecting is prohibited without authorisation in protected areas (L. 22/2022), but not formally forbidden in other areas, even though metal detectorists must comply with the law and report all archaeological finds. However, finds dated to contemporary age are in an intermediate legal status and are frequently not perceived as ‘archaeological assets’. As a result, they often end up being not reported creating a knowledge gap and not allowing authorities to protect contexts with historic significance, such as those dated to the First World War. On the other hand, the reporting of all finds dated to contemporary age poses new challenges from the managerial point of view.

This paper will present the results of a survey run among the members of an association which promotes ‘responsible’ metal detecting in Italy, and teaches its members the requirements of cultural heritage legislation. We will underline the agency of metal detectorists on the field and the weight of their understanding of what an ‘archaeological find’ is (and therefore must be reported to the authorities), with serious consequences for heritage authorities. A better understanding between archaeologists and metal detectorists is the first step to develop citizen science approaches, enabling the recording recent (industrial) heritage which might have a very high historical significance but relatively low ‘intrinsic’ value.

10 THE APPROACHES OF COMMUNITY PARTICIPATION IN INDUSTRIAL HERITAGE: A CASE STUDY OF WANGSHIAO INDUSTRIAL HERITAGE SITE, CHINA

Mu, Aijia (The University of Oulu)

Community participation has been proven to be indispensable in the process of heritage-making and management, yet it encounters challenges in practice. This paper consists of a part of a doctoral project that explores the dynamics of community engagement in industrial heritage. It delves into the interactions between the community and the place, examining their sentiments, memories, and emotional responses during the transformation of industrial remains into heritage. Using the Wangshiao Industrial Heritage Site in China as a case study, this paper conducts a content analysis of official documents to examine the community participation and negotiation process with the government regarding the demands of the community during the heritage-making process as well as the role of archaeologists in government-led heritage projects. The findings show that the community is limited to the information level of participation, whereas, the community engages with the government about needs and interests in various ways. In addition, archaeologists shoulder more responsibility to the government than the community. This paper reflects on reasons behind the information level of participation in the Chinese context, and calls for more interactions between archaeologists and communities through participation approaches that will be employed in the bigger project.

927 REFLECTING HISTORY IN ARCHITECTURE AND VERNACULAR DESIGN ? DIRECTING SUSTAINABLE FUTURES

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Teräväinen, Helena (Aalto University) - Rönn, Magnus (Chalmers University)

Session format: Regular session

Scholars from Aalto University, Finland, Chalmers University of Technology, Sweden, National Technical University, Athens and Tampere University, Finland, have proudly joined forces to organize a multidisciplinary session called: 'Reflecting History in Architecture and Vernacular Design – Directing Sustainable Futures.' This headline illustrates a session that provides knowledge facilitating essential insights from the past for the development of a sustainable built environment in the future. The objective is to explore the past and offer possibilities for directing the future towards sustainability, to shape our perception of the present and the vision for tomorrow more clearly: 'Historia magistra vitae,' wrote Cicero.

Through case studies of architecture and urban design, heritage, and material culture in relation to designing sustainable dwellings and settlements, the approach of sustainable innovations that enrich the cultural heritage of various regions in Europe will be presented and critically analysed. This perspective primarily focuses on place and space and the ways in which design is influenced by sustainable inventions and interventions at sites. By applying architectural theory and history and viewing vernacular heritage as innovations that fit a thriving, sustainable future, the session is expected to provide new insights into creating architecture and ways of living that are sustainable and suitable for the cultural characteristics of different sites in Europe.

We hereby invite scholars in architecture and urban design, architectural conservators, and archaeologists to participate in the session, submit papers, and make contributions within the overall theme of the session, which is specified in four directions: 1) Sustainability, heritage, and the urban space, 2) Innovation, new thinking in architecture, and learning from the past, 3) Expressions of history in sustainable design, 4) Architecture and archaeology in cooperation.

ABSTRACTS

1 THE GREEK ARCHIPELAGO'S ARCHITECTURAL FORMS OF SUSTAINABILITY : FROM TRADITION TO FUTURE

Kouzelis, Athanasios (Chalmers Univ. of technology; Univ. of West Attica)

The paper illustrates the knowledge that provides important past insight for the development of future sustainable built environment. The study of the past plays a key role in addressing sustainability, shaping our perception of the present, and our views of the future: 'Historia magistra vitae,' wrote Cicero. Using case studies of vernacular architecture and material culture in relation to a recent sustainable dwelling and settlements in the Greek Archipelago's islands, an approach of sustainable innovations that enriches the cultural heritage of the region will be presented.

This approach is chiefly concerned with domestic space, and the ways in which it articulates and is itself articulated by sustainable inventions and interventions. It is based on the methodological issues of using architectural and archaeological evidence in order to provide a more comprehensive view of a cultural compensation on ongoing and future sustainable planning in the Greek Archipelago's islands.

By applying the property of vernacular architecture and seeing in it innovations that fit for a thriving sustainable future, it is expected an application of advanced knowledge in creating the kind of architecture and means of living that is sustainable and appropriate for the area's cultural peculiarity.

2 VERNACULAR ARCHITECTURE IN THE NAVIA RIVER BASIN (ASTURIAS, SPAIN). A BUILT LANDSCAPE IN A RURAL MOUNTAIN AREA

Rodríguez-Pérez, Santiago (Universidad de Oviedo)

This communication presents a preview of the results of the author's doctoral research, focused on the study of the landscape and vernacular architecture in a territory of Asturias (Spain), the Navia river valley. This is a mid-mountain area, where an interesting ethnographic and architectural cultural heritage is preserved.

The techno-ecological adaptation of local communities to the environment entailed the agricultural transformation of the landscape and its conversion into a human habitat, through architecture as a cultural tool, in a long-lasting process. This research explores how the communities in the area constructed the landscape and their own architectural language, through the different building typologies and their historical evolution, and their relationship with their culture.

In the study area, the peasant habitat is structured around the *casearía*. The *casearía* is the living and productive space of the peasant family, and groups together domestic spaces (housing), and productive spaces (barns, stables, cellars, auxiliary buildings, etc.), as well as farmland and grazing land, rights over common land, mills, forestry areas, etc. Grouped into hamlets and parishes, they have been the basis of rural settlement in the northwest of the Iberian Peninsula since the Middle Ages. Alongside them, we find a whole series of constructions that make up the cultural landscape (road networks, plots of land and terracing, canalisations, etc.).

Today, although these rural spaces are still inhabited and the community still maintains identity links with its heritage, the conservation of this architectural landscape faces several challenges: abandonment and ruin due to emigration and rural depopulation, urban speculation, as well as the absence of social awareness, economic resources and legal protection regulations.

3 WOODEN FACADES IN FRANCE AND SCANDINAVIA REVEAL THE ROLE OF TRADITIONAL PRACTICES IN REGENERATIVE ARCHITECTURE

Brun, Géraldine (Göteborgs universitet)

The regenerative paradigm that architecture is entering was first conceptualized by Lyle in 1996 although it is partly based on older principles that allowed to shape durable buildings for centuries. For example, regenerative architecture does not consider buildings only as constructions but also as part of a place (Mang and Reed, 2012), reminding of vernacular design which "embodied the local characteristics of a place" such as the climate, the native materials and the history of the traditions (Nagashima, 1999). Traditional practices can inspire regenerative strategies but are hardly found captured in written words (Wahl, 2016), instead, they remain either kept alive by marginal practitioners or frozen in our tangible heritage which is hard to make sense of today (Nilsen, 2021).

The ongoing research seeks to inform regenerative architecture with local traditions of wood cladding in different places in Scandinavia and in France. A forensic approach is adopted to attempt to "reconstruct the course of events and understand the motivations" (Almevik, 2012), consisting of claddings' craft-based observations complemented by practitioners' interviews, literature, dendrochronology for dating and wood species identification.

In Champagne in France, vernacular buildings are clad with "tavillons", thin clapboards held by vertical battens, a design connected to the traditional use of split oak. Sawn boards from poplar and alder also function as "tavillons", although abrasion threatens their longevity (Brun, 2023). While more profitable non-local softwoods start to replace poplar and alder, the regional import of shingles sawn from chestnut wood for cladding churches is already considered a tradition. In Sweden, board-on-board is the dominant cladding system, and using pine heartwood with high density is known as the traditional recipe for long durability. However, case studies indicate that alder and spruce have been considered suitable for cladding certain buildings, and that low density pine can be synonym of high quality.

4 THE HERITAGIZATION OF DIFFERENT BUILDING TYPES IN A FINNISH RURAL TOWN

Teräväinen, Helena (Aalto University)

This paper explores the distinctness in evaluations of the built heritage on different levels in a rural town in Finland.

Lapua Cathedral was designed by architect C.L. Engel in the neo-classical style and completed 1827. This church is the fifth in the parish and has always been highly respected among people, and self-evidently listed into the national important cultural heritage environments (CHE 2009)

Vernacular houses in Ostrobothnia have been two-storey, red wooden houses, facades featuring the classicism. Those were significant also in Lapua until 1960's but obviously, too modest to be appreciated as cultural heritage.

Throughout history administrative buildings have been highly respected, as well as symbols of power. Lapua Town hall by architect M. Björklund was completed 1924. The activities in the building have changed during one hundred years, but the appearance has remained original. In the 1960's it was nearly demolished but instead the municipal council decided to repair it heavily. The architectural values were not acknowledged until 1990's when the first historical building inventory was published.

The latest building types recognized with historical values are factories and other production buildings. The example in Lapua is the old cartridge factory from 1920's, now known today as Old Paukku, the culture center. The first town plan 1994 with conservation marks was not accepted by the municipal council, but the regional plan raised the value recognition and now it listed as a national level heritage. The protective town plan was accepted at last, but the wooden workers' canteen from 1924 is still threatened.

The research question: "How the values of users, owners, planning and museum experts in the case study have been varying on local, regional and national levels in the heritagization?."

5 EXPERIMENTING WITH SCENARIOS AS TOOLS FOR ANALYZING CONFLICTING IDEAS IN BUILDING CONSERVATION. A SCENARIO EXERCISE ON IDEAS OF JOHN DEWEY

Östman, Leif (Novia)

We have been involved in an inventory of old buildings in a coastal area, with obvious conflicts between preservation of wildlife, tourism and cultural heritage, implicating a favored neglect which will lead to the destruction of cultural heritage. The aim of the inventory of old buildings was to evaluate their value as representations of seafaring history in the area and make proposals for regulations for the planning of the area. Almost all original functions have ceased to exist. There is no staff needed for piloting or service of the lighthouses on the islands, and there are very few fishermen left. The aim of this paper is to clarify concepts and their implications for this cultural heritage in the long run. The mode of study is based on the ideas of John Dewey and his "Pattern of Inquiry". The approach is focusing on "deliberately instituting cases which will throw light on the specific empirical causes of success and failure". I present and discuss three different scenarios, based on specific interests regarding this coastal area: protecting the nature and allowing the built heritage to deteriorate, turning the buildings into exclusive vacation homes by means of material investments, or renewed coastal fishing as providing resilience in case of deteriorating food supply due to climate change. The paper exemplifies the qualities of the objects in relation to building conservation practices in Finland, but the main outcome is a comparison of scenarios as a test of ideas in order to promote a better understanding of the conflicting ideas, as well as testing the idea of scenario-building as a method for supporting and managing a productive dialogue about conflicting ideas.

6 DECORATING HOMES WITH CRUDE CONSTRUCTIONS: EXCAVATIONS AS A FORM OF HOME REPAIR

Kalakoski, Iida (Tampere university) - Sirén, Riina (Tampere university)

Vernacular architecture is defined as "architecture without architects". Correspondingly, vernacular repair could be defined as "repair without professionals". In both cases, instead of being influenced by educated designers or craftsmen, builders and repairers learn from their peers, such as earlier generations, friends, neighbours, or, as very often today, from various forms of media, both social and traditional. Home decoration magazines, for example, are an important platform for sharing domestic repair ideas and practices from one home repairer to another.

Our study focuses on home repair practices that involve removing building materials, such as wall papers, sheets, claddings, or plaster, to reveal the underlying structures and to leave them visible in the room. Such practices appear as a contemporary home decoration trend, which is spread, as we claim, through home decoration magazines. An apparent motivator for such excavations is, in addition to the prominent impact on the interior, the ease to accomplish the changes by a home-repairer. In this study compare the repair practices presented in Finnish home decoration magazines to the international conservation declarations, published by ICOMOS.

Revealing the log frame, brick masonry, or floor or ceiling blanks influence not only the usability and functionality of the space but also the authenticity and materiality of it. For domestic repairers, the exposure of aged constructions may emphasize the difference between not only the methods and materials of distinct ages but also of past and present in general. Experts, in turn, value the original materials and original design of the buildings. We claim that these excavations reveal a contradiction between vernacular repairers and conservation expert's perceptions of good maintenance for historic buildings.

7 ARCHITECTURAL SCANDALS IN GOTHENBURG: PROFESSION AND POLITICS COMPETING IN AREAS OF NATIONAL IMPORTANCE IN CULTURAL HERITAGE POLICY.

Rönn, Magnus (Chalmers University of Technology; Kulturlandskapet)

In 2016, the city of Gothenburg organized a design developer competition at a site close to Götaplasten, which is the most significant place in the city. The competition was important to politics and guidelines steering architecture and cultural heritage at the site. The winner was a design team composed of two companies in Gothenburg; a developer (Serneke) and an architectural office (Semrén + Månsson). The land allocation agreement established in 2017, demands the developer to carry out a parallel assignment.

In 2020, the developer invited companies to prequalification for competing in the parallel assignment, organized in collaboration with the city and the Swedish Architects. However, the office behind the winning design in the competition 2016 was excluded. This is the first scandal. The winner in this parallel assignment includes the same architectural firm that reviewed the design proposals in the first competition. This is the second scandal. There is a business relationship involved in the process, challenging ethical rules.

After the jury pointed out the best solution for the assignment, a new political majority criticised the winning design. They stopped the architecture from being implemented in 2023 due to the lack of a classical form. Instead, a new design must be drawn up. This is the third scandal. The rules have been changed. The work of the jury became

meaningless. The adaptation of the design to the site, its urban context, cultural values and architectural qualities, are questioned by politicians. The case shows how ethical principles, intended to steer professional actors, are applied at a demanding site facing politicians. The city is acting both as the organizer of the first competition, co-organizer of the parallel commission, landowner and authority responsible for the detailed development plan of the site.

928 WHY WE SHOULD PERSIST IN MAKING ARCHAEOLOGY ACCESSIBLE AND INCLUSIVE TO ALL?

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Hunt, Abi (University of Lincoln; Harlaxton College; Enabled Archaeology Foundation) - Gerberg Hostrup, Sebastian (Museum Lolland-Falster)

Session format: Round table (without formal abstracts)

This round table will build on our panel at EAA 2023 where we asked if archaeology was a hospitable discipline. We will invite discussants from our 2023 panel, along with activists supporting a range of minority groups in archaeology to discuss why we all need to persist in making archaeology accessible and inclusive to all. We will aim to take an intersectional approach to the question and will consider that people have multiple identities, including age, gender, families and parenthood, disability, race, religion, sex, and sexual orientation, that are discriminated against, and used to marginalise and exclude people from archaeology. Our consideration of why we need to persist with our work will help us formulate the key messages we need to convey to governments, archaeological funders, organisations, statutory bodies, and the general public about the benefits engaging a diverse range of people with the archaeological process, management, interpretation in our work for the benefit of the public and society across Europe.

929 WHAT IS THE VILLAGE? REGIONAL COMPARISON OF EARLY EUROPEAN AND NEAR EASTERN PREHISTORIC VILLAGES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Marciniak, Arkadiusz (Adam Mickiewicz University) - Kuijt, Ian (University of Notre Dame)

Session format: Session with keynote presentation and discussion

The emergence of larger Neolithic villages in the Near East and the spread of village systems into the Balkans and eastern Europe around the Black Sea represents a major evolutionary transition in how people organized their economic and social lives. The appearance of a large, densely packed village focused on farming and herding of stock, highlights the creation of a new way of life, with shared and interconnected practices from the Near East and south-eastern Europe. While significant research has explored aspects of changing economy, residential architecture, and the organization of space from individual settlements, surprisingly little research has stepped back from the scale of the individual building and household, considered regional and inter-regional practices, and asked "What is the village?".

In this session, we aim to consider a range of understudied multi-scalar aspects of villages as a unit of analysis with the aim of advancing comparative perspectives of villages within and between neighboring regions. This includes thinking about villages at increasing scales, including the life-history of individual Neolithic buildings, how long they served their residential character, the character of clusters of buildings with physical gaps between them, the size and character of open space, consideration of village biographies, both with buildings made of wood and clay as well as buildings with foundations and walls made of stone, and finally, to address the relationships between regional villages and how these were socially, economically, and biologically interlinked. Presenters will investigate how the creation and maintenance of villages in southwestern Asia and Old Europe were shaped by a range of region-specific variables, such as settlement practices, the character of the local environment, access to construction materials, and variables of global significance, in particular the early Holocene climate oscillations.

ABSTRACTS

1 NEOLITHIC FARMING AND "THE VILLAGE": INSIGHTS FROM WESTERN ASIA AND SOUTH-EAST EUROPE

Bogaard, Amy (School of Archaeology, University of Oxford; Santa Fe Institute, USA)

In response to the central question posed by this session ("what is the village?") I reflect on available evidence for Neolithic settlements as communities of shared agropastoral practice, knowledge and materials, drawing on examples from western Asia and southeast Europe. Practices ranging from the choice and care of preferred crops and livestock to culling patterns and storage behaviour have fundamental implications for the ecology, resilience and sociality of

Neolithic settlements. Examples to consider range from fantastically long-lived sites of millennial duration, as in central Anatolia, to shorter-lived but recurrent occupations of 1-2 centuries along lakeshores, as recently investigated in south-east Europe through the ERC synergy EXPLO project, a collaboration between Oxford, Thessaloniki and Bern. Considering land-use practices at different social scales, from the individual house to the local community (“village”) and wider region, I seek to trace themes such as ownership, inheritance, collaboration and cooperation. I develop the argument that a critical mass of households was needed to make early farming work, and that the emergence and spread of “villages” was necessary to the establishment and evolution of early farming.

2 THE DEATH OF THE NEOLITHIC VILLAGE: ÇATALHÖYÜK AFTER AN ABRUPT DEMISE OF THE INCIPIENT NEOLITHIC LIFE

Marciniak, Arkadiusz (Adam Mickiewicz University)

For more than half a millennium, the imposed egalitarianism provided a solid foundation for the unprecedented growth of the community inhabiting the large Neolithic settlement at Çatalhöyük. Around 300 years before its ultimate abandonment, however, this incipient Neolithic lifeways came to an abrupt end. Çatalhöyük around 6300 BC, once filled with hundreds of occupied houses, was now largely deserted, and a majority of the population left.

Focusing on our ongoing work at Çatalhöyük, in this presentation I outline the major steps in the process of folding up the Neolithic village. What was the Neolithic village like, physically and socially, after a larger portion of the population had departed? In particular, I will discuss the re-occupation of the previously abandoned houses, the life-history of newly built houses, the character of their clusters, and the forms of open space. It will also outline how recently unearthed architectural buildings illustrate attempts by the remaining portion of the population to re-institute the incipient Neolithic mode of life in a largely transformed way. Using the Çatalhöyük example, the ultimate goal of the paper is to scrutinize the character of Neolithic villages long after they lost their primordial character.

3 ASINGERAN, THE SOCIO-ECONOMIC TRANSFORMATION OF A CHALCOLITHIC RURAL (?) COMMUNITY IN THE PLAIN OF NAVKUR

Iamoni, Marco (University of Udine)

The Chalcolithic era in Northern Mesopotamia is widely recognized as a period during which local communities underwent significant socio-economic changes. While the general characteristics of this era are well-known, it is increasingly evident that each region experienced unique processes with diverse manifestations of these changes.

The area of Navkur, a large plain extending between the upper Zab and the local hills near the modern city of Ba'adre, is relatively unexplored during this period. Recent data suggest that human rural communities thrived there since the end of the 6th millennium BCE, thanks to the resources of the local territory. Excavations conducted at the site of Asingeran are bringing to light information that demonstrates these changes.

This paper aims to provide a preliminary view of the transformation through an analysis of available evidence concerning the burial tradition of infants. It combines this analysis with a study of the local structure of the settlement and the economic activities characterizing the site throughout the 5th and 4th millennia BCE. Although the overall picture is preliminary in many details, it offers a model that appears to share points of contact, as well as some substantial differences, with what is known from other contemporary sites in Northern Mesopotamia. In particular, it challenges the paradigm of small sites as evidence of rural communities and suggests that the area of Navkur might have witnessed different outcomes in what could be termed a phenomenon of ‘micro-complexity’.

4 KOVAČEVO AND THE OLDEST NEOLITHIC VILLAGES IN THE BALKANS

Demoule, Jean Paul (Université de Paris I Panthéon - Sorbonne)

Excavations covering more than 2,000 m² at Kovačevo, in south-western Bulgaria, have revealed the evolution over a millennium of one of the oldest Neolithic villages in the Balkans. The earliest phases (from 6200 BC onwards) developed over a limited area, while at the end of the Early Neolithic period the site covered almost six hectares. The dwellings are rectangular, made of wood and wattle and daub. The earliest dwellings were large and built on the ground. In more recent phases, they are smaller and built over pits used as crawl spaces, which are used as rubbish pits once the house has been abandoned. A few rare children’s graves have been found under or beside the houses, a custom well known in Anatolia, but rare in the Balkans. The location of the adult cemetery is unknown. The abandonment of the village at the time of its greatest expansion, followed by a more limited occupation in the Middle Neolithic, may suggest logistical difficulties. In fact, when agricultural colonization resumed westwards with the Bandkeramik, the villages remained still small until they reached the Atlantic coast.

5 OVERGROWN VILLAGES OR PROTO-URBAN CENTRES? MODELLING THE DEMOGRAPHIC GROWTH OF A TRYPILLIAN MEGA-SITE

Kiosak, Dmytro (Odesa I.I. Mechnikov National University; GPR Human Past, UBM, U-Bordeaux)

Trypillia mega-sites (4100-3400 BCE, Central Ukraine) have received several interpretations: from temporary gathering places to proto-urban centres. One of the most common interpretations of this phenomenon is that it is an overgrown village. That is, the agglomeration of the population took place mechanically, without acquiring a new quality – hierarchies, management, division of labour, etc. The Trypillians chose to settle together in a place – the sum of all these villages – instead of living in many small villages. What made this possible? From the point of view of anthropological theory, there are limits to the growth of human collectives, and it is likely that the maximum possible population of thousands of houses far exceeded these limits for a Neolithic agricultural community. We will try to highlight some of the technical parameters that would be required for the existence of such an overgrown village using agent-based modelling, and then discuss their correspondence to the current views on the complexity and organisation of early farming society.

6 ‘THE TRYPILLIA MEGASITES WERE NOT VILLAGES!: WHAT NON-VILLAGES CAN DO TO INFORM VILLAGES.’

Gaydarska, Bisserka (Historic England) - Chapman, John (Durham University)

To call Trypillia megasites (TMS) ‘large villages’ is akin to calling a “Schweinschaxe” a large pork chop. In the following paper, we seek to demonstrate that this is a categorical mistake. Our baseline comparison is that the TMS equivalent of an “Early Balkan Village” (EBV) is a single Quarter.

It is apparent that the principal difference between a TMS and an EBV is that of scale, with implications for every aspect of life. The tension between ‘global’ and ‘local’ identities was a recurrent feature of TMS life. Our expectation is that such tensions would not be part of EBV life, where inter-household rivalries would have been more significant. A second example is that an entire inter-EBV exchange and mating network is found within a single TMS. Thirdly, the enclosure ditch around TMS required more work for the entire TMS community than for the far smaller EBV ditches increasingly found in geophysical plots, although TMS ditch-digging was probably organised on a Quarter level. Fourthly, the TMS inner open area was central to political decision-making and social life, with access to the open area from all Quarters. Were there such open areas within EBVs? The potential for such development seems to have stemmed from the creation of the ‘dispersed’ Late Neolithic Anatolian village.

Other themes for comparative discussion include the spatial patterning in house layout and variability in house size according to Quarters, as well as the location of two special features – Assembly Houses (communal structures) and pottery kilns.

Perhaps the most important inference from TMS plans is the potential for democratic decision-making. If an egalitarian structure was possible on such large sites, was it not highly probable on EBVs?

In this paper, we seek to give a human face to these structural analogies between Trypillia megasites, their Quarters and EBVs.

7 UNSTRUCTURED VILLAGES? SETTLEMENT ORGANIZATION IN NEOLITHIC AND ENEOLITHIC SITES OF THE NORTHWESTERN CARPATHIAN BASIN

Wunderlich, Maria (Institute of Pre- and Protohistoric Archaeology, University Kiel)

In contrast to the structured, long-lasting settlement sites known from the Neolithic periods in southeastern Europe or the Near East, the northwestern Carpathian Basin (western Slovakia, Moravia and Lower Austria) only exhibits loosely structured and low-density settlement sites. This is a marked difference from the aforementioned areas. Only a few of these sites have been labelled as villages within research discourses due to their common lack of clear communal features and less complex forms of spatial and, presumably, socio-political organization. Yet, excavations and research projects have revealed interesting diversities of house inventories and house forms, as well as differing concepts in the use of space within and between settlement sites that seem to be influenced by changing perceptions and motivations of the communities using these sites.

This presentation will investigate the suitability of the village concept in the northwestern Carpathian Basin region, using a case study from the Neolithic and Eneolithic/Chalcolithic periods. Intra-site analyses, including mean house distance, house inventory variability, and open space indexing, will be used to examine these case studies in a regional comparative framework. The talk will explore methods for describing various forms of spatial organization and the use of space within and between villages, and ways to connect these with comparable and overarching terminologies. This will include an examination of the relationship and usefulness of terms such as ‘village’ or ‘settlement site’.

8 VILLAGE VIBES IN LONGHOUSES? SETTLEMENT STRUCTURE OF THE LBK IN LESSER POLAND AND KUJAVIA

Pyzel, Joanna (Maria Curie-Skłodowska University in Lublin) - Czerniak, Lech (University of Gdańsk)

The communities of the first Central European farmers of the LBK are mainly known from settlement sites consisting of a variety of features, including the iconic longhouses, which are surprisingly similar across the vast area of this culture. Settlement studies have mainly focused on the level of the individual house and household as the most appropriate unit for studying LBK communities. Much less attention has been paid to the question of whether these houses formed spatial and social units of a higher order (a village), whose inhabitants shared a common identity, or whether they were merely random spatial clusters of individual households. In our presentation we will focus on the problem of the existence of villages in the LBK in two regions along the Vistula River in present-day Poland: the upland of Lesser Poland and the lowland of Kuyavia, where large-scale rescue excavations on motorway routes provide insights into the settlement structure of these communities. We will look at the organisation of space, the dynamics of settlement, and the similarities and differences within the sites analysed, which will allow us to explore which community(ies) inhabited a settlement/village and what held them together. We will also look at similarities and differences within and between the regions studied to explore whether there was a supra-regional model of LBK settlement and underlying social organisation.

9 SCALAR STRESS AND SOCIAL NETWORKS IN NEOLITHIC VILLAGES

Kuijt, Ian (Univ. of Notre Dame)

The appearance of larger-scale aggregate villages across many, but not all, areas of the Near East after 8,500 BC (\pm) led to the reorganization of social networks. Researchers are only now starting to understand how the increased physical compaction and increase in number of people, resulted in scalar stress within early villages. From an evolutionary standpoint, analysis suggests that, at least on some level, the evolution of the households and villages, in their many forms, were partially linked to adaptive shifts from highly centralized single-node network systems focused on key individuals to those of decentralized multi-node social networks based on households and Houses. This paper explores the relationship between the increased number of people living in early villages in south eastern Europe and Anatolia, and the social stress that must have existed within these communities as villages expanded, and how this process might have changed social networks at the household and community level.

930 BARBARIANS AT THE GATE OR BEHIND THE GATES? THE COLLISION OF THE MATERIAL CULTURES OF THE INVADER AND THE INVADED

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Miller Bonney, Emily (California State University Fullerton) - Prew, George (National Museums Scotland)

Session format: Regular session

Material culture records how people comprising a community respond to changes in their circumstances. Invasion, when one culture suddenly and hostilely intrudes on another, constitutes a particularly intense cultural shift. Invasion imposes profound, disruptive, and traumatic changes on a community, compressing transformative shifts into brief time frames. Both the invader and the invaded likely view the other as a barbarian because of their cultural differences. Invaders try to force change as they insist on subordination of the prior culture to their own. The target of the invasion will resist. Responses, in whatever direction, from the individual to the community, are particularly charged and fraught with danger, sometimes compliant and sometimes subversive. These responses can materialize in an array of different media, ranging from radical shifts to insistent continuity, hybridisation to selective incorporation to outright rejection of the forces and elements involved in that change. The emergence of post-colonial theories and archaeologies in the last few decades has invigorated the study of responses to invasion. Recent world events have underscored the importance of understanding the variety and complexity of material culture responses to the imposition of alien cultural elements on communities and the fear of cultural erasure.

We invite contributions on all aspects of creative responses to invasion without restrictions to the chronological period or geographic locale, and particularly welcome those that reflect on the competing views of just who is the barbarian. Contributions can examine a single object, an assemblage or a more general cultural expression, from a single pot to an architectural format and beyond. Papers could address a particular individual or draw on larger narratives and wide datasets, and we encourage consideration of response on all levels, from those of the individual, to artistic and cultural movements, to wider forces affecting multiple cultures and/or periods.

ABSTRACTS

1 WORKING AT THE BOUNDARIES: ROLE OF CELTIC ART IN NAVIGATING SOCIAL CHANGE DURING AND AFTER THE ROMAN CONQUEST OF BRITAIN

Joy, Jody (Museum of Archaeology and Anthropology; University of Cambridge)

Star and Griesemer (1989) have identified a category of objects they call 'boundary objects' which are "...both adaptable to different viewpoints and robust enough to maintain identity across them" (Star and Griesemer 1989, 387). In this presentation, I argue that so-called Celtic art, the decorated material culture, particularly metalwork, in use in the British Isles at around the time of the Roman invasion of 43 CE and for decades after, acted as boundary objects. By providing many different facets which could be drawn upon in social interactions between the 'invader' and the 'invaded,' Celtic art was pivotal in negotiations and renegotiations of identity throughout the Conquest period. With a focus on torcs and neck-rings, I will examine what some of these interactions might have looked like and highlight the critical role of material culture in shaping and navigating social change.

2 'BARBARIAN' ART IN A 'ROMAN' PLACE: THE 'CULTS OF THE HEAD?' PROJECT

Ellis-Haken, Rebecca (University of York) - Armit, Ian (University of York)

The Roman invasion of southern England in AD 43 is often seen as an abrupt turning point in Britain's past: the shift from prehistory to history. Yet interactions between the expanding Roman world and Iron Age communities in Britain affected material expression over a much longer period. Artefacts from the first centuries BC and AD in England and Wales can often show a myriad of artistic influences, from the insular La Tène, to the imported Roman, or a hybridity which appears to fuse the two. The recognition of the continuation of insular art on 'Roman' period objects, as outlined in recent changes to the Treasure Act (2023), demonstrate that conversations about how we classify this hybridity in art are moving forward for metalwork artefacts. The same, however, cannot so far be said for other classes of material culture.

The discovery of around 200 anthropomorphic stone heads from Dean Hall Roman Temple (Gloucestershire), the most ever excavated from a single site in the UK, forces us to visit this topic with a focus on stone statuary. This paper introduces the Leverhulme Trust funded 'Cults of the Head?' project, which aims to record, analyse, and contextualise this discovery within the visual culture of Late Iron Age and early Roman Britain and Europe. It outlines initial results relating to the stylistic analysis of the heads, focusing on the apparent acceptance of 'barbarian' art in a 'Roman' place.

3 RELIGION AS AN INVADING FORCE: THE CASE OF ROMAN MERCENARIES IN EGYPT

Ringheim, Hannah (ETH Zurich)

What constitutes an invasion does not necessarily involve aggressions and combative warfare; the gradual takeover of a community's social, political and economic life can transpire subtly and result in new material culture and behaviors that are just as long term and invasive as war. One enduring method of invading can take place through the infiltration and adoption of new religious practices. This paper investigates how mercenaries acted as political pawns as part of a larger infiltration of an invading force by diffusing cults and religion. An example of this comes from the Roman army in Egypt, where the military was fundamental in creating new ritual cults in a cross-cultural environment and then transcending religious ideologies beyond the boundaries of Egypt. This in turn helped to solidify the identity of local communities as part of the Roman Empire.

As early as the first century BCE, epigraphic and papyrological sources point to foreign mercenaries in the Roman army who received land grants for their service in Egypt, resulting in a permanent migration. Furthermore, material evidence from specific cult sites, such as the Caesareum in Alexandria, Philae, and Karnak reveal soldier dedications in local sacred spaces. Mercenaries found commonalities in local religions to then make dedications using their own practices. Likewise major economic hubs in the eastern desert further reflect military dedications in local cults. This paper analyzes case studies of these texts and dedications from Philae, Karnak, and Elephantine that show the spread of Roman cult by mercenaries. This infiltration ultimately had an enduring impact that led to the hybridisation of local Egyptian religions with Roman cults, thus securing Roman social, political, and economic rule over the region.

4 "THEY TURN UP IN THE STRANGEST PLACES..." NEW NARRATIVES OF THE ROMAN CONQUEST IN SCOTLAND THROUGH CHANCE FINDS

Prew, George (National Museums Scotland)

The impact of Rome on the lands which would one day become Scotland should not be understated. While the Roman invasion of Scotland was not as comprehensive as their conquest of the rest of Great Britain, too much of the focus on Roman activity in and around Scotland focuses on the two barriers set between Scotland and the Empire,

Hadrian's Wall and the Antonine Wall. Much of this is due to the paucity of evidence which has traditionally appeared of Roman activity in the rest of Scotland, but this is changing massively with the recent explosion in interest in metal detecting, more and more chance finds are coming up from Shetland in the north down to the traditional home of Scottish Roman activity in the Scottish Borders.

This talk presents the evidence which can often be overlooked of chance finds which have come through the Treasure Trove system in the last twenty years, and suggests new narratives to enrich our understanding of Roman activity in throughout their invasion and settlement of Great Britain, its effect on the peoples of what is now Scotland, and the interaction of local peoples with the cultures and material cultures of the invaders on their doorstep.

5 CRAFTING TRADITION? MAINTAINING OR CREATING TRADITION IN OCCUPIED LAND, A VIEW FROM ANCIENT BRITAIN

Adams, Sophia (British Museum)

In this paper I propose that a long-term perspective is needed to recognise the effect of invasion on the material culture of both the occupied and occupier in southern Britain in the first century CE. Manufacturing methods and quality of production have often been employed as marking a separation between local methods and Romanising practices. Though I agree that changes in technology can be seen on either side of the Roman invasion of Britain in this paper I criticise the singular separation of local and traditional on the one hand and imported and new on the other. To explore this issue this paper focuses on copper alloy cast and sheet metal objects particularly those adorned with red materials: coral, red glass and red enamel. The application of red materials to weaponry has been interpreted as a distinctive characteristic of the material culture of Iron Age Britain but the colour is also closely associated with the Roman military. The non-linear progression in materials used and manufacturing methods may be highlighted in an object tour from the fifth century BCE Basse-Yutz flagons from Lorraine, to the first century CE strainer vessel found at Chettle Park, Dorset. Through this process I debate the perception of shifts in craft production and the concept of tradition as an interpretive tool for reaching the unwritten responses to invasion.

6 793 AND 1493: COMPARING COLONIAL DISCOURSES OF 'DISAPPEARANCE'

Maldonado, Adrián (National Museums Scotland)

In the archaeological and historical literature around the Viking Age in the northern and western islands of Scotland, UK, the overarching discourse has always been one of colonisation followed by population replacement. The narratives constructed within this discourse only work when we see only Scandinavian people and practices expanding outward from a homeland, without taking into account the effect of these expanded horizons on Scandinavian identities. The linguistic, historical and archaeological data for these events are patchy and inconsistent, but their interpretation has nonetheless extended into extremes of rhetoric involving genocide and replacement. All of this is very familiar to Caribbeanists who study the aftermath of indigenous contact with Europeans. The trope of indigenous 'disappearance' has long been mobilised to justify displacement and disenfranchisement. New ethnohistoric work on the islands of Puerto Rico and Hispaniola has revealed the persistence of indigenous Taíno lifeways despite the massive disruptions of the colonial period. This paper will draw parallels not between two dissimilar historical processes, but rather in the discourses surrounding two contact events – the first Viking raid in northern Britain in 793, and the first European landing on Puerto Rico in 1493 – in order to highlight systemic colonialist distortions of contact scenarios. It will apply Caribbeanist and indigenous perspectives on discourses of identity formation in medieval Europe.

7 LOCAL RESISTANCE THROUGH MORTUARY ARCHITECTURAL TRADITIONALISM TO A SOFT INVASION ON BRONZE AGE CRETE

Miller Bonney, Emily (California State University Fullerton)

The organizers of this session request reflections on the consequences of cultural collisions associated with invasion – movements of people through an act of assault or a migration or trader/merchant colonization from outside one geographic/cultural area into another. This paper suggests that these cultural collisions also can occur through what might be termed soft invasions. In a soft invasion an administrative center expands its reach across a larger geographic area that shares some generally similar cultural characteristics but with distinct local variants. The entity attempting to assert a broader hegemony seeks a homogeneous and unified culture. Around 1900 BCE the administrative and religious institutions located at the palace at Knossos in central Crete initiated such a process. The emergence of palatial architecture and a more shared vocabulary of ceramic motifs across the island reflect the impact of the Knossian consolidation of authority. As in most soft invasions not all regions submitted to the efforts at cultural homogenization. In south central Crete, particularly in the areas closest to the site of Phaistos, there were dramatic assertions of traditional mortuary customs with the construction of some of the largest circular built stone tombs, a type of structure used for collective burials since the beginning of the bronze age. While the scale of the tombs could be attributed to the emergence of powerful families whose ascendance was tied to affiliation with the Knossian ruling

class, the emphatically local appearance and means of construction also could be read as a form of resistance and an effort to push back against the Knossian authority.

931 TRACING HUMAN STORIES THROUGH STABLE ISOTOPES: UNRAVELLING THE DYNAMICS OF HEALTH AND IDENTITIES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Curto, Ana (HERCULES Laboratory, University of Évora) - Papageorgopoulou, Christina (Laboratory of Physical Anthropology, Democritus University of Thrace) - Goude, Gwenaëlle (CNRS UMR 7269 LAM-PEA) - López-Costas, Olalla (EcoPast. Área de Arqueología. Universidade de Santiago de Compostela; Dpt of Archaeology and Classical Studies. Stockholm University)

Session format: Regular session

Stable isotopes are now widely recognized as an invaluable asset in osteoarchaeology, offering unparalleled perspectives on the diets of humans and animals, as well as their migration behaviours and surrounding environments. Beyond these applications, stable isotopic analysis has expanded its scope to encompass the examination of metabolic processes and isotopic fractionation, providing nuanced insights into the intricate interplay between disease, behaviour, and isotopic composition. And has even applied to identify soldiers and individuals who perished in historical conflicts. The impact of physiological processes and stress on stable isotopes has garnered significant research attention, with pioneering studies highlighting the complex connections between physiological stress, metabolic processes, and stable isotopic signatures. These studies shed light on the complex relationships among human biology, environmental conditions, and overall health.

Studies investigating factors such as breastfeeding duration and the timing of weaning have revealed distinct markers in skeletal tissues, offering valuable insights into the physiological stress experienced during the transition from breastfeeding to solid food. These investigations have contributed significantly to our understanding of childhood nutrition and its lasting implications for health and growth, enabling researchers to discern the effects of growth disturbances and developmental stress in ancient populations.

By analysing stable isotopes in human remains from different social groups or geographical regions, researchers can uncover disparities in health and nutrition within past populations. This approach helps identify patterns of inequality, differential access to resources, and the impact of socio-economic and environmental factors on health outcomes in ancient societies.

During the upcoming session, we will delve into the intricate relationships between physiological responses to disease and potential alterations in dietary behaviours, aiming to elucidate the complex dynamics among health, environment, and culture in various historical contexts.

ABSTRACTS

1 STABLE SULFUR ISOTOPE RATIOS AS AN ADDITIONAL PROXY FOR THE RECONSTRUCTION OF WEANING PATTERNS - A CASE STUDY

Cheung, Christina (Department of Anthropology, Chinese University of Hong Kong; EA – Eco-anthropologie (UMR 7206), Muséum National d'Histoire Naturelle, CNRS, Université Paris Diderot, Paris, France; UMR 7269, LAMPEA, Aix-Marseille Université, CNRS, Minist Culture, Aix-en-Provence, France) - Herrscher, Estelle (UMR 7269, LAMPEA, Aix-Marseille Université, CNRS, Minist Culture, Aix-en-Provence, France) - Macdonald, Rebecca (Department of Archaeology, Simon Fraser University, Burnaby, BC, Canada) - Richards, Michael (Department of Archaeology, Simon Fraser University, Burnaby, BC, Canada) - Thomas, Aline (EA – Eco-anthropologie (UMR 7206), Muséum National d'Histoire Naturelle, CNRS, Université Paris Diderot, Paris, France)

Over the past three or four years, sequential isotopic analysis of human dentine has become an increasingly common approach to reconstruct childhood lifehistory, and often specifically, weaning patterns in archaeological populations. The isotope systems involved are usually those of nitrogen ($\delta^{15}\text{N}$) and/or carbon ($\delta^{13}\text{C}$). Recent advancement in mass spectroscopy has allowed the simultaneous measurement of carbon, nitrogen, and sulfur isotope ratios in small volume of processed dentine, thus opening up the possibility to incorporate stable sulfur isotope ratios ($\delta^{34}\text{S}$) in sequential dentine analysis. However, one question remains: what can $\delta^{34}\text{S}$ in sequential dentine tell us about childhood lifehistory? In this study, a total of eleven first molars from two Middle Neolithic sites in the Paris Basin region, Balloy 'Les Réaudins' (BLR) and Vignely 'la Porte aux Bergers' (VPB) are sequentially analysed for stable carbon, nitrogen, and sulfur isotope ratios. Our results showed that $\delta^{34}\text{S}$ values in sequentially sampled dentine also show corresponding trends during the weaning period, suggesting it can be used as an additional proxy for understanding major shifts in

diets during childhood. However, the result of this study reinforced the importance of establishing an archaeological local baseline, especially that of sulfur, in order to produce meaningful interpretations of the isotope data generated.

2 EARLY LIFE HISTORIES IN PREHISTORIC ALGERIA: FIRST EVIDENCES BY MULTI-ISOTOPE AND BIOANTHROPOLOGICAL APPROACHES

GOUDE, Gwenaëlle (CNRS, Aix Marseille Univ, Minist Culture, UMR 7269 LAMPEA, France) - Chaïd-Saoudi, Yasmina (Algiers University 2, Institute of Archaeology, Laboratory of Sedimentary Basins & Geodynamics, Algeria) - Stéphane Rottier, Samuel Bedecarrats (Bordeaux University, UMR 5199 PACEA, France) - Sayle, Kerry (SUERC, University of Glasgow, Scotland, United Kingdom) - Bray, Fabrice (UAR 3290 MSAP, CNRS, Lille University, France) - Thibaut Devière, Lou Spanneut (Aix Marseille University, CNRS, IRD, UMR 7330 CEREGE, France) - Babredine Sitouah, Maëlle Couvrat (CNRS, UMR 7269 LAMPEA, France/Algiers University 2, Institute of Archaeology, Algeria) - Domingo C. Salazar-García, Robert Power (School of Archaeology, University College Dublin, Ireland/Universitat de València, Spain) - Laurent Bouby, Apolline Lambert (UMR 5554 ISEM, CNRS, University of Montpellier, France) - David Au Yang, Guillaume Leduc (CNRS, IRD, Aix Marseille Univ, UMR 7330 CEREGE, France)

This study presents an unprecedented documentation on the diet, mobility and lifeways of children and adults at the Prehistoric settlement of Columnata (Sidi Hosni, Algeria). Discovered in the 1930's, the site displays material from the Epipalaeolithic to the Neolithic. In this study we focus specifically on newly excavated burials dating from the 11th mill. to the 9th mill. cal BP. The isotopic compositions ($\delta^{13}C$, $\delta^{15}N$, $\delta^{34}S$) of bone collagen of three individuals and teeth of five individuals (sequential sampling in dentine) were analysed. Information on protein intake, environment and life history from ca. birth to early adulthood (depending on the piece analysed) was obtained. Age-alignment for teeth isotopic sequences was statistically adapted. Stable isotope compositions were measured by EA-IRMS, sex determination was confirmed by employing peptide identification in tooth enamel of four individuals, and environment and food resources were further documented by utilising microremains from dental calculus. Results show protein consumption was based mainly on terrestrial resources with a possible high reliance on plant foods. Carbon and sulphur isotopic compositions suggest the exploitation of three different areas as well as intra-life mobility. Exclusive breastfeeding is visible until ca. 12 months for three individuals (both male and female) and one child seems to have benefited from a longer exclusive breastfeeding period. Weaning appears to start at ca. 12 months but teeth sampled do not provide information on completion of the weaning stage. The isotopic profiles of the third molar of a male individual suggest significant changes (subsistence/mobility?) at ca. 17 years old. Isotopic, proteomic and calculus analysis are funded by the French National Research Agency (ANR Women SOFar 21-CE03-0008) and archaeological research is conducted by Algiers2 University, Institute of Archaeology with the support of Algerian Ministry of Culture.

3 ESTIMATING THE HUMAN DIET IN THE ANCIENT GREEK COLONY OF AMBRACIA USING STABLE ISOTOPES ($\delta^{15}N$, $\delta^{13}C$) AND BAYESIAN MIXING MODEL

Georgiadou, Angeliki (Laboratory of Physical Anthropology, Democritus University of Thrace) - Ganiatsou, Elissavet (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace) - Xanthopoulos, Kiriakos (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace) - Papageorgopoulou, Christina (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace)

The coexistence of multiple traditions in the newly formed Greek colonies led to a cultural hybridization allowed nutrition systems to combine in new ways, as food is a marker of social practice. While extensive research has been conducted on reconstructing the diet of past populations through stable carbon and nitrogen isotopes, only a limited focus has been placed on quantifying colonial diets over time using both chemical and statistical data. In this study, we utilise stable carbon and nitrogen analysis of human and faunal remains together with isotopic mixing models to quantify the relative contribution of different food sources in Ambracia, a Corinthian colony. We examine the individuals' diet to clarify food strategies during the colonization process. A diet of 232 individuals and 17 animals was reconstructed by measuring nitrogen and carbon isotope ratios on bone collagen. The material originates from the western cemetery of ancient Ambracia dated from its foundation (625 BC) to the city's decline (33 BC). Dietary protein was estimated using the Bayesian mixing model MixSIAR.

Our results demonstrate that the first settlers and subsequent generations followed the same diet, consisting mainly of terrestrial animals and a lesser extent of C3 plants (grains, cereals, fruit-vegetables) and marine resources (fish-sea-food). During the Hellenistic period (323-31 BC), in which Ambracia became the capital of the kingdom of Pyrrhus, a clear change was observed in the dietary preferences of the population. We noticed a decrease in the consumption of terrestrial animal protein and an increase in the consumption of plant and marine protein. These observations reveal that the population is beginning to combine food sources to a greater extent, indicating the simultaneous exploitation

of more agricultural and fishery products. Our findings provide a basis for more specialized approaches to understanding the colonial subsistence strategies in antiquity.

4 EXPLORING ROMAN CHILDCARE THROUGH STABLE ISOTOPE ANALYSIS AND NUTRITIONAL STRESS EVIDENCE: A CASE STUDY OF LUCUS FERONIAE AND ISOLA SACRA

Formichella, Giulia (Sapienza University of Rome) - Soncin, Silvia (Sapienza University of Rome) - Tafuri, Mary Anne (Sapienza University of Rome)

The weaning period plays a crucial role in the growth and survival of children, influencing morbidity and, consequently, mortality. As known, weaning induces physiological stress, which in turn is influenced by various factors such as the introduction of complementary foods as well as the duration and frequency of breastfeeding. Additionally, environmental, cultural, and socio-economic factors also contribute. Investigating nutrition during Roman childhood, the timing and methods of weaning, and observing morbidity in both children and adults are essential for better understanding the Roman world.

This study aims to explore childcare within the core of the Roman Empire by examining infant feeding practices at two sites located 30 km from Rome, dating back to the 1st-3rd century AD. The first site is the agricultural settlement of Lucus Feroniae, while the second is the harbour site of Isola Sacra. Our investigation employs stable isotope analysis of carbon, nitrogen, and sulphur carried out on incremental dentine sections of permanent first molars or canines of 8 adult individuals (4 from Lucus Feroniae and 4 from Isola Sacra). In addition to stable isotope analysis, the study incorporates palaeopathological analyses aimed at identifying non-specific stresses such as enamel hypoplasia, along with metabolic stresses like porotic hyperostosis and skeletal indicators of C and D vitamin deficiency.

In this setting, we present preliminary results that allow the identification of the onset and completion of weaning as well as other events that characterise the first period of life of these individuals (infancy, early childhood, late childhood and adolescence). Our results are used to interpret practices of childcare at the sites of Lucus Feroniae and Isola Sacra, and here we compare them with previously published studies on other populations in the core of the Roman Empire and on its margins, to delineate similarities and differences.

5 INVESTIGATING DIETARY ($\Delta^{13}C$, $\Delta^{15}N$, AMINO ACIDS) AND MOBILITY PATTERNS (87SR/86SR) AT THE NECROPOLIS OF SAINT JUST DE VALCABRÈRE

Morcillo, Victor (Universidad Autónoma de Madrid) - Fuller, Benjamin T. (Géosciences Environnement Toulouse) - Van Andringa, William (École Pratique des Hautes Études) - Jaouen, Klervia (Géosciences Environnement Toulouse)

Located at the base of the Pyrenees in southern France, the necropolis of Saint Just de Valcabrère is associated with the Roman town of Lugdunum Convenarum. The site dates from at least the 4th century AD when hypogea and tombs were constructed, and it was used for burials until the basilica of Saint Just de Valcabrère was erected in the 11th century AD. For nearly the past decade, excavations have taken place at this site and over 200 individuals representing late Roman and Medieval individuals have been recovered. Here we explore dietary ($\delta^{13}C$, $\delta^{15}N$, amino acids) and mobility (87Sr/86Sr) patterns with a multi-pronged isotopic investigation of 82 Roman and Medieval human individuals (69 adults and 13 perinatals) and 20 animals from this necropolis. The isotopic results indicate that there was a progressive transition in the diet of these individuals with a reduction of dietary animal protein and an introduction of millet from the end of the Roman period toward the Medieval period. In addition, comparative studies of the graves found unique dietary patterns associated with social class. Of particular interest is the burial of a young woman (18-22 years old) that was found in a 4th century marble sarcophagus but was radiocarbon dated to 1960 ± 30 BP or the Roman period before the site was established. Bulk isotopic analysis results did not indicate a unique diet, but $\delta^{13}C$ amino acid analysis determined that she consumed marine protein. The amount consumed is however not sufficient to explain her anomalous ^{14}C age in relation to the reservoir effect. This study advances our knowledge of dietary and mobility patterns during the Roman and Medieval periods in southern France and highlights the important role of amino acid isotopic results in reconstructing past dietary patterns.

6 FED THE SAME WAY? EXPLORING THE INFLUENCE OF BREASTFEEDING, WEANING, AND CHILDHOOD DIET ON ADULT SEX RATIOS IN MEDIEVAL TUSCANY

Amaro, Alessio (Department of Anthropology, McMaster University, Canada) - Fornaciari, Antonio (Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Italy) - Giuffra, Valentina (Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Italy) - Kim, Sang-Tae (School of Earth, Environment & Society, McMaster University, Canada) - Knyf, Martin (School of Earth, Environment & Society, McMaster University, Canada) - Prowse, Tracy (Department of Anthropology, McMaster University, Canada)

Osteological and historical evidence suggests a shortage of adult females during the European Middle Ages, where the number of males was atypically higher than that of females. In modern populations, normal sex ratios (RS = 100 * males/females) range between 90 and 105, but at birth this ratio is typically skewed toward males (RS = 104-107). This ratio tends to become more equal over the life course, as males are typically subject to higher mortality rates.

Here we investigate one potential cause that may have contributed to the shortage of women during the Italian Middle Ages - gendered-based differences in the timing and pattern of breastfeeding and weaning. We reconstruct breastfeeding, weaning, and childhood diet patterns of three medieval populations that lived in Tuscany, Italy (11th - 13th CE). Adult first molars from Badia Pozzeveri (n= 24), Aulla (n= 19), and Montescudaio (n= 32) were used to measure carbon and nitrogen isotope compositions of males and females, applying serial sampling of primary dentine using a 1.5 mm biopsy punch. Each tooth provided between 9 to 12 data points per individual, ranging from birth to 9.5 years, covering the period of breastfeeding, initiation and completion of weaning, as well as post-weaning childhood diet. These data were analysed to explore possible gender-based differences in the way male and female children were nurtured (e.g., prolonged/shortened breastfeeding, early/late weaning). Different feeding practices could have affected the health and survivorship of females, impacting the adult sex ratio in medieval Italy.

By exploiting the incremental dentine development, teeth are an important resource for exploring the complexities surrounding the feeding of children in the past. This presentation demonstrates that serial dentine stable isotope compositions can be used to investigate questions beyond infant feeding practices, and help develop explanations for the unbalanced demographic patterns observed in medieval Europe.

7 DIET ($\delta^{13}C$, $\delta^{15}N$) AND MOBILITY ($\delta^{18}O$) IN THE MEDIEVAL SITE OF NOVIODUNUM (ROMANIA): POVERTY AND THE BOGOMIL NEO-GNOSTIC SECT

García-Vázquez, Ana (ArchaeoSciences Division, Research Institute of the University of Bucharest, Romania) - Vasile, Gabriel ("Vasile Pârvan" Institute of Archaeology, Romanian Academy, Bucharest, Romania) - Coman, Petra (ArchaeoSciences Division, Research Institute of the University of Bucharest, Romania) - Streinu, Marius (National Institute of Heritage, Bucharest, Romania) - Stănică, Aurel-Daniel ("Gavrilă Simion" Eco-Museum Research Institute, Tulcea, Romania)

The Noviodunum archaeological site, situated on the right bank of the Danube, approximately 20 km from the Danube Delta, being the narrowest crossing ford, and becoming a strategic and economic hub from pre-Roman times to the Middle Ages. A civil settlement developed around the fortification, which in the late mid-Byzantine and medieval periods would be occupied by a necropolis that extends to the interior of the fortification, after the latter was abandoned.

This study presents data from 36 individuals spanning the late 11th to mid-13th century, a period when Noviodunum was under Byzantine Empire and Golden Horde rule. The anthropological analysis aimed not only to establish a biological profile but also to document features shedding light on the individuals' general health and lifestyles. This included non-metric traits, anomalies, pathological conditions, antemortem skeletal trauma, skeletal stature, entheses robusticity, and potential enthesopathies. Correlation with age and sex aimed to unravel insights into mortality patterns in medieval Byzantine Dobruja, revealing notable pathologies/abnormalities like biparietal thinning, sacralisation, spina bifida occulta, cervical rib, and leontiasis ossea.

Dietary patterns were determined, with a group of individuals exhibiting a higher reliance on freshwater fish, while others, with lower $\delta^{15}N$ values, suggested different percentages of C4 plants consumption, possibly millet. A male from a grave associated with the Bogomil gnostic sect's ritual burial, has isotopic values that indicates a vegetarian or vegan diet, aligning with their ascetic lifestyle.

Patterns of mobility varied among individuals throughout their lives, and the $\delta^{18}O$ values also indicate different origins or water sources. Given the proximity of numerous lakes besides the Danube, the varied isotopic values find potential explanations in the availability of different water sources in the Noviodunum vicinity.

8 DIACHRONIC CHANGES IN DIET WITH RESPECT TO THE BLACK DEATH: STABLE ISOTOPIC EVIDENCE FROM MEDIEVAL TOULOUSE, FRANCE

Kacki, Sacha (UMR5199 PACEA, CNRS-Université de Bordeaux, France; Department of Archaeology, Durham University, UK) - Tyler, Janelle (Department of Archaeology, Durham University, UK) - Cordiner, Eleanor (Department of Archaeology, Durham University, UK) - Gowland, Rebecca (Department of Archaeology, Durham University, UK) - Gröcke, Darren (Department of Earth Sciences, Durham University, UK) - Montgomery, Janet (Department of Archaeology, Durham University, UK)

The Black Death (A.D. 1347-1352) caused millions of deaths in Europe over a short period and had a major social and economic impact on late medieval societies. Some scholars have posited that this epidemic caused such unprecedented levels of mortality because the population was already weakened by decades of crop failure and famine, while others suggest that the resulting population decline may have led to an improvement in the diet of the laboring classes. To test both these hypotheses, we analyzed carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) stable isotopes in 172 bone samples from medieval Toulouse (France), collected on skeletons from a mass grave related to the Black Death (BD) (A.D. 1348, n=47), and a pre-BD (A.D. 1330-1334, n=69) and post-BD (A.D. 1380-1545, n=56) parochial cemetery. No significant differences were observed between the pre-BD and BD groups, suggesting that there had been no particular decline in the quality or diversity of food consumed in the last few years before the epidemic. There was, however, a significant shift in $\delta^{13}C$ and $\delta^{15}N$ values between these two groups and the post-BD population. These results indicate a diversification of the diet after the epidemic, with increased access to animal/marine protein and possibly C4 plants. The more notable increase in $\delta^{15}N$ values between the BD and post-BD periods was for females, suggesting that the Black Death had different effects on dietary changes according to sex. Overall, the results demonstrate dietary changes in the aftermath of the Black Death and raise interesting questions around gendered access to diet, possibly suggesting reduced social inequalities between males and females following this plague outbreak.

9 THE URBAN EVOLUTION OF DIET: EVIDENCE FROM ANCIENT THESSALONIKI USING STABLE ISOTOPES, BAYESIAN MODELING AND MACHINE LEARNING

Papageorgopoulou, Christina (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, 69100, Komotini, Greece.) - Choupa, Maria Nefeli (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, 69100, Komotini, Greece.) - Georgiadou, Angeliki (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, 69100, Komotini, Greece.) - Protosalti, Soultana (Ephorate of Antiquities of Thessaloniki City, Ministry of Culture and Sports, 54003 Thessaloniki, Greece) - Tzevreni, Stavroula (Ephorate of Antiquities of Thessaloniki City, Ministry of Culture and Sports, 54003 Thessaloniki, Greece) - Konstantinidou, Krino (Ephorate of Antiquities of Thessaloniki City, Ministry of Culture and Sports, 54003 Thessaloniki, Greece) - Vasileiadou, Stella (Ephorate of Antiquities of Thessaloniki City, Ministry of Culture and Sports, 54003 Thessaloniki, Greece) - Ganiatsou, Elissavet (Laboratory of Physical Anthropology, Department of History and Ethnology, Democritus University of Thrace, 69100, Komotini, Greece.)

Urbanization, the concentration of human populations in cities, influences food system dynamics, including food production and consumption, with far-reaching effects on economic, health, and environmental aspects. Understanding the ways in which ancient food systems sustained the equilibrium between food resources and provisioning, requires a long-term perspective, drawn from a range of sources, including anthropological, bioarchaeological and zooarchaeological records.

In this study we target the food system of ancient Thessaloniki, an exemplary pre-industrial urban site spanning 18 centuries. We integrate stable isotope analysis of carbon, nitrogen and sulphur from bone and dentine collagen from skeletal remains. The isotopic data are analyzed using Bayesian modeling and machine learning to reconstruct the dietary components of infant, childhood and adult diets. We introduce the first open-source pipeline for isotopic data, freely accessible as R code. This tool offers metric calculations, collagen quality assessment, plotting options, and algorithmic integration for dietary and weaning reconstructions.

Childhood diets included C3 plants and animal protein, with limited evidence of C4 plants and fish consumption based on preliminary results of 68 individuals (792 $\delta^{15}N$ and $\delta^{13}C$ measurements from dentinal collagen). Adult diets consisted of C3 plants, freshwater fish and limited consumption of animal protein and C4 plants based on 151 measurements of $\delta^{15}N$ and $\delta^{13}C$ and 131 of $\delta^{34}S$ from bone collagen. These data span from the city's foundation in 315 BC through the 16th century AD, focusing on the Roman period (168-324 AD).

Our findings contribute a deeper understanding of dietary patterns using the largest isotopic dataset from ancient bones and teeth samples in Greece. We pioneer the investigation of urban population sustainability through consistent, reproducible, and efficient research approaches.

This research is part of CityLife, an ERC-Consolidator Grant-funded project investigating long-term human adaptation against the backdrop of urban evolution using ancient molecular, historical, and ecological evidence.

10 MAPPING ISOTOPE SIGNALS IN THE HUMAN PETROUS BONE: ITS POTENTIAL USE AS A TOOL FOR LIFE HISTORY RECONSTRUCTION

KONTOPOULOS, IOANNIS (University of Tübingen) - Chovalopoulou, Maria Eleni (National and Kapodistrian University of Athens) - Garcia-Huidobro, Valentina (University of Tübingen) - Bocherens, Hervé (University of Tübingen)

During the past few years the petrous bone has become the most sought-after skeletal element for palaeogenetic studies as the endogenous DNA yields are often dramatically higher compared to other skeletal elements. Still, many things about the formation and remodelling of its sub-components remain unclear. The inner ear part of the petrous bone, unlike long bones, is assumed to be fully formed in utero. However, it is uncertain whether different parts may attain their adult characteristics in infancy and/or early childhood. It is, therefore, unknown whether the petrous bone can be used to better understand physiological and metabolic changes in ancient individuals.

Since the unique microstructural characteristics of the petrous bone (e.g. the co-existence of woven and lamellar tissue) suggest a complex picture, we present our initial results on the relationship between the isotopic composition of different anatomical sites of the inner ear and their formation time (in utero, infancy, early childhood). Petrous bone isotope mapping with high temporal resolution is achieved through the comparison of a large number of modern human petrous bone microsamples (n=120) to sequential dentine (n=131) collagen isotopic data intra-individually (5 individuals). The potential use of the petrous bone collagen isotope signals as an additional or alternative tool to dentine isotope values for life history reconstruction is further assessed.

11 EXPLORING THE INTERSECTION OF MATERNAL-INFANT DIET, HEALTH, AND SOCIAL STATUS IN INDUSTRIAL LONDON: A COMBINED PALAEOPATHOLOGICAL AND STABLE ISOTOPE APPROACH

Eggington, Jack (University of Reading) - Lewis, Mary (University of Reading) - Müldner, Gundula (University of Reading)

Historical literature has identified socioeconomic status as a significant causative factor in poor health, morbidity, and mortality during the industrial period in England. However, the effect of social status on the maternal-infant nexus of diet and health is less clear, and bioarchaeological analysis offers the only means to directly observe this sensitive relationship.

This study applies a nuanced approach to exploring this issue, utilising both palaeopathological and chemical methods to provide a comprehensive understanding of the status and nutritional health of both mother and child. Young non-adults (20 weeks gestation to 3 years postpartum) and adult females (22-46 years) from the industrial cemetery of St. James, London (n=460) were analysed. The short duration of cemetery use (1789-1853) and defined social stratification, allows for the consideration of broad patterns of diet and health, in addition to individual life histories. Non-specific stress (dental enamel defects and growth disruption), metabolic disease (scurvy and rickets), and caries were recorded using macroscopic and radiographic standards, providing evidence for the impact of nutritional deficiencies in young non-adults and adult females. A sub sample of individuals was selected for nitrogen and carbon stable isotope analysis of bone collagen (n=95) and 30 teeth (20 DM1 and 10 M1) were sectioned for incremental dentine analysis (average of 18 increments for M1, and 9 for DM1).

A high prevalence of scurvy in infant (in the first year of life) individuals (18.9%, n=10) and evidence of growth disruption, could be indicative of poor maternal diet and health, or early weaning practices. Coupling the palaeopathological data with high resolution stable isotope analysis allows for the exploration of these possibilities and the complex interplay of social status, adult and infant diet, breastfeeding and weaning practices and nutritional stress at a population and individual level.

12 EXPLORING POTENTIALITY OF STABLE ISOTOPES AND ELEMENTAL COMPOSITION FOR AIDING IN THE IDENTIFICATION OF BRIGADIERS KILLED IN SPANISH CIVIL WAR

López-Costas, Olalla (Area of Archaeology. EcoPast. CRETUS. Universidade de Santiago de Compostela, Spain; Archaeological Research Laboratory, Stockholm University, Wallenberglaboratoriet, SE-10691, Sweden) - Martínez Cortizas, Antonio (CRETUS. EcoPast. Fac of Biology. Universidade de Santiago de Compostela, Spain) - Benito Sánchez, María (Departamento de Medicina Legal, Psiquiatría y Patología - Laboratorio de Antropología y Odontología Forense. Universidad Complutense de Madrid, Spain)

The Spanish government and people are deeply indebted to the International Brigadiers, people who left their country behind to fight in the Spanish Civil War (1936-1939). One way to repay this debt is to identify those who ended up in an unmarked grave and return the skeletons to their families. In this work we explore the potential of stable isotopes in bone collagen and elemental composition to understand aspects of the lives and death of these men and women. We investigate three male skeletons found in a mass grave with ten individuals and placed in La Casa de Campo, Ma-

drid. The brigade they belonged to is known and their pairs were already identified. From each of them we sampled the 3rd right rib. A secondary objective is to understand intra-bone variability in order to evaluate the homogeneity/heterogeneity of the data. For this, each rib was sub-sampled in 5 fragments from the vertebral end to the sternal end, separating cancellous bone from cortical bone. A total of 32 samples were analysed by FTIR-ATR to understand the bone composition, showing bands of calcium phosphate, carbonate and amides compatible with well-preserved collagen and bioapatite. Collagen was extracted from cortical bone (n=15) obtaining low variability in isotopic composition, i.e., $\delta^{13}\text{C}$ (-18.6±0.1; -18.4±0.1; -18.0±0.1), $\delta^{15}\text{N}$ (11.4±0.2; 11.2±0.2; 11.8±0.3) and $\delta^{34}\text{S}$ (5.5±0.2; 7.0±0.1; 8.5±0.1). Mercury concentrations show large inter and intra-individual differences (60±32µg/kg; 13±3µg/kg; 17±14µg/kg) following a gradient along the rib, higher in the sternal end. This fact is discussed as related to the body position during decomposition. ICP-MS (32 elements) was performed to understand aspects of premortem life (exposure to metals) and soil characteristics. All results are discussed together with the osteological and textual information to narrow the possibilities of these individuals' origin and way of life, approaching their biography. However, some limitations were observed.

932 CONTINUITY AND CHANGE IN THE WAGONS AND CHARIOTS OF LATER PREHISTORIC EUROPE AND EURASIA

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Reinhold, Sabine (German Archaeological Institute) - Ginoux, Nathalie-Cécile (Sorbonne Université; Centre André Chastel (UMR 8150)) - Vardanyan, Benik (Institute of Archaeology and Ethnography NAS RA; History Museum of Armenia) - Giles, Melanie (University of Manchester)

Session format: Regular session

Chariotry is a daring and dramatic aspect of Late Bronze Age and Iron Age life which emerges out of a much longer tradition of wagonry. These captivating assemblages offer unique insights into the transformation of relationships between people, animals and material culture: transforming speed and mobility by compressing time and space. They also quickly become a symbol not just of socio-political power but ritual authority.

This session encourages speakers to present old and new case studies, particularly from the last 25 years, which expand our knowledge of wheeled vehicles. It will include the uniquely preserved chariots found together with four-wheeled wagons in the Late Bronze Age necropolis of Lchashen (Armenia): a watershed moment in the history of wheeled transport. It will also present examples from Iron Age Europe, where two-wheeled chariots began to replace the Hallstatt traditions of four-wheeled wagons by the 5th-early 4th century BCE. Yet our session will argue for a more polychronic approach to wheeled vehicles that challenges neat sequences of cultural change in terms of 'transformation' effects: legacies and traditions that are passed on while being transformed, rather than representing a linear continuum of practice. We thus welcome papers that examine wagons and chariots from different perspectives: co-existence and persistence of technical knowledge, changes in social meaning and value, critically exploring both long distance cultural contacts as well as local craft traditions.

We also encourage presentations on the representation and symbolism of wheeled vehicles, with examples that encompass not just spectacular burials but 'everyday' wagons and draught vehicles. Our session thus aims to debate the ways in which wheeled vehicles transformed agricultural as well as socio-political practice, empowering and distilling fundamental ideas about prestige and personality but also shaping deeper cosmological and eschatological beliefs, including journeys into death.

ABSTRACTS

1 BRONZE AGE WHEELED VEHICLES OF THE CAUCASUS AND BEYOND - AN INTRODUCTION

Reinhold, Sabine (German Archaeological Institute)

Wheeled vehicles were introduced during the mid-4th mill. BCE in area from Southwest Asia to Scandinavia. Whether their invention spread out of a single center or from multiple places is still debated, yet these early wagons changed like little other innovation human lifeways in Eurasia. Harnessing cattle and later horses as engines of labor to wheeled vehicles facilitated agriculturalists to enlarge work and transportation capacity, pastoralists to expand economic networks, and warriors to accelerate their campaigns.

Wagons became part of grave assemblages in the Caucasus from the very beginning. From this time onwards and in expanding geographical regions, wagonry became a central element in funeral rituals. However, we see little differentiation in graves with and without wagons during the 4th and 3rd mill. BCE. Only by the final 3rd mill. BCE the 'Early Kurgans' in the Caucasus, the 'Royal tombs' of Alaça Höyük or the 'Royal tombs' of Ur involved wagons in assemblages that far exceeded those of contemporaneous burials and that can be attributed to ruling political elites. A game-changer in wagonry was the domestication of the horses during the 3rd mill. BCE. After 2200 BCE these

horses spread rapidly from north of the Caucasus into Europe, Central and Southwest Asia, and at least from 2000 BCE they were harnessed in front of two-wheeled chariots. Mesopotamian texts attest to the assignment of chariots to 'royalty', outline the high costs involved in operating chariots but likewise highlighting the acceleration of movement and warfare using them.

I will explore the social history of early carriages in the Caucasus and Eurasia focusing on the interplay of social representation and the use of wheeled vehicles in everyday life that maybe lies at the heart for certain persons to be presented in death driving or in possession of a carriage.

2 WEALTHY TOMBS WITH WAGONS FROM BRONZE AGE GONUR (TURKMENISTAN)

Tufer, Mike (German Archeological Institute, Eurasia-Department)

In the second half of the 3rd millennium BCE the early urban settlement of Gonur emerged as its ritual centre of the so-called Margiana (Turkmenistan). The site is surrounded by extensive necropolises with thousands of graves, of which one stands out due to particularly richly furnished and architecturally elaborately designed tombs. They are referred to as 'Royal Tombs' and included, among other things, four-wheeled vehicles. As draught animals camels were used in addition to donkeys. Similar wagons pulled by camels are illustrated at Central Asian petroglyphs.

Far-reaching contacts by means of these wheeled vehicles can be assumed from evidence of possible four-wheeled vehicles in tombs in Western China that also contained burial objects of Central Asian provenance.

The Margiana is generally a region poor in raw materials. The widespread presence of stone and metal artefacts in the tombs of Gonur, however, is evidence for a continuous supply of raw materials that were then processed in the settlement's workshops. We can assume that the group of people who were buried in the luxuriant graves with vehicles as grave goods acquired their wealth by supplying the settlement with such raw materials. However, it is difficult to determine whether these people were also part of the Margiana's political ruling class. In the so-called 'palace' burials existed that do not contain any grave goods. The sumptuous burials with wagons thus may have been reserved for merchants, whereas the political (ritual?) ruling class had no need to express their importance through grave goods.

3 THE DYNAMICS OF SOCIAL ELITES AND WHEELED VEHICLES IN LATE BRONZE AGE ARMENIA: INSIGHTS FROM THE ARCHAEOLOGICAL SITE OF LCHASHEN

Vardanyan, Benik (Institute of Archaeology and Ethnography; History Museum of Armenia)

In Armenia, wheeled vehicles have played a significant role in funerary rituals since the Middle Bronze Age (23th BC), with four-wheeled wagons being the earliest. The transition from the 3rd to the 2nd millennia BC saw wheeled transport in funerary rituals symbolizing a distinct social status, particularly among elite members of communities.

During Late Bronze Age, spanning the 15th to 13th centuries BC, the social landscape represented by excavated settlements and burial practices changed. The consolidation of military, religious, and economic power around central figures led to the use of wheeled vehicles or symbolic substitutes as key identifiers in associated burials.

Monuments like Lchashen, Lori Berd, Metsamor, V. Naver, Gegharot, Artik, etc. serve as invaluable sources for exploring the cultural, economic, military, and social aspects of the LBA in Armenia. Lchashen, in particular, stands out despite its underexplored excavation data from 1956-1975, highlighting 295 burials now stored in the Historical Museum of Armenia.

While Lchashen's earliest burials with vehicles date back to the MBA, the LBA exhibits remarkable structural diversity. The 23 identified vehicles can be categorized into two-wheeled charts, four-wheeled wagons, and spoke-wheeled chariots. Notably, four-wheeled wagons from this era were harnessed with cattle, while two-wheeled wagons from the 1st half of the 15th century BC were drawn by horses.

Beyond complete chariot complexes, certain burials feature symbolic chariot parts, including wood fragments, wheels, yokes, bridles, horse remains, and charioteer armor. Bronze group sculptures of chariots, depictions on vessels and belts, and rock paintings further enrich the archaeological record.

This report aims to illuminate the circumstances surrounding the discovery of wagons and chariots in Lchashen, utilizing archaeological data to delineate connections between the interred individuals and the states of the Near East. Through this investigation, an understanding emerges of Armenia's pivotal role within the LBA world-system.

4 CHARIOT REPRESENTATIONS ON BRONZE BELTS ICONOGRAPHY FROM THE SOUTH CAUCASUS

Manukyan, Sonja (Freie Universität Berlin; BerGSAS - Berliner Antike-Kolleg)

Chariots from the LBA and EIA are not only found in archaeological contexts but also in contemporary visual arts. In this regard, the iconography of Southcaucasian bronze belts is an indirect source of information for the appearance, use, and symbology of wagons in the late prehistoric communities in the region.

These depictions occur in Akthala, Astghi Blur, Chakhbulag, Lchashen, Narekvavi, Stepanavan, Tli, and Iranian Azerbaijan. Additionally, archaeological evidence (e.g. Nerqin Getashen), indicates the simultaneous presence of belts and actual chariots. It is probable that the association of these two objects is linked to elite status and reveals the importance of chariots in both funerary rituals and visual art.

Several common traits are noted in their representations. Their two-spoked wheels are symmetrically positioned under and above the carriage and depicted from a side view. Horses are the typical draft animals employed. The presence of a yoke connecting the animals, whether four, two, or two pairs, is common. Most chariots feature a shaft between the coach and the yoke. Some chariots include reins, which are connected either to the yoke or to the animals' bits. Regarding the human figures (charioteers and/or chariot fighters), they are often depicted above the carriage. Two variations are observed in Lchashen, where the driver is dismounted behind the vehicle, and Chakhbulag, which lacks it altogether. A unique feature is in one of the Stepanavan chariots, where the chariot is divided into two sectors, one for each passenger.

The resonance of the iconographical approach can give information that is rarely provided by actual archaeological finds, such as the way the chariots were operated, the number of "passengers" they could host, and their function. Moreover, it shows the importance of wagons as an integral part of the existence of these high-status individuals, being portrayed even on their vestments.

5 THE FINAL JOURNEY. CHARIOTEERS AND CHARIOT OWNERS IN IRON AGE TEMPERATE EUROPE

Anthoons, Greta (Independent Researcher)

Remains of a charioteer's accoutrement – a goad or a whip – are rarely attested in chariot burials. Andrew Fitzpatrick has suggested that the driver of the chariot was also the horses' groom, a servant of the individual or family who owned the vehicle. Like the horses – rarely buried with the deceased – the charioteer/groom would have remained in the service of the family after the burial and would have held on to and looked after the goad. This would imply that most individuals buried with a chariot were the (high status) owners but not the drivers of the buried vehicles, which is different from other narratives, where the deceased is generally portrayed as a charioteer. No doubt, both roles were sometimes assumed by one and the same person. We can speculate but have no certainty why a given person was buried with a chariot, and this may vary with time and place. If the vehicle was composite and/or communally owned, as suggested by Melanie Giles for the East Yorkshire chariot burials, the emphasis may have been on facilitating the deceased's journey to the afterlife, rather than on evoking the prestige of owning or driving a chariot.

Drawing on iconographic, textual, and archaeological evidence, this paper will discuss the social status of charioteers in Iron Age temperate Europe and will delve deeper into the issues outlined above.

6 THE TROMPGÅRD BURIAL. -NEW TRENDS IN BURIALS OF FOUR-WHEELED WAGONS, SOUTHWEST SCANDINAVIAN ROMAN IRON AGE, 1ST TO 3RD CENTURY CE

Jepsen, Jeppe (Museum Nordsjælland)

Among elite burials from the southwestern Scandinavian Roman Iron Age, burials with richly decorated four-wheeled wagons stand out. The carts were originally perceived as part of the group of bog offerings, and not as part of status-marking grave gifts. This view that stems from the first find of splendid wagons at Dejbjerg and from Tacitus' Germania. Today it is clear that the four-wheeled wagons are not only sacrificial finds, but rather part of the burial equipment in rich graves from the time just after the birth of Christ. The number of finds of these magnificent chariots has increased sharply in recent decades. They have all appeared either in grave finds or in a context where they have entered complex burial rituals.

One such find is the Trompgård find from Bjergby, Northwest-Vendsyssel. The Trompgård find site was heavily damaged by recent cultivation, yet a pattern emerged where the deceased individual had been cremated and interred in one pit, while the burnt wagon was buried in a nearby pit. And at these two facilities, the ashes from the cremation were deposited in an independent feature. These ash burials are a phenomenon that can be found at other burials in which prestigious wagons are included, Hedegård and Kraghede. The phenomenon is strongly reminiscent of the concept of Bustum. Likewise, there is another characteristic that the burials were carried out in settlements, and suggesting these settlements were burnt down as an element of the burial ritual.

7 ASSEMBLAGES OF POWER: LATER PREHISTORIC AND EARLY ROMAN WHEELED VEHICLE DEPOSITS IN BRITAIN

Giles, Melanie (University of Manchester) - Adams, Sophia (The British Museum) - Moore, Tom (University of Durham)

Chariots and wagons from the middle Iron Age-early Roman era provide the opportunity to explore the concept of an archaeological assemblage through composite, crafted vehicles which spill beyond their materials; harnessing the skills of human and equine participants with wood, metal and hide components, alongside captivating Celtic art affects... producing intimidating displays of power. In this paper, we present a range of recent discoveries alongside the re-analysis of old finds, encompassing both complete chariot burials, hoard components and vehicle deposits. We will present select osteobiographies and object histories of some vehicles, charioteers and their ponies, but we also pay attention to the performative spectacle of vehicle deposition. Recent metal detectorist discoveries have expanded the repertoire of pony gear associated with chariotry in Britain. Our case studies will range from the middle Iron Age to the first century CE, considering both the 'hey day' of chariot burials in Britain and the role of both chariot and wagon as symbols of indigenous authority at the time of the Roman Conquest.

934 SACRED LANDSCAPES IN CONTEXT: CREATION, DEVELOPMENT, AND CONCEPTUALISATION

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Zapelloni Pavia, Arianna (Charles University Prague) - Comes-Trinidad, Emilie (Laboratoire ArAr - Maison de l'Orient et de la Méditerranée (Lyon, France)) - Mazzilli, Francesca (Royal Holloway University of London; Universität Münster) - Terrier, Aurelie (EPFL (Ecole Polytechnique Fédérale de Lausanne) - ENAC IA LAPIS) - von Bechtolsheim, Mirjam (Open University)

Session format: Regular session

This session aims to shed light on the notion of sacred landscapes on the one hand as part of ancient living realities and, on the other hand, as part of analytical categories in Antiquity and the Middle Ages. We would like to expand and deepen current conversations about the meaning(s) of sacred landscapes and the methodologies that scholars can use to investigate religiosity in the landscape with a broad chronological and geographical framework, considering the Mediterranean basin from Prehistory to the Middle Ages. Within this framework, the session will focus on four interrelated themes:

1. 'Creation' explores how and why sacred landscapes were created and recognised in different contexts in the ancient Mediterranean world, or whether they were unique to a geographical location or time.
2. 'Development' hones in on questions of continuity and change within sacred landscapes, exploring the impact of socio-cultural, political, and religious dynamics on their transformations and considering whether they remained constant amidst evolving human contexts.
3. 'Evolution' highlights the shift from the notion of the sacred landscape to a geography of the sacred brought about by the emergence of medieval societies and the new role played by religious establishments in constructing territory.
4. 'Conceptualization' addresses contemporary scholarly frameworks for defining 'sacred landscapes' and explores methodologies for discerning sacred meanings within ancient landscapes.

This session seeks to assemble diverse perspectives from different contexts to elucidate the complex and multifaceted nature of sacred landscapes in the Mediterranean basin throughout one and a half millennia and to generate discussion across disciplines beyond chronological and geographical boundaries. By establishing comparative frameworks, the session will showcase a range of research questions and methodologies that can enhance our comprehension of sacred landscapes.

ABSTRACTS

1 SACRED LANDSCAPE IN ANCIENT EGYPT: ROYAL IDEOLOGY, SOCIETY AND MODERN FRAMEWORKS

Chapon, Linda (Équipe Égypte Nilotique et Méditerranéenne (ASM - UMR 5140) University Paul-Valéry Montpellier 3, France)

In Ancient Egypt, natural landscapes and man-made monuments were intrinsically linked to create a sacred landscape imbued with religious and ideological concepts. Well explored is the Theban landscape (Luxor), whose east-west orientation governed monuments and ritual processions and which undoubtedly impacted ancient Egyptians' living

realities. This area had particular natural features, such as the natural pyramid, that influenced the development of concepts surrounding the landscape and how it was shaped to integrate monuments and rituals, including processional avenues. In particular, temples were multifocal, powerful centres encompassing religious, cosmic, ideological, political and economic aspects. However, monumental architecture and ritual landscapes also embody the supreme function of the king as the provider for the gods. Though exceptional, mainly thanks to monumental sources from the area, the case of Thebes is not unique. It was somehow a recreation of an inherited/reproduced sacred and conceptual landscape for dynastic purposes in the Middle Kingdom (c. 2030-1650 BC) and then again in the New Kingdom (c. 1539-1075 BC). This paper aims to discuss in what way royal ideology and elites, on the one hand, and relationships with the nature of the population in general, on the other hand, were at the heart of the (re)creation of sacred landscapes. Hence, this would allow an approach to how kingship using monuments and rituals was embodied in the sacred landscape and how society integrated and perceived these realities. When exploring these issues, it becomes necessary to reflect on the current frameworks and parameters we use to identify and understand sacred landscapes in Ancient Egypt.

2 TROJAN WANDERERS BETWEEN EAST AND WEST: APPROACHING SACRED LANDSCAPES IN NORTHERN EPIRUS

D'Ambola, Francesca (University of Rome - La Sapienza)

In Epirus the diffusion of narratives connected to the Trojan cycle is mainly documented by written sources. The toponymy also indicates their relevance for Epirote identity and collective memory, especially in the region of Chaonia. Within this cultural landscape, symbolic meaning could have been embedded within natural landscapes and some sites could have been chosen as places of worship.

The paper aims to analyse these narratives, embraced by Chaonian elites since at least the 5th century BCE, and their manipulation over the centuries as a potential contributing factor to the importation of cults and deities connected to the Trojan cycle. Written sources will be related to archaeological evidence, geographical features and iconographic data. From a diachronic perspective, these data will be connected to the broader socio-cultural and political context, with a particular focus on the Hellenistic and Augustan periods, when some Chaonian communities had a privileged position in the dialogue with Rome during the Macedonian Wars and Augustan colonisation.

These traditions show how the Trojan myths were used in the redefinition of sacred landscapes, by acting on local toponymy and monuments. A diachronic view allows us to investigate how landscapes were transformed to better suit new political or social needs, for example, to gain prestige through common ancestors or to facilitate diplomatic relations.

The analysis will hopefully underline the importance of sacred landscapes as a tool for individuals and groups to create a shared identity and to demonstrate their status by adopting mythological narratives and by spreading cults and religious imagery. Lastly, the study of sacred landscapes could enhance the comprehension of the changing political, cultural and social dynamics of the territory.

3 DIVINE PEAKS. MOUNTAINS AS SACRED LANDSCAPES IN ANTIQUITY

Marti, Cynthia (Philipps-Universität Marburg)

This paper aims to explore the sacredness of remote mountainous landscapes in the Mediterranean, with a special focus on Attica and the Peloponnese during antiquity, from the Geometric to the Hellenistic era. Since large parts of Greece consist of mountainous regions, mountains did not only have an economic and social relevance, but are also places where sanctuaries were located, making them into sacred landscapes and places of ritual practices of ancient communities.

The exploration of mountains as sacred spaces prompts the questions about the human-environment interactions in these remote areas at the margin of the polis. In these sanctuaries, both the natural features such as altitude, visibility or vegetation as well as built architecture like temples, altars or temenos play an important role in creating a sacred atmosphere and offer insights into the ways in which ancient communities engaged with their environment. Moreover, mountains also play an important role in ancient myths and, in addition to their significance as places frequented by humans, making them into imaginary landscapes inhabited by deities and mystical creatures.

In summary, this paper aims to contribute to a comprehensive understanding of mountains as sacred landscapes, exploring the interconnections between mountainous regions, cult architecture and practices in peripheral areas. Through interdisciplinary exploration using both archaeological and textual sources, I aim to discuss the economic, social and religious dimensions of sanctuaries in mountainous regions.

4 **SENSING ILLUMINATED OLYMPOS OVER TIME AND SPACE, ALONG WITH ITS TRANSFORMED RELIGIOUS ASPECTS IN HOMER**

Saito, Yukiko (University of Liverpool, UK; Osaka University, Japan)

This paper attempts to explore how viewing Olympos could be recognised or perceived, and transformed over time and space, primarily focusing on the Homeric scenery, providing new insights on how to visualize the ancient vistas as a sensory experience, through colour/light-related epistemological investigation.

Olympos appears ubiquitously in Homer and its varicoloured landscape and brightness have been pictured since antiquity. Its embellishments are various, such as *ἀγάννιφος*, 'snow-capped,' (Il. 1. 420, 18. 186, etc.), *μακρός*, 'tall,' 'lofty' (Il. 1. 403, 2. 48, etc.), *αἰπύς*, 'steep,' (Il. 5. 367, 5. 868, etc.), and so on. At Od. 6. 41-45, Athene with *γλαυκῶπις* goes to Olympos, which is described as standing firmly, unaffected by anything whatsoever – winds (*ἄνεμος*), rains (*ὄμβρος*), or snow (*χιών*) – and the shining light spreads over; *λευκή δ' ἐπιδέδρομεν αἴγλη*. The expression *ἀπ' αἰγλήεντος Ὀλύμπου*, 'from bright Olympos,' occurs three times (Il. 1. 532, 13. 243, Od. 20. 103). Zeus as *αὐτός Ὀλύμπιος*, 'the Olympian himself,' also sends forth *φῶς* (light) as a portent (Il. 2. 308-310). The brightness played a significant part in conveying the religious sense to viewers, and still does today.

Examining the sceneries where *Ὀλυμπος* is portrayed, I elucidate how bright-hue-related aspects of Olympos influenced the ancients' perceptions, while investigating mutual connections of those *Ὀλυμπος*-attached spaces, as well as metaphorical, transformed representations that the Olympos vista indicates. Accordingly, its quintessential effect upon human minds, the multi-faced divine sense of awe that its radiance implies in a space-time continuum is extracted. My objective is to untangle the woven interconnections of colour/light and divinity within the landscapes of Olympos as the poet's aesthetical design, like an orchestration inside the story and beyond, producing not only dazzling visual effects but also the immeasurable sacredness of Olympos that continues to illuminate us all.

5 **WORSHIPPING SILVANUS AT WORK: APPROACHING ROMAN PROFESSIONAL ECOLOGIES AS SACRED LANDSCAPES QUANTITATIVELY**

Glomb, Tomas (Masaryk University)

This paper proposes a hypothesis that the worship of specific deities played a significant role in mitigating uncertainties and reducing risks associated with working environments in the Roman Empire. For example, hunters were tied to animal habitats, miners to mineral deposits, and soldiers to tensions at political borders, and any abrupt change or disbalance in those environments constituted an enormous threat to the livelihood of those professionals. Through appropriate worship, people of profession had the means of transforming their working environment into a balanced sacred landscape protected by a deity. This paper tests these assumptions through a case study focusing on exploring quantitatively the relationships between working environments and the worship of Silvanus, the Roman god of woods, uncultivated lands, fields, and estates. Methodologically, the paper presents formal analyses of geocoded Latin epigraphic evidence as a proxy for both professional activities and situated worship of Silvanus in the Roman Empire. By using spatial proximity analysis and machine-learning predictive models, the paper explores whether it is possible to retrospectively predict a portion of the known places of worship of Silvanus by geocoded locations of professional ecologies dependent on forest conditions. As a result, the paper opens the broader question of to what extent people of profession contributed to the known spatiotemporal distribution of cults in the Roman Empire by transforming their places of work into sacred landscapes.

6 **RESILIENCE AND CHANGE IN THE (RE)CREATION OF SACRED LANDSCAPES IN THE GRAECO-ROMAN CITY OF ISTROS (BLACK SEA)**

Litu, Alexandra (University of Bucharest) - Achim, Irina (Vasile Parvan Institute of Archaeology (Romania))

The city of Istros lies on the Western shore of the Black Sea having been founded by Ionian colonists from Miletus in the 7thc. BC; it entered Roman administration under Augustus and endured until the beginning of the 7thc. AD. It was excavated since the beginning of the 20thc. and during this time a number of sacred structures of Greek age (from Archaic to Hellenistic) and six paleochristian basilicas (four of them are *intra muros* and in close proximity) were identified and researched up to now while the evidence for the Early Roman Age is more scarce. The landscape of the city seems to have been substantially reshaped over time with sacred structures having been built and abandoned. Only one area in the city (in the limits of what has been excavated) apparently shows persistent resilience in its sacred character from the 6thc. BC to the 6thc. AD under various guises - Archaic and Early Roman Age bothroi placed in part immediately underneath a 6thc. Christian basilica with crypt. Offerings found in these bothroi raise the possibility of them being connected to the main deity of this Milesian colony, Apollon Ietros; epigraphic evidence shows that deities evoking Ionian identity were honored deep into the Roman age. Other Greek cult buildings and rock-cut pits with significant finds have been excavated in other parts of the city, but in no demonstrable precedence to later cult structures. This configuration also raises the issue of the (re)creation and limits of sacred landscapes, and of the fluctuation of areas given symbolic weight in a city - obviously, a network created by rock-cut pits differs from a landscape created by Christian basilicas which is expressed not only by their monumentality, but also through their demonstrable connectedness through a system of streets allowing for sacred processions.

7 **CREATION AND EVOLUTION OF A SACRED LANDSCAPE: THE SITE OF SANTA MARTA (CINIGIANO, GR), MIDDLE OMBRONE VALLEY**

Baleani, Benedetta (University at Buffalo - SUNY) - Mandorlo, Alessia (Università del Salento) - Cirigliano, Giuseppe (IMT Lucca) - Massari, Alberto (Università di Trento) - Golia, Vincenzo (Università di Siena) - Felici, Cristina (Università di Siena) - Cirillo, Marianna (ATS - Archaeolandscapes Tech&Survey) - Ugolini, Federico (Università di Siena) - Vaccaro, Emanuele (Università di Trento) - Campana, Stefano (Università di Siena)

Starting from Late Antiquity, the Christianization of rural areas caused several deep transformations of sacred landscapes. In recent decades, this phenomenon in Southern Tuscany has been a polarizing area of study. Of particular interest are religious structures that often overlap pre-existing centers, and become new hubs throughout the end of the Roman Empire and Middle Ages. This trajectory of change reflects the development of local communities and their mutable relationship with the territory. The archaeological site of Santa Marta, discovered in 2007, provides further insight into this phenomenon. Recent excavations, beginning in 2012 and still ongoing, highlight the site's pivotal role in the middle of the Ombrone Valley over many centuries (2nd - 17th cent. CE). Santa Marta, situated along the ancient route that connected the Tyrrhenian coast with the inlands, and the Adriatic Sea, represents an opportunity to document the transformation of an extended Roman *mansio* within a Christian religious space. Stratigraphic investigations have illuminated a 2nd century complex, comprising residential areas, and both a private and a public *balneum*. Despite these structures falling into disuse within the first half of the 6th cent. CE, there are some sporadic traces of activity datable to the following century. From the Early Middle Ages (9th cent. CE), Santa Marta boasted a large church characterized by various construction phases, some of which may precede the 9th century. The centrality of Santa Marta to the local communities is attested by the presence of an extended cemetery, used until the 17th century. Numerous burials, associated with different construction phases of the church, are located both inside and outside the structure. The continuous use of the site seems to derive from the role of the route, which justified the establishment of a *mansio* and enabled the evangelization of the internal rural region.

8 **BRINDISI RURAL CHURCHES AS A MEDIUM OF EVANGELISATION AND TERRITORIAL CONTROL (5TH-8TH CENTURY)**

Zocco, Simone (Sapienza University of Rome)

In the Brindisi countryside (Apulia, Italy), several churches, which can be dated to Late Antiquity and Early Middle Ages, were built near road routes or crossroads.

During the 5th-6th century CE, the road system was the basis of the evangelisation process of the local rural societies: the present intervention aims to understand the dynamics of Christianization, the context in which the first churches were founded, and the relationship between the churches mentioned above and the late antique settlement structure.

In the 7th-8th century, after the Lombard invasion, some of these buildings underwent a series of renovations following precise architectural schemes, while new Christian temples were founded. The resulting ecclesiastical organisation, therefore, appears different compared to previous centuries: the suggested hypothesis is that the churches played a distinct role in this phase, being more focused on the control/defence of the territory in an area of possible friction between Lombards and Byzantines. Through the comparison with different sources, the present contribution will attempt to propose a possible evolutionary landscape model from the perspective of sacred buildings, specifically observing their function within local settlement and social systems.

9 **ENGENDERING RURAL SYMBIOSIS: VILLAS AND CULT IN THE LATE ROMAN PERIOD**

Beckmann, Sarah (University of California, Los Angeles)

The last century has brought to light many late antique villas, which scholars mark as evidence for a late antique "villa boom." Much has been made of widespread architectural and decoration renovations (mid-3rd – early 5th c. CE), and scholars have traditionally explored the degree to which such renovations reinforced social hierarchies. Indeed, late antique villa are frequently conceived as evidence for a burgeoning elite class, for peer polity competition across *domini*, and for increasingly fraught relations across wealthy landowners and their poor clients. My paper challenges these assumptions, which are rooted in literary sources and medieval-oriented teleologies. The relationship between late antique villas and the *rus*, I alternatively argue, was more symbiotic than we have previously admitted.

I make this case using cult structures created *ex novo* in the late antique period at villas in southwestern France and the Iberian Peninsula: mausolea, ritual "pagan" sites, and paleo-Christian structures. These too have been interpreted

primarily as status objects, which obfuscates their role in engendering community in the late Roman *rus*. The quasi-public nature of many of these cult sites, I argue, can and should be treated as a window onto the interdependencies linking villas with the rural populations living on and around them. Rural groups were apparently receptive to estate cult offerings; they made use of them often, as proven by dedications but also by habitation and burial in nearby locales. We may therefore look to villa cult sites to reconstruct not only the sacred practices animating the late Roman *rus*, but also the symbiotic relationships linking subaltern rural populations to villas and the surrounding land, sometimes long after the cessation of elite habitation. So-called private cult sites, I argue, are ultimately poised to bring greater attention to the shape and character of the provincial countryside in late antiquity.

10 REPRESENTATION OF THE "SACRED LANDSCAPE" OF THE FIRST CHRISTIANS IN RURAL PROVENCE IN LATE ANTIQUITY: ARCHAEOLOGICAL APPROACHES

Martinez-Honorin, Fabienne (Archéologie)

In the current state of knowledge, Provence is one of the first centers of Christianity in Gaul during Late Antiquity. The beginnings of this ecclesial institution will gradually take root and become a lasting institution in the Middle Ages. The archaeological discoveries of recent decades encourage us to question this phenomenon and to understand how it spread beyond the cities where it was first established. This region is the ideal study setting to understand the process of Christianization in a space marked by the diversity of its landscape and its relief.

This communication proposes to define what is meant by "sacred landscape" at a period which saw the transformation of the Roman world take place in southern Gaul.

The study will focus on the identification of markers of the new religion through the archaeological evidence recorded, to locate them to have a spatial representation of the places of these cultic practices. Thus, the typological and topographical study of these attestations, in particular of primitive churches, evolving within human occupations in particular habitats, will be able to highlight an idea of the construction of the "sacred Christian landscape" of this period operated by the actors of this diffusion that are the bishops and the Roman aristocrats.

This communication is also an opportunity to present certain spatial analysis methods used to address these questions. They consist of using computer software such as QGIS for the calculations of distance-costs between the different geolocated entities that can consider the slopes of the relief, and for the visibility analysis which boils down to evaluating "the visible space" from a specific location.

11 CLIMBING THE STAIRS OF THE DIVINE ASCENT IN DESERT LANDSCAPES

Pestarino, Beatrice (University of Liverpool) - Lehnig, Sina (University of Haifa; Minerva Stiftung für die Forschung, Max-Planck-Gesellschaft)

Historically, geographical remoteness, extreme climate, epidemics, and conflicts have precipitated demographic shifts, economic decline, and isolation of settlements, particularly in deserts and remote landscapes. Within this context, research reveals two significant roles of religion: spirituality intensifies during crises, and new places of worship emerge in infrastructural and economically weak areas. This study focuses on examining the strategic establishment of religious hubs along the Negev-Sinai route, aiming to combat marginalization and foster economic development.

Revitalizing religious tourism in economically disadvantaged regions can enhance local infrastructure and stimulate business growth. Archaeological examples are the development of monasteries and xenodocheia in the Negev during the 6th century AD and in the Sinai with St. Catherine Monastery. Similar trends persist, as seen in the economic growth of Lourdes, France, driven by Christian religious tourism since the late 19th century.

This paper will chronologically compare settlement patterns and economic models in the Negev desert. During the Roman and Late Antique period, agriculture, particularly wine production, was pivotal for the economy, enabling settlements to expand and invest in infrastructure. However, the decline in wine exports after the mid-6th century AD due to decadal climatic changes and the Justinian Plague led to demographic alterations. Thus, we will explore the economic role of pilgrim accommodations, monasteries, and places of worship amid diminishing agricultural prosperity.

The second part will examine pilgrims' graffiti, showcasing increased attendance and the establishment of new facilities related to religious journeys. Using a cognitive-semiotic approach, it will focus on graffiti clusters at sacred places, exploring the cognitive aspects behind their writing. Newly discovered graffiti at the Monastery of Saint Catherine in Sinai and Mitzpe Shivta in the Negev will be analyzed to understand their role in confirming pilgrims' religious experience and increasing attendance, leading to further graffiti creation in a graffiti mania.

936 TOWARDS THE LIVING CITY THROUGH TIME: INTERDISCIPLINARY APPROACHES TO ANCIENT CIVILISATIONS OF CENTRAL ITALY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Stoddart, Simon (University of Cambridge; University of Kiel) - Bagnasco, Giovanna (University of Milan) - Carosi, Simona (Soprintendenza Archeologia Belle Arti e Paesaggio per la provincia di Viterbo e per l'Etruria meridionale) - Franceschini, Mariachiara (Albert-Ludwigs-Universität Freiburg) - Pasiëka, Paul (Johannes Gutenberg-Universität Mainz)

Session format: Regular session

The Etruscan cities of Tarquinia and Vulci have both been examined over a long period of time exhibiting phases of foundation, resilience, development and decline. Science@Tarquinia is an ongoing interdisciplinary collaboration between the University of Milan and the University of Cambridge, alongside eleven other institutions, where humanistic and scientific methods have been brought together in one unified approach, drawing on geoarchaeology, human remains, animal bones, plant remains, aDNA and isotopes. This work has enhanced our knowledge of ritual process, complemented by the study of rural settlement, site formation processes, ancestry, mobility, health, diet and violence. New research projects in Vulci have reconsidered different phases of intense building activities, (re)shaping of the urban and social structure, or monumentalization of public buildings that alternate with contraction of the settlement area, (partial) abandonment, and crisis mostly related to changing geopolitical and social conditions. Different types of historical and archaeological resilience and persistence have been highlighted by interdisciplinary contributions including archaeometry, prosopography, zooarchaeology and geophysics.

The session aims to address a basic question: how can we describe and model long-term change and transformation in Central Italy by integrating different datasets, structural and biological, both in the cities and their necropolises and in their relation to the wider Mediterranean? How can we model social change with archaeological data?

By combining the two complementary approaches to these two cities we have perhaps for the first time, a more comprehensive understanding of the key life forces underlying the biography of two of the most ancient European cities. We invite other projects to make presentations, alongside our own, that contribute to this interdisciplinary, comparative road towards a deeper understanding of the life of Italy's ancient civilisations.

ABSTRACTS

1 "TARQUINIA PROJECT": SCALES OF OBSERVATION FOR EXPERIMENTAL PURPOSES IN HISTORICAL AND CULTURAL RECONSTRUCTION

Bagnasco Gianni, Giovanna (Università degli Studi di Milano)

This paper focuses on Tarquinia, one of the foremost Etruscan cities at the roots of Europe, as a model for breakthrough research on silent civilisations, lacking direct historical written sources. The project aims at reconstructing cultural history from inside the materiality of ruins, sherds, and fragmentary epigraphic documentation and stimulating the potentialities of every single Archaeology oriented discipline towards a multidisciplinary framework. This kind of observation reveals factors previously unexpected and supports identification of invisible syntactic links connecting material aspects left by ancient communities. However, carrying out global archaeological research at a small, medium, large scale implies the problem of the experimental use of the quality and quantity of data at the intersection between the field of micro- and macro-history. Case studies are selected here to discuss this methodology, from data analysis to research of recurring associations between different categories of evidence. This will, in the first instance, draw on reliable micro-historical reconstructions, then connect to macro-history, by tapping into the overall cultural history of the settlement.

2 THE NEW CITYSCAPE OF VULCI THROUGH TIME: INTERDISCIPLINARY RESEARCH INTO THE ETRUSCAN AND ROMAN CITY

Pasiëka, Paul (Johannes Gutenberg-Universität Mainz) - Franceschini, Mariachiara (Albert-Ludwigs-Universität Freiburg)

The Vulci Cityscape project aims to clarify the settlement strategies and urban structures of the northern part of the ancient city of Vulci using a multiscale approach and an interdisciplinary methodology. A pivotal question concerns the dialectical interrelation between urban spaces with different political, religious, economic, or residential functions. By combining non-invasive geophysical prospection, excavations, and different archaeometric analyses, we aim to reassess and reconstruct a holistic panorama of the cityscape of Etruscan and Roman Vulci. In our paper, we will present the results of the first four years of research, focussing in particular on the geophysical prospections carried

out in 2020 in the northern part of the city and on the ongoing excavation of a Late Archaic temple we discovered immediately next to the well-known Tempio Grande. The area of the temple offers a rich and complex stratigraphy, which seems to range from the Late Bronze Age/Early Iron Age up to the second century AD, comprising phases of monumentalization, re-use, and abandonment. This multiscale approach, which takes into account both the spatial and temporal levels, thus provides a glimpse into the chequered history of Vulci as a dynamic living city through time.

3 **VULCI E I SUOI ABITANTI ATTRAVERSO I SECOLI. LA STRUTTURAZIONE SOCIALE, CULTURALE ED ECONOMICA ATTRAVERSO LO STUDIO DELLE NECROPOLI**

Carosi, Simona (MIC) - Casi, Carlo (Fondazione Vulci) - Regoli, Carlo (Fondazione Vulci)

Di recente, gli scavi nella necropoli settentrionale di Vulci nel settore centrale dell'Osteria e sul Poggio Mengarelli, hanno permesso di avere a disposizione una grande quantità di materiali e, anche attraverso la bioarcheologia e nonostante le alterazioni causate da azioni clandestine, di conoscere associazioni di oggetti di corredo ceramico e personali, tali da consentire una prima ricostruzione della storia della città. Attraverso inoltre l'interpretazione degli usi e rituali che si leggono sul terreno, attraverso i rapporti con elementi allogeni confluiti nei corredi e grazie allo studio delle modalità con cui questi ultimi dialogano con elementi di tradizione locale, oggi è possibile raccontare molto di Vulci e dei suoi abitanti, a partire dalla formazione e nei primi secoli della sua storia. Partendo dalle associazioni e dissociazioni rispetto a schemi precostituiti, si possono trarre informazioni sulla circolazione di modelli e mode, sull'apprezzamento di particolari prodotti e anche come determinate scelte possono riflettersi sulla topografia dei luoghi.

4 **A NEW CULT COMPLEX FROM THE URBAN PLATEAU AT VULCI**

Sabatini, Serena (University of Gothenburg) - Selsvold, Irene (University of Leicester) - Gustavsson, Anna (University of Gothenburg)

This paper discusses preliminary results from the archaeological excavations (2022-2024) at Vulci carried out by the University of Gothenburg, within the framework of the project Understanding Urban Identity (UUI). The project aims to contribute to the understanding of the rise and development of the proto-urban and urban centers of Mid-Tyrrhenian Italy. Our excavation is located on the eastern edge of the urban plateau, an area that according to earlier geophysical prospections was only moderately urbanized. So far, the excavation has revealed three unusual circular stone features in connection to a quadrangular building with stone wall foundation. There is clear evidence of sacrificial activity across the entire area, which suggests we have uncovered the remains of a cult complex in use during approximately the second and the third quarter of the first millennium BCE. The complex seems to have fallen out of use after the Roman conquest of Vulci; however, the absence of material from the Roman period might be due to post-depositional events. Plough-marks on the surface of one of the stone features may indicate that post-Etruscan archaeological layers have been removed by modern agricultural activity. This unexpected discovery highlights the complexity of the urban organization at Vulci. The evidence suggests that beside domestic units, which are unfortunately still poorly documented, the urban plan included various types of religious installations and complexes. The evidence from the UUI excavations show that besides monumental temples, the local population, or maybe specific groups/kins, could practice religious and ritual activities also in decentered sanctuaries of less monumental nature. Through an interdisciplinary approach, the UUI team is currently working to understand the nature of the cult practiced in the newly discovered complex to situate it in the wider societal context at Vulci and beyond. The preliminary results from our analyses will be also discussed.

5 **INTERDISCIPLINARY SCIENTIFIC APPROACHES TO THE ANCIENT CIVILISATIONS OF CENTRAL ITALY: LESSONS FROM SCIENCE@TARQUINIA**

Stoddart, Simon (University of Cambridge) - Cattaneo, Cristina (University of Milan) - Esposito, Carmen (University of Bologna) - Madgwick, Richard (University of Cardiff) - McLaughlin, Rowan (University of Maynooth) - Marras, Gianbattista (University of Cambridge) - Breslin, Emily (Trinity College, Dublin) - Prato, Ornella (University College, London) - Schmidt, Frijda (University of Cambridge) - Marzullo, Matilde (University of Milan)

This paper will explore the state of the art of interdisciplinary scientific approaches to the study of the pre-Roman living city. It will draw on the experience of Science@Tarquinia, an initiative put in play by Giovanna Bagnasco and Simon Stoddart, drawing not only on the expertise of their two universities (Milan and Cambridge), but also on a range of other European and North American institutions. The work has focused on site formation processes (as discussed by a separate paper in the session), the systematic collection of animal bones and seeds employing enhanced sampling techniques and a specially commissioned flotation machine, and multi-faceted study of six inhumations supported by bioarchaeology (osteobiographies, radiocarbon dating, cultural dating, isotopes and ancient DNA). The paper will seek to offer routes to future research as well as reporting on current achievements and make comparisons inter-regionally with the rest of Central Italy where the data are already extant. At a conceptual level, the paper will dwell on the

integration of qualitative evidence from Etruscan archaeology with quantitative evidence in the presence of sufficient sample size from scientific archaeology.

6 **RECONSTRUCTING ETRUSCAN DIET AND MOBILITY AT THE SAN GIULIANO NECROPOLIS, ITALY** **Grimes, Vaughan (Memorial University of Newfoundland) - Tidman, Hope (Memorial University of Newfoundland) - Fulton, Deirdre (Baylor University) - Southon, John (University of California, Irvine) - Zori, Colleen (Baylor University) - Zori, Davide (Baylor University)**

Much of our evidence for Etruscan culture and society is dominated by historical narratives and archaeological investigations focused on large, major habitation and necropolises (e.g., Tarquinia and Veii), while there is a relative dearth of information about minor Etruscan centers and how lived experiences, including dietary patterns and mobility within and beyond Etruria, compare between major and minor centers. The Etruscan necropolis at San Giuliano, Lazio, Italy, represents one such minor center and contains artifacts and skeletal remains associated with over 500 rock-cut tombs found at this site. Since 2016 this area has been the subject of surveys, excavations, and multi-disciplinary study by the San Giuliano Archaeological Research Project (SGARP). Here we report on progress with developing a site radiocarbon chronological framework and application of isotope-based methods utilizing carbon, nitrogen, oxygen, and strontium in the reconstruction of a regional isotope baseline for mobility studies, as well as data related to diet and mobility reconstruction obtained directly from the remains of Etruscan individuals. Our isotope results will be discussed in context with other archaeological evidence from the SGARP and available isotope data from neighbouring major centers to offer a broader perspective on Etruscan lifeways.

7 **SITE FORMATION PROCESSES WITH SPECIAL ATTENTION TO THE STUDY OF CONCOTTO**

Carter, Constanza (University of Cambridge) - Marras, Gianbattista (University of Cambridge) - Zaggia, Caterina (University of Cambridge) - Sheldrake, Molly (University of Cambridge) - Schmidt, Frijda (University of Cambridge) - Marzullo, Matilde (University of Milan) - Stoddart, Simon (University of Cambridge) - French, Charles (University of Cambridge)

The zona monumentale of Tarquinia presents one of the deepest and longest sequences within any Etruscan city, covering the period from the Late Bronze Age to the Roman period. For any urban context, it is crucial to establish the site formation processes that underly such an extensive sequence. As in any archaeological context, urban stratigraphies are made of depositional units bounded by unconformities. Establishing periods of more or less intensive use, and even abandonment, is therefore intrinsically challenging. Following a geoarchaeological approach, we aim to shed valuable insight onto the site history of Tarquinia, establishing the details of deposition, erosion, and exposure of the sediments which have deliberately or unintentionally accumulated across areas of this monumental site. In particular, the ubiquitous solid deposits found at Tarquinia are generically defined as concotto. Often subjected to heat, this can be derived from collapsed mudbrick, daub, kilns, furnaces and other less solid building materials and even refuse. However, the distribution, composition, and origin of concotto elements within the context of Tarquinian stratigraphy, remain poorly understood. The paper will report on the geoarchaeological analyses of the concotto to decipher its origin and purpose in the broader context of the stratigraphy of the site which has been studied for several years, using techniques such as micromorphology, SEM and FTIR. On this basis, an interpretation will be given of the activities on the site in a manner that is complementary to standard archaeological work.

8 **TARQUINIA PROJECT: POTTERY AS A MULTI-LAYERED INFORMATIVE RESOURCE. PRODUCTION, USAGE, INTERDISCIPLINARITY**

Teseo, Daniele (Tarquinia Project - Università degli Studi di Milano) - Marzullo, Matilde (Tarquinia Project - Università degli Studi di Milano) - Bezzolato, Alice (Tarquinia Project - Università degli Studi di Milano) - Micheletti, Sara (Tarquinia Project - Università degli Studi di Milano) - Rossi, Eleonora (Tarquinia Project - Università degli Studi di Milano)

Since its beginning, in 1982, "Tarquinia Project" has implemented a method aimed at innovating the traditional way of conducting archaeological research. The synergistic interaction with other scientific sectors has made it possible to take full advantage of the documentary potential of artifacts and contexts pertaining to the 'monumental complex' and the Ara della Regina sanctuary at Tarquinia. The present contribution intends to offer an overview of the most recent results acquired within fruitful partnerships with the Departments of Inorganic Chemistry and Geology at University of Milan: through an extensive sampling, spanning from impasto to fine pottery, this interdisciplinary approach has allowed us to define the microscopic peculiarities of Tarquinia ceramics and to understand better their full range of usage. The presentation also touches upon the collaboration with the Department of Informatics as part of a project of national interest (PRIN 2022): in particular, "Tarquinia Project" is updating its excavation database and is developing a user-friendly search system to analyze data from various angles and to automate the generation of ArchMatrix based on stratigraphic relationships.

9 RAW MATERIALS, MANUFACTURING TECHNIQUES AND CULTURAL CONNECTIONS IN IRON AGE AND EARLY ORIENTALIZING TARQUINIA

Cerasuolo, Orlando (Archaeological Park of Cerveteri and Tarquinia - PACT) - Bordo, Francesco (Archaeological Park of Cerveteri and Tarquinia - PACT)

The paper aims to present the main aspects of an ongoing research project dedicated to a set of Etruscan artifacts held in the National Archaeological Museum of Tarquinia. The artifacts belong to funerary contexts dating from the beginning of the Early Iron Age to the mid 7th century BCE, that is the period of greater long-range connection between Etruscan society and the wider Mediterranean and European world.

With an interdisciplinary and diachronic approach, the project addresses issues related to provenance and procurement of raw materials; dynamics and interaction between local development and external influence in manufacturing techniques; use and function of exotic and uncommon material in funerary context; social and economic change.

Tarquinia shows the earliest specimen of the granulation technique in Western goldsmithing, but how to frame the specific technique? How was it acquired by the Etruscans? And where was the actual gold coming from? Were the different glass products imported by the Phoenicians, made in Veneto or genuinely local? Silver and lead may have come from Spain; amber from the Baltic; ivory from Egypt, or rather from the eastern Mediterranean. Can we define the time frame of the arrival of exotic material, crafting techniques and craftsmen? All these questions and hypotheses demand a modern inquiry.

The focus of the project lies on exotic and uncommon materials (mainly gold, silver, glass, amber and ivory) on which archaeological study and modern scientific non-destructive analyses (XRF, Raman, DRIFTS, FTIR, HR Digital Microscopy, etc.) are performed for the first time.

Finally, these types of analyses could provide additional insights on the initial stages of the Etruscan Tarquinia, effectively integrating the new information lead by the Science@Tarquinia project and the systematic characterization of specialized handicraft in Pre-Roman Italy (i.e., Bronze Age glass in Northern Italy).

10 COMPARING CENTRAL PLACES: SETTLEMENT AND LAND USE IN ETRURIA

Zeviani, Camilla (University of Cambridge; Christian-Albrechts-Universität zu Kiel)

Etruscan studies have reached great heights in the accumulation of cultural data. This is particularly true for landscape studies: the second half of the 20th century has been fruitful as it saw a growth in survey projects exploring ancient central Italian landscapes. Survey data have indeed a lot of potential for the study of urbanisation, facilitating the quantification of different patterns to draw comparisons of control strategies enacted by different power places.

This paper focuses on the analysis of rural settlement data between the 7th and the 4th centuries BC, when urbanised institutions and lifestyles consolidated. Four case studies are selected and discussed, representing different types of territorial control: Tuscania, a mid-ranking centre tied to the city of Tarquinia; Chiusi and Cerveteri, both urban central places, with different developments and ways to administer territories; finally, the palatial site of Murlo, in open conflict with urbanised realities.

Site trends, proxies of population change, locational analysis and agricultural suitability, using computational techniques (GIS), reveal different rural infrastructures sustaining Etruscan central places. I will show how, despite responding to similar stimuli, these centres adopted different strategies to control their lands and benefit from them.

Relatively new social anthropological studies on state formation and urbanisation are applied: more segmented, irregular processes can better explain the variability defining Central Italian urbanisation and countryside organisation, as consequences of dealing with the challenges of rapid settlement aggregation.

This approach combines therefore quantitative approaches and social anthropology theory, providing nuanced examinations of how structured Etruscan landscapes became, how they were exploited, who lived there, and how relationships with the central place were developed, as well as the different decisions and responses of the central places' leading families to such changes that transformed Etruria into an influential and competing player in the Mediterranean scene.

11 THE BLERA ARCHAEOLOGICAL PROJECT: INVESTIGATING ETRUSCAN URBANISM THROUGH MULTI-RESOLUTION ARCHAEOLOGY

Olsson, Hampus (Swedish Institute of Classical Studies in Rome; Lund University) - Landeschi, Giacomo (Lund University) - Küçükdemirci, Melda (Istanbul University - Cerrahpaşa; Lund University) - Derudas, Paola (Lund University)

The continuity of Etruscan cities and settlements into Roman, and up to our own days, is a hotly debated topic. The Etruscan town of Blera, located approximately 55 km northwest of Rome, was probably founded in the 8th century BC. Unlike many other ancient towns in its vicinity, Blera has never been abandoned and it has retained its ancient

name for more than 2,500 years, albeit in a somewhat corrupt form. Blera survived into the Roman period and gained the status of municipium after the Social War. The Petrolo plateau, located northwest of the medieval city centre, was the site of the Etruscan and later Roman town. The settlement was subsequently abandoned in favour of the adjacent smaller plateau where today Blera's Old town is located. The purpose of the project is to provide a deeper understanding of the structure and organisation of Etruscan smaller towns and how these were affected by the later Roman expansion across Italy. Furthermore, it is intended to map and define different settlement phases on the city plateau, from the Villanovan period to the Early Middle Ages. This will be carried out through a systematic investigation of the Petrolo plateau, where a recently developed theoretical and methodological approach, known as 'multi-resolution archaeology', will be introduced and applied to the study of urbanism in Etruscan small-size towns.

12 A VIEW FROM THE EAST: COMPARATIVE STUDIES OF RURAL SETTLEMENT FROM THE VALLEY OF GUBBIO

Negro, Marianna (University of Cambridge) - Whitehead, Nicholas (Independent Scholar) - Ceccarelli, Letizia (Politecnico di Milano) - Cocozza, Carlo (Max Planck Institute of Geoanthropology) - Fernandes, Ricardo (Max Planck Institute of Geoanthropology) - Teegen, Wolf-Rüdiger (LMU Munich) - Tilby, Emily (University of Cambridge) - Trentacoste, Angela (British School at Rome) - Halpin, Áine (Trinity College, Dublin) - Bradley, Dan (Trinity College, Dublin)

This paper contributes to the interdisciplinary examination of long-term change and transformation in Central Italy by focusing on the landscape organisation in the Gubbio Valley. Drawing from archaeological research spanning the 19th century to the present, the study delves into the evolution of rural settlements within the valley, revealing a nuanced interplay between urban, rural, and religious landscapes from the second millennium BC to the Roman era. The most recent research highlights the correlation between Umbrian sites and Roman landscape occupation, challenging traditional narratives of romanisation.

Furthermore, the paper discusses innovative methodologies, including the re-examination of ceramic materials and digitization of paper records, to elucidate the density of rural occupation over millennia. By integrating cutting-edge scientific techniques such as isotopic and aDNA analysis and presence of pathologies on the sampled teeth, alongside precise radiocarbon dating, we anticipate novel insights into the faunal deposits of Monte Ingino and Monte Ansciano. All this updates the 1994 publication.

This interdisciplinary approach not only enhances our understanding of the landscape dynamics in the Gubbio Valley but also contributes to the broader discourse on long-term societal change and resilience in Central Italy. Therefore, by presenting the study of the Gubbio valley alongside other projects, the paper aims to foster comparative analyses that deepen our comprehension of Italy's ancient civilisations.

938 THE ARCHAEOLOGY OF ANCIENT BORDERSCAPES: MULTIPLE APPROACHES, NEW PARADIGMS

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Gatto, Maria Carmela (Polish Academy of Sciences; University of Leicester) - Nicolini, Serena (Alma Mater Studiorum Università di Bologna) - Ferrario, Marco (University of Augsburg; Università di Trento)

Session format: Regular session

The session proposed solicits papers interrogating the concepts of geopolitical, socio-cultural, natural, symbolic, and spiritual boundaries in the ancient world. Often, even the most defined borders are fuzzier and more complex than they first appear. We propose to approach this complexity through the concept of "borderscapes": the political, cultural, physical, mental, intellectual, and/or spiritual geographies where boundaries are located and where the tangible and intangible practices of boundary-making and boundary-maintenance occur. "Borderscapes" emphasize how boundaries are actively shaped in specific places, though these places need not exist in the physical realm.

The discussion of geopolitical borderscapes will be a focus. From a methodological standpoint, the session taps into recent scholarship on frontier zone history, historiography, anthropology, and archaeo-ethnology from a multidisciplinary and comparative perspective. For too long, borderlands have been approached as spaces (physical and/or discursive) of imperial or state appropriation, violence, and exploitation or as pockets of resistance and defiance of said attempts at people and resource control. Moving forward from such a dichotomy, the session makes a case for reconceptualizing borderlands as spaces of transformation, affecting patterns of community building and state formation (or breakup) within and beyond the frontier itself. Recent scholarship, especially the Imperial Turn, has stressed entanglement, mediation, appropriation, and reassembling of material culture as defining features of borderlands and the processes contributing to creating, reshaping, and even causing their demises. They ought, therefore, to be understood and investigated as critical areas of innovation, capable of affecting both the space of the frontier itself and the wider world(s) entangled with them.

The spectrum for this session is intentionally broad since boundaries have taken so many different forms in the past, and all have changed dynamically over time and across space. Papers exploring ancient borderscapes from any theoretical or empirical perspective are welcome.

ABSTRACTS

1 THE MAKING OF AN ANCIENT EGYPTIAN BORDERSCAPE – THE FIRST NILE CATARACT REGION IN THE 4TH/3RD MILLENNIA BCE

Gatto, Maria Carmela (Institute of Mediterranean and Oriental Cultures Polish Academy of Sciences; University of Leicester)

The ancient Egyptian state, traditionally known as the earliest territorial polity of human history, developed in the Lower Nile region at the end of the 4th millennium BCE. Alongside the political transformations, the complex process of state formation instigated far-reaching and profound changes in the socio-economic structure of its territory. With the example of our modern nation-states and geopolitical borders in mind, we expect such changes to have especially marked its newly established borders. However, current scholarship has determined that the ancient Egyptian state did not function as our modern states do, and this, of course, has consequences on the nature of its borders. While many studies have discussed the ancient Egyptian borders in dynastic times, none has focused on understanding how they came into being. The BORDERSCAPE Project, established at the Institute of Mediterranean and Oriental Cultures of the Polish Academy of Sciences and funded by the Norway Grants and the National Science Centre of Poland, has taken up the challenge by focusing on the ancient Egyptian southern border with Nubia, geographically corresponding to the First Nile Cataract region. The presentation discusses the results of the recently completed project, focusing on detecting the time and nature of discontinuities in settlement patterns, land use and community structuring between the 4th and the 3rd millennium BCE.

2 NARRATIVES AND MATERIALITY OF STATE FORMATION AND BORDER-MAKING: A VIEW FROM THE HASMONEAN KINGDOM

Sabar, Roi (Boston University)

The emergence of the Hasmonean dynasty is well documented in the historical narratives of 1 Maccabees and Flavius Josephus. Centered in Judea, the Hasmoneans gained autonomy around the middle of the 2nd c. BCE, in the context of the fall of the Seleucid Empire. In the following decades the dynasty established a hereditary monarchy, and its rulers expanded the kingdom's territory, until it came to a sudden end with the Roman conquest of the Levant. Being geographically small-scale, and chronologically well-framed, the Hasmonean Kingdom offers a valuable case study for state formation processes.

In this paper I will examine the archaeological evidence (*vis-à-vis* the historical narratives) for the Hasmonean expansion and border-making in the Galilee – the northern region of the realm. Although clear and large-scale Hasmonean archaeological contexts are limited in the region, years of archaeological work produced substantial data on the materiality of the Hasmoneans. This data allows us to reconstruct a significant shift in the settlement dynamics. This trend reached a zenith in the time of King Alexander Yannai (104- 76 BCE) – when two predominant fortresses were built along the margins of the Hasmonean territory in the Galilee.

3 THE IMPERIAL BORDERSCAPE ACHAEMENID NORTHEASTERN CENTRAL ASIA AS A STEPPE FRONTIER ZONE

Ferrario, Marco (University of Trento; Augsburg University)

Volume 3 of the groundbreaking Handbook of Ancient Afro-Eurasian Economies is due to setting a new benchmark in how inter- and intra-imperial connectivity across Afro-Eurasia must be understood and researched. According to the authors, frontier zones ought to be conceptualized first and foremost as ever-changing landscapes (physical as well as discursive) of transformation and innovation, as contested areas in which multiple actors entangled in overlapping and sometimes competitive networks pursue different agendas while jostling for individual as well as group power and resource control. Such insights are critical for a long overdue reassessment of the borderlands dynamics shaping the imperial space of Achaemenid Northeastern Central Asia, which is still often approached as an unruly space contested between agricultural and steppe (nomadic) societies. With the aim of challenging such a fraught and biased narrative, the present paper attempts to sketch, on the one hand, an imperial history of a borderland (looking at Central Asia from the vantage point of the emerging and then established Persian power). On the other hand, it shifts the focus towards a borderland history of an Empire, therefore taking a local approach to Achaemenid imperialism in the region. The outcome is – hopefully – a problematized approach to the Eurasian borderscapes at the edges of and beyond the first Afro-Eurasian hyperpower in world history.

4 PLACE, BOUNDARIES, AND THE (RE)MAKING OF PICTLAND: THOUGHTS FROM THE CARN DROMA SITE IN EASTERN ARGYLL, SCOTLAND

Hansen, Daniel (The University of Chicago)

It is now widely accepted in archaeology that boundaries in the past were often dynamic, permeable, and multiple; archaeologists have been duly cautioned against applying modern ideologies about boundaries to past contexts. Nevertheless, in the past as in the present, contexts arose in which it was pertinent for social actors to define a clear boundary: to identify contrasting groups, to determine criteria of inclusion/exclusion, and to link these contrasts geographically to features of the physical environment. These acts of boundary-making were indeed contextual, but often also materially consequential, shaping the ways people perceived and acted in their environments.

This multi-method paper interrogates the boundaries of “Pictland,” the territory associated with the Picts of late antique and early medieval northern Britain ca. AD 300 – 900. Specifically, it will address the ways in which contrasts between people were mapped onto landscape features and vice versa. It combines historical material with original archaeological and analysis from the Carn Droma site on the eastern edges of Argyll near Tyndrum, Stirling, a site at which prehistoric remains and natural landscape features such as hydrology and geomorphology were understood by some early medieval perspectives as a conceptual limit of Pictland. It then places these findings in the context of other boundary-making events around Pictland from the Roman past through the ethnographic present to offer an account of boundary-making that draws on literature on the semiotics of place-making and social differentiation.

5 BORDERS AND FRONTIERS IN THE LATIN EAST: THE CASE-STUDY OF THE LORDSHIP OF TRANSJORDAN

Sinibaldi, Micaela (University of Warsaw)

In the Latin Middle East, borders and frontier areas have been often associated to the idea of isolated zones, and frontiers have been traditionally understood to comprise a series of forts strategically placed to protect an area against an external enemy. For some scholars, areas of the Latin Kingdom of Jerusalem such as Transjordan were “frontier area par excellence,” simply defined as places where life was less secure than in the heart of the kingdom.

The case study of the Lordship of Transjordan demonstrates how the period of presence of the Europeans in a remote area of the Middle East was not limited to a phase simply characterised by military defence and building of fortifications, but that it involved, instead, a period of significant interaction between the local and the Frankish communities. This phase was characterised by a clear adaptation on behalf of the Franks to the local environment and by an important reliance on the local inhabitants, both of which were crucial strategies of settlement. In addition, those traditionally seen simply as “border” and “frontier” areas were deeply and permanently transformed from the point of view of the landscape as a result of this phase. The entanglements and the relationships between the communities involved in this process are evident from a study of the material culture, which reflects that daily life in Frankish settlements constantly relied on the support of the local environment and people. They are, furthermore, confirmed by an analysis of the documentary sources, which clearly demonstrate that the relationships between the Franks and the local communities were crucial to their ability to conquer and maintain control on the territories selected.

6 RETHINKING WEST AFRICAN STATE-FRONTIER BOUNDARY AND MATERIAL CULTURE: INSIGHTS FROM THE ARCHAEOLOGICAL RESEARCH AT ILORIN, NORTHERN YORUBALAND, NIGERIA

Owoseni, Bolaji (McDonald Institute for Archaeological Research, University of Cambridge)

This paper presents the archaeological research conducted in Ilorin; a historically significant city located at the geopolitical northern frontier of the defunct Oyo Yoruba Empire, which collapsed in the early nineteenth century. Situated between two ecological zones of the savanna and forest regions of present-day Nigeria, Ilorin is recognized for its multi-ethnic society and its role as part of the Yoruba world. This research investigates the socio-political evolution of Ilorin, exploring the city's connections to the broader Yoruba region and beyond before the 19th century. Employing archaeological surveys, and excavations, the study reveals Ilorin's past through the analysis of material culture, with a focus on ceramics. Excavations focus primarily on the site of the present Kwara State College of Education, Ilorin where archaeological material evidence, including pottery, grinding stones, and potsherd pavements were recovered. Radiocarbon dating from excavated units spans the first millennium to the second millennium A.D. These results position early Ilorin within or preceding the timeline of significant centers of the Yoruba region including the Oyo empire and Ile-Ife. This challenges the conventional notion that areas on the borders of major centers merely passively received state appropriation and innovation, showcasing the dynamic nature of West African societies in premodern settings. The research highlights Ilorin as a unique case for Yoruba region frontier or borderland studies, demonstrating that these areas can overlap, share similar features, or even operate autonomously from state/core centers of em-

pires. The findings from Ilorin underscore borderlands' intricate complexity and their importance as contact zones for social interactions and cultural exchanges.

7 **SANCTUARY BORDERSCAPES AND TRANSFORMATIVE VISION: THE CULT OF KYBELE IN WESTERN ANATOLIA**

Rodriguez, Leticia (University of California, Berkeley)

The Phrygian cult of the Mother Goddess in Anatolia is well-known, with early, extensive interaction and exchange between Phrygians and Greek populations likely occurring in the Sea of Marmara region and along the western Black Sea coast in the early sixth century BCE. Subsequent adoption and adaptation of the cult occurred throughout the northwestern and western coasts, processes and practices which ultimately spread to the nearby Aegean islands of Lesbos, Samos and Chios.

This paper explores questions of syncretism, phenomenology, and other forms of transcultural semiotic interaction across a series of Kybele sanctuary sites in western Anatolia. As an overarching methodological framework, I make productive use of the theoretical notion of 'borderlands', particularly as formulated by Chicana scholar Gloria Anzaldúa, re-situating the ancient works and spaces of my research within their multivalent geopolitical, socio-cultural, and sacred contexts. Utilizing the Latinx conceptual framework of borderlands helps to reveal long-overlooked points of artistic intersection and interaction in Ancient Ionia and Anatolia, while also illustrating that the cultural boundaries that have come to define our approach to both East Greek and Anatolian material culture were actually anything but distinct.

In particular, this paper highlights how Phrygian influence can be observed in religion and cult practice in these borderlands, as manifested in material culture and traces of engagement with topography. Through my examination of space, sculpture, and votives, I demonstrate how, as a goddess of shifting identities constrained neither by physical nor academic borders, Kybele may be viewed as transcultural, a 'divine diplomat' capable of speaking to various communities across Anatolia—as well as those passing through from other regions in the Mediterranean and Western Asia—blurring religious and sociocultural boundaries. I also consider how the connection between sacred sites has been severed not only by academic discourse, but also by modern, geopolitical borders.

8 **FRINGE RELIGION? SANCTUARIES AND THE SACRED IN PELOPONNESIAN BORDERSCAPES**

Dunn, Shannon (Bryn Mawr College)

Ancient Greek border sanctuaries have been commonly understood within scholarship as sacred places that reflected or reinforced the territorial boundaries of different political entities. Though implied to be a distinct group of sacred places, there is no agreement about how these sanctuaries functioned as/at borders. Despite the lasting impact of scholarly models of the distribution and function of sanctuaries in the Greek landscape, the type of site often referred to as a "border sanctuary" has not been subject to a large-scale study which comprehensively addresses this category, and which uses sufficient data to critically discuss the usefulness and verity of such terminology. As those models rely on sanctuary landscapes, both in terms of terrain and of spatial relationships, this study maintains the same focus. In the Peloponnese alone, there were different strategies for border delineation and land claims, and different deities preferred by poleis to guard these marginal or contested areas. Major landscape features tended to be used to determine borders, often associated with sacred sites, such as mountain-top temples at the edges of a territory, or shrines in a pass between two regions. I will demonstrate some of the complexities of religious practices in a border zone with archaeological evidence for access to and control of these sanctuaries, using as a case studies several regional clusters of sanctuaries in major border areas of the Peloponnese. I will also present Peloponnesian patterns of the deities, votives, and topographies associated with "border sanctuaries. I will explore the political and religious systems at play, whether there is a unique religious culture in border zones/micro-regions, and how proximity to different territories and changes in their rule by distant poleis affected the religious communities engaging with border areas.

9 **UNDER THE MOUNTAIN AND BETWEEN THE GULFS: SOUTHERN PHOCIS IN LH IIIA-B**

Ruza, Stefano (National and Kapodistrian University of Athens; La Sapienza, University of Rome) - Scarsella, Elena (Independent Researcher)

This paper aims to investigate how the people inhabiting southern Phocis adapted to the peculiarities of their environment and how, at the same time, they interacted with the Beotian palatial societies between LH IIIA and LH IIIB (roughly 1300-1200 BC). The map clearly shows that the region can be broadly divided in two on the basis of the orography: the western and the eastern one. They both had the mountains and the sea acting as gateway points in the landscape, intercepting the route that connected Central Greece to the Gulf of Corinth. On the other hand, there seems to be the possibility of two different routes that the Phocians may have used to reach Beotia: the western one, dominated by the sites of Krisa and Delphi, appears to be completely independent from any palace; the eastern one,

dominated by Medeon, may have been more directly involved with Beotian authorities, although the Medeon itself may have not been in direct subordination of any palatial centre.

10 **FROM THE HELLESPONT TO THE PILLARS: A BORDER WITHIN AND WITHOUT BOUNDS**

Sink, Samantha (Trinity College Dublin)

Straits such as the Pillars of Herakles and the Hellespont were natural borders of economic and political importance, which provided opportunities for navigation, trade, and military endeavours. While the Hellespont connected the east with the west, the Pillars of Herakles connected the Mediterranean with the Atlantic—the west with the unknown. Although these borderscapes may seem geopolitical, Eratosthenes investigated them to explore the nature of the world and thereby pivoted the Mediterranean world.

Eratosthenes approached geography with originality, demonstrating a movement of shared knowledge within the borders of the oikoumene. Alongside the observation and theorization of physical geography, he was also interested in empirical exploration through mathematical applications. With these methods, Eratosthenes focused on geographic connections from a spatial and oikoumenic, rather than a geopolitical, perspective, on how the straits related to the inhabited (Hellenistic) world.

This paper examines the Pillars of Herakles and Hellespont fragments in Eratosthenes' Geographika to discuss his measurements, methodology, and what they reveal geographically about shared communities of knowledge. By combining the geography of these spaces and the applied mathematics of Eratosthenes, this paper explores borders within the oikoumene and an intellectual community without bounds, which comprised scholars, traders, merchants, and sailors.

11 **"BOUNDARY OF GEZER" INSCRIPTIONS - THE EARLIEST EVIDENCE FOR THE "MIXED BORDERS" CUSTOM (HEBREW: ERUV TECHUMIN)?**

Korzakova, Hava (Bar Ilan University)

Near the town of Gezer, mentioned already in El Amarna letters, on the Merneptah stele, and in the Bible, 13 peculiar inscriptions on bedrock have been found, the first ones by Clermont-Ganneau in 1874, and the last one by Mitchell in 2012. Some of the inscriptions are only partly legible, but it seems that all of them have been originally bilingual, written in Greek and Hebrew. The Greek part in 8 of the inscriptions is a Genitive of "Alkios", a proper name derived from the Hebrew "Helkiya", another inscription contains another name, "Alexa", and one more – yet another name, "Archelaos", also in Genitive. The Hebrew part is the same in all the inscriptions where it is still legible, and it says *techum Gezer*, i.e. "boundary of Gezer". In 3 of the inscriptions the Greek and the Hebrew parts are written in the same orientation, while in the other 7 they are oriented *tête-bêche*. In the inscriptions still in situ the Greek words face the direction of Gezer, and the Hebrew ones vice versa.

It has been suggested that the inscriptions marked the Sabbatical boundary or referred to the administrative boundary. Rosenfeld in 1988 has identified the names from the inscriptions with a family from the Herodian nobility, mentioned by Josephus. The uniqueness of the boundary inscriptions of Gezer demands further explanation as to their purpose. I suggest seeing them as the earliest evidence for the Jewish custom of "mixed borders", (Hebrew: *eruv techumin*), which appears the later halachic literature.

12 **CENTRAL AFRICAN ARCHAEOLOGY OF THE NORTHERN BANTU BORDERLANDS: INITIAL RESULTS OF THE CONGUBANGI RESEARCH PROJECT**

Coutros, Peter (Ghent University) - Zana, Henri (Ghent University) - Nguerede, Lucien (Ghent University) - Pacciarotti, Sara (Ghent University)

Despite being at the center of the continent, the Congo-Ubangi watershed is perhaps one of the least archaeologically explored regions of Africa. This zone extends across where the Democratic Republic of the Congo (DRC), Republic of the Congo, and the Central African Republic (CAR) converge. Due to its location, the Congo-Ubangi region is a borderscape of nested cultural, linguistic and natural boundaries. Most notably, the region straddles an environmental border between the Congo rainforest in the south and the savanna in the north, intermixed with a matrix of various micro-ecosystems which are the basis for group specializations in different subsistence strategies. Likewise, this region contains fuzzy linguistic borders between communities speaking Bantu languages in the south and Central Sudanic and Ubangi languages in the north. Group-specific subsistence specializations appear to override linguistic affiliations when it comes to group identity.

Numerous cultural borders also exist across the Congo-Ubangi region, including those within and between rainforest hunter-gatherers and settled communities. However, due to the dearth of archaeological research in the region, the nature, alignment, and time-depth of these environmental, linguistic, and cultural borders are poorly understood. In this talk, we present the initial results of CongUbangi, an interdisciplinary research project (funded by an ERC Start-

ing Grant # 101116562) employing archaeological, ethnoarchaeological, linguistic and genetic methods to explore the interconnections among these different borders. This paper will focus on the results of a series of archaeological surveys and excavations conducted in northern DRC and southern CAR. This work has centered on the Ubangi River bend, and has identified and investigated numerous new sites between Gemena, Gbadolite, and Bangui. The results of these efforts provide much needed new primary data for establishing a robust occupational history of the region while contributing additional context for larger-scale processes across Central Africa.

13 FUZZY BOUNDARIES AND LANDSCAPE MAKING IN UPPER EGYPTIAN HUNTING PETROGLYPHS FROM THE 4TH MILLENNIUM BCE

Maydana, Sebastián (Universidad de Buenos Aires)

In most palaeolithic societies, hunting is an activity where every member of the community participates, in one way or another. Wisdom pertaining to the chase is thus the single most important knowledge that is passed onto the younger generations. This was certainly not the case in Egypt during the 4th millennium BCE, where typically 99% of every village's food was obtained from agriculture, fishing, gathering, and livestock raising. Under these conditions, it may be puzzling to find that a surprisingly large proportion of rock art depictions from this period show hunting scenes. But it is precisely under these conditions, too, that hunting acquires a number of attached meanings that have nothing to do with what the same practice meant barely centuries before. Hunting in a non-hunting society is performed only by a select few, who for this reason become 'special' members of the community. Borders are drawn with respect to the rest of their community, but at the same time, in view of their special relationship with the animals, boundaries with the non-human world become fuzzy. Furthermore, during the hunting expeditions these extraordinary beings enter a different time regime, a different perception of reality, as Tim Ingold points out. Finally, inscribing the hunted animals as well as the hunters in the desert rocks is a way of appropriating and building the desert landscape by marking off the extension of the communal domain. In this communication, I will analyse the construction of landscape and the placing of boundaries through hunting petroglyphs from Upper Egypt dating to the 4th millennium BCE.

14 BETWEEN EGYPT AND LIBYA - EXPLORING THE COASTAL BORDERSCAPES OF EASTERN MARMARICA

Nikolaus, Julia (Ulster University) - Ray, Nick (University of Southampton) - Blue, Lucy (University of Southampton; Honor Frost Foundation) - Gahnem, Mai (CMAUCH; Ulster University)

The eastern Marmarica region along the northwest coast of Egypt is defined by being the border area to Libya in the west. Today this is a highly militarized zone, with several naval bases along the coast. In the past, however, the borders between Libya and Egypt were not a clear separation in space. In particular, the area between Marsa Matruh and Sollum was a very fluid zone in which both Egyptian and Libyan people lived and interacted over a prolonged period in which the boundaries expanded and contracted in relation to shifts in political power. For example, this area lay outside of the westerly outpost of Zawyet Umm El Rakhm from the time of Rameses II but the outpost did not mark a strict division and was not an impenetrable barrier to the movement of people and goods.

The Northwest Egypt Survey Project took place in November 2023 and explored the coastal area between Sidi el Barrani and Marsa Matruh as rapid agricultural and urban development severely threaten archaeological sites along the coast. The results show that this region is far from being an empty border landscape. Instead, the evidence suggests a very dynamic zone in which production and trade played an important role – an interpretation observed by Rieger who investigated the tableland region south of Marsa Matruh. There is a clear need to re-think and re-evaluate the role of this borderscape along the coastline, as well as investigate what role maritime connections played in this area. This paper will draw on the results of the Northwest Egypt Survey Project to explore the dynamics of this borderscape and how land- and sea-based connections have made this zone a much more fluid one than previously thought.

15 ENCLAVE, GREY ZONE OR WHAT? NUBIANS IN THE GEBELEIN REGION (SOUTHERN EGYPT) IN THE LATE 3RD MILLENNIUM BCE

Ejsmond, Wojciech (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences)

The reality of ethnic landscapes is complex and often too dynamic to be easily translated into two-dimensional maps with borders and the nature of the presence of certain groups may be difficult to define. The case of Gebelein is a good example of the pitfalls of the concept of ethnic, cultural, or even political borders.

The late 3rd-millennium funerary stelae from the Gebelein region often depict Nubians. They can be recognised by hieroglyphic inscriptions calling them Nehesi (Nubians) and/or ethnic markers (dark complexion, kinky hair, dress, etc). Previous scholars believed they were mercenaries brought to this area by warlords during the turmoil of the First Intermediate Period (ca. 2118–1980 BCE). Their subsequent disappearance from the archaeological record after

that time was also previously explained by their alleged eagerness to blend into the local Egyptian society, to which they were supposedly aspiring. This view is undermined by the fact that Nubians deliberately underlined their distinct ethnicity on the stelae.

A wider examination of their presence in southern Upper Egypt shows that they were living there already before the emergence of the pharaonic state and thus can be regarded as native to this land and they mixed with Egyptians. It seems that they even retained their tribal structure when living in Egypt.

The issue here is how to define such presence. Can we call them natives of the Gebelein region? Did they form an enclave within the state, or southern Upper Egypt was a sort of grey zone inhabited by two native ethnic groups? By bringing together iconographic, philological, and archaeological evidence this paper aims to explore the complexities of the ethnic landscape during the FIP on the example of the Gebelein region.

16 DYNAMICS OF SETTLEMENT PATTERNS AT THE SOUTHERN EGYPTIAN BORDER BETWEEN THE SECOND MILLENNIUM BC AND THE ROMAN PERIOD

Nicolini, Serena (University of Bologna)

The Southern Egyptian border, encompassing the Nile First Cataract, is pivotal in the historical relations between Egypt and Nubia, dating back to the Predynastic period and throughout all other historical periods. The area's cultural diversity and geopolitical significance make it a fascinating subject of study for scholars interested in making and maintaining borderscapes. Despite its importance, the surrounding desert regions have been largely overlooked from an archaeological perspective, while the Nile Valley has been described as central from a cultural perspective. However, recent research is shedding new light on the role of the deserts, the people living in them, and their relations with the valley.

This paper aims to conduct a diachronic analysis of settlement patterns in the region, spanning from the Second Millennium BC to the Roman period. Geospatial, archaeological, epigraphical, and historical datasets will be discussed to comprehensively understand the complex network of cultures and relationships among people residing along the Nile and in the deserts.

Furthermore, the notion of a borderscape as a purely human-made feature or landscape will be addressed. Instead, we will examine the unique environmental and cultural characteristics of the First Cataract region that influenced the intricate dynamics between cultural groups. Analysing settlement patterns and land use will also contribute to determining the area's trajectories and characteristics of entanglement.

17 RECONCEPTUALISING THE BORDERSCAPE OF THE DAL CATARACT IN SUDAN: TRANSFORMATION PATTERNS OF BRONZE AGE NUBIAN CULTURES

Budka, Julia (LMU Munich)

Recent studies in Sudanese archaeology have addressed the complexity of cultural encounters in the Bronze Age in ancient Sudan highlighting material entanglement and various aspects of sociocultural relations. There is evidence for a high degree of social diversity which includes different social groups (Egyptians, Kerma Nubians, C-Group and Pan-Grave Nubians) of either a distinct or of a more hybrid character. Based on archaeological evidence, at the local scale, social, economic and cultural identities influenced, changed and sometimes merged with each other. It is, therefore, timely to consider the existence of multiple 'Nubias' in the Bronze Age rather than a single homogenous entity.

To address the cultural dynamics and diversity of ancient Nilotic groups, the ERC DiverseNile project draws upon the idea of contact spaces – which complements the concept of "borderscapes" as defined for this session. The primary objective of the DiverseNile project is to reconstruct Middle Nile landscape biographies beyond established cultural categories, enabling new insights into the ancient dynamics of social spaces. Its main case study is the Attab to Ferka region in northern Sudan. Next to the Dal cataract and upstream of a rocky outcrop, the Batn el-Haggat, this region is both a geological boundary zone and a cultural contact zone. The area has a long history as a contact space between various cultural groups and either the northernmost realm (e.g. the Kerma Kingdom) or the southernmost region of influence (e.g. the C-Group).

This paper will present archaeological evidence from settlements and cemeteries, primarily the pottery, and discuss the need for a reconceptualization of the borderscape of the Dal cataract in Bronze Age Sudan. The landscape approach adopted by the DiverseNile project and the geographical features of the study area will also be discussed to support this reconceptualization.

FRONTIER WANDERING ON THE NILE'S THIRD CATARACT

Zielinska, Dobrochna (Faculty of Archaeology, University of Warsaw) - Drzewiecki, Mariusz (University of Warsaw) - Ciesielska, Joanna (University of Warsaw) - Polkowski, Paweł (Archaeological Museum in Poznań) - Innemée, Karel (University of Warsaw) - Osypiński, Piotr (Institute of Archaeology and Ethnology Polish Academy of Sciences) - Rosa, Katarzyna (University of Warsaw) - Kurcz, Maciej (Jagiellonian University)

The paper relates to ongoing research around the church at Miseeda in the Mahas region at Nile's Third Cataract (Sudan). In past decades, the region was a part of large archaeological surveys that showed a dynamic history of this rocky section of the Nile Valley.

The current archaeological survey is meant to identify remains of human activities from prehistory to modern times in the close surroundings of the church in Miseeda. The results unveiled an unexpectedly rich archaeological landscape. They helped to link the area with the main regional centres that were active in the past, such as the capital of the Kerma kingdom and the New Kingdom settlement in Tombos. It also sheds light on the changing relations between the kingdoms of Nobadia and Makuria in medieval times.

In this presentation, we intend to situate the results of our investigations within a broader discussion of the frontier-like nature of the region, by both referring to particular timeframes and approaching it from a diachronic perspective.

Along with the archaeological studies, ethnographic research concerning the current understanding of borderness phenomena in the community of Miseeda was undertaken and will be presented by Maciej Kurcz during session #382.

WHO DO BORDERS SEPARATE? A WORKERS' PERSPECTIVE ON THE EGYPTIAN-NUBIAN BORDERSCAPE

Lemos, Rennan (University of Cambridge)

Non-elite experiences of state society and colonization across the borders of ancient Egypt and Nubia in the New Kingdom (c. 1550-1070 BCE) seem to have been similar. From a bioarchaeological perspective, non-elite individuals suffered from trauma to a large extent in both Egypt and Nubia, most likely due to intense work conditions. From a material culture perspective, scarcity dominates the burials of non-elite individuals, usually deposited in simple pit graves with only a handful of items. Cultural contacts or entanglements have been at the core of recent scholarship on Egypto-Nubian interactions in the New Kingdom colonial period. However, my previous work on Egyptian-style material culture from colonial cemeteries in Nubia has emphasized that cultural entanglements were restricted to elites able to consume these objects. These cultural entanglements resulted in different material and social phenomena, which seem to have always ended up reinforcing the colonized aspect of local practices in the colony. In the light of the exclusive nature of 'objects of entanglement' and the material scarcity that defined the lives of the vast majority of the population in the Egypto-Nubian borderscape, this paper discusses borders from the perspective of non-elite or working populations. As a social archaeology 'from below', the paper focuses on the materialization of hierarchization and power that defined how non-elites experienced the Egyptian colonial state. While cultural entanglements separate 'Egypt' and 'Nubia', experiences of scarcity and oppression across cultural borders bring together working populations to find alternatives to state internal and external colonization.

LET'S CROSS THE EASTERN BORDER! NEW EVIDENCE OF AN EARLY 3RD MILLENNIUM BCE OCCUPATION AT SHAQADUD (BUTANA, CENTRAL SUDAN)

Andrea, Manzo (Università degli studi di Napoli; ISMEO-Associazione Internazionale di Studi sul Mediterraneo e l'Oriente) - Giancristofaro, Enrico (Università degli studi di Napoli) - Varadzinová, Lenka (Czech Institute of Egyptology, Faculty of Arts, Charles University, Prague) - Varadzin, Ladislav (Institute of Archaeology, Czech Academy of Sciences)

Shaqadud is a site in the savannah 50 km east of the Nile Valley, in Central Sudan. Excavations conducted there in 1982-1983 by an American-Sudanese team have documented a long sequence from the mid-7th to the early 2nd millennium BCE. This made of Shaqadud a key site for the late Prehistory of the Nile valley South of Nubia and the eastern Sahel. Moreover, the evidence from Shaqadud partially bridged the gap between the 4th and 1st millennia BCE characterizing the chrono-cultural sequence in the Nile Valley tract between the confluence of the Blue and White Nile and the Atbara River junction. However, it did not cover a gap between the late 5th and the early 3rd millennia BCE.

The recent resumption of investigations by the Shaqadud Archaeological Project brought to light evidence of a previously unknown occupation dating to the first centuries of the 3rd millennium BCE, while new surface finds expanded the evidence also for the 2nd millennium BCE. These new finds push back the chronology of Post-Neolithic Shaqadud to ca. 3000 BCE and provide new insights into the possible links with the regions East of the Atbara. In this presentation the newly discovered Post-Neolithic materials will be presented and compared with the ones of

the Butana Group and Gash Group of the Eritrean-Sudanese Lowlands. Indeed, on the one hand the new evidence allows a more accurate assessment of the Post-Neolithic ceramic assemblage at Shaqadud and shortens the gaps in the regional sequences. On the other hand, it is also crucial for understanding the broader East-West connections that involved the site. From our perspective, Post-Neolithic Shaqadud was not marginal, but a crucial node in hitherto poorly known East-West networks, that may have been a cultural corridor in ancient Africa as important as the North-South corridor along the Nile.

RITUALISM AND FUNERARY PRACTICES IN THE MEDITERRANEAN BASIN: OBJECTS, SYMBOLISM, INPUTS, AND RESILIENCE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Conejo, Noe (Università degli Studi di Padova; UNIAHQ-Universidade de Lisboa) - Cáceres Puerto, Carlos (Independent Research) - Ramos Soldado, José Luis (Andalusian Institute of Historical Heritage-IAPH.)

Session format: Regular session

Mobility and cultural exchanges were not uncommon around the Mediterranean in antiquity, whom populations had long been interconnected for centuries before the surge of Rome. However, when addressing migration, individuals often misjudge the implications for the people involved in these processes, and the impact they had in their destinations. Upon their deaths, individuals who were fortunate enough had the opportunity to build something to be remembered by. However, those funerary monuments represent more than a longing for eternity, as they convey the cultural background of the displaced and preserve their cultural ethos in a foreign land.

Scholarship on funerary archaeology has grown exponentially in recent decades. However, academic organisational and intellectual structures often artificially isolate the study of funerary evidence as they encompass established cultural parameters rather than assessing the interconnectivity that the Mediterranean had for centuries. This created artificial boundaries that ignore this connectivity, categorising funerary elements as Punic, Greek, Roman, or Barbaricum. When assessing funerary evidence, we tend to point out the main differentiating elements between cultural backgrounds, effectively neglecting the connections that different communities shared. As academics, we usually ignore that the funerary elements acted as conveyors of identity, which were often assimilated by the local communities, rather than as a characteristic feature of a determined civilisation.

This session brings together scholars who work across temporal and spatial boundaries in the Mediterranean Basin. We will reconsider how to re-evaluate the interconnectivity among the Mediterranean, and how this shaped the diversity of the materiality of belief. The aim is to extend the chronological timeframe of our session beyond the constraints of the Roman Empire to cover a broad range of cultures within the Mediterranean sphere. Thus, we invite contributions analysing funerary practices, cross-cultural influences, and identity from the Phoenician colonisation of the Mediterranean to the Early Medieval Period.

ABSTRACTS

MORTUARY PRACTICES AND IDENTITY IN TEL 'ETON: FROM THE END OF THE BRONZE AGE TO THE LATE IRON AGE

Baruch, Eyal (Bar Ilan University) - Faust, Avraham (Bar-Ilan University)

The cemetery surrounding Tel 'Eton is one of the largest burial grounds in ancient Israel. It was first identified in 1968 when, following extensive looting, the IAA excavated a number of tombs, and since 2006 we are conducting an intensive survey in the vicinity of the mound. The earliest known caves appear to be dated to the Intermediate Bronze Age, but most of the caves are later, and the cemetery was used continuously from the Late Bronze Age to the later part of the Iron Age. An examination of the tombs and their contents reveals interesting patterns of continuity and change over time. Both the plan of the earlier Iron Age tombs and their content expose many outside contacts, but later changes show that the population of the site gradually assimilated and became Israelite in the course of the 10th-8th centuries. From a broader perspective, an examination of regional changes in burial practices suggests that the Tel 'Eton burial traditions influenced the development of the Judahite burial practices (and the so-called "Judahite tomb") in the 8th century BCE.

The first part of the lecture will summarize the results of the survey and excavations that were carried out in the cemetery since it was discovered almost 60 years ago. The second part of the paper will review the changes in burial practices over the centuries, and will reflect on the complex connections between the Tel 'Eton cemetery and the development of the popular Judahite burial of the Iron IIB-C.

2 LA NECROPOLI EST DI POLIZZELLO. INFLUENZE INTERCULTURALI NELLE PRATICHE FUNERARIE DI UN CENTRO INDIGENO DELLA SICILIA CENTRO-MERIDIONALE (TITOLO PROVVISORIO)

Barbera, Antonio (Archeologo specializzato indipendente)

Durante l'intervento saranno presentate alcune considerazioni inerenti ai rapporti culturali intercorsi tra la comunità indigena di Polizzello (CL) e le colonie greche di Sicilia. Esse sono state elaborate con i risultati emersi dallo studio dei contesti funerari e dei relativi manufatti provenienti dalla Necropoli Est del sito e dal loro confronto con altre realtà siciliane coeve.

La necropoli è stata utilizzata dalla comunità sicana che occupò questa altura interna della Sicilia centro-meridionale durante il periodo in cui si intensificarono i contatti con i Fenici e i Greci. In particolare, quest'ultimi furono protagonisti di un continuo confronto -e scontro- con le comunità indigene, le quali da una parte reagirono attraverso un rafforzamento e un ritorno alle proprie tradizioni, dall'altra subirono l'influenza della cultura greca; entrambe le condizioni sono ben testimoniate dalle evidenze archeologiche. Seguendo le diverse fasi d'uso individuate in questa necropoli, è possibile riconoscere una progressiva apertura alla tradizione greca da parte del centro, riscontrabile nella cultura materiale: ne sono testimonianza la scelta dei corredi (non solo per le classi e le tipologie utilizzate, ma anche per le caratteristiche produttive), nonché la disposizione dei defunti e il rituale funerario.

Verso la metà dell'VIII sec. a. C. alcune tombe di età più antica sono riutilizzate e il record archeologico dimostra ancora il perdurare della tradizione funeraria isolana dei periodi precedenti. Un importante cambiamento si verifica nell'VII sec. a. C., quando si nota un momento di rottura con le tradizioni locali, mediante l'adozione di elementi allogeni di tradizione greca in uso fino all'abbandono del centro.

In conclusione, attraverso quasi due secoli si osserva nella necropoli di Polizzello il passaggio da una cultura caratterizzata da uno spiccato conservativismo da contrapporre alle nuove invasioni culturali, ad un periodo in cui quest'ultime riuscirono a penetrare la diffidenza iniziale delle comunità locali.

3 PATTERNS OF CONNECTIVITY IN ARCHAIC MÉTAUROS

Scaravilli, Marco Stefano (MIC - Soprintendenza ABAP RC-VV.) - Quondam, Francesco (University of Vienna) - Hansen, Clara (University of Vienna)

The necropolis of Métauros in southern Calabria (nowadays Gioia Tauro) with approximately 1500 excavated burials from the Archaic Period (7th-5th century), features rituals and burial assemblages that suggest multiple scales of mobility and interconnectivity. This is shown first by a mixture of burial rites that are either associated with long-standing local traditions or with the arrival of long-distance migrants. This is supported additionally by the inclusion and sometimes combination of objects commonly classified as "indigenous" (e.g., impasto ware) and those viewed as "Greek" (Corinthian, Samian, Attic, etc.).

By analyzing a sample of 250 Greek tombs, this study aims to foreground patterns in connectivity and mobility to shed light on the wide range of identities expressed in the context of Archaic burials. We consider, on the one hand, burial rite (treatment of the body, architectural features, grave good assemblages), and on the other aspects regarding the organization of the space and funerary projection of the community. We will show that the dynamics at play went beyond the simplistic narrative that is often perpetuated for this period known as "Greek Colonisation", painting a more detailed and varied picture of Archaic Magna Graecia and the existing cultural identities.

4 RITUALISM AND FUNERARY PRACTICES IN TARTESSOS: THE QUESTION OF IDENTITY IN A WORLD OF CONSTANT CHANGE

Ramos-Soldado, José Luis (Laboratory of Palaeobiology, Andalusian Institute of Historical Heritage)

The funerary practices existing among the Tartessian populations are featured by the coexistence of diverse traditions – Atlantic, Hinterland, and Mediterranean –. This has been mainly considered a result of the dynamics derived from the Phoenician colonisation in the southwest of the Iberian Peninsula during the Iron Age. Hence, and despite the limited and fragmentary archaeological record available in this regard, several customs have been identified, including weapon deposits in water courses, carved stone stelae, both inhumation and cremation burials, and individual and collective tumuli. Among these, the spread of funerary rituals of Eastern influence stands out for their contrasts in comparison with other practices. In this context, for instance, the arising of cremation rituals coincides with the arrival of eastern settlers.

This heterogeneous record has caused an ongoing discussion regarding the identity and cultural definition of the buried Tartessians. Traditionally, it has been considered that the elite emulated certain Phoenician traits as a display of prestige. However, the research conducted in the past decades rather suggests a progressive miscegenation process,

which is especially perceivable in modest burials. The absence of epigraphy and the assorted nature of the grave goods have further intensified this debate.

This contribution addresses the described framework, reflecting on the complexity of defining particular identities before the coexistence and connivance of diverse forms of expression detectable through the material record.

5 SOME PHOENICIAN JEWELS FROM MOTYA (SICILY)

Oliveri, Francesca (former Soprintendenza del Mare)

The study of precious pendants and earrings found on the Phoenician island of Motya in Sicily has offered the opportunity for reflection on fashion habits of the Phoenician of the West Mediterranean.

Jewels are special artefacts: probably born with the will of embellishment, they possess a much deeper meaning than that, upgrading the simple material object with symbolic, magical and religious values or making it an instrument of prestige and ostentation.

This complexity leads toward two substantive aspects related to the duration of use and the geographic distribution of some ornaments.

It is important to remember that even on the occasion of discovery in a perfectly datable archaeological context, a jewel could always be much older, representing, for example, a family inheritance.

Similarly, some productions particularly welcome and fashionable, enjoy wide circulation capable of overcoming regional boundaries, especially those that become portable symbolic objects and bear images of beloved potent deities.

6 THE AFTERLIFE OF FUNERARY MONUMENTS. REUSE AND MISUSE OF THOLOS TOMBS IN CLASSICAL ANTIQUITY

Galli, Alessio (Scuola Normale Superiore di Pisa)

Amongst the most remarkable landmarks of Aegean prehistory, tholos tombs were an important feature of Minoan and Mycenaean funerary practices. Although we mainly recognize them for their original purpose, we cannot ignore the impact that their striking architecture had on the ancient landscape. It is only natural that later civilizations might have reused and reinterpreted the structures of the tholoi to fit new scopes, stripping them of their original identity to give them new meanings. Tholos tombs thus continued to be an important part of the Greek landscape even centuries after their primary use, passing from one civilization to another.

This paper aims to present a catalogue of the evidence of reuse of tholoi in classical antiquity. Previous studies have chiefly been focused on the tomb cults that took over previous burials, but this paper wishes to reverse the narrative and start the analysis from the tomb itself. The reassessment of the evidence linked to the reuse and repurpose of tholoi considers a diachronic span that covers Archaic, Classical, Hellenistic and Roman Greece. I will outline a survey of possible ancient reinterpretations of the funerary structures of Minoan and Mycenaean memory: as heroa for cult purposes, for domestic or industrial use, and as garbage dumps. Each choice of reuse marks a new way in which human groups and communities saw their Aegean past and made use of it, shaping new traditions and identities and parting way with ancient civilizations.

7 CONSTRUCTING LOCAL IDENTITIES IN THE MEDITERRANEAN WEST. FUNERARY CONTEXTS AND CULTURAL HYBRIDISATION IN COLONIA AUGUSTA EMERITA

Cáceres-Puerto, Carlos (Independent Researcher)

Mobility and cultural exchange were not uncommon in Roman times around the Mediterranean, as it continued a long-lasting tradition of interconnectivity spanning hundreds of years. This connectedness favoured the creation of new settlements and communities as the Romans expanded their domains. Some of these settlements were conceived to assimilate preexisting communities, adopting their ethos and cultural practices, whereas others were established from scratch. The latter, often associated with military foundations, saw their first settlers struggle to maintain the ethos of their motherland. Burial practices, funerary monuments, and grave goods conveyed not only the cultural background of the new settlers, but also the story of a community, a belief system, and who they longed to be associated with.

Colonia Augusta Emerita was a Roman colony founded in 25BC in western Hispania. It was established under the direct command of the first Roman emperor, Augustus, and was shortly afterwards named the capital of the Province of Lusitania. The nature of its foundation, as a newly established settlement, intensely shaped the idiosyncrasy of its first settlers. This can be perceived through the funerary record, as they strove to assimilate to other provinces, perhaps to compensate for the lack of a shared identity.

This paper aims to analyse how the inhabitants of Colonia Augusta Emerita negotiated and hybridised diverse cultural influences to shape their identity as a community. I examine the funerary record between the late 1st century BC and

the 3rd century AD to discern patterns of cultural hybridisation, shedding light on the dynamic processes of assimilation, adaptation, and reinterpretation of traditions. The case of Colonia Augusta Emerita offers valuable insights into the complex interplay of local, regional, and transregional influences that shaped the sociocultural fabric of a Roman settlement during the Early Imperial Roman period through the funerary record.

8 IMPERIAL FUNERARY CONTEXTS FROM THE SITE OF UNHOS (LOURES, PORTUGAL). STUDY OF BONE ARTEFACTS, POTTERY AND GLASS VESSELS

Guimarães, Raquel (ERAAUB (Equip de Recerca Arqueològica i Arqueomètrica de la Universitat de Barcelona); IAUB (Institut d'Arqueologia de la Universitat de Barcelona); CHAM (Centro de Humanidades)) - Lopes, Martim (Universitat Rovira i Virgili; CHAM (Centro de Humanidades))

In 2007, an emergency excavation was initiated in Unhos due to road construction, revealing Roman structures previously unknown in the area. Portions of these structures were detected, suggesting they were part of an unidentified villa. Additionally, in another area of intervention further from the initial site, funerary contexts of cremation were uncovered, albeit with poor preservation.

This study aims to comprehensively analyze the materials collected, focusing on at least three distinct burials dating from the late 1st to the 3rd centuries AD. Despite severe fragmentation, some profiles have been reconstructed, revealing a diverse and uncommon assortment of spolia for the Olisipo region, the nearest Roman city. Among the findings are a significant number of bone artifacts and a glazed ceramic of possible local or regional origin, representing a previously undocumented production in this area.

This discovery holds implications for understanding the socio-economic dynamics and cultural exchanges prevalent in the region during this time period.

9 ROMAN-PERIOD BURIAL PRACTICES AND FUNERARY ARCHITECTURE AT HIPPOS OF THE DECAPOLIS: BETWEEN LOCAL, PROVINCIAL, AND CLASSICAL

Eisenberg, Michael (Zinman Institute of Archaeology, University of Haifa; German Institute of Archaeology (GPIA)) - Kowalewska, Arleta (Zinman Institute of Archaeology, University of Haifa)

Antiochia Hippos (Sussita) of the Decapolis, located 2 km east of the shores of the Sea of Galilee, has three recognized necropoleis, all dated to the Roman period (63 BCE–4th century CE). The most prestigious and the best-researched is the Saddle Necropolis located along Hippos' main approach via the saddle. The recent excavations make this necropolis one of the most prominent examples of Roman cemeteries in the Southern Levant. With its various types of burials (hundreds of nari and basalt sarcophagi, numerous pit graves cut into the bedrock with or without stelae, a dozen burial caves with burial niches, funerary podia, and at least two elaborately decorated mausolea) this necropolis represents all the socioeconomic strata of Hippos' residents and the mixed cultural background (Graeco-Roman, Phoenician, and local Semitic influences) from which this funerary structures emerged. This presentation visualizes the excavated components of the Saddle Necropolis, while discussing their possible cultural origins and their common and unique local expression within a polis in the Eastern Mediterranean.

10 "I WROTE ENTIRELY IN (MY) OWN HAND": THE ROLE OF LOCAL STONE-DRESSING WORKSHOPS IN POST-ROMAN FUNERARY PRACTICES FROM ZOARA (JORDAN)

Perez Yarza, Lorena (University of Warsaw) - Borczyńska, Julia (University of Warsaw) - Rea, Andrés (University of Warsaw) - Nowakowski, Paweł (University of Warsaw) - Bastero Acha, Marina (University of Warsaw)

The Ghawr as-Safi site (Jordan) is characterized by an extensive necropolis associated with a Late Antique and Islamic settlement that continued the ancient settlement known as Zoara or Zoora. The necropolis has yielded over 600 funerary inscriptions composed in Greek, Aramaic, Hebrew and Arabic, attesting to the linguistic diversity prevalent in the local commemorative practices. Approximately 250 of these can be precisely dated to the 4th and 5th centuries, aligning with the transition from Roman into the post-Roman and Byzantine world. The analysis of this epigraphic ensemble depicts the regional consolidation of new funerary forms, adapted to accommodate the novel Christian ecumene within the Mediterranean milieu. However, this adaptation unfolds within a local Semitic context that had long been shaped by Graeco-Roman influences. The decline of the ancient world and the emergence of new socio-political dynamics did not put an end to this characteristic cultural framework, but rather encouraged changes in a culture that retained many of its former characteristics.

This paper aims to bring forward the role of the epigraphic workshops of Zoara as agents of a coherent epigraphic horizon with its own cultural dynamics and transformations. Several workshops have been identified through the multidisciplinary study of regional patterns or 'styles' present in the morphology, iconography, funerary formulae and palaeography of stelae. These production places reinvented and adapted Late Antique carving, writing and decoration techniques to the specific needs of the site's inhabitants, even serving as an example of a common local production.

Moreover, the cultural reality of these funerary practices surpasses the traditional temporal categorization of 'Antiquity, Late Antiquity and Byzantine or Middle Ages'. Rather, they need to be viewed in a new Mediterranean grid of local and interconnected spaces that derive from an earlier past as testified by the epigraphic workshops of Zoara.

11 POST-DEPOSITIONAL RITUALISM AT LATE ANTIQUE TOMBS OF THE WESTERN MEDITERRANEAN. LOCAL PARTICULARITIES IN A COMMEMORATIVE KOINÉ

Ardeleanu, Stefan (University of Hamburg)

The transition from the High Imperial period to Late Antiquity was a transformative period in many respects. The spread of Christianity, the fragmentation of the late Roman Empire and massive mobility were just some of the major processes that permanently changed Late Antique societies. Two central areas of people's everyday lives and mentalities were also affected: Concepts of the afterlife and the commemoration of the dead. The paper proposes to shed light on the fascinating variety of ritual practices that were carried out at closed graves in memory of the deceased, which have so far received little attention from funerary archaeology. New research shows that, recurring to a pagan tradition, people continued to eat, celebrate and drink intensively at graves for a long time. Grave paintings, pottery, glass, fauna and botanical finds provide astonishingly detailed insights into the practices carried out at graves. The church tried hard to curb this ritual activity, with geographically very differing and overall little success. Especially, more than 700 Late Antique funerary mensae, ritual-associated tomb markers in the form of banquets built over tombs, show the enormous popularity of these ancient practices, which even continued beyond the Middle Ages and into the modern era in some regions. These postdepositional rituals and ritualized monuments were very common in the Western Mediterranean throughout Late Antiquity, mostly in urban areas and in elite milieus. Due to their technical and structural analogies, they form a veritable 'funerary koiné' along the Western Mediterranean. Simultaneously to these global trends, in each region with high density of ritualized grave markers also local traditions and particularities emerged. Both aspects will be analyzed balanced in this paper.

12 THE USE OF COINS IN LONGOBARD TOMBS: CONTINUITY OF A RITE OR A PRACTICE WITH RENEWED MEANINGS?

Conejo, Noe (Università degli Studi di Padova- Universidad Carlos III de Madrid)

The arrival of the Longobards on the Italic peninsula meant the spread of new funerary practices in the territory. In a highly hierarchical society, the grave was conceived as a space for the communication of meanings, where the social status of individuals and their respective family ties were clearly marked. In numerous necropolises in northern Italy between the 6th and 7th centuries, some tombs contain one or more coins as part of the grave goods. These could be placed with the deceased individually or transformed into personal decorative items together with other elements such as beads and/or semi-precious stones. Traditionally these decorative objects have been considered as status markers, in the case of coins minted in precious metals, and as talismans or magical objects, due to their antiquity, as most of the pieces are from the Roman period, and due to their iconography, with some images related to eschatological ideas. These interpretations can also be related to the untransformed coins deposited on the deceased, which have sometimes been interpreted as a continuation of the famous rite of Charon, the fierce boatman who in classical times guided souls through the underworld in exchange for a coin. A systematic compilation of the coins found in these necropolises provides new data on this practice and allows us to reflect on other aspects that have been overlooked in recent years, such as the weight of the economy in the choice and use of coins in these tombs. In this way, new lines of research are provided on a rite that in form presents continuities with the previous period, but with totally different meanings that make the placement of coins in Longobard tombs a genuine gesture for understanding the mentality of these communities.

13 BETWEEN MATERIAL AND IMMATERIAL. THE GRAVE GOODS AND THEIR DIFFERENT MEANINGS FROM THE 8TH TO THE 10TH CENTURIES

Colagrande, Andrea (Università degli studi di Trento)

The study of Early Medieval funerary contexts has a long historiographical tradition and has undergone considerable development in recent years. Although the collection, analysis and interpretation of funerary data constitute a well-established methodological approach, academic interest commonly tends to wane in relation to the final centuries of the Early Middle Ages, a chronological period for which it is customary to consider the different social and theological implications to imply the absence of funerary objects in favour of a marked immateriality of ritual. The present work deals with the centuries between the 8th and 10th centuries, a chronological arc marked by profound changes at a social and liturgical level, and will attempt to present the current state of knowledge on the evolution of rituality linked to the funerary episode with particular reference to the presence and absence of grave goods in sites from different geographical areas of northern Italy and beyond, with the aim of highlighting how the process of

abandoning grave goods occurred gradually and differently in distinct geographical areas, demonstrating the different responses of communities to the change in funerary ritual.

950 TRADE IN METALS FROM THE BRONZE AGE TILL EARLY MODERN TIMES BETWEEN THE CARPATHIAN BASIN AND THE NORTHERN ADRIATIC

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Kiss, Viktória (Institute of Archaeology, Research Centre for the Humanities, Budapest) - Romhányi, Beatrix (Medieval Studies Department, Károli Gáspár Calvinist University) - Cavazzuti, Claudio (Prehistory & Protohistory Dept., University of Bologna) - Angelini, Ivana (Dep. of Cultural Heritage, University of Padua)

Session format: Regular session

From the beginning of the Copper Age until the pre-modern era, copper played a prominent role in the economy. Mining and trading the metal – be it pure copper or a copper alloy – created corridors of interaction that connected distant regions in Europe and beyond. Previous research has shown that these trade networks existed over the long term, and even when they were temporarily disbanded for various reasons – demographic, environmental or political – they re-emerged as soon as circumstances became favourable. The part of Europe comprising Northern Italy, the Eastern Alps, the Carpathian Basin, and the Northern Balkans was one of the geographical settings where – due to rich natural resources and their long exploitation over millennia – such networks can be traced and studied in a diachronic perspective. The study of such long-term processes requires a complex methodology that includes traditional archaeological methods, material analysis and, in the periods where they exist, the use of written evidence.

The aim of the session is to bring together researchers from different archaeological periods who deal with copper-bearing objects, objects related to mining, metallurgical technologies and metal provenance, as well as other artefacts also connected to copper trading (e.g. animals, textile or other organic materials). The focus of the session is on the diachronic consideration of metal production and trade in the respective geographical region, with a special emphasis on the connections between Italy and the Carpathian Basin, in line with the motto of the conference – Persisting with change.

ABSTRACTS

1 LINKING DISTANT REGIONS: THE STUDY OF TRADE NETWORKS AND TRADE GOODS IN A DIACHRONIC PERSPECTIVE

F. Romhányi, Beatrix (Károli Gáspár University of the Reformed Church)

Copper has been one of the most important raw materials mined in the Carpathian Basin since the early Bronze Age. Its extraction, processing and trade can be traced from the Bronze Age to the Middle Ages and beyond. Recent diachronic studies have shown that on the one hand, the prehistoric distribution networks, which are based on archaeological findings and the analysis of the material, and on the other, the medieval trade networks, which are documented by written records, largely overlap. Based on these research findings, the paper focuses on the trade networks linking Italy, the Carpathian Basin, and the neighbouring parts of the Balkans, with an emphasis on the Middle Ages up to the early-sixteenth century (the copper trade of the Fugger Company) and the written evidence. In addition to copper, other trade goods potentially involved in the exchange – such as salt, livestock, and textiles – will also be thematised.

2 DIFFUSION OF SOUTHEASTERN ALPINE COPPER IN ITALY FROM THE CHALCOLITHIC TO THE BRONZE AGE

Angelini, Ivana (Department of Cultural Heritage, University of Padova)

Recent years have witnessed a notable increasing in the chemical and isotopic analysis of Chalcolithic and Bronze Age metal artefacts conducted by various research teams. Consequently, a wealth of data is now available in the literature, facilitating the reconstruction and tracing of the exploitation of diverse mining areas. Notably, publications on the isotopic characterization of South-Eastern Alpine copper ores (Nimis et al., 2012; Artioli et al., 2016) have led to the revelation that this type of copper spread significantly farther into Northern Europe than previously assumed (Melheim et al., 2018; Ling et al., 2016; Nørgaard et al., 2021), particularly from about 1500 BCE. However, questions remain regarding its spread southward into the Italian peninsula and the beginning of systematic ore exploitation in the South Eastern Alps.

Based on the works of the archaeometallurgy research team at Padova, this presentation aims to provide a comprehensive overview and address these inquiries. The discussion will focus on archaeometric investigations conducted on prehistoric Italian copper and bronze objects, thanks to collaborative efforts and projects spanning the last 15 years.

Approximately one hundred Chalcolithic and one hundred and fifty Bronze Age artefacts have been analysed (with data either published or in press). The presentation will discuss these results to review current knowledge while highlighting remaining uncertainties surrounding the diffusion of Alpine copper in Italy during the specified chronological range.

3 TRADE, METALS AND POPULATION MOVEMENTS

Kiss, Viktória (Institute of Archaeology HUN-REN Research Centre for the Humanities)

Collection of import vessels and bronze artefacts outside of their original distribution area, indicating the interaction of communities living in modern-day Western Hungary in the late Early Bronze Age and Middle Bronze Age (2100-1600/1500 BC), have already suggested trade connections. It was also supposed that these relationships may indicate exogamous marriage customs in a wider region. This paper summarizes the results of a new aDNA study of the burials excavated in the region of western Hungary, combined with data of metal trade. The case study of the burials from Balatonkeresztúr provides evidence of the mobility of small communities coming from the area northeast of the Carpathian Basin in the Early Bronze Age (2400-2100 BC). In addition, after the settlement of these newcomers, the trade links observed within and outside of the Carpathian Basin during several hundred years were confirmed not only by their special type of encrusted pottery and bronze objects but by archeogenetic data. Recent bioarchaeological analyses in this way uncover information of contacts among copper and tin producers, metal traders, as well as bronzesmiths of characteristic local bronze artifacts within a wide area from the region of the Erzgebirge and the Slovakian Ore Mountains, until Eastern Serbia.

4 BRONZE PRODUCTION AND DISTRIBUTION IN EARLY BRONZE AGE FORTIFIED SETTLEMENTS OF EASTERN SLOVAKIA

Oravkinová, Dominika (Institute of Archaeology of Slovak Academy of Sciences) - Števkó, Martin (Earth Science Institute of Slovak Academy of Sciences) - Villa, Igor (Institute of Geological Sciences, University of Bern) - Zachar, Tomáš (Archaeological Heritage Office of Saxony) - Furmánek, Václav (Institute of Archaeology of Slovak Academy of Sciences) - Olexa, Ladislav (Slovak Archaeological and Historical Institute) - Olšav, Štefan (Institute of Archaeology of Slovak Academy of Sciences)

The period around 1600 BC is referred as the peak of the Early and Middle Bronze Age Carpathian metalwork among communities settled in Slovakia, traceable even as typologic and provenance imprint that resonated across wider European trade networks. During this particular era, numerous bronze collections from the so-called Koszider horizon were abandoned and examined in diverse contexts within several fortified settlements in the macro-region of the northeastern Carpathians. Most of them also accompanied the multiple evidence of active local metallurgy. The raw material origin of these artefacts is currently presumed only indirectly, relying on the proximity of exploitable copper deposits in the Slovenské rudohorie Mts., geochemically mapped solely in the western to central regions. Bridging the data gap, we conducted a chemical and lead isotope analysis of bronze artefacts from four fortified sites considered production centers in three different micro-regions of Eastern Slovakia, namely Košice-Barca, Nižná Myšľa, Spišský Štvrtok, and Včelince. To better evaluate their main production characteristics while addressing the degree of material and stylistic homogeneity, we focused on bronze by-products and types of local origin supported by casting molds. Additionally, their provenance was investigated through exploratory analyses of copper minerals from the Spišsko-gemerské rudohorie Mts. hydrothermal ore deposits located in the site-catchment areas. All the results will be summarized to gain a more nuanced understanding of local communities' involvement in then metal trade on cross-regional and European scales.

5 CIRCULATION OF METALS AND MODELS ALONG THE PERSISTENT CORRIDOR BETWEEN THE DANUBE AND PO RIVER VALLEYS DURING THE BRONZE AGE

Cavazzuti, Claudio (University of Bologna) - Kiss, Viktória (Hungarian Academy of Science) - Cattani, Maurizio (University of Bologna) - Lugli, Federico (University of Modena and Reggio Emilia) - Cipriani, Anna (University of Modena and Reggio Emilia)

The areas between the middle Danube and the Po River valleys, as well as neighbouring regions, show intense interactions at least from the Bell Beaker periods until the Late Bronze Age. This is clear from the analysis of artefact types, funerary rituals, settlement features, agricultural strategies. In this paper, we focus on the geographic distribution of specific types of metal items dated between Early and Late Bronze Age, such as solid-hilted daggers and ösenringe, Boiu-Sauerbrunn-Keszthely type swords, and a variety of pins, which emphasize the role of warriors, high-status women, artisans, and their possible mobility across the two areas. Beside that, we will address the theme of production technology, looking at casting techniques and stone moulds, as well as the widespread evidence of well-structured metal workshops within the settlements. In addition, we will present lead isotope data from Emilia-Romagna, which

highlight the presence of copper from the Eastern Alps and Mitterberg during the Middle and Late Bronze Age, emphasizing the role of the alpine metallogenic province for the supply of metal in the two large plains.

6 MIDDLE AND LATE BRONZE AGE COPPER EXCHANGE NETWORKS BETWEEN ITALY, THE EASTERN ALPS AND THE BALKANS

Arena, Alberta (Österreichische Akademie der Wissenschaften) - Gavranović, Mario (Österreichische Akademie der Wissenschaften) - Mehofer, Mathias (Universität Wien) - Mittermair, Nicole (Österreichische Akademie der Wissenschaften)

In this paper, we present recently acquired results, including chemical and lead isotope analyses, concerning copper-based objects from Italy and the Balkans. Our investigation has unveiled a significant influx of copper from the southern and eastern Alps into the Balkans, indicating an apparent disregard for locally sourced copper. Notably, evidence of local copper production has only been found in eastern Serbia between 2000 and 1600 BC.

Our primary aim is to explore the timing of the transition from the utilization of domestic copper to the reliance on imported copper, as well as to identify the preferred distribution routes, such as the trans-Adriatic route and the Sava River Valley. Drawing from a comprehensive dataset comprising over 1000 samples, we can affirm that during the Late Bronze Age (14th-9th centuries BC), the majority of metallurgical workshops in the central and western Balkans were supplied with raw copper from Trentino.

Of particular significance are the Middle Bronze Age artefacts (16th-14th centuries BC) found in both Italy and the Balkans, which have been determined to be crafted from copper originating from Trentino. This discovery underscores an extensive production and a widespread distribution network established as early as this phase.

Our focus will be directed towards newly analyzed Middle Bronze Age artefacts from southeastern Italy, the coastal Balkans, and the Southern Carpathian Basin, shedding further light on the intricate patterns of copper trade and exchange in the region.

7 PIXE EXAMINATIONS OF TUMULUS CULTURE BRONZE OBJECTS FROM THE SZEGED AREA (SOUTHERN GREAT HUNGARIAN PLAIN)

Sánta, Gábor (Independent) - Šmit, Žiga (Faculty of Mathematics and Physics, University of Ljubljana, Ljubljana, Slovenia; Jožef Stefan Institute, Ljubljana, Slovenia)

The transition from the Middle to the Late Bronze Age in the Carpathian Basin is an eventful period with many questions.

Our project was to investigate Tumulus Culture bronze objects from key cemeteries and stray finds near Szeged, SE Hungary (Tápé, Bogárzó, Röske, etc.). They were measured in Ljubljana by PIXE methods in 2010.

The raw materials of the 39 examined objects were classified into the following clusters:

1. Average composition with a subgroup (1a.); 2. zinc-rich objects; 3. lead-rich objects. Tin content varies between 4-20%, with an average of 10%.

Trace element (As, Sb, Ag, Ni) ratios were calculated, and projected onto diagrams from recent literature with the same double logarithmic scaling. On the key Ag/Ni diagram, the objects separate clearly from objects from Mitterberg and fit well with the Ag/Ni ratios known from the Hron Valley in Slovakia.

We compared our results with other analysis data of the Hajdúsámson-Apa-type and Koszider period metals. Among the researchers of the topic, a consensus is beginning to emerge on the intensive Carpathian Basin Early and Middle Bronze Age (until the beginning of Reinecke B) mining of Hron Valley ore deposits. Most of the metal material of the contemporaneous Northern Bronze Age come from there, too. Researchers presuppose a wide-ranging system of relationships in which some communities of the Carpathian Basin could play a mediating role. Around 1600 BC mining and using of the Mitterberg ores became more important and started to dominate the metal supply of main parts of Central Europe until the end of Reinecke Br. D. Our data show that Tumulus Culture communities of the Southern Great Plain in Hungary may continued to prefer copper raw material from the Hron Valley within the investigated period, or possibly some mixture of copper from Hron Valley and Mitterberg was used.

8 THE (RE) DISCOVERY OF THE VETRIOLO BRONZE AGE MINING AREA (TRENTINO, ITALY): ARCHAEOLOGICAL AND ARCHAOMETRIC DATA

Silvestri, Elena (Archaeological Heritage office, Strategic Mission Unit Superintendence for Cultural Heritage and Activities, Autonomous Province of Trento, Italy) - Abar, Aydin (Division of Mining and Resource Archaeology, Department of Archaeologies, University of Innsbruck, Austria) - Bellintani, Paolo (Archaeological Heritage office, Strategic Mission Unit Superintendence for Cultural Heritage and Activities, Autonomous Province of Trento, Italy) - Angelini, Ivana (Department of Cultural Heritage, University of Padua, Italy) - Artioli, Gilberto (Department of Geoscience, University of Padua, Italy) - Lucarelli, Chiara (Department of Geoscience, University of Padua, Italy)

In eastern Trentino (Northern Italy), a total of 205 smelting sites, dedicated to processing copper minerals (mixed sulphides mostly with chalcopyrite), have been recorded so far, most of which are traditionally dated to the Italian Recent and Final Bronze Age. Despite the considerable number of smelting sites, very little data is available on pre-historic mines.

Following the destruction caused by the storm VAIA, investigations at Vetriolo (Levico Terme) restarted in 2020, in the area where Preuschen hinted at prehistoric mining in the 1960s, but could not prove it. A number of features (depressions, heaps and dumps) have been discovered that are likely associated with prehistoric mining activity. Surveys, excavations, and related finds thus far support the hypothesis of local mining during the latest phases of the Bronze Age, and even indicate that mining, beneficiation, and the production of finished products took place on the same site. The archaeological contexts are not the only indication that the Trentino mining district was prosperous at that time. In recent years provenance studies on the origin of copper in metal objects typologically dated to all the phases of the Italian Bronze Age (in particular from the Garda region) and the later European Bronze Age (e.g. Scandinavia, Western and Central Balkans, Bulgaria), have suggested that some of it is of south-eastern Alpine origin (Trentino – Alto Adige/Veneto).

In this paper, mineralogical, chemical and isotopic data from Vetriolo ores, as well as metal objects and a few slags will be presented. This information is integrated into a comprehensive database that covers most copper deposits and many objects in Europe. The approach aims to provide insights into the significance of the mining area in interpreting ancient metal production and exchange in the Alpine region and beyond.

9 SILVER- AND COPPER-INLAYED BELT GARNITURES OF THE 6TH-7TH CENTURIES AD AND THEIR SPREAD AROUND THE ALPS

Samu, Levente (Eötvös Loránd University Budapest) - Koch, Ursula (Curt-Engelhorn-Zentrum Kulturgeschichte an Reiss-Engelhorn-Museen Mannheim) - Daim, Falko (Department of Prehistoric and Historical Archaeology, University of Vienna)

In the early medieval times the belts played a special role in the visual communication. They could express the social status and hierarchy between individuals. In the Avar age Carpathian Basin (6th-9th centuries AD) the belts and belt garnitures were especially accentuated. Thanks to the burial customs and the excavated large cemeteries we have now a relatively detailed picture about the metal sets of these belts and in general about the belt structures.

Among the large variety of belts the silver- and copper-inlayed ones (tauschierte Gürtelgarnituren) build a special group. The iron strap-ends and mounts were decorated with different silver- and/or copper-inlayed ornamental elements. They were spread in large areas between Frankia and the Carpathian Basin from the second half of the 6th century on until the end of the 7th century. Based on their structure and decoration (motives) they can be divided into many different typological and chronological subgroups. Thanks to them we are also able to connect the chronological systems of different regions. Their spatial distribution is also important, as they can mark important communication routes connecting the regions around the Alps and beyond.

10 THE COPPER OF THE AVARS: ON THE PROBLEM OF EARLY MEDIEVAL METAL RESOURCES IN EAST-CENTRAL-EUROPE

Mozgai, Viktória (HUN-REN RCAES Institute for Geological and Geochemical Research) - Villa, Igor (Institute of Geology, Bern University) - Bajnóczi, Bernadett (HUN-REN RCAES Institute for Geological and Geochemical Research) - Szenthe, Gergely (Hungarian National Museum)

Our case study addresses the question of the early medieval revival of copper production in Europe. The focus of the research area is the Carpathian Basin, located on the eastern periphery of the zone influenced by European early medieval processes. The research of where and when early medieval metal production started in the region in our case also provides answers to the question of how the region was linked to the European continental economic network, which is until recently an unresolved problem. Ore extraction and the production of various non-ferrous metals (copper, silver, gold) had important centres in the Carpathian Mountains throughout the Middle Ages until the Modern Era. Concerning the Avar period, our study is based on copper samples taken from 'Late Avar' (c. 8th

century AD) artefacts, which were used for certain purposes alongside the copper alloys predominant in the period, containing mostly lead as alloying material. As the samples were selected from the entire Avar cultural area, results are representative of the entire region, and allow the identification of copper resources accessed by the inhabitants of the Carpathian Basin.

957 DESTROYED, SUBMERGED, AND UNREACHABLE: THE CHALLENGING INTERPRETATION OF HUMAN STRATEGIES ACROSS LOST LANDSCAPES

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Gomes de Almeida, Miguel (Dryas / Octopetala) - Aubry, Thierry (FCP - Fundação Côa Parque)

Session format: Regular session

Prehistoric research responds to a demanding scientific programme aimed at replicating the ethnographers' emphasis on human social relationships, economic strategies, technical procedures, interpersonal variability, and material culture.

This Paleolithic approach (based on complementary analytical tools, such as techno-typological analysis, raw material identification, and site catchment analysis) requires a thorough exploitation of each site's archaeological remains (both artifacts and ecofacts) informative potential, to reconstruct the groups' everyday routines, but also their subsistence strategies and normative cultural structures.

This approach also broadens the archaeologist's horizons by placing each site within the context of the territory(/ies) defined by the movement of objects, people, and ideas deduced from intra-site analyses. Recent research stresses site complementarity and, occasionally, surprisingly large territories or circulation areas.

However, these interpretative efforts frequently struggle with fragmentary and incomplete knowledge of the ecological context and landscapes in which the prehistoric groups evolved.

Although this lack of information is often due to insufficient Palaeogeographic and Palaeoenvironmental reconstructions of past landscapes, as well as the alea of archaeological preservation, regional studies have highlighted the methodological difficulties in understanding the groups' adaptations to landscapes still largely unknown to us.

While large stretches of shoreline are currently underwater because of Holocene sea-level rise, which prevents us from knowing vital information about the economic adaptation to these unique, rich ecosystems, the recent interactions between the effects of climate change and growing anthropogenic artificialization of the landscape further limit our ability to access important archaeological data, or even wipe it out entirely.

Contributions are expected to focus on:

1. Data collection and surveys in environments difficult to access, destroyed, or submerged.
2. The palaeogeographic/palaeoecological reconstruction of lost landscapes.
3. Regional interpretations of human cultural responses to these ill known territories.
4. Resilience and mitigation projects for climate change and anthropogenic artificialization impacts on archaeological resources.

ABSTRACTS

1 AN UNEXPECTED TURN OF (MIDDLE!?) PALAEOOLITHIC EVENTS: PICÕES DOS GRILOS 4

Aubry, Thierry (Fundação Côa Parque; Uniarq - Centro de Arqueologia da Universidade de Lisboa) - Almeida, Miguel (Morph / Grupo Dryas; Uniarq - Centro de Arqueologia da Universidade de Lisboa) - Aires, Sílvia (Fundação Côa Parque) - Luís, Luís (Fundação Côa Parque; Uniarq - Centro de Arqueologia da Universidade de Lisboa) - Silvestre, Marcelo (Fundação Côa Parque) - Ramos, Patrícia (CITCEM, Centro de Investigação Transdisciplinar "Cultura, Espaço e Memória") - Ferreira, André (Morph / Grupo Dryas)

Despite the link between the Palaeolithic rock art concepts, style, and techniques of the UNESCO World heritage sites of the Côa Valley and Siega Verde, the previously known archaeological record in the territory between these rock art concentrations showed scarce evidence of Palaeolithic occupation: most coeval sites were limited to the lower Côa Valley, indicating that humans mainly occupied deep valley refugia, contrasting with limited logistic activities in the plateaus.

Recent archaeological surveys conducted to test this hypothesis, were based on the geological evidence that:

- (1) near-surface impermeability in large areas of the plateau and
- (2) early spring snow melting or rainfall concentration due to climate oscillations

would provide excellent conditions for large herbivores in the plateau areas, at least seasonally, during most Upper Pleistocene.

This survey project documented the Pleistocene occupation of the Côa / Águeda interfluvial plateau: surface lithic remains were identified in numerous locations, including several sites with likely preservation of stratified archaeological layers, which were selected for subsequent intrusive tests.

One of these sites, Picões dos Grilos 4, yielding an abundant surface lithic remains with raw material and technological features indicating an Upper Palaeolithic occupation, was excavated, revealing an unexpected find: while no stratified layers produced objects archaeological related to the surface series, a deep, preserved, isolated layer delivered a technologically coherent set of lithic artifacts similar to other known regional Middle Palaeolithic sites.

This discrepancy between surface remains and preserved stratified archaeological layers has methodological implications, as it means that future surveying should focus on the potential of preserving Pleistocene layers, rather than looking for surface remains.

This consideration only increases our absolute dependency on a detailed reconstruction of past climate and landscape evolution: such knowledge, which is critical for interpreting human adaptation to Past Landscapes, thus becomes equally essential for identifying archaeological stratified sites.

2 SOMEWHERE BEYOND THE SEA SEARCHING FOR MORE AHRENSBURGIAN

Grimm, Sonja (Leibniz Zentrum für Archäologie, LEIZA-ZBSA)

Submerged in today's North Sea and Baltic Sea are large landscapes that Late Pleistocene hunter-fisher-gatherer communities could explore. Different geoscientific and palaeoenvironmental studies have reconstructed these landscapes in the last decades and identified rich and diverse environments that underwent significant transformations after the last glacial maximum (c. 24.5-17.0 kyrs BCE). However, only single archaeological finds that were dredged from the sea ground are attributed to this Late Palaeolithic period. The Cimbrian Peninsula bridges the "lost landscapes" of the North Sea and the Baltic Sea. The archaeological record from this area makes building hypotheses about land use also for the today submerged territories possible.

This presentation brings together our current knowledge about the period from the end of the Lateglacial Interstadial to the beginning of the Postglacial (c. 11-9.3 kyrs BCE). I use the reconstruction of the submerged landscapes of the North Sea and the Baltic Sea as well as of the Cimbrian Peninsula and compare these changing landscapes with our knowledge of the Late Palaeolithic Ahrensburgian settlement and land-use strategies mostly from the Cimbrian Peninsula but also from other areas adjacent to the North Sea and the Baltic Sea. Hence, I aim to understand the development of the Ahrensburgian based on our for different reasons limited knowledge across these lost landscapes.

3 ANTHRACOLOGICAL EVIDENCE ON LOST WOODLANDS OF THE CURONIAN SPIT AND ITS IMPLICATIONS ON NEOLITHIC SITES, PALEOENVIRONMENT AND THE SPIT FORMATION

Peseckas, Kestutis (Nature Research Centre (Vilnius, Lithuania)) - Pilkauskas, Mindaugas (Lithuanian Institute of History) - Piličiauskas, Gytis (Lithuanian Institute of History)

The Curonian Spit separates Baltic Sea from the Curonian Lagoon. It was formed at the end of the Atlantic and the beginning of the Subboreal and is composed almost entirely of aeolian sand. Landscape of the Curonian Spit in the past was repeatedly formed and deformed during the sand dune activation (deflation) and stabilisation (paleosol formation) phases. These processes are attributed to both natural and anthropogenic factors leading to deforestation. As a result of dune reactivation and westerly winds between 3500 and 1000 BP Curonian Spit migrated about 180 m and in the last 1000 years almost 500 m to the east. Today, the Spit is characterised by its unique dune system, consisting of selected and protected areas with still active dunes and dunes stabilised over the last 150 years by the construction of protective dune ridge and extensive tree planting program. Most of the area of the Curonian Spit is covered by forests, but only a fraction of them are naturally grown and have been preserved since the 18th century.

Curonian Spit is also known for its Neolithic sites of Corded Ware and Bay-Coast cultures that settled the Spit during 4th and 3rd millennium BC. For the reasons mentioned above, the prehistoric landscape of these sites is difficult to understand, however in the last 10 years renewed interdisciplinary field research has provided reliable palaeoenvironmental interpretations. Today we add to them the results of the first anthracological analysis of charcoal from the Nida and Alksnynė sites. Different dominant wood species were identified in these sites, suggesting different edaphic conditions in the southern and northern parts of the Spit. The results of this analysis contribute to the understanding of the archaeological sites, their natural environment and functions, and also give an insight into the unique period of the Spit formation.

4 NEUENWALDE - A SANDY SLOPE AND CHANGING WETLANDS IN NORTHERN GERMANY

Mahlstedt, Svea (Lower Saxonian Institute for Historical Coastal Research) - Siegmüller, Annette (Lower Saxonian Institute for Historical Coastal Research) - Wolters, Steffen (Lower Saxonian Institute for Historical Coastal Research)

Some 15 km from the present day North Sea coast and on the edge of a vast wetland area the sandy slope of Neuenwalde has been occupied by early and mid-Holocene inhabitants for several thousand years. During this time the wetlands changed from a floodplain of a little streamlet to a large raised bog region that during Neolithic times also got affected by a temporary marine ingression.

An excavation in the 1960s on sandy grounds has given evidence that the upper part of the slope was inhabited. An intensive survey of the area conducted between 2019 and 2023 searching for well preserved remains in the deeper parts of the slope today covered by wetland revealed several traces of early and mid-Holocene human activity in a constantly changing landscape.

This paper strives to bring together the different aspects of archaeological traces and landscape development with a more general interpretation of the role, which the slope of Neuenwalde played in the life of early and mid-Holocene small scale societies.

5 THE SEA-LEVEL RISE AND THE HUMANE RESPONSE IN THE NEOLITHIC PERIOD IN THE SOUTHERN LEVANT

Indino, Lorenzo (Sapienza University of Rome)

The paper will examine some submerged Neolithic settlements (7500-6000 B.C.) that were exposed off the Carmel coast of Israel, in an area of about 8 km². The discovery of human burials, rectangular stone structures, megalithic structures, olive oil extraction installations and stone-built water wells shows a fully agricultural subsistence economy. The development of wells that utilized coastal aquifers enabled permanent human habitation near the coastline for the first time in this area. But settlements adjacent to the sea are most vulnerable by climate change. Indeed, this period is associated with an abrupt rise in sea-level and consequent alteration of coastal landscapes and their ecology. The humane response to sea-level rise is highlighted by large stones in the water wells to raise the well bases and so enable them to exploit fresh water from the upper to avoid the salinization or the construction of a seawall at Tel Hreiz. These are evidence of mitigation for the climate change in the Neolithic period

6 SUNKEN PREHISTORIC SHIP SLIPWAYS ON THE EAST COAST OF THE ADRIATIC SEA

Parica, Mate (University of Zadar, Department of archaeology)

Recently, several sunken prehistoric sites have been found on the Croatian Adriatic coast. They date from the Neolithic to the Hellenistic period, and some of them contain traces of ship slips.

Some sites are settlements, others are naval trading bases. The most common slipway structures were built in places where the natural slope angle is too steep to pull ships out. In this case, dry stone constructions were used to build ramps with a smaller angle so that the ships could be pulled out more easily. A higher concentration of pottery can be observed in the area of the above-mentioned ramps. If we assume that the towing of ships on dry land was prevalent in prehistoric times, then the Italian Adriatic coast is also very suitable for sailing to the northern Adriatic. This is evidence that ships were kept on the coast from the earliest times and that the Liburnian ships continued this tradition, due to the geomorphological and meteorological characteristics of the Adriatic.

965 IN-SITU SENSING OF (GEO-)ARCHAEOLOGICAL SOIL AND SEDIMENT ARCHIVES: EMERGING METHODOLOGIES AND APPLICATIONS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Werther, Lukas (German Archaeological Institute, RGK) - Verhegge, Jeroen (Gent University) - Brown, Antony (University of Southampton; The Arctic University of Norway Tromsø) - Köhler, Anne (Leipzig University)

Session format: Regular session

In recent decades, there have been significant advances in the use of aerial remote sensing techniques (e.g., LiDAR) and proximal sensing methods (e.g., near-surface geophysics) in archaeology. While these approaches yield high-resolution data at the horizontal level, their capacity for vertical subsurface discrimination is more constrained. This limitation is often addressed by collecting data as the sensor moves down the soil profile or within a borehole. Consequently, the miniaturization of computing and sensing equipment has enabled a growing adoption of direct push-type sensors (e.g., cone penetration testing, color logging tools) in (geo-)archaeology, particularly for mapping deeply buried deposits in-situ, especially in wetlands and floodplains. In parallel, sensors traditionally capable of microscoping

sensing, but originally designed for laboratory use, such as portable X-ray fluorescence (pXRF) and portable OSL (pOSL), have now been adapted for field measurements, enhancing their applicability in on-site archaeological investigations of sections and profiles.

Archaeological investigations often require the integration of multiple sensing techniques, each capturing different types of evidence. However, integration poses significant challenges in fusing different scales, dimensions, and properties and extracting meaningful information from diverse datasets. Moreover, the varying signals and responses encountered in different archaeological and soil materials underscore the necessity for comparative frameworks, databases, and networks. As a result, there is also a growing need for the development and deployment of low-cost, efficient equipment.

This session invites papers that explore novel in-situ sensing approaches in (geo-)archaeological research. Topics of interest include, but are not limited to, direct push sensing, borehole and core applications, long-term monitoring of in-situ archaeological remains, or handheld sensing and imagery applications in excavation settings as well as examples of in situ data with remote/proximal sensing fusion. Submissions that address the session's themes of technological innovation, methodological challenges, and practical applications in diverse archaeological contexts are particularly welcomed.

ABSTRACTS

1 ENHANCING DETECTION OF LOW-CONTRAST PREHISTORIC SITES THROUGH INVASIVE GEOPHYSICAL FIELD INVESTIGATIONS

Verhegge, Jeroen (Ghent University) - Mendoza Veirana, Gaston (Ghent University) - Cornelis, Wim (Ghent University) - Grison, Hana (Czech Academy of Sciences) - Rensink, Eelco (Cultural Heritage Agency of the Netherlands) - De Kort, Jan-Willem (Cultural Heritage Agency of the Netherlands) - Pisz, Michał (University of Warsaw) - Jakubczak, Michał (Polish Academy of Sciences) - De Smedt, Philippe (Ghent University)

In archaeological geophysical prospection, predicting whether an archaeological feature will show a detectable contrast using geophysical methods is challenging due to the variable geophysical responses of the subsurface materials. Forward modelling, simulating instrument responses over synthetic models of subsurface contexts, is one approach to this issue. However, accurately defining the models' parameters is not straightforward. While the geometry of potential archaeological features and soils is static, and can often be assessed through archaeological information, addressing the geophysical properties of features' backfills and soil horizons remains challenging. Furthermore, many of these properties, such as electrical conductivity or dielectric permittivity, are dynamic because they are influenced primarily by soil moisture content, which is variable.

These challenges are addressed by developing practical field strategies for collecting geophysical data and soil samples to better understand and predict the geophysical characteristics of archaeological sites. This includes measuring and sampling excavated sections to refine models that link soil properties to geophysical attributes, and employing long-term geophysical monitoring to evaluate the impact of soil moisture dynamics on geophysical signals.

By improving the parametrization, the ability to simulate the detectability of archaeological features with various instruments is enhanced, thereby improving survey strategies as well as interpretations. Thus, this approach offers a less biased and quantitative approach than relying solely on expert opinion. Finally, this approach offers a route towards integrating geophysical research in invasive archaeological investigations.

The effectiveness of this approach is showcased through case studies in the European lowlands, including a Final Palaeolithic palaeosol horizon in Lommel (Belgium), a Neolithic pit feature in Valthe (Netherlands), and a Neolithic long-house in Radojewice (Poland) to strategize surveys, resolve discrepancies in survey data and enhance understanding of archaeological contexts.

2 DIRECT PUSH- SENSING AND GEOPHYSICAL MAPPING - INSIGHTS INTO A TOOLBOX FOR ENHANCED INVESTIGATION OF FLOODPLAIN STRUCTURES

Werban, Ulrike (Helmholtz Centre for Environmental Research - UFZ, Leipzig, Germany) - Köhler, Anne (Institute for Physical Geography, University of Leipzig, Germany) - Dietrich, Peter (Helmholtz Centre for Environmental Research - UFZ, Leipzig, Germany) - Werther, Lukas (Romano-Germanic Commission, German Archaeological Institute, Frankfurt, Germany) - Zielhofer, Christoph (Institute for Physical Geography, University of Leipzig, Germany)

Floodplain sediments serve as valuable geoarchives, offering significant potential to enhance our understanding of past landscapes. However, conducting detailed investigations, such as excavations, in floodplain areas can be challenging due to high groundwater levels. Consequently, non-invasive and minimally invasive investigation methods have gained popularity in geoarchaeological research over the last few years. Despite their potential, these methods are often underutilized. In our presentation, we aim to provide an overview of direct-push-based in situ sensing meth-

ods for geoarchaeological investigations. We will showcase a diverse range of technologies and highlight the drawbacks and advantages of each method. These include Electrical Conductivity (EC) logs, Cone Penetration Testing (CPT) techniques and innovative color logs all providing vertical highly resolved profiles of subsurface properties associated with fluvial stratigraphy. Moreover, we will explore how floodplain studies can benefit from a combined approach that integrates direct-push sensing technology with near-surface geophysical imaging methods. Geophysical methods allow near surface investigation along transects or even over large areas. This integrated approach allows for a multi-dimensional spatial exploration of floodplains, providing a more comprehensive understanding of their architecture.

3 **LOOKING BENEATH THE SURFACE. RECONSTRUCTING FORMER FLOODPLAIN LANDSCAPES USING MULTIPROXY ANALYTICAL TECHNIQUES ACROSS THE RIVER AVON AND STONEHENGE ENVIRONS**

Pears, Ben (Department of Geography & Environmental Science, University of Southampton, UK) - Hudson, Sam (Department of Geography & Environmental Science, University of Southampton, UK) - Koehler, Anne (Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany) - Kreck, Manuel (Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany) - Pohle, Marco (Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany) - Tomsett, Christopher (Department of Geography & Environmental Science, University of Southampton, UK) - Werban, Ulrike (Helmholtz Centre for Environmental Research – UFZ, Leipzig, Germany) - Zielhofer, Christoph (Institute for Physical Geography, Universität Leipzig, Leipzig, Germany) - Brown, Tony (Department of Geography & Environmental Science, University of Southampton, UK; Tromsø Museum, UiT, Tromsø, Norway)

British chalk river systems are important but sensitive geomorphological landscapes which have a close historic relationship with anthropogenic factors. Over exploitation and the intensification of human activity in the last 500 years (primarily through drainage and water meadow creation) has however led to a loss in the complex and dynamic biophysical mosaic supporting ecological variation used to reconstruct past environmental conditions.

Here we demonstrate a distinctive multiproxy approach combining surface (LiDAR) and subsurface Electromagnetic Induction, (EMI), Electrical Resistivity Tomography (ERT) and Direct Push Colourimetry survey techniques alongside new and traditional sedimentological and palaeoenvironmental methods (e.g. SedaDNA) to look through surface disturbance in the Wiltshire Avon floodplain on the edge of the Stonehenge environs.

The use of this innovative multi analytical methodology has been invaluable in the discovery of discrete palaeochannels and fluvial deposits associated with the early history of the Avon fluvial landscape, particularly from the Mesolithic period to the Bronze Age. The development in our understanding of early to mid-Holocene fluvial dynamics and vegetation history will provide a greater context for human activity and occupation of the area.

4 **DEVELOPING A SURVEY STRATEGY FOR THE DETECTION OF DEEPLY BURIED PREHISTORIC SITES, ADDING VALUE TO GEOTECHNICAL INVESTIGATIONS**

Vanhecke, Michiel (Geosonda Environment nv)

We propose a strategy to detect deeply buried prehistoric landscapes buried below Holocene clay and peat deposits in the polder landscapes and coastal plains of the Low Countries and illustrate its efficacy through recent case studies where it also contributes significantly to geotechnical investigations.

In these contexts, where high groundwater levels and local geology do not allow cost-efficient invasive prospection, non-invasive geophysical survey and/or minimally invasive direct push sensing, in combination with high-quality core sampling allows the reconstruction of Early to Middle Holocene paleolandscapes.

In a first phase, frequency domain electromagnetic induction survey maps shallow variations in lithology. These surface covering proxy data are characterized by a high horizontal resolution but require targeted validation tests (CPT or drillings) on specific locations to allow lithological interpretation.

Secondly, accurate depth sounding data on mechanical and other soil properties are collected using Direct-push sensing (CPT-E, camera-CPT, magneto-CPT). An interpolation of the interpreted measurements leads to an underground landscape model where lithostratigraphic units are defined, anomalies can be delineated and expectations regarding archaeological occupation can be raised. Moreover, the results provide the basis for optimizing the geotechnical survey campaign.

Third, sonic drilling samples complete or discontinuous soil profiles. The large sample volume (10 cm diameter) of this drilling technique allows the validation and correlation of the geophysical and direct push survey data and the resulting cores are suitable for both archaeological applications (artefact scatter mapping, palaeoecological sampling, dating, ...) and geotechnical laboratory analysis (mechanical properties, soil behavior characterization, ...).

Since the geophysical data, CPT-data and soil samples resulting from the geoarchaeological survey are valuable for project developers, contractors, environmental and geotechnical engineering firms, and public authorities alike and

because they supply high-quality soil data for a later stage of the development process, this methodology forms an important bridge between (geo)archaeological research and geotechnical investigations.

5 **ASSESSING MAGNETIC ANOMALIES WITH SUSCEPTIBILITY MEASUREMENTS AND SOIL ANALYSES - A REPORT FROM A ROMAN TOWN IN GERMANY**

Pickartz, Natalie (State Office for Cultural Heritage Baden-Württemberg) - Dreibrodt, Stefan (State Office for Cultural Heritage Baden-Württemberg) - Konrad, Michaela (Institute for Archaeology, Heritage Conservation Studies and Art History, University of Bamberg) - Schmöler, Astrid (Institute for Archaeology, Heritage Conservation Studies and Art History, University of Bamberg) - Kortüm, Klaus (State Office for Cultural Heritage Baden-Württemberg) - Faber, Andrea (Institute for Archaeology, Heritage Conservation Studies and Art History, University of Bamberg) - de Neef, Wieke (Institute for Archaeology, Heritage Conservation Studies and Art History, University of Bamberg)

A Roman site of about 25 ha is located next to the German city 'Neuenstadt am Kocher' in the northern part of Baden-Württemberg. The Roman town was erected as part of infrastructure measures during the relocation of the Limes around 160 CE. The site has been documented over several years by aerial photography and small scale geophysical surveys. The first ground penetrating radar (GPR) and magnetometer surveys were conducted about 20 years ago. Test trenches and excavations were performed at several locations throughout the site, e.g. at the Apollo-Grannus temple. In 2023, the State Office for Cultural Heritage Baden-Württemberg in cooperation with the University of Bamberg surveyed a 17.5 ha contiguous area with magnetic gradiometry. This yielded a comprehensive map of the site with a precise localization of all buildings known from aerial photographs. Apart from those buildings, magnetic anomalies of possible pits or kilns were detected. Some parts of the site show no anomalies that can be associated with archaeological features. To investigate the use and function of the pits and the 'empty spaces', minimal invasive studies are conducted. These include in-situ downhole measurements of the magnetic susceptibility and the determination of soil characteristics (RGB colors, pH values, grain size distribution, Loss on ignition, susceptibility) in the laboratory. The distribution of the boreholes allow also to determine the soil thickness on top of the archaeological layers in different parts of the site and to reconstruct the post-depositional formation and erosion processes. These combined data allow a risk assessment relevant for cultural heritage management.

6 **LARGE-SCALE GEOCHEMICAL PROSPECTION WITHIN THE PROCESS OF RESCUE ARCHAEOLOGICAL RESEARCH - INTEGRATED MULTI-METHODOLOGICAL ARCHAEOLOGICAL PROSPECTION (IMAP)**

Fišer, Jan (University of Hradec Králové) - Horák, Jan (University of Hradec Králové) - Holas, Matouš (Museum of Eastern Bohemia in Hradec Králové) - Holbová, Tereza (University of Hradec Králové) - Katonová, Klára (University of Hradec Králové) - Kindlmann, Petr (Osina Archo) - Plíšek, Jan (University of Hradec Králové) - Rytíř, Ladislav (University of Hradec Králové) - Soltészová, Kitty (University of Hradec Králové) - Bambasová, Sylva (University of Hradec Králové)

This paper brings the overview of large-scale geochemical prospection in the context of the IMAP (Integrated Multi-methodological Archaeological Prospection) project. The IMAP project is primarily focused on the development of methodology and multidisciplinary in archaeological prospection. Methods used in this project include geophysical prospection, traditional archaeological collections, and soil characteristic analyses. The paper will present the approach and results of the main method of the project, which is large-scale geochemical sampling. The extent of the sampled area is 5.5 ha and the number of samples collected exceeds the commonly used datasets in archaeology (over five thousand samples). The strategy of sampling and subsequent processing of samples in this quantitative level, moreover, in the context of time constraints associated with the characteristics of rescue archaeological research, requires specific organizational demands and requirements of a practical and theoretical nature, the sum of which and the approaches of solution we would like to present in this paper together with preliminary results. The aim of the project is to create a unique big dataset, which aims at understanding the transect of the past of a part of the landscape without regard to the delineation of the archaeological site. The project tested new hypotheses and analytical approaches with potential to touch also other scientific disciplines beyond archaeology like soil science, landscape development, environmental sustainability etc.

7 **ARCHIVING THE SEDIMENT ARCHIVE: INTEGRATING IN-SITU GEOARCHAEOLOGICAL DATA AND REMOTE SENSING DATA IN A HISTORIC LANDSCAPE CHARACTERISATION FRAMEWORK**

Jetzinger, Doris (Department of Prehistoric and Historical Archaeology, University of Vienna)

Investigating archaeological landscape histories presents a challenging task that is characterised and exacerbated by the time frame, spatial extent, and diverse topographical settings of the respective study area. The most important

source of information for tackling such research objectives is constituted by soil and sediment archives. Sediments represent key artefacts for archaeological landscape research as all processes and activities that take place within a landscape are recorded via or within the sediment. Multidisciplinary approaches employing joint applications of in-situ and remote sensing techniques, geophysical prospection, and geoarchaeological methods are widely used to study sediments for research on archaeological landscapes. However, after data acquisition little attention is often paid to establishing a solid methodological framework for integrated data archiving, analysis, and interpretation.

In this paper we present a novel approach that is currently being undertaken by the “Life of a Landscape” project to address this desideratum by employing Historic Landscape Characterisation (HLC) as a methodological framework to facilitate an integrated, joint analysis of diverse landscape- and geoarchaeological datasets. HLC is a tool for storing, visualising and analysing information on changes and developments in landscapes over time. Our project aims at creating an archaeological landscape biography of the Kreuttal microregion in Lower Austria by studying the sediment archives via targeted percussion coring, in-situ sedimentological analysis and sampling for pXRF, pOSL, and stable isotope analysis, as well as geophysical prospection and remote sensing techniques. For each data set a separate category is defined within the HLC framework to facilitate analysis and interpretation within a consistent, comparative environment. This methodological framework allows for a multifaceted yet structured study of the project area’s sediment archives that will offer insights into the landscape history, landscape and land-use changes, and human-landscape interactions over time.

8 QUANTUM ARCHAEOLOGY: EXPLORING GEOPHYSICS AS A TOOL FOR THE ANALYSIS OF ARCHAEOLOGICAL SITES

Boucher, Andy (Headland Archaeology (UK) Limited) - Gwilt, Tom (Headland Archaeology (UK) Limited) - Harrison, Sam (Headland Archaeology (UK) Limited) - Walker, Joanna (Headland Archaeology (UK) Limited)

The success of geophysical prospection methods has naturally lead to them being focused on locating and identifying targets for further investigation. We will explore the potential those same geophysical properties have to assist us with understanding archaeological sites ranging from Palaeolithic to early historic in date. We will also look at the obstacles to implementing these methods and ways in which they might become “democratised” within the wider archaeological workforce. We will present examples that include high resolution remapping of features to unravel phasing and predict the parts of site that are most meaningful to investigate, we will consider insitu profiling of magnetic properties and how these can be related to each other. Our aim is to improve the way in which archaeological sites are approached and provide a quantitative approach that can be used to back up more subjective and qualitative observations. We also aim to compare the results from this work alongside information that pXRF can now provide to help formulate future approaches and equipment.

9 ENHANCING GPR DATA QUALITY: DATA COLLECTION, INTEGRATION, AND ANALYSIS IN LONG-TERM MONITORING APPROACHES

Schneidhofer, Petra (Department for Cultural Heritage Management, Vestfold County Council) - Nau, Erich (Norwegian Institute for Cultural Heritage Research) - Tonning, Christer (Department for Cultural Heritage Management, Vestfold County Council) - Cannell, Rebecca (Norwegian Institute for Cultural Heritage Research) - Hinterleitner, Alois (GeoSphere Austria)

Since 2016, the department for cultural heritage management of Vestfold County Council (Norway) and its partners have investigated the influence of environmental factors, particularly soil moisture, on GPR data quality acquired for archaeological purposes. Two projects, namely pilot study The Borre Monitoring Project and three-year project VEMOP focused on the geophysical response in GPR data acquired under different environmental conditions across several known archaeological sites in southern Norway.

The novelty of using long-term monitoring to better understand the connection between environmental factors and GPR data quality necessitated considerable effort in designing a suitable research approach. This approach involved combining the acquisition of different GPR time series with in-situ, real time monitoring of the subsurface properties relevant for electromagnetic wave propagation at each site. Equipment selection, including GPR devices and monitoring tools such as soil moisture sensors, rain gauges, and frost tubes, was based on suitability to research questions, budget constraints, and compatibility with the Nordic climate.

The analysis of the resulting extensive dataset required the development of a custom-written analysis tool: APlinside 1.0 allowed to efficiently integrate the different subsurface and electromagnetic properties recorded, including volumetric water content, bulk electrical conductivity, soil temperature, precipitation rates, snow depth, depth of frostline as well as EM wave velocity and signal attenuation and compare them against the quality of the respective GPR data sets.

This paper provides a detailed overview of the project design, equipment selection, and introduces the application of the analysis tool APlinside 1.0.

10 MORE THAN MEETS THE EYE: HYPERSPECTRAL IMAGING FOR THE RECORDING OF ARCHAEOLOGICAL FEATURES AND DEPOSITS

Crabb, Nicholas (Bournemouth University)

Hyperspectral imaging is a non-destructive technique that captures rich spectral information of a scene or target. Unlike conventional cameras, which record panchromatic imagery, or multispectral sensors that cover a small number of narrow or broad wavelength regions, hyperspectral sensors collect data across hundreds of contiguous spectral bands. The provision of this detailed spectral information can enable an improved characterisation and classification of different materials, and hyperspectral sensors are increasingly widely used for a range of remote sensing and laboratory analyses in other disciplines. For example, it is currently under significant development for analysing geological samples and is employed in the food industry to assess quality. However, the application of hyperspectral imaging in archaeology has been largely confined to ‘horizontal’ remote sensing of the ground surface, as opposed to analyses of vertical subsurface sediment or soil profiles. This is in part due to the high-cost and lack of portability of conventional hyperspectral systems, but the recent availability of more affordable sensors adapted for field-use has meant that there are options available for archaeological fieldwork.

This paper will discuss the potential contribution that compact hyperspectral sensors can make to the recording of archaeological features and deposits. It will present initial results from an archaeological site in southern Britain and provide comparison with other datasets (e.g. conventional site records (section drawings/photographs), pXRF and other geoarchaeological laboratory methods (particle size analysis, loss on ignition, magnetic susceptibility)). It aims to establish whether an improved characterisation of archaeological features can be identified through hyperspectral imaging, that might not otherwise be achievable through recording with common cameras or the human eye. Such an approach has potential to allow for a more quantitative approach to the recording of archaeological features, and for additional details of deposits to be established (e.g. sediment composition and organic content).

971 HEALTH OF LABORING COMMUNITIES ACROSS GEOGRAPHIES OF WORK

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Cianciosi, Alessandra (University of Amsterdam) - Caval, Sasa (Scientific-research center of the SAZU) - Manfio, Stefania (Stanford University)

Session format: Regular session

This session aims to discuss themes focused on laboring communities from antiquity to the pre-modern period, developed by social and environmental archaeologists, as well as historians and ethnographers. We invite participants to reflect on communities that have been marginalized or subjected to exploitation and social inequality. Our focus are the communities engaged in demanding labor activities, often related to the extraction or production of primary sources, and who, as a result, have become primary, albeit unconscious, agents of significant ecological transformations.

The goal is to explore the material life conditions of traditionally marginalized groups of workers in specialized sectors, such as plantations or mines. We would like to hear about different perspectives on how new technologies have influenced emerging environmental and labor-related hazards, and how these communities have coped with the adverse health and environmental consequences of their work activities. Through environmental archaeological data, we would like to discuss if and how working communities developed spaces of resistance against competing powers, as well as the conceptualization and dissemination of new knowledge to manage work-related risks.

Understanding these historical conditions allows us to reflect on labor practices in the past and their enduring material legacy. It also allows us to explore the disparities that persist in the contemporary world and how they can be addressed. We invite speakers to consider (bio)archaeological markers of resistance to inequality or marginalization and their effects, while also incorporating health and social inequality into the discussion. We anticipate generating a discussion about a scholarship on the study of inequality in the past and demonstrating how it can provide unique insights into the range of impacts on people’s health and ways of life.

ABSTRACTS

1 WHO WERE THE MINERS OF THE ROCCA SAN SILVESTRO CASTLE?

Viva, Serena (Department of History and Cultural Heritage, University of Siena; Department of Cultural Heritage, University of Salento) - Bianchi, Giovanna (Department of History and Cultural Heritage, University of Siena) - Geltner, Guy (History Department, Faculty of Arts, Monash University)

The ARC project ‘Pursuing Public Health in the Preindustrial World, 1100-1800’ (Monash University), has the objective of studying premodern age public healthcare, covering preventative practices used by different categories of

people and laborers with a historical and bio-archaeological approach. The project provides an opportunity to return to research at the castle of the Rocca San Silvestro, to investigate the human community and working conditions in a medieval mining context.

From 1984 to 1994, archaeological excavations were conducted on the site, revealing and meticulously documenting a setting characterized by mining areas, production areas, stately and working-class dwellings, a village, a church, and a cemetery.

The subject matter of public health is closely associated with the mining activity, maybe the primary purpose of the site. The ongoing anthropological and paleopathological investigations, after studying mortality patterns and biological characteristics of the sample, aim to understand the extent to which individuals were involved in mining activities, working conditions, health risks, and accident prevention practices. Furthermore, whether it is possible to identify evidence of medical environmental measures that could reduce harm or improve general health conditions.

The research also aims to comprehend all aspects related to mining operations, including the processing of the extracted materials, involving other classes of workers, and determining whether mining was not solely a source of income, but rather a complement to other activities such as breeding and farming.

To achieve this, we need a multidisciplinary approach, so in addition to bio-anthropological analysis the research will include archaeobotanical, archeozoological, geochemical, and chemical analyses, to answer numerous questions on the site's production dynamics, the pollution of the area caused by mining activity, the paleo-diet and the origin of the human community of San Silvestro.

Research like this could give new answers on a very important site in Italy's medieval panorama.

2 **MEDIEVAL MINERS AND SMELTERS: SILVER PRODUCTION, SETTLEMENT AND ENVIRONMENT**

Hrubý, Petr (Masaryk University of Brno) - Malý, Karel (Masaryk University of Brno) - Kočár, Petr (Institute of Archaeology, Academy of Sciences) - Petr, Libor (Masaryk University of Brno)

The lecture will present the results of the multidisciplinary mining archaeological research in Central Czech Highlands (CZ) in the last 10 years, which is focused on the study of medieval mining and smelting sites. It will show the two most archaeologically visible phenomena that were characteristic of silver production. Silver was an essential coinage metal, blood in the veins of the "Old World" economies, and the a means of power projection of the ruling elites. The first was the existence of settlements of miners and metallurgists. These settlements were in all respects different from agricultural villages and towns. They existed usually temporarily, but at the time of the great boom of silver production in the Czech Kingdom in the 13th century it was an important part of the social and settlement structure of the mountains and highlands. The second was the impact of metal production on the environment, especially the drastic deforestation and contamination of soils with heavy metals.

3 **BIOMECHANICS OF INDIVIDUALS FROM A COLONIAL DOCKYARD SITE IN BRAZIL**

De Almeida Prado, Patricia (Université Sorbonne Paris Nord; Universidade Federal da Bahia) - Borges, Caroline (Universidade Federal Rural de Pernambuco) - Nascimento Oliveira, Ana (Universidade Federal Rural de Pernambuco) - Souza Cunha, Claudia (Universidade Federal do Piauí)

This investigation aims to explore the upper limb biomechanics of the individuals buried in one of the oldest colonial cemeteries in Brazil. The archaeological site of Pilar is located in the namesake low-income neighbourhood of Recife. In the colonial period, this area was beyond the walls of what was to become the Village of Recife, latter to become the province capital. Surprisingly, this archaeological site is hardly reported in historical documents.

Regarding the human remains, more than 130 skeletons have been found at the site, some from the late 16th and early 17th centuries, as well as around 200,000 fragments and objects that are being analysed to understand the habits and details of the people who lived there in the 1500s and 1600s. Most individuals excavated are young males between 16 and 25 years old, although rare younger and older ones, as well as a couple of young women, have been found. Furthermore, those individuals are robust and some are over 1.70 m tall. They were buried in simple graves, in dorsal decubitus and mostly facing east. Many burials are double, although simple and triple ones have also been excavated.

To analyse the biomechanical forces on the shoulder complex, 36 pairs of clavicles with at least one muscle and 2 ligament insertions and their respective humeral deltoid insertions were selected. Preliminary analysis revealed that, when present, there is a correlation between the robustness of stress markers of the deltoid muscle on its clavicular and humeral insertions. There is also a correlation between the clavicular insertion of the deltoid and the robustness of the conoid and trapezoid ligament's insertion, demonstrating significant force loads on the upper limb. It should be noted that some individuals are sub-adults and already show robustness in the non-fused upper limb bones.

4 **LABOR EXPLOITATION AND HEALTH INEQUITIES AMONG SUGAR PLANTATIONS WORKERS IN MAURITIUS**

Cianciosi, Alessandra (Ca' Foscari University of Venice) - Manfio, Stefania (Stanford University)

In many colonies, the economy depended heavily on the cultivation of a single crop, and plantation owners employed forced labor, including slavery and indentured labor, to attain and sustain competitive production levels. Recent archaeological investigations in Mauritius have focused on surviving industrial and domestic areas within sugar plantations, providing insights into the intersection of power dynamics and cultural constructs within the configuration of plantation spaces. While the industrial areas underwent many transformations due to technological and industrial advancements, the domestic areas remained relatively unchanged. They were used indifferently by various communities of laborers, including enslaved and indentured laborers, single adult men, and family nuclei. Despite the effective standardization of working-class architecture, namely the use of line barracks associated with wells and water tanks, the accurate survey and preliminary excavations in several sites in Mauritius revealed a greater variability in material culture and dwellings solutions, suggesting spaces of resistance to conforming policies imposed by the landowners' elite. In light of these new insights, this contribution explores and discusses sanitary measures incorporated by labor communities in their domestic architecture, particularly regarding water management. Indeed, the island was plagued by malaria and cholera epidemics, which had a significant impact on certain districts and plantations during the second half of the nineteenth century. A comparative analysis rooted in landscape and architectural archaeology of several post-emancipation agrarian settlements forms the basis for future environmental research on health preservation in Mauritian plantations.

5 **"THE QUALITY OF LIFE": AN ARCHIVE OF INDENTURED LABOURERS' LIVES FROM MAURITIUS**

Caval, Saša (Scientific-research center of the SAZU, Ljubljana; University of Primorska, Koper, Slovenia)

Between the 1830s and 1920s, nearly half a million people migrated from South Asia to Mauritius in search of work. The urge for a better life was so strong that they were willing to cross the Kālā Pānī, even if it meant going against their religious beliefs and ending their reincarnation cycle. The indentured labour system was a British Colonial government experiment in which they wanted to replace slavery with cheap labour.

However, most workers who came to Mauritius decided to stay and build a new life on the island. They settled on the island, had families, and created a different life. The harsh working conditions in the sugarcane fields caused many health issues. People's lives were also impacted by poverty, malnutrition, and other ailments. The middle and second half of the 19th century was especially devastating due to many epidemic diseases that spread across the island and the destructive tropical cyclones that caused severe loss of life, with property and environmental damage.

The presentation will focus on the extensive burial records of the Bois Marchand Cemetery in Mauritius, which date back to January 1868. This cemetery was the largest in the Indian Ocean at its inscription in 1867, and the records provide a unique repository of demographic and disease data. There is no other archive like this for the region. The presentation will examine the health status of indentured workers buried at the Bois Marchand cemetery, as preserved in these burial registers.

6 **LABOUR, SLAVERY AND ETHNICITY IN 19TH AND 20TH CENTURY PEARLING COMMUNITIES, SHARK BAY AND COSSACK, WESTERN AUSTRALIA**

Anderson, Ross (Western Australian Museum)

The 19th century northern Australian pearling industry was controlled by European and colonial Australian interests. From its beginnings it depended heavily on Aboriginal and Asian divers for its labour force, initially wading, and then free-diving to collect pearl shell. Aboriginal and Asian people were valued for their maritime and free-diving skills, underwater vision and ability to undertake sustained physical effort in northern Australia's harsh climate, though their efforts met with little reward. The rapid growth of the shipping-dependent pearling and pastoral industries saw an allied need for construction of pastoral and maritime infrastructure. A shortage of Aboriginal workers (whether willing or not) led to an increasingly rapacious demand for labour, that led the colonial government to introduce laws to control the exploitation of Aboriginal people. The restrictions on Aboriginal labour and ongoing demand for workers saw labour sourced regionally from Malaya, Macassar, Timor, Ceylon, China, the Philippines and South Sea Islands. This paper presents the results of historical research and archaeological fieldwork undertaken into 19th and early 20th century multi-ethnic maritime communities at Shark Bay and Cossack, two significant locations in the early development of the northern Australian pearling industry.

973 PYROARCHAEOLOGY: FIRE-RELATED ENGINEERING, ENVIRONMENT AND CULTURAL PROXIES

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Schmidt, Patrick (Tübingen University) - Shaw, Candice (University of Toronto)

Session format: Regular session

Pyroarchaeological research encompasses natural and anthropogenic fire. The latter and its traces are understood as archaeological artefacts. This field relies on a large variety of methods to obtain environmental and behavioral proxies informing us on technology, diet, cultural activities and settlement patterns. Arguably, the most striking fire-related behaviour unique to modern humans is the use of heat to transform the properties of materials, processes which are sometimes termed “engineering” or “transformative techniques”. Beyond this, the analysis of fire-related artefacts and sediments can reveal cultural choices, environmental restrictions and variability, and evolutionary consequences. This session will be open to contributions from multiple disciplines concerned with the study of ancient fire, from the origins of fire use to its application in more complex technological innovations. The session puts special emphasis on the analysis of archaeological materials and experimental approaches, including their cognitive, cultural and social implications. Contributions from geoarchaeology, ethnography and ethnoarchaeology are also welcome. This large-scale approach aims at providing a comprehensive dataset on how fire-related techniques were invented and conducted, discusses new analytical tools and allows us to understand the role of fire in cultural evolution.

ABSTRACTS

1 SMOKE ON THE WATER: BURNT MOUNDS AND THEIR CERAMIC EVIDENCE IN BRITAIN

Fitzgerald, Nick (University of Bristol)

This paper will explore burnt mounds and their use in Britain, focusing on their ceramic and geographical evidence. Burnt mounds are a site type peculiar to Britain and Ireland that consist of a mound of fire-cracked rock, often occurring in conjunction with a trough. They are also often located in wetlands. These sites primarily date from the Bronze Age, although examples are also known from the Neolithic and Iron Age. Previously believed to be distributed mainly in Scotland, Ireland and Wales with pockets of activity in England, there is now enough evidence to extend the practice to England more broadly. Despite their apparent ubiquity, there remains no consensus on what purpose these mounds fulfilled. It is apparent that the fire-heated rocks were used to heat water within the trough at most examples, and so most uses that can be devised for hot water have been proposed. Currently the list of theorised uses stands at cooking, brewing, bathing, steam bending for wood, steam for forming leather, metalworking, horn working, and also the fulling of woollen textiles. This paper will examine burnt mounds in Britain through two approaches. Primarily it will examine the results of organic residue analysis at a major burnt mound site in England, presenting further information on the possible activities taking place. In addition, it will also utilise organic residue analysis to explore the relationship between the mound and its associated settlement, shedding further light on the position of burnt mounds within their contemporary societies. This will be combined with a secondary approach applying the preliminary results from a GIS database of burnt mounds in Britain, elaborating on the patterns and distributions found. The combination of these two approaches will provide an opportunity to look at these often undramatic monuments in a new light.

2 INVESTIGATING THE INTENTIONAL AND ACCIDENTAL IMPACT OF FIRE ON CLAY MATERIALS FROM OPPSAL, SOUTHEASTERN NORWAY

Polanska, Weronika (University of Oslo) - Fredriksen, Per Ditlef (Department of Archaeology, Conservation and History, University of Oslo)

Pottery and other ceramic material is produced by intentional heat preservation. While secondary burning damages ceramic material, this burning also preserves important information about the process. What information may be revealed when comparing intentional, controlled secondary firing of ceramic material from a cremation grave with similar material having undergone secondary burning in a nearby context characterised by uncontrolled and accidental circumstances? Here we present the results of a comparative analysis of pXRF and petrographic data of ceramics from recent excavations at Oppsal in southeastern Norway. We focus on funerary pottery from a burial mound and ceramic building material and domestic pottery found in a burned house. The analyses of material from these well-documented neighbouring contexts provide a unique opportunity to not only compare funerary and domestic ceramics in Migration Period Scandinavia, but also shed comparative light on the consequences of secondary burning due to different circumstances, with potentially contrasting levels of fire control.

All materials were analysed with the use of a handheld XRF device. The prehistoric material was supplied by samples of local raw clay from the site's surrounding landscape. The semi-quantitative statistical analysis helped determine which

local clay sources were most likely used in the ceramic production. Additionally, a comparative thin-section petrography of fired clay from Oppsal and other relevant sites revealed how a prehistoric house fire impacted different clay materials.

3 NEW FACETS OF THE FAIENCE INDUSTRY THROUGH SCIENTIFIC ANALYSIS: A CASE STUDY OF THE HARAPPAN SITE OF TIGRANA, HARYANA, INDIA

Singh, Garima (Deccan College PGRI, Pune) - Parmar, Narendra (Associate Professor, Central University of Haryana, Haryana, 123031, India)

The technological advancement of the Harappan craft industry has garnered numerous questions for archaeologists in regards with its lasting technical expertise in modern times. The recent excavation at the Harappan site of Tigrana in the state of Haryana, India has reported in-situ faience from the kilns suggesting the craft manufacturing debris at a large scale.

The paper presents a reconstruction of rural Harappan industrial settlement of Tigrana using refined scientific techniques using Fourier-transform infrared spectroscopy (FTIR) and Thermogravimetric analysis (TGA) adhering to soil samples and faience artefacts collected from the excavated kilns and furnaces belonging to the Harappan (protohistoric) period.

The research work aims to comprehend the craft industry and temperature variations that occurred throughout the heating process by the individuals responsible for manufacturing craft items such as pottery, beads, bangles, terracotta figurines, etc. Since the samples are being analysed, it will enable us to interpret the byproduct of these furnaces and kilns using the database that was created and challenges faced during the analysis, and its limitations in the field of ancient pyrotechnology. The newly updated data in this research will demonstrate how Tigrana's inhabitants appeared to have engaged in both hinterland and international trade with other contemporary Harappan sites and civilizations during their occupation of the corridor during the early and mature Harappan phases dating back to 3000-1900 BCE.

The research work also seeks to identify the social background of a potential rural industrial settlement within the context of all Harappan sites. The presented study will go into great detail about the spatial distribution of excavated sites, producing a significant number of furnaces and faience artefacts. Through scientific study, the paper aims to show how the technological advancement of the Harappans contributed to the development of the Indus Valley Civilization.

4 BONE AS A PROXY FOR FIRE IN THE ARCHAEOLOGICAL RECORD

Shaw, Candice (University of Toronto) - Natalio, Filipe (Weizmann Institute of Science) - Chazan, Michael (University of Toronto)

While the use of fire has undoubtedly played an essential role in our species' evolution, detecting evidence of its presence in the archaeological record presents considerable challenges due to both its ephemeral and friable nature. Fortunately, bone has proved to be a useful proxy, offering not only (circumstantially) exceptional preservation but also the capability to capture past heating events in its mineral structure. Techniques such as FTIR spectroscopy and micro-histology offer insights into how different variables, for example heating duration, temperature, and bone type and size, may impact the resultant signatures of heating episodes in bone. Given the similarities observed in bone mineral altered by ambient-temperature diagenetic processes, the issue of equifinality still persists in bone which may have been heated to lower temperatures. This paper provides an in-depth exploration into the heat alteration of the bone mineral carbonated hydroxyapatite, while evaluating the success of different approaches for its detection.

5 MIDNIGHT FIRE: EXPERIMENTAL APPROACH INTO FUEL MANAGEMENT AND FIRE USE IN THE PAST DWELLINGS REGARDING HEALTH AND HABITABILITY

Robledo, Andrés (Institute of Human Paleoeology and Social Evolution (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art; Instituto de Antropología de Córdoba (IDACOR CONICET)) - Burguet-Coca, Aitor (Department of Archaeological Sciences, Faculty of Archaeology, Leiden University; Institute of Human Paleoeology and Social Evolution (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art) - Speciale, Claudia (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art) - Bianco, Sabrina (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art) - Garay-Palacios, Blanca (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art,) - Fernández Iriarte, Tomás (Universitat Rovira i Virgili, Departament d'Història i Història de l'Art,) - Ölz, Marie-Estelle (University of Bologna) - Mas, Bàrbara (Seminari d'Estudis i Recerques Prehistòriques (SERP), Departament d'Història i Arqueologia, Facultat de Geografia i Història, Universitat de Barcelona; Institut d'Arqueologia de la Universitat de Barcelona (IAUB), Facultat de Geografia i Història, Universitat de Barcelona; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA)) - Rubert, Irene (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art) - Allué, Ethel (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili, Departament d'Història i Història de l'Art)

The study of anthropogenic evidence of the use of fire from past societies is a useful tool for understanding about the decisions on fuel management, economic strategies and landscape transformation. Fire, as a technological resource, implies decisions and choices made by different human groups regarding the selection, procurement, and use of fuel. In this occasion, we present results from a research project that explores the exposure to by-products of the fire (heat, light, smoke) through the implementation of experimental fires in open, semi-open (rockshelters), and close (huts and caves) dwellings occupied by people in the past. With the objective of studying well-being (health and habitability conditions) by the use of fire by prehistoric communities, we implemented an experimental program in order to measure air quality, heat transmission, and light procurement. The protocols were established with the formulation of hypotheses from archaeological cases with a wide chronological span from the Middle Paleolithic to the Chalcolithic (a: Abric Romaní - Capellades, Barcelona, Spain; b: Molí del Salt - Vimbodí i Poblet, Tarragona, Spain; and c: El Mirador cave - Sierra de Atapuerca, Burgos, Spain). We carried out 25 fire experiments recording different variables including: meteorological conditions (temperature, wind, rainfall, humidity), hearth temperature (8 per hearth K type thermocouples), illumination, heat transfer properties, and measurements of fine particle emissions. The fuel used in all experiments was related to the archaeobotanical record from the study cases: *Pinus sylvestris*, *Quercus ilex*, *Q. faginea*, *Q. pyrenaica*, *Crataegus monogyna*, *Juniperus communis*, and *Prunus spinosa* with different sizes and states (quantity 10 kgs per hearth). The results will add new knowledge about human living conditions and hearth functionality and likewise will contribute to the study of fuel management among past prehistoric societies.

6 INTRODUCING BENZENE POLYCARBOXYLIC ACID ANALYSIS: POTENTIAL OF A MOLECULAR MARKER FOR THE STUDY OF ARCHAEOLOGICAL HEARTHES AND WILDFIRES

Notterpek, Ivy (CEPAM - UMR 7264, CNRS, Université Côte d'Azur; BioArCh, Department of Archaeology, University of York) - Théry, Isabelle (CEPAM - UMR 7264, CNRS, Université Côte d'Azur) - Craig, Oliver (BioArCh, Department of Archaeology, University of York) - Bodu, Pierre (UMR 8068, TEMPS, MSH Mondes, Université Paris Nanterre) - Lucquin, Alexandre (BioArCh, Department of Archaeology, University of York) - Abiven, Samuel (Laboratoire de Géologie, Département de Géosciences, École Normale Supérieure; CEREEP Ecotron Ile De France CNRS / ENS - UMS 3194)

Since its development in 1998, benzene polycarboxylic acid (BPCA) analysis has become a powerful and frequently employed tool in environmental science research for its ability to elucidate the molecular characteristics of charred material on the entire combustion continuum from charcoal to condensates and soot. Applications of the method to ancient soils, sediments, and charred material are presently limited, yet the method holds great potential in archaeological research as a molecular marker for charred biomass, including cases where no or few macroscopic charcoal fragments remain. This study presents a multi-faceted approach to the implementation of the BPCA method in archaeological research. The interpretive potential of BPCA analysis—namely related to the aromaticity, aromatic condensation, and combustion temperature of the charred material—is first demonstrated through the statistical analysis of a BPCA database created for lab-produced charcoal. Variables hypothesized to influence the BPCA signal such as oxygen availability during pyrolysis are raised, highlighting future directions of research. Methodological considerations are elucidated through the presentation of pilot tests on experimental materials conducted to optimize the BPCA protocol for the analysis of archaeological samples. BPCA analysis is then applied to charcoal and charcoal-rich sediments from combustion residues directly overlying Levallois lithic remains in the Middle Palaeolithic (MIS 5) deposits of Ormesson (Seine-et-Marne, France), with the objective of characterizing the fire temperature

reached in different zones in order to differentiate between the natural and anthropogenic origin of the fire. Lastly, complementary approaches such as polycyclic aromatic hydrocarbon analysis to permit source identification and the radiocarbon dating of isolated BPCAs are discussed to emphasize the interdisciplinary potential of this molecular marker for charring new to archaeological research.

7 CRUNCHY BEER: EXPERIMENTAL ARCHAEOBOTANY STUDY IN DETERMINING BEER, BREAD, OR PORRIDGE OF NEOLITHIC AMORPHOUS CHARRED OBJECTS

Berndt, Jessi (Institute for Archaeological Sciences, Universität Tübingen)

Fire is often noted for its destructive nature, while in archaeology it is often lauded for its impact on material preservation. Charred crust amorphous charred objects (ACOs) excavated from burn layers, vessels and hearths, are a source of valuable information, but what is the information they contain and how do we attain it? The amorphous nature of ACOs makes them complicated archaeological finds to interpret. An experimental archaeological approach can be a promising path to establish datasets for working with and assessing ACOs. Here we present the research conducted focusing on cereal crust ACOs.

Experiments were designed and executed for establishing crust shape formation factors, the identification of intended food/drink of cereal based ACOs (such as beer, bread, or porridge), indications of cooking accidents versus intentional heating, and testing the visibility of production methodology signatures involved in the formation of the food stuffs preserved in the charring process. Analysis began by using a newly developed diagnostic metrics cataloguing protocol designed for ACOs, macro and micro morphometric data, recording processing and fermentation characteristics under SEM and CT microscopy, and collated from both the experimental and archaeological traits.

The archaeological ACOs focused on in this paper are cereal crusts from Sipplingen-Osthafen, a waterlogged Neolithic pile-dwelling lakeshore settlement located in Southwestern Germany. This work was done aiming to be used for the better understanding of the specific site material from Sipplingen, but also to aid in developing better methodologies, protocols, and interpretation datasets for working with ACOs in general.

8 NEANDERTHAL ADHESIVE TECHNOLOGY AND IT IMPLICATIONS

Schmidt, Patrick (Eberhard Karls University of Tübingen, Department of Geosciences, Applied Mineralogy, Wilhelmstraße 56, 72074 Tübingen, Germany.)

Research into human uniqueness is gaining increasing importance in prehistoric archaeology. One of the most striking behaviours unique to early and modern humans among other primates is that they used fire to transform the properties of materials. This is so because adhesives are often not available in nature but must be produced. This talk will report on the way Neanderthals used fire to make adhesives. Their adhesive technology was cognitively more demanding than other tool making processes. It fulfils all three criteria proposed for interpreting ancient technologies as being highly relevant for our understanding of human evolution. These three criteria are i) Neanderthal adhesive making requirement more time and/or raw materials than other techniques, ii) making adhesives was difficult and iii) the methods used were purposefully invented and/or evolved from previously simpler techniques. These three hypotheses were tested on several Neanderthal adhesive finds that will be described in this talk.

9 WHAT'S THE DIFFERENCE? PROCEDURAL COMPLEXITY OF FIRE PRESERVATION VS. FIRE PRODUCTION

Klein, Regine (University of Tübingen, Institute for Archaeological Sciences; Research center ROCEEH, Heidelberg Academy of Sciences and Humanities, Senckenberg Research Institute, Tübingen, Germany) - Haidle, Miriam (Research center ROCEEH, Heidelberg Academy of Sciences and Humanities, Senckenberg Research Institute, Frankfurt/Main, Germany; Institut für Ur- und Frühgeschichte und Archäologie des Mittelalters, Abt. Ältere Urgeschichte und Quartärökologie, Eberhard Karls Universität Tübingen, Tübingen, Germany)

Fire is an indispensable part of all recent societies. It facilitated our species survival, by providing warmth, light, allowing us to cook, and solving technological challenges. Despite the significance of fire, our knowledge about the development of hominin-fire-interaction remains fragmentary. The main dissent among scholars is about when hominins started to use fire, when they did so regularly and when they depended on it, implying fire-production. Yet, they agree that hominins did preserve fire, gathered from natural sources, before they learned how to make it. This implies that fire maintenance is less demanding than fire production. However, there is rarely any discussion about what activities, skills, knowledge, and mindset are needed for a robust fire maintenance (i.e., preserving fire over a prolonged period). Although, we do know from recent and sub-recent hunter-gatherers that they often prefer to preserve fire instead of making it, again detailed descriptions of the involved activities are lacking. To overcome this research gap, we are applying reverse engineering to an archaeological question, using effective chains to model a system of fire preservation, and are contrasting it against fire production (strike-a-light and hand drill). Our study shows that fire maintenance is complex, involving various activities (i.e.: collecting raw materials and fire, building, maintaining, using, and transport-

ing fire, discarding the remnants). Fire making requires additional activities, skills, and knowledge. The main difference lies in producing an initial spark or glow with a tool-agent-set. Such sets are presumably a new evolutionary development and so far, closely connected to fire production or younger technological solutions. Knowing the system of fire maintenance is an important part of comprehending hominin-fire-evolution and might in future help to understand the regional and temporal inconsistencies distinctive in the archeological fire signature.

10 HEAT TREATMENT IN LITHIC PRODUCTION IN THE EARLY NEOLITHIC OF THE COVES DEL FEM (TARRAGONA, SPAIN): EVIDENCE, SIGNIFICANCE, AND VARIABILITY

Minguell, Arnau (Universitat Autònoma de Barcelona, Departament de prehistòria) - Palomo, Antoni (Universitat Autònoma de Barcelona, Departament de prehistòria) - Terradas, Xavier (Consejo Superior de Investigaciones Científicas (CSIC-IMF)) - Rosillo, Rafel (Independent researcher) - Piqué, Raquel (Universitat Autònoma de Barcelona, Departament de prehistòria)

This study focuses on analysing the evidence of heat treatment in the lithic production at the archaeological site of Coves del Fem, located on the NE Iberian Peninsula. The aim is to comprehend the presence, importance, and variability of heat treatment practice in the knapping processes, as well as its relationship with the raw materials used. The primary objective is to determine whether heat treatment was a common practice in lithic production at Coves del Fem, with a particular focus on the Early Neolithic levels of the site. The morphology of the artifacts and the raw materials used have been examined, and evidence of heat treatment has been identified through the observation of reddening and texture overlays on the artifact surfaces.

A consistent application of this technical procedure has been observed in preforms of cores, in the early stages of lithic reduction. Additionally, it has been documented that many artifacts were crafted from locally sourced raw materials characterized by their relatively low quality. This could have motivated the application of heat treatment for this reason, some experimental approaches to treating local raw materials have been conducted. Preliminary results indicate that heat treatment played a significant role in the lithic production at Coves del Fem, especially during the Neolithic periods, where a unipolar production aimed at obtaining blade blanks has been documented. The heating technique appears to have been related to the quality of the local raw materials and may have been a specialized practice passed down over time. This study provides a foundation for future research exploring the continuity of heat treatment practices, employing methodologies that enable a more detailed characterization of the process.

11 SILCRETE USE AND LITHIC PROVISIONING STRATEGIES IN THE MIDDLE STONE AGE AT NELSON BAY CAVE, SOUTH AFRICA

Watson, Sara (Field Museum of Natural History)

The use of heat treatment to modify the physical properties of lithic raw materials was a major technological innovation of the Middle Stone Age and is one of the earliest documented transformative technologies. Applications of heat treatment on silcrete artifacts are well documented in Still Bay and Howiesons Poort lithic assemblages across southern Africa. Fewer descriptions of heat treatment are available for Early MSA assemblages, but those that are indicate that methods of silcrete heat treatment were already established by at least ~130 ka. However, most research on the use of heat treatment for silcrete lithic artifact production have come from sites where silcrete is a relatively abundant and locally available resource. Less data is available about the context in which silcrete was acquired and modified in areas where it is less prevalent and potentially harder to access, raising questions regarding the role of lithic provisioning strategies in the use and treatment of silcrete in the Middle Stone Age. The site of Nelson Bay Cave, on the southern coast of South Africa, has a long Middle Stone Age sequence including Early MSA and Howiesons Poort assemblages. Here I provide preliminary results that are part of a larger study. I analyzed the Middle Stone Age silcrete assemblage from Nelson Bay Cave to investigate how lithic provisioning strategies influenced the acquisition, treatment, and use of silcrete at the site. In this study, I consider three questions: How was heat treatment implemented during lithic production the southern Cape? Was silcrete use influenced by lithic provisioning strategies in silcrete-poor contexts? And in what ways did silcrete acquisition change from the Early Middle Stone Age to the Howiesons Poort at Nelson Bay Cave?

12 LITHIC HEAT TREATMENT AND REDUCTION TECHNOLOGY IN THE LATE MESOLITHIC SETTLERS OF ROTI NALA, MAHARASHTRA, INDIA

Rajak, Shubham (Deccan College Postgraduate and Research Institute (Deemed University), Pune) - Das, Pronil (Deccan College Postgraduate and Research Institute (Deemed University), Pune; Deccan College Postgraduate and Research Institute (Deemed University), Pune)

Microlithic production technology and hilly landscape occupation are some of the lesser-studied topics in the pre-historic archaeology of India. The present research has been carried out in the Roti Nala village situated on the hilly

uplands of the Pune district in Maharashtra, which aims to investigate the Microlithic techno-behavioural complexities and settlement strategy. In this research, we have conducted archaeological exploration in an open-air site of Roti Nala, collected lithic samples for technological reconstruction, and carried out experimental knapping and heat treatment. While heat treatment has been recognised as a distinctive feature within the limited context of the Indian Mesolithic, its prevalence remains rare in the cultural milieu of the Indian Mesolithic, highlighting its significance in archaeological discourse although relatively few systematic studies are available. In this paper, we aim to shed light on two questions: What technique and heating parameters were used in the preparation of raw material, and which kind of elemental changes, microstructural changes and micro-crystal breakage patterns can be observed in local quartz and other siliceous raw material which helped them to enhance their microlithic technology? We investigated these questions by using experimental heat treatment and knapping for measuring past heating temperatures of heat-treated stones and quantitative surface roughness, micro-crystal breakage pattern and thin section analysis aiming to interpret the techno-behavioural knowledge of raw material selection, raw material preparation, and lithic production in hilly uplands of Maharashtra. Our results show a low-investment procedure for raw material preparation, relying on above-ground uncontrolled camp-fires with 350-450 °C heat. These findings have important implications for our understanding of the Indian Late Microlithic chaîne opératoire in terms of the investment in time and resource utility pattern and for the refinement of archaeological techniques used to identify heat treatment in the Mesolithic culture of hilly areas in Maharashtra.

974 METALS AND METALWORKING II: PRODUCTION AND TECHNOLOGY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Kmosek, Matej (Institute of Archaeology of the Czech Academy of Sciences, Brno; Charles University, Faculty of Arts, Institute of Classical Archaeology) - Neiß, Michael (Lund University, Department of Archaeology and Ancient History; Aarhus University) - Saage, Ragnar (University of Tartu) - Wärmländer, Sebastian (Stockholm University, Department of Archaeology and Classical Studies) - Noergaard, Heide (Moesgaard Museum, Department of Archaeology)

Session format: Regular session

Archaeometallurgy is a multidisciplinary field where researchers with different expertises and different traditions come together to answer questions related to ancient metals and metalcraft. Most research in this field is based on metallurgical analyses, but studies that involve typological seriation, experimental archaeology, or material provenancing are also common.

For this session, we welcome full-length papers on metal production and metalwork technology in a very broad sense. Some studies might involve archaeometrical analyses that aim to reveal the different steps in an operational chain. Others might be based on visual analyses, experimental archaeology, anthropology, ethnoarchaeology, or studies of written sources, e.g. of ancient recipes. The social and environmental aspects of metal production and metalwork are also of interest, e.g. organization of production, impact on the natural environment etc. As important advances in archaeometallurgical research often derive from original approaches, papers focusing on new methods will be most welcome!

Ideally, the papers should connect with the EAA meeting theme “Persisting with change”, but this is not an absolute demand. We welcome contributions from all geographic regions and time periods and do encourage students and young researchers to present their ongoing research projects.

ABSTRACTS

1 AT THE CORE OF BRONZE PRODUCTION. ARCHAEOLOGICAL EVIDENCE AND ANALYTICAL DATA FROM BRONZE AGE METAL WORKSHOPS IN NORTHERN ITALY

Barchiesi, Francesca (University of Bologna) - Cavazzuti, Claudio (University of Bologna) - Cattani, Maurizio (University of Bologna) - Debandi, Florencia (University of Bologna) - Putzolu, Cristiano (University of Bologna) - Brunelli, Daniele (University of Modena and Reggio Emilia) - Cipriani, Anna (University of Modena and Reggio Emilia) - De Falco, Maria (University of Modena and Reggio Emilia) - Levi, Sara (University of Modena and Reggio Emilia) - Lugli, Federico (University of Frankfurt)

In the framework of the CAST project (Copper Accumulation, Supply, and Technology among Italian prehistoric societies), we explore several aspects of metalworking among Middle-Recent Bronze Age communities in Northern Italy (c. 1700/1650-1150 BCE), a context where the body of evidence is particularly conspicuous. The project is based on a multidisciplinary approach, which combines archaeometric analysis, traceology, 3D reconstructions and experimental archaeology.

Our paper will address three main research questions:

- 1) How were metal workshop organized?
- 2) Can we identify different levels of complexity of bronze productions?
- 3) What does the distribution of models and artefacts tell us about regional and trans-regional networks?

We will focus on sites with traces of secondary metallurgy in the Po plain and, following a biographic approach, show the results of macro- and microscopic analysis of bronze objects, such as daggers or pins, and clay/stone implements involved in various phases of the chaîne opératoire (stone tools, crucibles, tuyères, casting moulds). High-quality 3D models of stone moulds were acquired using both SfM photogrammetry and 3D scanning, in order to analyse their manufacturing process and use. The two approaches were both compared and combined to define what would guarantee the best possible result depending on the aims, from scientific to museographic and educational purposes. We will also present the result of experimental archaeology protocols, devoted above all to the reconstruction of casting and manufacturing techniques.

2 SOAPSTONE MOULDS IN SOUTHERN SCANDINAVIA DURING THE LATE BRONZE AGE - ORIGIN - USE - DISTRIBUTION

Nilsson, Andreas (Sydsvensk Arkeologi; Department of Archaeology and Ancient History, Lund University)

When we discuss bronze artisans and if they were specialists or part time specialists we need to study all aspects of the craft itself. One of the aspects of the bronze casting craft in Scandinavia that needs to be studied further is the soapstone moulds from primarily the late Bronze Age. This study can be used as one of the bases for the discussions around full-time/part-time specialists and mass production. The study can also be used as one of the bases for a discussion about transport routes for both material and ideas in Scandinavia during the late Bronze Age.

Most researchers agree that soapstone has been used in the Scandinavian Bronze Age to manufacture various types of moulds. The same consensus does not apply regarding the source of the soapstone and the use of the moulds. In discussion it is often argued that the stone comes from Norway, where there are deposits of high-quality soapstone, but there are also deposits of high-quality soapstone along the Swedish west coast where most of the soapstone moulds have been found. There has also been a discussion about whether soapstone moulds primarily have been used for casting the wax model used for casting with *cire perdue*-technique.

I will present the result of a project run at the department of archaeology and ancient history at Lund University. The goal of the project is through experimental archaeology, XRF- analysis and artefact studies to determine the origin, distribution and spread of soapstone and soapstone moulds, but also to determine whether soapstone moulds from the Bronze Age have been used to cast bronze or if they have been used for other types of castings such as casting wax models.

3 NEW ANALYSIS OF THE BRONZE CASTING AT HALLUNDA, SWEDEN

Eriksson, Thomas (National Museum of History, Stockholm)

The Bronze Age complex in Hallunda, outside Stockholm, was excavated in 1969-71. The site was rich finds from settlements, bronze workshops, and the surrounding graves. The site is one of the most well known in Scandinavia and is acclaimed for its well-preserved furnace. The bronze workshop is dated to the late Bronze Age, c. 1100-500 BC.

At one of the sites, Botkyrka 13:1, twelve features were interpreted as furnaces due to abundance of sintered clay. The area is also rich in finds of crucibles, moulds, and bronze melts. Two of the features were brought in 1971 to the museum for prospective investigations.

The features have been thereafter well-quoted and debated. The interpretations have spanned from post-holes, cremation pits to furnaces with cupolas of clay or a combination.

One of these features was excavated in 2023 by a joint project from Upplandsmuseet, the National Historical Museums and Stockholm University. The purpose of the excavation was to confirm or falsify the different interpretations by using new scientific methods. The use of handheld XRF gave new data of the chemical composition of the soil in feature. Among other things, lateral and depth changes in the concentrations of copper, tin and zinc were measured. The quantities were then compared with analyses of finds that had been in contact or had not been in contact with the bronze.

A more comprehensive target was to set the new evidence and results to set the workshop in broader perspective. Hallunda was a nodal point for trade and barter during the Bronze Age with contacts around the Baltic Sea.

4 ARCHAOMETRY STUDY AND RESTORATION OF ROMAN BRONZE VESSELS FROM BURGAS

Karailieva, Violeta (National Academy of Arts, Department of Conservation and Restoration, Bulgaria)

The lack of data from archaeometry analyses of bronze vessels in Bulgaria regarding the AD period clearly stands out. The development and accessibility of different analytical methods provide prerequisites for filling these significant

gaps. Five vessels were selected from the Museum of Burgas, which dates to the 1st -3rd c. AD. The aims are to clarify the technological stages of the manufacturing process, the type of alloy, the products due to the corrosion processes that occur in the object after its burial. ICP-AES was used to determine the elemental composition and type of the alloy. The type of the corrosion products was determined by XRD. The data from the analyses were further used for the conservation treatment and restoration interventions of one vessel. Unfortunately, the vessels are accidental finds therefore the interpretation of the results and the comparative analyses are not complete. Nonetheless, an attempt was made to establish the corrosion processes that resulted in the formation of the main oxides, carbonates, and chlorides. The vessels are documented, their condition, technological stages of their manufacture, and corrosion processes are thoroughly described. Conservation and restoration interventions at the oenochoe began with a mechanical evening of the surface, inhibition, and passivation of the metal. The reintegration of the form was done after the deformations on the edges were carefully retouched. An interesting problem arose while interpreting the results of the elemental composition of the oenochoe. According to analytical data, the alloy used for its manufacturing is brass. However, the zinc content has rather high values, that are uncharacteristic for the period. The pitcher does not leave the impression of a counterfeit. This leads to the assumption that the vessel was made after the 16th century AD. Nonetheless, the question remains open due to the lack of enough analytical data and archaeological context.

5 SYSTEMATIC TECHNOLOGICAL RESEARCH OF GERMANIC KNEE FIBULAE FROM CZECH REPUBLIC

Foucek, Cenek (University of Chemistry and Technology, Prague)

This paper focuses on the identification and comparison of manufacturing techniques among individual groups of Germanic knee fibulae using commonly employed laboratory methods, such as use-wear analysis, metallographic analysis, and XRF elemental composition analysis. We selected 10 representatives each from Central Bohemia and Southern Moravia (together 20 pieces), dating back to the Roman periods B2 and B2-C1.

Prior to any intervention, the fibulae underwent macroscopic, microscopic, and radiographic imaging and photographic documentation. This was followed by use-wear analysis. Subsequently sampling and metallographic analysis were carried out. XRF analysis of samples was done to determine the elemental composition of various parts of the fibulae. It aimed to identify material (dis)similarities of individual fibulae and their groups and material relationships between the body of the fibula and individual parts such as coil spring and the coil axis.

Based on results of such a research, individual groups of fibulae were determined according to manufacturing processes involved in their production. Determined groups are mostly type dependant creating two main of basic shape creation, such as hammering from wire/rod or casting into a mould. The results of this work enable the comparison of determined groups based on manufacturing techniques used for knee fibulae production. Such technological insight was compared with traditional typology grouping based primarily on fibulae morphology.

6 UNBUCKLING THE PAST: TRANSFORMATIONS IN TECHNOLOGY AND CULTURE THROUGH A TRIPARTITE BELT BUCKLE FROM ANCIENT JAFFA

Mazis, Matasha (Technical University Darmstadt) - Ashkenazi, Dana (Tel Aviv University) - Fantalkin, Alexander (Tel Aviv University)

In this paper we present a tripartite metal buckle from the ancient Mediterranean port of Jaffa. The buckle is dated seventh to eighth century CE, an era of sociopolitical transformations from Roman-Byzantine to Arab rule in the Levant. We argue that the buckle represents enduring traditions as well as adaptations in response to momentous social change. Our study involves a comprehensive examination of technology and art: we explore the buckle's composition, fabrication techniques, and cultural meaning. Using X-ray fluorescence spectrometry and scanning electron microscopy with energy-dispersive X-ray spectroscopy, we characterise the composition of each of the buckle's three discrete components and their methods of manufacture. The results reveal the use of both recycled copper alloys and pure copper parts, technical challenges in casting the openwork plate, cold fastening of the components, and heretofore undocumented finishing techniques for this type of buckle: precision-contouring of the openwork shapes. There is no evidence of enamelling, which goes against existing theories about these types of objects. Comparing the techniques and design elements with contemporary examples, we find the buckle has roots in Roman military culture. However, its predominantly religious iconography reflects enigmatic and hidden elements that reflect the geopolitical reality of the era. Our study not only sheds light on contemporary buckle production, but embodies a broader narrative of endurance and transformation during immense social change.

7 A 16TH C. METAL THREAD EMBROIDERY MADE BY COPPER STRIPS, SILK AND SHEEP WOOL, EXCAVATED AT SKRIÐUKLAUSTUR MONASTERY IN ICELAND

Wärmländer, Sebastian (Department of Archaeology and Classical Studies, Stockholm University, 106 91 Stockholm, Sweden; UCLA/Getty Conservation Programme, UCLA, CA 90095, USA)

Textile ornaments involving metal threads were common decorations on liturgical textiles in Medieval and Early Modern Europe. The most prestigious metal threads were made from gold or silver, spun around a core silk fiber. Less prestigious versions employed copper-alloy strips wound around cores of linen. Here, we used different analytical techniques to characterize a metal thread of unusual design, excavated in a 16th c. grave from the Skriðuklaustur Monastery in eastern Iceland. The material identification showed that thin copper strips had been wrapped around fibers of silk, thereby producing metal threads which had been wrapped around a second fibrous core made from animal hair. This was surprising, as very few metal threads with animal hair are known to exist. Species identification of the keratin protein in the hair fibers showed them to derive from sheep, suggesting that imported metal threads with silk cores had been combined with local sheep wool. Given the general scarcity of imported prestige goods in this remote island, we interpret the uncommon composition of this textile ornament as an Icelandic attempt to keep up with the fashion trends in mainland Europe, albeit with elements of locally improvised non-prestigious materials.

8 PIECING TOGETHER A LARGER PICTURE - ENRICHING THE UNDERSTANDING OF PAST IRON PRODUCTION THROUGH SMALL-SCALE ARCHAOMETALLURGICAL ANALYSES WITHIN CONTRACT ARCHAEOLOGY

Svensson, Andreas (Sydsvensk Arkeologi AB)

The understanding of the technological, social and economic aspects of past iron production has made considerable advances in the last decades. In Scandinavia, recent research-projects have been fruitful in advancing new knowledge concerning questions of chronology, technology and socio-economy (e.g. Bennerhag 2023; Rundberget 2016).

However, the bulk of archaeometallurgical analyses conducted in Scandinavia (and perhaps also Europe as a whole) consist of small-scale studies connected to Contract Archaeology-projects. It is within these that hitherto unknown production sites are surveyed and excavated and the material retrieved from them analysed to chart the nature of the metalworking performed in the past. Commonly, the investigation areas as well as the budget for analyses are considerably restricted, and hence the underpinning research questions are often basic. On the other hand, the nature of the research questions posed within the analytical programs enables comparisons between sites and projects.

In this paper, methods and frameworks concerning how these many and disparate archaeometallurgical analyses conducted within Contract Archaeology could be synthesised are suggested and described. Several examples of small-scale analyses performed at the newly established archaeometallurgical lab infra-structure at Sydsvensk Arkeologi AB, Sweden are used to highlight how the knowledge production regarding iron production can be further advanced in the future. The establishment of protocols for exchange of analytic data and interpreted results within the community of practising archaeometallurgists and archaeologists is forwarded as a key aspect in this regard, and the paper aims to encourage discussions on this and other subjects concerning the synthesis of archaeometallurgical analyses.

9 HOW DO WE ACCOUNT FOR THE CESSATION OF IRON SMELTING ON ELBA IN THE FIRST CENTURY BCE?

Monroe, Christina (University of Oxford)

The archaeological record demonstrates that many iron smelting sites on the iron-rich island of Elba were abandoned in the late first century BCE after a peak of iron smelting from the third to early first centuries BCE. A passage from Strabo (c. 63 BCE to 23 CE; Geographica 5.2.6) has been referenced as evidence for a lack of fuel due to deforestation as the reason for the inability to continue to smelt iron on the island. To test this, a study (Becker et al. 2020), used spatio-temporal models to show that complete deforestation of the island in the first century BCE was improbable, but that there was a lack of fuel (a 67% likelihood) between 124–85 BCE.

Although the authors took this result to mean that deforestation was not the cause of the cessation of smelting, I propose that even a lack of fuel would have been reason enough for many of the smelting sites to shut down. If there was a need to transport timber arduously over land or by ship, then it may have prompted the acceptance for shipping ore alone, rather than timber and ore. It was more economically advantageous for most of the iron ore from the mid to late first century BCE to have been mined on the eastern coast of Elba and then directly shipped to Populonia—as it had been from the seventh to fourth centuries BCE—because this was a shorter distance than many of the smelting sites on the northwest and western coast of Elba. Therefore, I argue that the abandonment of most smelting sites on Elba was a formulated economic decision that weighed the saving of time and transportation costs. This demonstrates the intelligent economic strategy of the Romans and exemplifies their adaptability and agency during changing landscapes.

10 NON-DESTRUCTIVE MULTIPROXY SURVEY AS A RESOURCE FOR THE STUDY OF DEVELOPMENT OF THE MEDIEVAL METALLURGY IN SLOVAKIA

Mino, Martin (Monument Board of Slovak Republic) - Petrik, Jozef (Faculty of Materials, Metallurgy and Recycling, Technical University Košice) - Midula, Pavol (Faculty of Environment, Jan Evangelista Purkyně University in Ústí nad Labem) - Ševčíková, Janka (Faculty of Natural Sciences, Matej Bel University in Banská Bystrica) - Andráš, Peter (Faculty of Natural Sciences, Matej Bel University in Banská Bystrica) - Hurajtová, Natália (Slovak Academy of Sciences, Institute of Landscape Ecology) - Styková, Barbora (Nuclear Physics Institute of the Czech Academy of Sciences) - Světlík, Ivo (Nuclear Physics Institute of the Czech Academy of Sciences) - Brabcová, Kateřina (Nuclear Physics Institute of the Czech Academy of Sciences)

A brief written 14th-century mention of a raid on the mining settlement of Kerling was formally the only information source about the settlement. This location belongs to the well-known Au/Ag mining district of the Banská Štiavnica region in Slovakia. Interest in the site was raised by the assumption of the existence of a mass grave of miners who died during the raid. This would be a valuable physical source of information about the origin and the way of life of the medieval miners who are usually hard to distinguish from the rest of the population. The position of the mining settlement was believed to be built around a small chapel on a plateau with the same name as the medieval settlement. The plain is surrounded by traces of medieval and modern mining activity registered as Au/Ag mines. The geophysical survey of the chapel's surroundings did not yield traces of a settlement in the area. However, rare surface finds document medieval activity here. The lidar data identified two foundation terraces of buildings north of the presumed location and a series of remodelled remains of smaller surface mines. Coring on the site provided an important chronological profile of the site, which placed it among the oldest mining locations in the area and also helped to locate the metallurgical site. Although the remains of the miners have not yet been located, an unexpected source of information on metallurgy has been discovered. The geochemical profile of the site was processed and the archaeometallurgical analysis of the obtained slag was carried out. Together with the limonite ore recovered during surface exploration, the results indicate that precious metals were not necessarily the area's original target of mining activities. The contribution combines the results of a multidisciplinary non-destructive survey with comparative material.

11 CULTIVATED PLANT MATERIAL AND OTHER ARCHAEBOTANICAL FINDS FROM IRON AGE SMELTING FURNACES IN WESTERN LITHUANIA

Bojarskaite, Kotryna (Lithuanian Institute of History) - Masiulienė, Ieva (Klaipėda University)

The Bandužiai-Žardė-Laistai archaeological complex in western Lithuania is perhaps the most excavated archaeological massif in Lithuania. The first sedentary communities began to settle there in the Late Bronze Age (1st millennium BC) and carried out various socioeconomic activities until the early Middle Ages (13th-14th centuries). The settlements belonging to this archaeological complex were located around wet and marshy areas. They were rich in bog ore iron deposits, essential for Iron age metal production and metalcraft. It is therefore not surprising that iron smelting and other related activities are the ones the most strongly reflected in the archaeological material of these settlements.

Iron-smelting furnaces has left one of the most noticeable traces in the settlements of the Bandužiai-Žardė-Laistai complex. They are unique short-lived objects, providing both valuable archaeological and archaeobotanical information. Crops grown in the vicinity of iron production sites were used in the iron smelting process and has left irrefutable evidence of the socioeconomic preferences of Iron Age people and their immediate natural environment.

The fact that cultivated plants were used in furnaces as a construction material can be seen from examples elsewhere in northern Europe. However, their exact purpose and how they came to be used in the context of furnaces in western Lithuanian settlements are still not fully explained. Archaeobotanical studies of iron-smelting furnaces have not yet been widely applied in Lithuania and have no equivalent yet. However, the first results from the settlement of Bandužiai, Žardė, which belongs to the Bandužiai-Žardė-Laistai complex, provide unique initial insights and promising results about this ancient practice that was also present on the eastern coast of the Baltic Sea.

12 SMALL REMAINS WITH A BIG MEANING – WHAT CAN A SLAG INCLUSION TELL US ABOUT THE BLACKSMITH'S WORK?

Tóth, Boglárka (Pázmány Péter Catholic University, Institute of Archaeology, Budapest, Hungary) - Török, Béla (Pázmány Péter Catholic University, Institute of Archaeology, Budapest, Hungary; University of Miskolc, Hungary) - Barkóczy, Péter (University of Miskolc, Institute of Physical Metallurgy, Metalforming and Nanotechnology; Miskolc, Hungary) - Kovács, Árpád (Pázmány Péter Catholic University, Institute of Archaeology, Budapest, Hungary; University of Miskolc, Hungary) - Langó, Péter (Pázmány Péter Catholic University, Institute of Archaeology, Budapest, Hungary)

Slag inclusions are small but important remainders of smelting and smithing process. They are found within most archaeological iron artefacts, and it is widely believed that they can provide us information about the provenance of iron artefacts and about the used smithing technology. However, the examination of inclusions in order to answer the questions of provenance is difficult and the results can be misleading or even inconclusive but it seems that they can be very useful during the examination of the manufacturing process of certain iron objects. In the last few years 22 double edged swords from Hungary (dated to the 10th century) were examined within a framework of a multiannual project, the main aim of which was to examine the different microstructure of the blades to determine the possible manufacturing methods of the weapons. In addition, the examination of the slag inclusions of the blades was an essential segment of the project, not only due to the fact that it offers us precious insight into the chemical composition of the slag along with the material but because it was also useful to verify the results of the project, especially during the determination of the various forging technologies of the blades. In light of this, our presentation seeks to highlight the importance and usefulness of the examination of slag inclusions regarding sword manufacturing methods.

The inclusions were examined with optical microscope (OM) and scanning electron microscope equipped with energy dispersive spectroscopy (SEM-EDS).

13 UNDERSTANDING BLOOMERY SMELTING THROUGH CURRENCY BLOOMS AND EXPERIMENTAL IRON FROM ESTONIA

Oks, Kristo (University of Tartu) - Saage, Ragnar (University of Tartu)

In recent years nearly 40 currency blooms have been found from Estonia as stray finds or hoards containing from 3 to 9 blooms. The few of them that have been dated were produced in the 11th to 13th century AD. The blooms can be defined as a product of one successful smelt in a bloomery furnace after which they have been consolidated and given a certain shape, which can be rectangular, loaf-shaped, or round. The uniform shape of many blooms indicates that the rectangular shape was the most standard one in Estonia and it is likely the shape that was used for trading.

Recently many of these blooms have been sampled for provenance and metallographical analysis. The provenance analysis enabled to link some of the finds to certain Estonian smelting sites. However, this paper will focus on metallographic analysis as it gives valuable information about the bloomery smelting process. The currency blooms enable to look at the iron just after the smelting process before it was hammered or carburised. The results of the metallographic analysis of the experimental iron are discussed for comparison as well.

The blooms also provide useful information about the volume of one smelt: the weight of the bloom reflects what could be considered a “normal” output. This is compared to the recent successful smelting experiments, where the output has reached comparable or even larger weights than we see in the case of archaeological currency blooms. Hence, we can say that in terms of weight, the experiments have reached an understanding deep enough to draw meaningful conclusions.

14 THE EFFECT OF THE CONSERVATION PROCESSES ON TECHNOLOGICAL AND FUNCTIONAL STUDIES OF THE KNIVES FOUND IN POLAND

Miazga, Beata (University of Wrocław, Institute of Archaeology)

The knife is one of the most popular archaeological finds, owing to the fact that it is a very useful tool accompanying man from ancient times. During their excavations archaeologists found knives made of flint, copper alloys or iron and steel. The last ones, despite being nearly the same or very close to modern knives, are a very frequent object of study and archaeologists' central focus is on the stylistic or functional recognition. The final identification of the purpose/functionality of each knife without advanced research, including metallographic, is not convincing. Therefore the implementation of research programmes for cutlery, involving raw-materials analysis as well as extensive technological and functional examinations are of critical importance and are performed in Poland, too. The results of microscopic and physicochemical analysis provide new data for further archaeological research.

This presentation is an attempt to summarise the complexity of the work on the iron/steel knives from the point of view conservation and archaeometric. The studies are based on the medieval and postmedieval finds from Poland, which are almost simultaneously subjected to conservation works and less invasive investigations, such as light micro-

scopes observations, also metallographic, scanning electron microscope with EDS spectrometer and X-ray fluorescence spectrometry or microhardness tester analyses.

15 INVESTIGATION OF IRON-WORKING ACTIVITIES OF THE MEDIEVAL HARBOUR AT HOEKE (BELGIUM)

Biernacka, Paulina (Historical Archaeology Research Group, Department of Archaeology, Ghent University, St.-Pietersnieuwstraat 35, 9000 Ghent, Belgium; Atomic & Mass Spectrometry – A&MS Research Unit, Department of Chemistry, Ghent University, Campus Sterre, Krijgslaan 281 - S12, 9000 Ghent, Belgium) - De Clercq, Wim (Historical Archaeology Research Group, Department of Archaeology, Ghent University, St.-Pietersnieuwstraat 35, 9000 Ghent, Belgium) - Dewaele, Stijn (Laboratory for Mineralogy and Petrology, Department of Geology, Ghent University, Campus Sterre, Krijgslaan 281 - S8, 9000 Ghent, Belgium) - Vanhaecke, Frank (Atomic & Mass Spectrometry – A&MS Research Unit, Department of Chemistry, Ghent University, Campus Sterre, Krijgslaan 281 - S12, 9000 Ghent, Belgium) - De Grave, Johan (Laboratory for Mineralogy and Petrology, Department of Geology, Ghent University, Campus Sterre, Krijgslaan 281 - S8, 9000 Ghent, Belgium)

Considering the numerous archaeological studies on the Medieval harbour in Bruges (Belgium), little attention has been directed toward metallurgical activities in this area. Recent excavations have revealed significant amounts of iron slag, fuel residues, and other by-products related to iron production, indicating substantial iron-working operations. This study presents new archaeometrical data on iron production in one of the outer harbours of Bruges, located in Hoeke, primarily focusing on the geochemical and mineralogical analysis of iron slags and fuel used.

Visual examination of the samples unveiled distinctive macroscopic characteristics, including the presence of Plano-Convex Bottom (PCB) slags and hammerscales, suggesting smithing activity. Samples were subsequently analysed using X-ray Diffraction (XRD) to determine mineralogical composition. Additionally, reflected light optical microscopy was employed for further study, to characterise the microstructural features of iron slags.

The geochemical and metallographic analysis of iron slags showed a complex mixture of iron oxides (wüstite FeO and mainly magnetite Fe₃O₄), fayalite (Fe₂SiO₄), and quartz (SiO₂). Microstructural analysis identified the presence of spinifex texture, the occurrence of metallic iron inclusions, and the incorporation of partially dissolved hammerscales within the slag. Moreover, the analysis pointed out that the investigated slag has a significant level of quartz, which could have been used as a flux.

An interesting aspect of the iron activity in Hoeke was the choice of fuel, which in this case was coal. As a result, coal not only provided a sufficiently high temperature but also caused slight alterations to the slags at both macroscopic and microscopic levels.

The obtained results provide first insights into the technological aspects of iron production in Hoeke, confirming the hypothesis that the excavated materials were involved in smithing activities. This research makes noteworthy contributions to understanding the iron activity in late Medieval Bruges.

975 BASKETS AND THEIR BELONGINGS: ARCHAEOBOTANY AND CONSERVATION OF VEGETAL BASKETRY OBJECTS AND THEIR VEGETAL CONTENT

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Andonova-Katsarski, Mila (Division of Palaeobotany and Palynology, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences) - Herero-Otal, Maria (Archaeobotany Laboratory, Prehistory Department, Autonomous University of Barcelona) - Stelzner, Ingrid (Leibniz-Zentrum für Archäologie, Mainz)

Session format: Regular session

The ancient basketry craft transitioned through the entire human history – from the early prehistoric human groups to the contemporary market of the 21st century. Basket-making is a trans-geographical and pervasive activity, resulting in products of diverse shapes, sizes, raw materials and functions as they service a wide utilisation spectrum by humans. Basketry is also strongly related to the vegetal raw material, including woody and non-woody plants, allowing for the creation of objects not only of different dimensions but also with specific properties such as durability, heavy load-resistivity, excellent ventilation or even waterproofness.

On the other hand, basketry products are often chosen for the storage, transportation and processing of raw materials or products of plant origin (consumables and non-consumables). Sometimes, a single plant may offer its different plant parts for both – a basket and its content. Examples of that could be some cereal species with stems and leaves appropriate for weaving, but also with a good grain yield which could be subsequently stored in a basket; or some tree species that provide outstanding properties for basket-making, but once shaped into a basket could also contain woody materials. The crucial role of conservation science is to uncover, document and preserve these objects, ensuring archaeobotanical analysis of both the baskets and their contents.

This particular link between the vegetal basketry object, its vegetal content (alimentary and non-alimentary) and their conservation is what we aim to explore in the current session. We welcome contributions, independent of their geographical region or chronological period, presenting archaeological, archaeobotanical, conservational or other related studies of both vegetal basketry materials combined with vegetal resources or products contained within basketry items and related to the functionality of both types of plant resources.

ABSTRACTS

1 **ETNO-ARCHAEOLOGICAL APPROACH TO THE BASKETRY OF THE HUNTER-GATHERERS OF TIERRA DEL FUEGO - PATAGONIA (CHILE AND ARGENTINA)**

Piqué, Raquel (Universitat Autònoma de Barcelona) - Franch Bach, Anna (Centro Austral de Investigaciones Científicas (CADIC-CONICET)) - Vietri, Luisa (Independent Researcher)

Tierra del Fuego and the Oriental Channels of Patagonia in Chile and Argentina comprise a vast area of channels, fjords, and islands. In pre-European times, these areas were inhabited by hunter-fisher-gatherer communities who navigated in these channels in their canoes. The Isla Grande of Tierra del Fuego was also home to pedestrian hunter-gatherers. Skilled basket making was a notable craft among the women of these groups, and some of these traditional techniques persist today.

Our research delves into the ethnohistorical documentation and ethnographic collections housed in various museums across Chile, Argentina, and Europe. The primary goal is to address several questions concerning the ecological and technical knowledge of these populations and the purpose of their organic containers. The outcomes of our investigation shed light on the diverse aspects of baskets, including variations in shapes, raw materials, sizes, and production techniques.

Notably, our findings underscore the relationship between these variables and the function of the containers. The predominant use of these baskets was for transporting and storing food and belongings. Remarkably, there is a homogeneity in the raw material employed (*Marsippospermum grandiflorum*) and a noticeable low diversity in terms of shapes and sizes. Its geographical origins and their significance within these hunter-fisher-gatherers societies are also discussed, in particular intergenerational transmission of knowledge.

2 **BASKETRY CREELS: MORPHOLOGY AND USE OF RECENT FINDS IN FRENCH PREVENTIVE ARCHAEOLOGY**

Lecomte-Schmitt, Blandine (Inrap; UMR 5600 Environnement Ville Société) - Flucher, Guy (Inrap) - Peltier, Virginie (Inrap) - Dietrich, Anne (Inrap)

Among archaeological discoveries, creels are of major significance, with findings often limited to fragments. Originating from the Mesolithic period (around 7000 BCE), corded basketry fish traps from Noyen-sur-Seine (Seine-et-Marne) stand as Europe's oldest known discoveries of this kind. The abundance of bone remains from eels and pikes further supports their association with this ancient fishing method.

In the past 15 years, preventive excavations in France have transformed our comprehension of fish traps through the identification of two river fishing sites. Alongside fixed fisheries, various well-preserved wickerwork fishing elements emerged from the sediments of ancient river branches of the Oise and Seine rivers, shedding light on the techniques and uses of these traps spanning from Antiquity to the Middle Ages.

Pont-sur-Seine (Aube, France) revealed six creels associated with a fish weir dating back to the 2nd century AD (Peltier Virginie et al. 2018). Two complete specimens underwent conservation measures by the Arc'Nucleart laboratory (CIA, Grenoble, France), showcasing the existence of at least two types and attesting to the exceptional skills of ancient craftsmen.

Brissay-Choigny (Aisne, France) along the Oise River unveiled another fishing method. Sixteen traps from the late Middle Ages, woven using a distinct technique, are linked to a fish weir (Flucher Guy et al. 2014).

While willow and hazel are primary materials, other options are not excluded. Weaving techniques, openings, and closures exhibit noteworthy similarities and differences depending on trap types.

Fish weirs, well-known since Antiquity, are characterized by long lines of stakes with wattle, using techniques akin to basketry to guide fish towards traps downstream or upstream.

This presentation aims to introduce recently discovered fish trap assemblages in preventive archaeology, covering taxa, manufacturing techniques, and specific features of these fisheries' organization.

3 **BASKETRY FOR THE DEAD: THE TECHNOLOGY OF WARI CANE BOXES**

Rudnicka, Emanuela (Faculty of Archaeology, University of Warsaw)

At archaeological sites cane baskets and reed mats are often found in burials of people of low prestige as well as representatives of the upper classes. Although Peruvian basketry remains mostly unexplored, recent investigations at Castillo de Huarmey in Peru offer insights into this ancient craft. Dating back to the Middle Horizon (600-1000 AD), the site served as a multifaceted locus, encompassing administrative, religious, and funerary functions for Wari culture - the first Andean empire. In 2012, the site yielded the burials of numerous Wari aristocrats, accompanied by an astonishing array of over 1,200 artifacts made of silver, gold, copper, bone, and wood, as well as textiles, pottery, and gourd vessels. In 2022, further excavation revealed the tombs of artisans affiliated with the imperial court, marking a pivotal juncture in unraveling the societal tapestry of the era.

The baskets found in the graves were made of cane, lined with textiles, and decorated with camelid wool yarns. The contents of the boxes, primarily associated with textile production and ceremonial practices, encompassed an array of personal effects, including bronze implements, obsidian tools, wooden utensils, as well as rattles and *Spondylus* shells. Additionally, artifacts indicative of social status, such as ear ornaments and metal plaques, further underscored the stratified nature of Wari society.

This paper aims to present the results of research focused on reconstructing the chaîne opératoire of Wari basketry. Traseological studies involving stone and metal tools, microscopic examinations, and analyses such as HPLC and Raman spectroscopy were employed to identify the raw materials utilized in crafting the baskets. These included cane, resin, cotton, and camelid wool dyed with flavonoids and cochineal, among others. Experimental archaeology research carried out in the Lambayeque and Cusco regions of Peru has led to the reconstruction of a Wari basket.

4 **EXPLORING BASKETRY TECHNIQUES BEYOND CONTAINER CONSTRUCTION: INSIGHTS FROM A COPPER AGE SETTLEMENT**

Aquaro, Antonella (DAI - Deutsches Archäologisches Institut)

This presentation explores the varied applications of basketry techniques beyond traditional container construction. It focuses on findings from the Copper Age settlement of Măgura Gorgana at Pietrele in south Romania (4550 - 4250 BC).

Specifically, a charred woven 'mat' recovered on the floor of a burnt structure prompts the discussion on weaving techniques in wattle and daub house construction.

The results of the anthracological analysis of these remains are presented here, contextualized within the broader pattern of plant exploitation at the site. These findings illuminate the intricate relationship between human societies and the vegetal world, showcasing how technological innovations in basketry intersect with cultural practices and resource utilization.

This examination not only deepens our understanding of prehistoric craftsmanship and technological capabilities but also underscores the sophisticated ways in which early societies harnessed plant materials to shape their material culture and architectural practices.

Overall, this research helps us comprehend the versatile applications of basketry techniques and highlights their significance beyond traditional vessel construction. This study serves to remind us that behind the house constructors were the able hands of basket makers and that the concept of weaving extends beyond physical structures to encompass broader cultural and societal elements.

5 **A LINDEN BAST BAG FROM THE 5TH MILLENNIUM BC**

Klügl, Johanna (Archaeological Service of the Canton of Bern) - Kühn, Marlu (University of Basel; Integrative Prehistory and Archeological Science (IPAS)) - Schoch, Werner (Laboratory for Ancient Wood Research) - Gubler, Regula (Archaeological Service of the Canton of Bern)

Alpine ice patches are valuable archaeological archives, as organic objects survive for thousands of years in their ice. Due to global warming, these are melting and unique perishable organic artifacts are discovered. One example is a linden (*Tilia* sp.) bast bag which dates back to 4344-4248 calBC and thawed out of the ice on the Schnidejoch ice patch in Switzerland. It was found by hikers in 2019 and recovered shortly afterwards as a block.

In this contribution the unique object and the analyses carried out on it are introduced. Further the lifting, uncovering and conservation tests are presented. These led to the decision to spray on 5% PEG 400 and to vacuum freeze-dry the bast fibre object in order to keep the shrinkage of the bast fibers as low as possible.

Today, after conservation, the twisted object measures 19 x 27 cm. In the lower area, which presumably forms the end of the artefact, it is fragmented and a large number of pine needles (*Pinus cembra*) were detected. It is possible that it is an open U-shaped pouch measuring approximately 18 x 24 cm, which was used for collecting, storing and trans-

porting food or other objects. While there are no archaeological comparative pieces, examples of this type of pouch can be found in an ethnographic context among the Ainu, an indigenous people of Japan and Russia.

It is discussed which investigations would still be possible in order to generate further information on the use of the artefact and also on the question of whether the pine needles were accidentally got caught or used intentionally. The conservation carried out is also discussed, particularly with regard to the question of the advantages and disadvantages and consequences of PEG impregnation and what other methods of treatment would have been possible.

6 VARIABILITY AND FUNCTION IN MESOLITHIC BASKETRY FROM CUEVA DE LOS MURCIÉLAGOS (ALBUÑOL, GRANADA, SPAIN)

Herrero-Otal, Maria (Autonomous University of Barcelona) - Piqué, Raquel (Autonomous University of Barcelona) - Homs, Anna (Autonomous University of Barcelona) - Bertin, Ingrid (Autonomous University of Barcelona) - Martínez-Sevilla, Francisco (University of Alcalá)

The scarce evidence of plant fibre-based crafts in archaeological context, their fragmentation, poor preservation, scarcity, and diverse spatial and chronological distribution have limited the research approaches, with raw material identification and technological descriptions being the most common analyses. The functionality of plant fibres containers is frequently suggested by comparison with modern basketry, but it is rarely possible to associate the baskets with a specific function.

The archaeological site of Cueva de los Murciélagos (Albuñol, Granada, Spain), located in the south-eastern part of the Iberian Peninsula, has provided a unique sample of desiccated baskets. The site is a burial cave discovered in the 19th century where several partially mummified bodies, accompanied by various types of goods -plant fibre objects, wooden tools, and other archaeological remains-. The latest radiocarbon analysis places the materials in two different prehistoric periods: the Mesolithic (7986-7391 cal BC) and the Neolithic (4373-3740 cal BC).

This presentation will focus on the sample of 11 baskets corresponding to the Mesolithic ones. We discuss the variability in this group of baskets in terms of their production processes, volume, shape, decoration, and contents, which has been linked to their function. Despite the homogeneity of the production technique and shape, the baskets present differences in respect the size and some technical characteristics. The context of their discovery, related to funerary practices, and their associated content allow us to discuss the functionality of these objects.

7 BASKETS AND THEIR BELONGINGS: A CASE STUDY FROM THE LATE NEOLITHIC PILE DWELLINGS OF THE LAKE CONSTANCE

Andonova-Katsarski, Mila (Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences) - Million, Sebastian (Dendrochronological Laboratory at Hemmenhofen, State Office for Cultural Heritage, Baden-Württemberg) - Marinova, Elena (Archaeobotanical Laboratory at Hemmenhofen, State Office for Cultural Heritage, Baden-Württemberg) - Probst-Boehm, Anja (Archaeological Museum of Baden-Württemberg, Konstanz) - Banck-Burgess, Johanna (State Office for Cultural Heritage at Esslingen, Baden-Württemberg)

This study captures five exclusively well-preserved coiled baskets and the archaeobotanical remains of their possible content originating from two Late Neolithic lakeshore settlements by the Lake Constance (Southwestern Germany): Hornstaad-Hörnle (phase IA 3919-3902 BC dendrochronological dating) and Sipplingen-Osthafen (phases SiB 3857-3817/SiE 3718-3660 BC dendrochronological dating). The paper aims to combine several different proxies, such as the analysis of monocotyledonous and woody plants chosen for basket-making, and the archaeobotanical investigation of cereal remains embedded in their fabric. This will allow for a technological overview of the baskets of interest concerning the choice of vegetal raw material for their creation. Finally, the link between basket-making techniques (coiling in particular), and their content (in the case of cereal grains and chaff) will be discussed. By the application of these investigation approaches, we propose several directions of interpretation for the usage of those five basketry products and their role in the Neolithic subsistence of the pile dwellings at Lake Constance. Even acknowledging the very specific taphonomic scenario of the selected case studies i.e. recording both perishable basketry containers along with their possible vegetal content, the paper will point out the potential and implications of the presented multi-proxy approach for different preservations types and various chronologies in a broad geographic range.

8 REVERSIBILITY OF CONSERVATION MEASURES: INVESTIGATING FOOD RESIDUES IN ORGANIC CONTAINERS

Stelzner, Ingrid (Leibniz-Zentrum für Archäologie) - Probst-Böhm, Anja (Archäologisches Landesmuseum Konstanz) - Marinova, Elena (Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart)

Archaeological textiles that have been preserved in waterlogged deposits are exposed to many dangers after their discovery. In addition to their high susceptibility to mechanical stress and microbial degradation, drying out can irretrievably destroy the finds. Therefore, conservation of the finds is necessary to preserve them permanently. The ma-

jority of the artefacts that were found in the lake shores and wetlands of the northern Alpine region of south-western Germany complex were treated with polyethylene glycol (PEG) before being freeze-dried. This process was applied to artefacts such as coiled baskets and bark containers, including their food residues. A comprehensive record of the artefacts was created several decades later during the joint project THEFBO (www.thefbo.de). The presentation discusses the analysis of the food residues inside the organic containers after conservation measures were carried out. Test series were conducted on the original material and samples produced through experimental archaeology. Microchemical tests were used to monitor the dissolution of the consolidant PEG. The samples were then analyzed using micro-residue analysis, as well as under reflected light and SEM microscopy. After the dissolution it was possible to determine the botanical characteristics of the specimens without any restrictions. Furthermore, the samples could undergo organic residual analyses to identify any lipids present and to specify the nutritional composition of the contents. This would provide insight into the diet of the prehistoric settlers.

978 THE ROLE OF PUBLIC ARCHAEOLOGY IN HERITAGE MANAGEMENT

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Thakur, Renu (Department of Ancient Indian History Culture and Archaeology, Panjab University, Chandigarh) - Gahlot, Seema (AREA Environmental and Heritage Consultant, 72 Brisbane Street, Dubbo 2830, NSW, Australia) - Bhattacharyya, Banani (Deputy Director, Department of Archaeology and Museums, Haryana, India)

Session format: Regular session

Heritage encompasses both natural and human-created elements, manifesting as tangible or intangible expressions. The survival and preservation of any form of heritage are imperative. This session aims to delve into the role of Public Archaeology in heritage management, soliciting enlightening case studies that illuminate public engagement strategies. Contributions from diverse methodological approaches will be encouraged, with a particular interest in comparative analyses between the global north and south to delineate the scope of heritage management. While involving the public in heritage management fosters understanding and inclusivity, it is not without challenges. The dynamic and diverse nature of communities may lead to conflicts, necessitating exploration of conflict resolution strategies through case studies. Addressing the alienation of indigenous groups from archaeological sites is crucial, as their involvement can be a valuable asset in heritage protection. This session endeavours to guide archaeologists towards a future where Public Archaeology becomes a standard practice, instilling pride and contentment within communities. Recognizing heritage as a catalyst for local socio-economic development and future sustainability, the session advocates for Public Archaeology as a means to garner both visitor interest and financial support. By exploring global case studies, the session aims to showcase how indigenous communities actively contribute to heritage safeguarding, envisioning a participatory approach that transforms heritage into a dynamic and inclusive process, enriched by diverse interests and perspectives. This session is an invitation to join us in reimagining heritage management.

ABSTRACTS

1 PREHISTORIC SITES FROM ARAVALLI HILLS IN HARYANA, INDIA

Bhattacharyya, Banani (Department of Archaeology and Museums, Haryana)

One of the oldest mountain ranges on earth, the Aravalli hills of India, are the prominent landforms shaping the west-Indian climate and biodiversity. Aravallis with its lush green forests used to act as a green barrier and acted as an effective shield against desertification. It checked the spread of the Indian Desert (Thar) towards eastern Rajasthan, Indo Gangetic plains, Haryana and Western UP.

The intensive study area selected was the Aravalli region of the Haryana Landscape. Aravallis bound Haryana in the southwest region. The northern point of the range continues as isolated hills and rocky ridges into Haryana State, ending in Delhi. Sites in five divisions namely, Mahendragarh, Rewari, Faridabad, Gurgaon (Gurugram), and Mewat with an area of 1899 km², 1594 km², 741 km², 1258 km², and 1507 km² respectively, were extensively surveyed for mapping the land use area/Land cover pattern and the status of key wildlife species.

The natural heritage of this region not only has a rich biodiversity but also covers several areas of archaeological finds and sacred groves. Exploration has been conducted in the area covering Shilakhari, Mangar, Kot, and Dhauj located in Faridabad and Roj ka Gujjar, Damdama in Gurugram. Based on this exploration, it is suggested that the area is one of the biggest Palaeolithic sites in the Indian sub-continent, where stone age tools were recovered from different open-air sites as well as from rock shelters including rock arts and petroglyphs. This discovery will take the history of Haryana further back in time.

2 ECHOES OF ANCESTRAL CONNECTION: UNVEILING THE CULTURAL AND SPIRITUAL SIGNIFICANCE OF THE RED HAND CAVES IN KU-RING-GAI NATIONAL PARK

Gahlot, Seema (AREA Environmental and Heritage Consultant)

This paper explores the cultural and spiritual significance of the Red Hand Caves, an ancient Aboriginal rock art site within Ku-ring-gai National Park. Dating back 500 to 1600 years, the hand impressions, crafted with ochre color, serve as a tangible link to the ancestral past of the Darramuragal or Darug and Guringai people. Investigating the traditional lands extending from Sydney's upper north shore to Port Stephens near Newcastle, the study underscores the profound compatibility between the traditional owners and nature, particularly evident during moments of silence, revealing a distinctive perception of time.

The Red Hand Caves are regarded as a symbolic landmark, signifying ancestral tribute and epitomizing the enduring connection between the Darramuragal or Darug and Guringai people and the natural environment. The caves, through intricate rock art, also reveal the transmission of cultural practices and sustainability within Aboriginal society, where ancestors guide successive generations through dreams, songs, and rituals.

The Red Hand Caves transcend their role as mere rock art, encapsulating a timeless connection between the Aboriginal people and their ancestral lands. The study seeks to contribute to the preservation of cultural heritage, fostering a deeper appreciation for the intricate relationship between traditional owners and their environment.

3 WHEN ART AND ARCHAEOLOGY MEET A NEOLITHIC FIGURINE AT SHA'AR HAGOLAN (ISRAEL)

Siegal, Shirley (Shirley's Fine Art School) - Tzur, Maia (Sha'ar HaGolan) - Eirikh-Rose, Anna (IAA) - Vieugué, Julien (CNRS France)

The profession of an archaeologist is a dream for many people. The image conveyed by Indiana Jones to the public is however very far from the reality. At Sha'ar Hagolan, a prehistoric site in Israel excavated under the supervision of Julien Vieugué (CNRS) and Anna Eirikh-Rose (IAA) with the support of the French Research Center in Jerusalem (CRFJ) and the Museum of the Yarmukian Culture (MYC). A novel collaboration between field archaeology and art was initiated to heighten awareness of this profession within Israeli society. Watercolorist Shirley Siegal created a series of paintings during two excavation seasons, with the intention of depicting the entire process from the discovery of objects to their exhibition in museums, encompassing their study in both field and laboratory settings.

During the dig in which professional archaeologists and unexperienced volunteers (including some members of the kibbutz of Sha'ar Hagolan) participated, an 8000-year-old clay figurine was unearthed alongside the stone basement wall of a Yarmukian building. This figurine, that represents a seated woman with large hips, is often interpreted as a "Mother-Goddess". Working on-site, the artist created a series of drawings describing the moment of discovery of the figurine and the excitement it created for both foreign scientists and the local community. The artworks were exhibited at the Brigham Young University, Jerusalem Center for Near Eastern Studies in 2023.

This presentation will outline the distinctive bond formed among art, archaeology, and the local community. It will emphasize the importance of reinforcing the commitment of Kibbutz members to preserving the site and its surrounding environment.

4 MUNICIPAL COUNCILS FOR THE MANAGEMENT OF CULTURAL HERITAGE IN THE CANARY ISLANDS (SPAIN): THE GHOST OF PROTECTIONISM

Morales Casañas, Diria (Universidad de La Laguna) - Pérez González, Elena (Universidad Europea de Canarias)

Spain is one of the European countries with a large and diverse cultural heritage. There are 50 inscriptions on the UNESCO World Heritage List and around 17,000 sites are protected with the highest legal category of protection. This volume of cultural heritage, which must be managed with its specificities, is reflected in the complexity of the co-existence between the local population and the cultural heritage. Therefore, management institutions such as cultural heritage councils or commissions are important to understand how they are affected in both directions.

Cultural heritage boards or commissions are official units for the management of cultural property. These structures can be at different administrative levels. In our work, we will focus on the local heritage councils of the autonomous community of the Canary Islands (Spain), to which we have had access. We will describe the state of their creation and functioning. We will look at the regulations and the acts of their creation and official announcements, as well as the administrative dossier with milestones of intervention in cultural assets.

This work will allow us to better understand the municipal management of cultural heritage in the Canary Islands (Spain), a management which, in our study, is presented as non-integrated and not engaged with the local population. Nor do local councils have the tools to facilitate this engagement. Often, these councils are only nominative and have never been activated.

This analysis will lead us to propose lines of work based on more global, logical, and structural processes of action, with more participatory development, following the trends and demands of cultural heritage management today.

5 ARCHAEOLOGY AND CIVIC PARTICIPATION ON THE DUTCH ISLAND OF TERSCHELLING: HERITAGE PARTICIPATION IN THE CREATION OF ARCHAEOLOGICAL EXPECTATION MAPS

Honshorst, Maaïke (University of Amsterdam; Buro de Brug; CARE Schylge; Steunpunt Monumentenzorg Friesland)

This study examines the added value of implementing the principles of the Faro Convention in the development of municipal archaeological expectation maps in the Netherlands. To investigate this, firstly, an archaeological expectation map was created of the municipal of Terschelling. Additionally, I conducted participatory research using a digital questionnaire grounded on the concepts of 'deep-map' and 'deep-mapping.'

Subsequently, based on the survey results, experiential maps were crafted, highlighting three themes: cultural history, heritage, and the archaeology of Terschelling. These experiential maps reflect the preferences and interests of citizens focused on historical and archaeological sites, themes, and periods.

Furthermore, I compared the experiential map with the concept of the deep-map. Based on this comparison, it can be concluded that the Terschelling experiential map does not meet all the characteristics of the deep-map. However, the concept of the deep-map is well-suited for creating an experiential map because its features align with the principles of the Faro Convention.

In conclusion, based on this paper it can be said that the significance of gathering experiential values and creating an experiential map lies in revealing which archaeological sites and periods capture the imagination and which do not, shedding light on knowledge gaps in history and archaeology among the public. Individuals who perceive certain missing archaeological locations and periods on the experiential map as an issue can respond by drawing attention to these absent periods in society, making them more captivating.

Finally, it is important to note that this study employed just one of many possible methods to explore the added value of implementing Faro Convention principles in creating an archaeological expectation map specifically, by seeking input and advice from citizens through a questionnaire. This means that using other steps in the participation ladder and guide may lead to different conclusions on this subject.

6 HERITAGE PRESERVATION, BENEFIT AND ENGAGEMENT: COMMUNITY ARCHAEOLOGY IN URBAN SPACES

Grewal, Jagtej (Panjab University, India)

The preservation of heritage is approached through various methods within the umbrella of community or public archaeology. Within the urban landscape the preservation of both tangible and intangible heritage has benefited from interventions such as cultural resource management, cultural tourism and community collaboration among others. This paper aims to study such interventions with reference to Amritsar which is in Punjab, a state in North-west India. The city has a rich cultural history as it is the religious centre of the Sikhs (a religious minority in India). The cityscape is home to religious, cultural and historical spaces and narratives linked to people's faith, emotions and economic survival and growth. The paper examines three case studies – the first related to a heritage craft of beaten metalwork and the intervention that enabled the survival of a dying tradition; the second of cultural tourism through heritage walks in the old town that led to the preservation of heritage sites and economic benefits to the community; and third the intervention for preservation of the heritage aspects of an old historic bazaar and the resulting benefits to the trader community. The paper aims to examine the methods employed for these and to study the results accruing from these interventions – that involved the local government, the affected communities and private individuals.

7 MAPPING THE LEGACY OF HERITAGE FORESTS IN THE CULTURAL LANDSCAPE OF INHAMBANE PROVINCE, SOUTHERN MOZAMBIQUE

Gota, Pascoal (Department of Archaeology and Ancient History, Uppsala University)

Inhambane province is part of the southern Zanzibar-Inhambane coastal forest mosaic consisting in several locally protected forest patches, but there no much research done regarding to the history, location and the management systems of these areas. This gap is currently and constantly engraining narratives that criticise local practices of conservation and cultural management, and consequently leading to conservation schemes that overlook the role of custodians and local communities. Relying heavily in satellite images, oral history, historical maps, land use and land cover classifications, I show how forest patches are biocultural and heritages sites being safeguarded by local custodians using a variety of approaches linked to local landscape management. The results are important to understand local conservation practices, and to build methodological approaches concurring for a formal recognition of local residents as stewards of intangible and tangible heritage as well as the biodiversity existing in the forest patches. Moreover, the

findings highlight that there is a room for alternative ways of conservations that goes beyond mainstream conservation approach to biodiversity and cultural heritage, thus opening space for collaboration with local residents.

8 ARCHIVING FOR THE FUTURE: EVALUATING THE POTENTIAL OF PUBLIC ENGAGEMENT IN HERITAGE MANAGEMENT IN UTTARAKHAND, INDIA

Bisht, Monica (SGRR University, Dehradun; Panjab University, Chandigarh)

India is culturally rich country known for its heritage through its nationally important archaeological heritage sites and monuments. Monitoring of these heritage sites is essential as they face increasing risk due to urbanization, tourism, natural and manmade disasters. Few of the biggest challenges for the heritage sector of India is how to record, document, protect, preserve, interpret and showcase the wide range of protected and unprotected built heritage. In a country of such cultural diversity, geographical variance and centuries old remains, a much larger network of organization including public and private sector bodies along with professionals and institutions are required to address these challenges at national, regional and local levels. Many archaeologists encourage the public to be directly involved in archaeological projects. The aim is to provide the public with experience of archaeological skills and methods, as well as insights into the heritage of their local area. People could become an active participant and determine for themselves what archaeological resources mean to them and their community. In this paper we will study how local communities can play imperative role in heritage management with special reference to the state of Uttarakhand located in North India, which is diverse in geographic and economic conditions with different religious backgrounds. The Constitutional Head of the state has already called upon the youth and tribal community to actively participate, preserve and learn from our heritage. We will evaluate how the public interest and demand for contribution in the heritage management can benefit us. We will also discuss challenges, policies and guidelines for its long-term protection, conservation and promotion.

9 GARDENS OF THE ROYAL AND PUBLIC: A CASE STUDY OF HERITAGE MANAGEMENT AT AAM KHAS BAGH, SIRHIND, PUNJAB, INDIA

Sharma, Pratibha (Panjab University)

Aam Khas Bagh is a Mughal garden located in Sirhind, Fatehgarh Sahib, Punjab, India. The complex consists of remains of a highway inn that was constructed for the royals as well as for the public. Today, the complex is beautified with elaborate gardens and fountains and parts of it have undergone conservation and renovation. There is an orchard spread within the vicinity of the complex. Most of the remains of the original compound is in ruins. The complex constitutes various monuments that are protected and maintained by the Archaeological Survey of India. The condition of the complex is deplorable and it requires more effort to preserve its heritage. The site has undergone conservation but the efforts seem to be in vain as presently it is not being ministered to. Better maintenance of the monuments including conservation and cleaning is necessary. Coordination with the local communities including community archaeology initiatives is required for better preservation of our monuments and heritage.

10 ECHOES OF HISTORY: REVITALIZING HERITAGE CONSERVATION AT MAHASU DEVTA TEMPLE

Kala, Himani (Panjab university)

Mahasu devta temple situated on the bank of river Tons in Hanol, Uttarakhand was built in 9th century. This historic temple is dedicated to lord Shiva. Nestled amidst the picturesque Himalayan foothills, the temple holds significant cultural and spiritual importance for the local population. The temple was constructed in Huna architectural style and is currently protected by the Archeological Survey of India but for the effective heritage management of the Mahasu temple a holistic approach is required that balances conservation, cultural practices, community involvement, and sustainable development to safeguard its significance for future generations. Collaboration among various stakeholders, including government agencies, local communities, religious authorities, and heritage organizations, is essential for achieving these goals. Different methodologies can be applied for the preservation of the monument. Awareness regarding the monument needs to be spread among the local community for its preservation and conservation. Through various measures the Mahasu temple's rich heritage can be preserved for future generations to cherish and appreciate.

11 FROM RUINS TO REVIVAL: THE ROLE OF PUBLIC ARCHAEOLOGY IN HERITAGE MANAGEMENT

Thakur, Renu (Panjab University)

The present paper aims to study the role of public archaeology in managing heritage.

Heritage Management encompasses a broader spectrum of activities aimed at conserving and managing Heritage resources for present and future generations. This involves comprehensive strategies. Public Archaeology stands as a vital pillar to understand, preserve, and celebrate rich legacy. It transcends traditional archaeological practices by

actively involving communities in exploration, excavation, interpretation, and preservation of both tangible and intangible heritage. This inclusive approach not only democratizes access to archaeological knowledge but also fosters a sense of ownership and pride within the Indigenous communities. In India, public archaeological has gained momentum in recent years. Community driven projects have raised awareness among people to safeguard Heritage but there is need for sustained support by Government, NGOs, and Academic Institutions to suggest innovative strategies in preserving Heritage and sustainable development of heritage sites. A few case studies highlighting the role of community and challenges faced would be discussed by us. There is an immediate need in India to envision a more participatory approach to safeguard our heritage through innovative public engagement strategies.

982 TRACING & PROTECTING: FACING THE SHADOWS OF ILLICIT TRAFFICKING IN CULTURAL GOODS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Axelsen, Irmelin (Museum of Cultural History, University of Oslo) - Traviglia, Arianna (Italian Institute of Technology) - Runhovde, Siv Rebekka (Museum of Cultural History, University of Oslo) - Vico Belmonte, Ana (Universidad Rey Juan Carlos)

Session format: Regular session

Cultural heritage across Europe is under threat, seemingly increasingly so, with several wars and conflict areas close to (and within) the continent's borders. The circulation of cultural goods with little or no information about their provenience or provenance in the licit and illicit market are glaring testaments to this. Trafficking in cultural heritage objects is an extensive and profitable crime area internationally with high profits and low risk. Moreover, the many actors involved in the illicit and 'grey' trade of cultural heritage are closely entangled.

Despite the most recent positive trends in the recovery of stolen/looted artworks, challenges persist due to inadequate general preparedness to dramatically address and prevent the issue. As international agreements and resolutions emphasize, information exchange and collaboration between researchers, museums, government institutions, actors in the art- and antiquities market, international NGOs and IGOs, and technology developers are needed to counteract and minimize the phenomenon.

By highlighting the urgency and complexity of the problem, this session is conceived as a joint event fostering a cooperative environment and cross-disciplinary alliances among interested stakeholders to deter and tackle the illicit trade. We welcome contributions dealing with:

- current cross-national collaborative initiatives to fight illicit trafficking in cultural goods
- the development of technological tools to increase the antiquities market security and support the Law Enforcement Agencies' endeavours
- practical and theoretical challenges and solutions related to the prevention of cultural heritage crime.
- (un)successful examples of tracing different types of cultural goods, such as portable heritage objects after being uncovered from the ground.
- experiences from cross-sectoral collaboration on seizures and restitution of illicit cultural heritage artefacts.

The session is also seamlessly integrated into the collaborative framework of RITHMS HE Project (G.A. 101073932, coordinated by the Italian Institute of Technology) and DECOPE Project (JPI Cultural Heritage network, partnered by the Universidad Rey Juan Carlos).

ABSTRACTS

1 LEGALITY IN THE FORMATION OF ARCHAEOLOGICAL COLLECTIONS AND FUTURE TRENDS: A CASE STUDY OF THE MUSEO DE AMÉRICA DE MADRID

Labrador Ballestero, Patricia (Universidad Rey Juan Carlos; Grupo de Investigación HIEART) - Martínez Peláez, Agustín (Universidad Rey Juan Carlos; Grupo de Investigación HIEART) - de la Fuente Polo, Paula (Universidad Rey Juan Carlos)

This proposal presents a detailed analysis of the legality surrounding the formation of archaeological collections, with a specific focus on the Museo de América de Madrid. The study explores institutional policies, legal frameworks, and trends in the acquisition of artefacts, outlining the complex dynamics that have shaped the acquisition and management of archaeological pieces at this institution over time.

This contribution considers how national and international legislation has influenced the formation of collections, and how these have evolved in response to legislative changes and shifts in public perceptions of cultural heritage. It takes

a rigorous approach to examine how these legal and social dynamics have affected the acquisition and management of archaeological collections at the Museo de América.

It also assesses current trends in the management of these collections, as well as possible challenges that this institution may face in the future, such as the potential threat of the return of some of its pieces. In short, this research aims to analyse the complex intersections between legality, ethics and museum management in the field of archaeology, using the case of the Museo de América de Madrid as a central case study.

2 TRADITION AND CONSISTENCY IN POLISH APPROACH TO EXPORT OF MOVEABLE ARCHAEOLOGICAL HERITAGE

Wisniewski, Mariusz (MKiDN, Ministry of Culture and National Heritage, Poland) - Szubska, Magdalena (Ministry of Culture and National Heritage, Poland)

Since regaining independence in 1918, Poland has demonstrated a steadfast commitment to protecting its cultural heritage. This presentation aims to explore a particular trace of the policy which started with the Decree of the Regency Council on the care of monuments of art and culture.

We are referring to early recognition of archaeological finds and archaeological artefacts as an important part of common heritage and therefore an effective ban of legal trade and, what is more, perhaps characteristic severe restriction on any export.

At the same time, this act created many routes that Polish legal solutions followed for over a century. This includes legal protection on all archaeological excavations and finds, including those not previously registered due to their nature. Requirement for permits for transport, ban on export and wide prerogative to take control over private property in the name of protection of common heritage at a scale unheard of in the early XX century. For Past 105 years, Poland changed governments, political system, national borders and most of its laws yet amazingly not its approach to control and limit the export of archaeological material. Through the 20 years of independence between world wars and amazingly during communist regime, up until recently official politics and rules of protection of archaeological heritage almost did not change direction. We shall try also, lastly, to explain this direction and implications of it on some of our actions as the Ministry of Culture and National Heritage.

3 ANALYSIS OF THE LEGAL AND ADMINISTRATIVE SITUATION OF TRAFFICKING IN CULTURAL GOODS

de la Fuente Polo, Paula (Rey Juan Carlos University) - Vico Belmonte, Ana (Rey Juan Carlos University)

This study forms part of the research carried out within the European research project DECOPE (Destructive Exploitation and Care of Cultural Objects. Professional/Public Education for sustainable heritage management), which is developing a database on Cultural Heritage legislation in each of the European countries and those in which there is a large traffic of cultural property.

Analyzing these data provides us with interesting information on the level of heterogeneity in the administrative processes in the movement of cultural property and how this hinders their control, benefiting illicit trafficking. For this reason, the administrative processes, and the degree of accessibility of such documentation are examined.

The database covers the following seven areas in each country: the administrative body in charge of managing the trafficking of cultural property, cultural heritage protection figures, exports, imports, customs and goods in transit, conflicting heritage legislation and the international conventions to which the country is a party. Of these seven areas, greater emphasis is placed on export and import issues, as export modalities are analyzed, as well as the documentation and documentation of the country's cultural heritage.

4 TRAFFICKED CULTURAL HERITAGE ARTEFACTS: BETWEEN TRANSNATIONAL GOVERNANCE AND NATIONAL LEGAL FRAMEWORKS

Roland, Håkon (University of Oslo)

Transnational governance, regulations and compliance are essential in safeguarding cultural heritage in war and conflict. When law enforcement or cultural heritage managers come across looted and trafficked cultural artefacts, a consistent set of regulations and ethical and normative guidelines set by transnational governance are put into effect. In a process of restitution, the responsible actors are expected to comply to heritage acts and national regulations, and usually express a strong will and motivation to do so. However, cultural heritage is influenced by informal structures and motivations in such processes, and compliance cannot be understood unambiguously even in cases involving looted cultural heritage of the same origin and nature.

The complex network that influences the construction of value of cultural heritage, how artefacts are activated as economic, diplomatic, and political currencies and how governance and compliance are played out will be discussed

based on two recent case studies from Norway. The two cases involve police seizures of illicit cultural heritage artefacts of identical types and origin, subjected to the same national legal framework. Despite this, the cases ended up with opposite outcomes. One ended up as a successful restitution on bilateral ministerial level, the other with a complete neglect of the seized heritage artefacts. The paper will discuss the relationship between transnational policy and regulations and how the national actors and legal framework comply to this (or not) in cases of trafficked cultural heritage artefacts.

5 CHANNELING SMUGGLING OF CULTURAL GOODS THROUGH THE SCHENGEN AREA. POLICY GAPS IN THE EUROPEAN CONTEXT

Nothnagel Vivas, Katharina (Universidad Rey Juan Carlos)

This study investigates how illicit trafficking in cultural property might be benefiting from differences between EU members states' national regulations on cultural heritage in a borderless space. Europe having a highly developed and established art market, it is also one of the world's largest receiving markets for illicit archaeological artefacts coming from MENA region, other source countries as well as originally from within its borders. Therefore, Europe has a unique scenario where the interests of the single market and freedom of movement interact with those of society as tutelar of a rich cultural heritage and with those of international security. That is why coordination in European policymaking is currently one of the main challenges for an adequate cultural heritage protection against smuggling.

The research methodology consists of a comparative analysis of restrictions on the concession of export permits for cultural goods. The sample taken has been member countries' national policies; policies from non-EU countries within the Schengen Area; and EU community regulation. A specific focus on those countries within the Schengen Area but where EU regulation is not applicable has been made. Results on disparity among policies have been encountered suggesting that these may be functioning as policy gaps due to non-cooperative regulation, through which illicit transit in cultural goods can be channeled.

Further research questions emerge such as what this non-cooperation is due to. Research can be extended to the sought of a common standpoint for European cultural policies: an adequate and specific criminological analysis of the illicit trade in cultural goods. Implications of this study pursue a better anticipation in future to preserve European international security and fight organised criminality in cultural goods by a deeper understanding of cultural export policing in Europe.

6 FINANCIAL CRIME AND THE ART MARKET. A REVIEW OF THE LITERATURE

Runhovde, Siv Rebekka (Museum of Cultural History University of Oslo)

The art market, a lucrative global industry, may face significant risk of financial crime, owing to factors such as transactional anonymity and regulatory gaps. My research investigates these risks within the Norwegian art market, focusing on the roles of i.a. galleries, auction houses, art dealers and antiquarians. By examining both primary and secondary markets, it seeks to understand how current practices may inadvertently facilitate illicit activities and proposes strategies for prevention and regulation. Existing research highlights a lack of risk awareness and self-regulation among market participants, emphasizing the need for enhanced oversight.

As the inaugural phase of the research, this paper presents preliminary insights gathered from a comprehensive review of the existing literature. Illegal trade in cultural artifacts is often economically motivated, but neither research nor regulatory authorities have devoted particular focus to the art market in the context of economic crime. By illuminating potential drivers of financial crime in the art trade, it sets the stage for further exploration and the development of targeted interventions to safeguard the integrity of the market.

7 INVESTIGATING FINANCIAL CRIME IN ANTIQUITIES TRAFFICKING

Gkioni, Maria (ACFE GREECE)

Investigating financial crime is a difficult task in comparison with other kind of crimes, i.e. murder, arson, terrorism. That is because financial crime causes the illegally gain of different assets (such as property or money), usually without violence. Moreover, the dearth of physical violence and victims acquits the perpetrators for their actions. However, financial crime forge harm in business and/or culture. In recent decades many investigations by law enforcement agencies or journalists showed that antiquities trafficking can be related to financial crime, as they can easily provide coverage to criminals and concealment of illegal actions (mainly laundry of dirty money).

This presentation briefly examines the connection between antiquities trafficking and financial crime with emphasis on money laundering. Firstly, a brief description of what constitutes financial crime will clarify its broad definition. Secondly, a glance at different types of financial crime will provide a better understanding of the term and its connection with antiquities trafficking. Thirdly, the analysis of revealed cases will illustrate the way dirty money produced

by antiquities trafficking infiltrate the financial system. Finally, the role archaeological community could play in the investigation and/or prevention and detection of these crimes will be discussed.

8 TUT ON TOUR: 30 YEARS OF DEMAND CREATION THROUGH EXHIBITION

Austin, Summer (University College London)

Tut on Tour is a multidisciplinary investigation into factors that create, enhance, and normalise demand for collecting antiquities. Using the original blockbuster, Treasures of Tutankhamun as the case study, this research investigates the correlating antiquities markets' reaction to 'Tut' blockbuster exhibition by gathering, quantifying, and contextualising 30-years of exhibition and antiquities market data. The objective of this study is to introduce reliable data to the crucial debate concerning the relationship between museum blockbuster exhibitions, end-market demand, and the illicit antiquities trade. The market for illicit antiquities is a demand-driven economic system predicated on collectors and museums acquiring antiquities; thus, we must understand what influences demand for antiquities. Utilising primary-sources and archaeological, economic, museological, and criminological theory, this research addresses the assumption that blockbuster exhibitions influence demand in the antiquities market. Anecdotal evidence and single-auction evidence in journals make up the totality of evidence for this assumption; thus, this research addresses a pivotal gap concerning causality between museums, the market, and the illicit trade. This blind-spot in our understanding of the impact of blockbusters results in museums, nation, researchers, and international legislators making decisions based on assumptions rather than realities.

Using a dual-methodological investigation, this research presents compelling evidence to support the hypothesis that blockbusters generate demand for their subject matter. The results support the hypothesis that the 1970s Tutankhamun exhibitions generated substantial market demand for Egyptian artefacts. The data demonstrates an instantaneous, intense, and sustained demand for ancient Egyptian objects created in direct response to the exhibit. This increase in demand can be linked to an increase in illicit activities.

This study provides a foundation to understand what motivates and inspires demand and collecting with the objective of protecting today's heritage. If we can understand and anticipate demand, more can be done to proactively reduce harm to the finite resource.

9 RITHMS INNOVATIVE PLATFORM: A EUROPEAN PROJECT TO SUPPORT LAW ENFORCEMENT AGENCIES' FIGHT AGAINST CULTURAL HERITAGE CRIME THROUGH TECHNOLOGY

De Bernardin, Michela (Istituto Italiano di Tecnologia) - Riccardo, Giovanelli (Istituto Italiano di Tecnologia) - Leeson, Madison (Istituto Italiano di Tecnologia) - Traviglia, Arianna (Istituto Italiano di Tecnologia)

Fuelled by factors like the high demand in the art market, ease of border crossing, and political instability, the illicit trafficking of cultural goods raises increasing global concerns. Heightened public awareness of thefts, looting activities, and dubious licenses of artefacts' import-export, particularly from conflict-affected countries, has spurred international initiatives to combat the phenomenon.

In this framework, the EU-funded RITHMS (Research, Intelligence, Technology for Heritage, and Market Security) project, currently in its second year of action, steps into the foreground by developing cutting-edge technology tailored to the operational needs of the Law Enforcement Agencies (LEAs) in disrupting this transnational crime.

Central to the RITHMS concept is an interoperable social network-oriented digital platform informed by inputs from diverse disciplines. This innovative platform will identify the interconnections among the actors involved in the (il)licit trade of cultural goods, integrating data from an unprecedented range of sources. Leveraging Social Network Analysis (SNA) methods, which illustrate human behaviour through relational data, the system will provide investigators with insightful intelligence on the activities and evolution of criminal networks.

At this stage, the correlation of open-source data from websites, social media, and databases of missing and stolen cultural goods is building the world's largest knowledge graph of items and individuals connected to the circulation of art and antiquities available to the LEAs.

Comprising four police authorities, two border agencies, a police university, SMEs, and researchers from social sciences and ICT, the RITHMS Consortium strives to offer a comprehensive strategy to combat the illicit trafficking of cultural heritage. Notably, the direct involvement of LEAs in all project phases allows for concrete and fruitful cooperation with the technological partners, which is crucial for effective, tangible results.

10 THE CULTURAL HERITAGE AT RISK DATABASE: PROACTIVE AND REACTIVE MEASURES TO TRACE STOLEN AND LOOTED CULTURAL PROPERTY

Korner, Will (The Cultural Heritage At Risk Database (CHARD))

The Cultural Heritage At Risk Database (CHARD) is a foundation registered in the Netherlands to protect the world's cultural heritage, especially moveable objects that may be at risk. Since 2015, CHARD has registered 'at risk'

objects from museums, warehouses, archaeological and religious sites, archives and depositories in conflict and crisis zones. Registered objects are kept confidential and secure on the leading due diligence database in the art market, the Art Loss Register, so that these objects can be traced if they appear on the market or in police or customs checks.

The proposed EAA presentation discusses how CHARD fits into existing systems to combat the illicit trafficking and sale of stolen cultural goods, drawing together information and resources that are already available, and maximizing the work of all stakeholders. CHARD has already proven an immediate and effective solution, transferring the hard work of archaeologists and museum professionals who painstakingly record cultural objects in the first place, as well as those who risk their lives every day to protect them, into practical tools to assist in the fight against trafficking. The setup and relationships that CHARD has built mean that this work can be undertaken at a fraction of the cost of similar database projects, whilst providing an invaluable data-set for other stakeholders to use in future.

This successful collaboration will be demonstrated in the presentation with case studies, where hundreds of stolen and looted objects have been traced by those involved with CHARD, as well as initiating major law enforcement investigations. These practical examples will show how the cooperation of all stakeholders - law enforcement, governments, museums, archaeologists, the trade and many others - can significantly expand the number of stolen and looted objects being protected and returned, increase possibilities for investigations, and address the illicit trafficking of cultural goods.

11 DOCUMENTING CONFLICT ANTIQUITIES TRAFFICKERS IN RUSSIA'S WAR ON UKRAINE

Hardy, Samuel (NIKU - Norwegian Institute for Cultural Heritage Research) - Telizhenko, Serhii (Institute of Archaeology, National Academy of Sciences of Ukraine (IANANU))

Particularly since the rise of the Islamic State through the civil war in Syria, there has been intense confusion, misinformation and disinformation about pillaging and other forms of profit-motivated looting and theft during conflict and crisis. Based on an international collaboration, using the case of Russia's war on Ukraine and other examples from the European Neighbourhood, this paper will review how fighters and facilitators finance and incentivise participation in armed conflict, terrorism and other processes of political violence; how ordinary criminals exploit extraordinary situations such as military occupation; and how intersecting conflict economies interact.

In doing so, this paper will highlight academic and legal obstacles to the storing and sharing of sensitive and other personal data on cultural heritage crime, even when self-identifying and self-incriminating data is open-source data that has been published openly by the perpetrators in order to facilitate their perpetration of crime and gain from the proceeds of crime. These are significant obstacles to combatting illicit trafficking of cultural goods, particularly when prevention is dependent upon collaboration with experts across organisations, sectors and borders.

984 ARCHAEOLOGY AND ANTHROPOLOGY, TWO APPROACHES ONE GOAL: INSIGHT INTO LIFE AND DEATH FROM THE 3RD TO 7TH CENTURY CE

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Mongillo, Jessica (Department of Environmental and Prevention Sciences, University of Ferrara) - Bolder-Boos, Marion (Institut für Altertumswissenschaften (IAW), Arbeitsbereich Klassische Archäologie, Johannes Gutenberg-Universität Mainz) - Dubbini, Rachele (Department of Humanities, University of Ferrara) - Bramanti, Barbara (Department of Environmental and Prevention Sciences, University of Ferrara) - Roascio, Stefano (Ministero della Cultura, Parco Archeologico dell'Appia Antica)

Session format: Regular session

In the 3rd century CE began a period of economic, political, social, and religious changes that paved the way for all those events that led to the crisis and fall of the Western Roman Empire in the 5th century. The whole of Western Europe underwent a great socio-cultural transformation and reorganization caused by the invasion of barbarian or non-Romanised western and eastern peoples (Goths, Franks, Lombards, etc.), and due to economic crisis, climatic changes, conflicts and the spread of infectious diseases and epidemics. Trade networks for supplies shifted towards the East causing new patterns of mobility and movement of people resulting in high inter-individual heterogeneity. These changes affected the areas of the Empire in different ways, especially the limes areas characterised by military occupation.

Anthropology can trace the effects of changes in the life of individuals through the analysis of skeletal remains. Similarly, archaeology attempts to answer the question of whether the funerary practices of this period reflect changes in beliefs and society. For instance, ways of displaying and commemorating the dead shifted after the spread of Christianity, and funerary structures reflect a shared ideology and symbols between Christians and pagans.

The purpose of this session is to combine two disciplines, funerary archaeology, and physical anthropology to explore the social and cultural changes from the 3rd to 7th century CE.

Contributions should include a multidisciplinary perspective, bringing together the analysis of human remains with burial patterns to address the same question. Papers may cover not only the mobility, genetics, demography, diet, and health of individuals of the period, but also the funerary contexts, grave goods, and material culture from various geographical areas, different social contexts, rural or urban areas, throughout the Roman Empire. This session aims to bring together bio-anthropological and archaeological studies to share and update the latest findings.

ABSTRACTS

1 THE ARCHAEOLOGICAL SITE OF VIA APPIA ANTICA 39: A BURIAL PLOT FROM THE IMPERIAL PERIOD TO THE 7TH CENTURY CE

Dubbini, Rachele (Dipartimento di Studi Umanistici, Università degli Studi di Ferrara) - Barbara, Bramanti (Dipartimento di Scienze dell'Ambiente e della Prevenzione, Università degli Studi di Ferrara) - Mongillo, Jessica (Dipartimento di Scienze dell'Ambiente e della Prevenzione, Università degli Studi di Ferrara) - Roascio, Stefano (Parco Archeologico dell'Appia Antica) - Bolder Boos, Marion (Institut für Altertumswissenschaften, Johannes Gutenberg-Universität Mainz)

Archaeological funerary contexts provide valuable information on the culture, beliefs, and lifestyle of ancient times. Alongside architectural structures, spatial organisation, frescoes, marble, mosaics, inscriptions, ceramics and terracotta, the depositions of individuals and skeletal remains represent the irreplaceable sign of their existence. The funerary site of Via Appia Antica 39 in Rome was discovered in 2022. It is located in the first stretch of the Via Appia at the gates of Rome, in a critical and borderline space between the urban periphery and the countryside. Here a burial plot from the Antonine era has been discovered, whose funerary use is attested for at least four centuries. The imperial columbaria included incineration burials and, at a lower level, inhumations inside large arcosolia. They were decorated by frescos and black and white mosaic floors. At the end of the 3rd and 4th centuries CE, a renovation took place, the ancient burials were respected, and new arcosolia were opened. The area was abandoned around the 6th to 7th century CE, due to upwelling of the water coming from the nearby Almo river: the dense fills of earth mixed with pottery, bricks and rubble offer a new picture of significant cultural and environmental changes. Furthermore, the variety of primary and secondary burials - in sarcophagi, bare earth and amphorae- and the definition of a space probably destined for children and some deviant burials, provide insight into the Late Antiquity transition in Rome.

2 CHANGES AND PERSISTENCE IN POPULATIONS, SOCIAL USES AND THE CONFIGURATION OF URBAN FUNERARY AREAS IN SOUTH-EASTERN GAUL (3RD-6TH C. CE)

Granier, Gaëlle (UMR 7268 ADES, CNRS - EFS- Aix-Marseille University, Marseille, France)

The configuration of many urban centres changed from the 3rd century onwards; and so the funerary sphere, but to what extent, and according to what social or religious criteria? Using examples from south-eastern Gaul, we will see that two major changes took place in funerary practices: in the 3rd century and in the 5th century. In this context, the funerary areas of the 3rd-4th centuries are highly specific and reflect social, symbolic and technical practices that retain a strong heritage of earlier practices while also incorporating new ones. In many cases, these groups broke with the topography of the Early Empire and were newly created in spaces that had previously been used for different purposes, raising the question of the legal evolution of the status of the plots. These new groups, which remained independent of one another, were formed according to a multitude of criteria: family, collegia, other social groups... and perhaps religious, although it was not considered necessary to indicate this on the grave, through its location or the practices adopted. However, these changes in practices were not accompanied by a change in the composition of the populations and their living conditions. The notion that these populations and the Late antique urban contexts in general were in decline therefore needs to be reconsidered, as does that of the devastating impact of the movements that took place from the 3rd century onwards within the Empire and on its borders. These recent archaeoanthropological studies highlight a rather integrative transformation, which includes a way of thinking about the city and the spaces that are accessible or dedicated to the dead that adapts, both pragmatically and in such a way as to ensure respect for the symbolic rules and fundamental social uses as well as those that emerge.

3 FAMILY AND SOCIETY IN THE ROMAN PROVINCE OF SARDINIA: A FUNERARY CONTEXT ANALYSIS

Serra, Rita (University of Sassari) - La Fragola, Alessandra (Independent researcher) - Gasperetti, Gabriella (Superintendenza of Archaeology, Fine Arts and Landscape for the provinces of Sassari and Nuoro) - Yavuz, Orhan (University of Tübingen) - Posth, Cosimo (University of Tübingen) - Bandiera, Pasquale (University of Sassari)

Necropolis are the mirror of living society and its concept. Analysing the dead city can be useful to better understand the living city. To carry out this concept we did an archaeological and anthropological analysis of a Roman settlement

of Carbia in NW Sardinia. This settlement was cited by sources (Itinerarium Antonini Augusti AD) and has not been discovered yet, but the same place has been discovered as a Roman imperial necropolis (1st-3rd century AD) with cremation and inhumation burials. An archaeological, anthropological and topographical analysis of burial arrangements was carried out and compared to social structure as indicated by sources. The first analysis underlined the absence of a division of the area by ritual, but also a partition by biological profile or type of burial is absent. A topographical disposition, with closed-up burials, with different ages of death and sexes, compatible with family groups, suggested a partition for families or gens, as a traditional division of Roman society. The genetic analysis ran on 10% of the burials scattered in the necropolis, but also with the comparison between burials side by side, showed that there are not relationships between all the individuals analysed for two degrees of kinship. At the same time, population genetics showed different origins between burials close to each other and a more similar origin between topographically distant burials. Considering this, we can say that the disposition of burials in Monte Carru necropolis does not indicate the classical division in Roman society in imperial times, but we can not deny that Sardinian inhabitants were not just a Roman people, but a provincial people with local origin and tradition.

4 THE BURIED AT THE AMPHITHEATER OF ALBENGA. NEW INTERPRETATIONS FOR A SOCIAL RECONSTRUCTION OF A LOCAL CAPITAL IN LATE ANTIQUITY

Roascio, Stefano (Parco Archeologico Appia Antica) - Delli', Elena (Soprintendenza ABAP Bari) - Spadea, Giuseppina (già Soprintendenza Archeologica Liguria) - Bona, Alessandro (Università Cattolica Sacro Cuore di Milano)

The amphitheater of Albingaunum (II AD) was the subject of various archaeological excavations started in the 1930s and ended in the 1980s, recently object of new reflections.

There are still many open questions, the case that presents itself is significant not only to investigate the general dynamics of demonumentalization and refunctionalization of entertainment buildings, but also the new funeral destinations that, in the case of Albenga, allow to open interesting hypotheses about the communities.

The amphitheater in question, located outside the city walls, was abandoned and converted into a necropolis space between the middle of the fifth and the middle of the sixth AD, when the ingauna town - under the emperor Constantius - was reorganized as the local capital of the Maritima Italicorum, with a contraction compared to the early imperial spaces.

Twenty-seven burials were made exploiting the ellipses of the amphitheater and were presented, with rare objects of equipment, in some structure cases, in others in bare ground or probable enchytrismos.

The anthropological analysis, which was possible to conduct on 12 burials, shows a population of 30 individuals, of which 22 adults and 8 subadults, with good living conditions except for rare pathological cases.

Interestingly some male subjects with allochthonous markers, specifically dolichocrania, high stature compared to the native populations and marked muscular insertions and enthesopathies.

The interdisciplinary rereading of the context seems to make plausible the possibility that such individuals can be traced to Gothic soldiers together with their families, certainly present in the area, whose burials suffer from poor archaeological visibility.

Given the strong ethnic and social mobility of late antiquity, it cannot be excluded that these are Central European auxiliaries inserted in the Byzantine ranks, which try to preserve their own cultural identity.

5 AN INSIGHT ON HEALTH STATUS DURING THE EARLY MIDDLE AGES IN CENTRAL AND NORTHERN ITALY (V-VII CENTURIES CE)

Manzo, Giulia (Department of Environmental and Prevention Sciences, University of Ferrara) - Regueiro Salcedo, Ian (Department of Human Studies, University of Ferrara) - Zedda, Nicoletta (Department of Environmental and Prevention Sciences, University of Ferrara)

The complex period between the formal end of the Western Roman Empire in 476 CE and the Lombard domination of Italy (560s CE onwards) is particularly characterised by climate, social and political changes and cyclic episodes of the so-called Justinian plague. In terms of health status and life conditions during this time ancient sources relating to the Italian peninsula are problematic and come mainly from non-medical legal, hagiographical, and archaeological records. However, these sources should be combined with a range of bioarchaeological data to provide broader insights into these issues. The aim of this study is to shed light on the complex transition period between Late Antiquity and the Early Middle Ages, analysing bioanthropological records that give relevant findings on the health and living conditions of Central and Northern Italian populations. We have collected all published palaeopathological evidence on human remains from the V-VII centuries in Northern and Central Italy, including infections, epidemics, mechanical and physiological stress, teeth pathologies and different kinds of traumas. Anthropological data were compared with historiographical and archaeological records to explore how climatic, political, social and health condition changes affected daily life and the organisation of the communities considered.

6 CHILDREN AND ADOLESCENTS AT THE END OF THE EMPIRE: FUNERARY PRACTICES AND BIOANTHROPOLOGICAL ASPECTS BETWEEN THE 4TH-6TH CENTURIES CE

Anedda, Roberta (Department of Environmental and Prevention Sciences, University of Ferrara) - **Masotti, Sabrina** (Department of Neuroscience and Rehabilitation, University of Ferrara) - **Gualdi-Russo, Emanuela** (Department of Neuroscience and Rehabilitation, University of Ferrara) - **Rinaldo, Natascia** (Department of Neuroscience and Rehabilitation, University of Ferrara) - **Bramanti, Barbara** (Department of Environmental and Prevention Sciences, University of Ferrara)

For bioanthropologists, tracing down childhood and adolescence during Late Antiquity and the Early Middle Ages is a difficult task because the concept itself is culturally defined, and even within a single culture, it is sensitive to social status and individual life circumstances. The profound socio-political changes and, in particular, the recurrent moments of crisis, that lead to end of the Roman Empire, between the 4th and 6th centuries CE, had an impact on the younger part of the population. As for burial practices, the written record is ambiguous and some texts state that infants who died in the first 40 days after birth were exempt from the rule of extra-urban burial, or that cremation could be practised only on those who had begun teething. The presence of children in the archaeological record, especially in funerary contexts, reveals a more complex picture, which varies according to geographical location and historical moment within the Roman world. In this study, we provide an overview of non-adults in late Roman funerary contexts, focusing on elements of persistence and new aspects that we can observe during Late Antiquity and the Early Middle Ages, with an example from the two rural Roman-Barbarian sites of Chiunsano (RO, 6th century CE) and Chiesazza (RO, 4th-6th century CE). Funerary archaeology can shed light on the perception of those who had not yet reached adulthood, and on how the advent of new religious beliefs influenced the burial ritual, while the bioanthropology of children can tell us more about how these changes affected the most vulnerable part of the population.

7 BIOARCHAEOLOGICAL INVESTIGATION OF THE NECROPOLIS OF SAN LORENZO DI QUINGENTOLE (MN): THE EARLY MEDIEVAL FACIES

Casagrande, Giulia (Sapienza Università di Roma)

This research focuses on the site of San Lorenzo di Quingentole, in the province of Mantua, a context of Roman origin that undergoes transformations during the medieval period. The aim of this study is to reconstruct the paleodemographic profile and the relevant pathological patterns of the population collected in the early medieval phase (VII-IX century) of the church building.

The 7th-century cemetery mainly consists of inhumations in earth graves and hooded burials arranged outside the double apse belonging to the religious building. The orientation of the burials is predominantly West-East and no grave goods were detected during excavations. The church of San Lorenzo will be used as a cemetery until the 11th century, when it will be decommissioned and demolished.

83 individuals were selected, belonging to the adult (<20 years) and adolescent (12-20 years) age classes, individually subjected to the reconstruction of the biological profile and the search for pathological lesions, especially focusing on trauma identification.

Based on comparisons with contemporaneous and geographically similar contexts, the population of San Lorenzo di Quingentole reveals a mostly balanced sex ratio (1.2), slightly favoring the male component, while the distribution of mortality exhibits a peak in the adult category, within the age range between 20 and 35 years.

The pathological study has allowed the identification of lesions from biomechanical stress and nonspecific infections, which may have involved and fatigued the adult population; whereas signs caused by metabolic and nutritional stress were identified in smaller percentages, suggesting generally balanced nutrition.

A more in-depth study of traumas seemed necessary starting from the bellicose component of the historical-political context, during post-classical centuries: despite the premises, the small percentage of traumas allows us to hypothesize the exclusion of the Mantuan community from the dynamics of conflict and violent encounters widespread in Northern Italy.

8 A BIOARCHAEOLOGICAL UNDERSTANDING OF THE LIVED EXPERIENCES OF CHILDREN DURING THE EARLY MEDIEVAL PERIOD IN SOUTHEAST ENGLAND

Bowers, Alexandra (University of Central Lancashire) - **Stewart, Allison** (University of Central Lancashire) - **Jones, Jennifer** (University of Central Lancashire)

There is a distinct lack of bioarchaeological studies of children from early Anglo-Saxon Britain, despite it being a dynamic period of cultural transition, migration and change. Something unique was happening in southeast England, reflecting a blend of burial practices incorporating both Romano-British and Northern European influences. Key

archaeological questions are not focused on how cultural change happened during the transition period, but rather how this change might have affected the living, breathing people who were experiencing it.

Through studying the child remains it is possible to explore the extent to which this mixing of Romano-British and Northern European peoples in the early Anglo-Saxon period affected population health and social interaction. This research uses 65 non-adults (aged 0-18 years) from the 5-6th century Oakington Anglo-Saxon burial site to investigate childhood burial practices and health during this significant transformation. This paper pairs bioarchaeological analysis of skeletal remains with anthropological investigation of funerary treatment to assess the social role and lived experiences of children. A lifecycle approach is employed to investigate the relationship between biological age, sex and health status at death with burial treatment. Through a multi-methodological approach, we can construct lived experiences and identities rather than just understanding circumstances of death.

Initial findings show that the subadults expressed enamel hypoplasia (80%), cribra orbitalia (30%), and periostitis (c.88%). This provides evidence for childhood stress in the form of metabolic nutritional deficiencies and/or infectious diseases at time of death. These may be reflective of environmental stresses the children experienced during growth, providing an argument for migration and cultural transition being a stressful period in their lives. Furthermore, 22% of varying age ranges and sex were found with grave goods including knives, animal bone, pottery, coins, and jewellery. These variations in grave goods show there were identity distinctions within the population.

9 LIVING IN THE SHADOW OF THE GOTHs: AN ANTHROPOLOGICAL STUDY OF TWO NORTHERN ITALIAN COMMUNITIES DURING THE 4TH-6TH CENTURY CE

Mongillo, Jessica (Department of Environmental and Prevention Sciences, University of Ferrara) - **Zedda, Nicoletta** (Department of Environmental and Prevention Sciences, University of Ferrara) - **Masotti, Sabrina** (Department of Neuroscience and Rehabilitation, University of Ferrara) - **Onisto, Nicoletta** (Department of Life Sciences and Biotechnology, University of Ferrara) - **Gualdi-Russo, Emanuela** (Department of Neuroscience and Rehabilitation, University of Ferrara)

In late antiquity, the Veneto region, located in north-eastern Italy, underwent significant historical and political changes. Several territories, including those gravitating around the ancient delta of the river Po, experienced cultural and demographic changes due to the favorable topographical position for the movement of people and goods. The sites of Chiesazza di Ficarolo and Chiunsano (Rovigo, Italy) are located between the two main branches of the Po with direct access to both the hydrographic network and the land route. Excavation activities carried out in these two settlements discovered inhumation burials that represent the first evidence of the arrival of the Goths in the Polesine territories. This paper presents the results of anthropological analysis conducted on 56 skeletal individuals from the two sites of Chiunsano and Chiesazza di Ficarolo. The burials, dated between the 4th and 6th centuries, are very modest, lacking grave goods and the individuals are oriented east-west with a typically Christian ritual. However, there are interesting exceptions such as the two unique burials with rich, Ostrogothic grave goods at Chiunsano and a group of deviant burials found at Chiesazza di Ficarolo. The bioarchaeological study of the sites revealed important insights into the demographic and population dynamics during this historical period marked by the settlement of barbarian communities in these territories.

987 THE INTRODUCTION OF TIN BRONZE IN PREHISTORIC EUROPE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: **Lackinger, Aaron** (Universidad de Granada) - **Figueiredo, Elin** (Universidade Nova de Lisboa) - **Comendador Rey, Beatriz** (Universidade de Vigo)

Session format: Regular session

The introduction of tin bronze into prehistoric societies has not been synchronous throughout Europe. Understanding this phenomenon in all its breadth, chronologically, technologically and culturally, is the aim of this session. In general, neo-diffusionist visions coexist with alternative theories that propose multifocal origins. The relative scarcity of tin mineral resources and its restricted locations necessarily condition the introduction and consolidation of tin bronze, which may occur at varying rates regarding different regions. Also, the mere presence of tin bronze artefacts in one region does not necessarily imply the adoption of the entire production technology (from ores to metal), since their presence can be a result of imported metal. Combining data on absolute chronology, technological characteristics, metal composition and geochemical characterization (isotopic and trace analysis) at the regional level is necessary to draw a comprehensive overview of the introduction of bronze technology across Europe. The production of a collective map presents an opportunity to glimpse the degree of interrelation between different societies and territories and to discuss the most plausible models for the origin and/or spread of this alloy and/or technology. Likewise, the significance of the incorporation of tin bronze for prehistoric societies should be discussed, based on its usage. To comprehend its significance, it is essential to determine its relative frequency concerning other metals or alloys, the

quality of its alloy, and its preferred application regarding the typology of the first bronze artefacts. Lastly, it is worth to discuss the reasons and timing of the alloy's consolidation at the expense of copper or arsenical copper alloy.

ABSTRACTS

1 THE ROLE OF TIN IN THE FORMATION OF MATHEMATICAL THINKING IN PREHISTORY

Dzbynski, Aleksander (Warsaw University)

Tin bronzes are stable alloys, in contrast to arsenical copper. Arsenic evaporates as metal or as arsenious oxide during melting, heating or forging, leading to unpredictable and therefore undesirable modification of the alloy. The direct addition of tin to molten copper made it possible to control the alloy, which could never be achieved when working with co-smelted alloys based upon arsenic or other natural copper additives. Moreover, the addition of tin, made the resulting metal—tin bronze—not only easier to process (lower temperature for heat treatments required) but it also had the potential to make it even harder. So, suddenly it was possible to bring to bear precision in the creation of an alloy and by doing this it was possible to implement mathematical precision into matter, which must have been one of the greatest discoveries in the human history, although still needed to be cognitively and culturally explored. It seems that this transformation would have not been possible without the use of weighing metrology which appeared, however, at later stages of metallurgy. The paper explores some aspects of this transformation by resorting to archaeological examples from the Near East and Europe between the 4th Millennium and 2th Millenium BC, and to theoretical considerations.

2 TIN AND WHITE BRONZE FROM THE CARPATHIAN AREA IN THE LATE BRONZE AGE

Wittenberger, Mihai (National History Museum of Transylvania, Clu-Napoca, Romania)

In this work, I will present metallurgy in the Bronze Age, mainly in Transylvania with an emphasis on the use of tin.

In comparison with other activities in Prehistory, metallurgy is a unitary chain of activities that begins in the mines, then primary and secondary creation and after manufacturing. In Transylvania we find the succession of all these activities, which proves a superior organization in this region.

The first pieces in bronze with tin appear at the end of the Early bronze age approximately 2300 BC. If in the middle bronze age most of the pieces are prestigious but in the late bronze age things change. Bronze is becoming very popular so the mines are developing.

The last bronze mine in Transylvania located in Rodna Veche (in the northeast of the region) was closed in 2010! This mine is known from the 14th century when here they produced pints of beer in a white bronze alloy similar to bronze in the late bronze age. The specialists of protohistory knew the existence of this treasure. The Transylvania region is known for bronze deposits and its means of communication

Of course, this source is not the only one to ensure the huge amount of bronze pieces discovered in Transylvania. The Uioara depot with more than a ton of bronze and tin has definitely some pieces imported from the West. For a ton of bronze you need minimum of 120 kilos of tin.

My presentation will list and describe the sources of bronze, especially “white bonze” (82% copper, 12% tin-typical metals in Transylvania. To complete my work I will also describe the means of communication.

Transylvania, tin, white bronze, metallurgy, trade, mining.

3 TIN ALLUVIAL ARMORICAN EXPLOITATION SINCE THE BEGINNING OF BRONZE AGE

Le Carlier de Veslud, Cécile (CNRS)

The ancient Armorican Massif is a geological entity partly made up of peraluminous granites rich in cassiterite, deposited at the end of the Hercynian period and associated with large vein systems that are also rich in tin ore. Weathering of these rocks has led to the development of a large number of fluvial and even coastal alluvial deposits. Most of them are easily accessible for open-cast mining operations.

Tin mining in the massif may have begun even before the Bronze Age, with a significant number of bronze objects dating from the late Neolithic period having been found in north-west France. The oldest evidence of the use of cassiterite comes from the petrological study of the crucible found at the Early Bronze Age site of Kersulec (Plouneour-Lanvern), in which bronze was produced by mixing grains of alluvial cassiterite directly with copper. Concerning ore extraction, a charcoal-bearing layer containing reduction slags in the Kerveatous valley (Plouarzel) has been dated to Middle/Final Bronze period. Production from this small valley in the early periods is estimated at 20 to 25t of cassiterite.

These first indications show that tin ore from the Armorican peninsula has been mined since the earliest days of bronze production in Western Europe. The considerable tonnages of alluvial ore present in the Brittany's rivers suggest that this region may have been a major production district during the Bronze Age.

4 THE INTRODUCTION OF TIN BRONZE IN THE ARGARIC CULTURE

Lackinger, Aaron (University of Granada) - Montero Ruiz, Ignacio (IH-CSIC) - Murillo Barroso, Mercedes (University of Granada)

The El Argar Culture developed in the southeast of the Iberian Peninsula during the Early and Middle Bronze Age (2200-1550 BC). It is characterised by a standardised material culture, mostly individual and double burials under the dwellings, and a settlement pattern with a predominance of high-rise sites, defensive elements, and an urban layout of terraced buildings with narrow streets, sometimes arranged in artificial terraces. It covers a vast territory, reaching up to 33,000 km² at its peak.

Most of the metal pieces come from funerary contexts, in many cases from ancient excavations. Tin bronzes are in a minority compared to copper and arsenical copper and appear later (after 1800 BC), a time when changes in the material culture also took place, such as the replacement of halberds by swords. The tin bronzes are generally poor and are concentrated in personal adornment items.

The remains of known metallurgical production are scarce, with the sites that have provided the greatest quantity of remains being El Argar (Antas, Almería) and, especially, Peñalosa (Baños de la Encina, Jaén), where information on the complete production sequence has been recovered, although to date, no local production of tin bronze has been documented at any of these sites.

It has been proposed that certain items which, in addition to tin, contain arsenic, could constitute the first evidence of local production of tin bronzes, a view which is reinforced by the isotopic correlation (LIA) of some of them with local copper resources.

The aims of this presentation are to explore this possibility and to fill in its content, in terms of dating, chemical composition and mining resources-tin bronze pieces relationships, via LIA geochemical characterisation.

5 THE INTRODUCTION OF BRONZE IN WESTERN IBERIA: A REVIEW

Figueiredo, Elin (Centre of Materials Research (CENIMAT/i3N), NOVA School of Science and Technology (FCT-NOVA), Lisbon, Portugal)

In western Iberia tin bronze became the primary material for most artefact typologies during the Late Bronze Age (ca. 1250-800 BCE), probably taking a strong advantage on the availability of local tin resources. In the previous periods, such as by Early and Middle Bronze Age (ca. 2250-1800 BCE and 1800-1250 BCE, respectively), bronze was used in some artefact typologies. Additionally, metallurgical remains from some sites indicate that bronze manufacturing was practised at least since the Middle Bronze Age.

In the present communication a state-of-the-art review of the findings concerning the presence and circulation of tin bronze in the Early and Middle Bronze Age in Western Iberia, particularly in present-day Portugal, will be provided. Isolated bronze or tin findings, as well as broad-edged axes of Bujões/Barcelos type which are often associated with the spread of tin bronze in western Iberia, will be presented. At least two sites for tin mining will also be mentioned, along with metallurgical remains such as crucibles containing tin bronze vestiges from the Middle Bronze Age.

6 TIN-BRONZE PRODUCTION BY CO-SMELTING AT THE PHOENICIAN SITE OF EL CARAMBOLO (CAMAS, SEVILLE, SPAIN)

Montero Ruiz, Ignacio (Instituto de Historia-CSIC) - Rovira-Llorens, Salvador (Museo Arqueologico Nacional) - Hunt-Ortiz, Mark (University of Seville)

El Carambolo is one of the most important archaeological sites on the Iberian Peninsula, particularly famous for the fabulous treasure found in it. It dates from the 9th to the 7th/6th century BC. Archaeological work carried out between 2002 and 2005 unearthed a late-period area specialising in metallurgical activities where slag and crucibles from bronze production were collected. Their study has been carried out using SEM and pXRF facilities.

There is little scientific literature on the technology of tin-bronze production. It is too readily assumed that Bronze Age bronze was obtained by alloying copper and tin. However, there is little evidence of the presence of metallic tin before the middle of the 1st millennium BC, despite being Iberia a land with important tin resources. On the other hand, the few analytical studies published so far about Bronze Age and early Iron Age refer to technologies of co-smelting copper minerals with cassiterite or cementation of copper with cassiterite. The slags from El Carambolo are part of this surprising panorama, even more surprising given its late Phoenician affiliation at a time when the Orientalising influence had taken root throughout the southern half of the Iberian Peninsula.

From the analytical study it can be deduced that they are fayalite slags that trap large amount of magnetite crystals as well as metal nodules (copper and bronze ones containing varying percentages of tin). Another characteristic, apparently common to all bronze slags, is the abundance of euhedral tin oxide crystals together with cassiterite grains. It is also common to find relics of unreduced copper ore. These are slags generated in an oxidising-reducing environment compatible with the use of smelting crucibles.

The nature of the copper ore worked suggests that it comes from a zone of supergene enrichment of primary sulphides dominated by chalcopyrite.

988 THROUGH THE LENS OF POTTERY: TECHNOLOGIES IN TIMES OF CHANGE IN PREHISTORIC MEDITERRANEAN BASIN

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Forte, Vanessa (Sapienza University of Rome) - De Falco, Maria (Durham University) - Carloni, Delia (University of Groningen) - Amicone, Silvia (University of Tübingen; University College London) - Bajeot, Jade (Polish Academy of Sciences)

Session format: Regular session

Advances in archaeological science (e.g., aDNA and isotopes analyses) are challenging traditional archaeological narratives and posing new questions especially regarding major transformations in European and Mediterranean societies during prehistoric times. Ceramic is an important component of the material record and gives us insights into cultural, chronological, technological, symbolic and socio-economic information beyond simple chrono-cultural determinations. The combination of stylistic, archaeometric, technological, trace and functional analyses, as well as experimental archaeology, has become established in archaeological research in recent years. At the same time, anthropological, sociological and ethnoarchaeological studies have informed the interpretation of potter's skill and knowledge. This interdisciplinary approach demonstrated to be crucial to detect and explore technical, cultural, symbolic, and socio-economic change. With this in mind, the session aims to bring together a broad range of expertise from archaeological theory, experimental work and the natural sciences, to present research about understandings of periods of change through the lens of ancient ceramic in the Mediterranean basin, from Neolithic to Iron Age.

In particular, we aim to focus on specific questions: What happens to the ceramic production in times of cultural, socio-economic or population transformations? Can periods of change be detected through advanced ceramic analyses? How can these different approaches to ceramics be combined to tackle transitions? What are the mechanisms of resistance and change in contexts of intense socio-cultural innovation? What is the role played by potters' knowledge and skill in these processes?

We welcome studies about the ceramic analyses in times of cultural and socio-economic change with an emphasis on the variety of theoretical and methodological approaches adopted in relation to different contexts and time periods.

ABSTRACTS

1 ADAPTATION OR INNOVATION: VARIABILITY OF CLAY PASTES OF THE EARLIEST POTTERY IN THE SOUTHERN LEVANT (7TH MILL. CAL. BC)

Harivel, Carine (Université Paris Nanterre - ED 395; Technologie et Ethnologie des Mondes Préhistoriques (UMR8068)) - Coquinot, Yvan (Centre de Recherche et de Restauration des Musées de France (C2RMF)) - Eirikh-Rose, Anna (Israel Antiquities Authority) - van den Brink, Edwin C. M. (Israel Antiquities Authority (Ret.)) - Yaroshevich, Alla (Israel Antiquities Authority) - Vieugué, Julien (Technologie et Ethnologie des Mondes Préhistoriques (UMR8068)) - Roux, Valentine (Technologie et Ethnologie des Mondes Préhistoriques (UMR8068))

The first pottery-making societies in the southern Levant appeared in the second half of the 7th millennium cal. BC (Early Pottery Neolithic period), which is relatively late compared to other neighbouring regions. The ceramic assemblages are characterised by a mastery of skills applied to a wide range of functional vessels, as well as by a stylistic variability from which researchers have distinguished three distinct cultural entities: the Yarmukian, the Lodian and the Byblos. This variability is the subject of much debate, as it is interpreted either in chronological or regional terms. Recent technological studies have shown that all the ceramic assemblages from the southern Levant belong to the same technical tradition and are evidence of communities belonging to the same socio-cultural entity. However, this technical tradition, shared by all three cultural entities, is accompanied by some variability in the ceramic clay pastes, not only explained by the intrinsic variability of the raw material.

How can we explain this variability? Is it a variability linked to the different environmental contexts (adaptation process) or is it a cultural variability (inventions) or both? Interpreting the clay paste variability in terms of potter's choice is a first step in investigating the changes observed at the sites. The study analyses the variability of clay pastes in four

sites from neighbouring regions with different geologies and environments: the Jordan Valley and the Jezre'el Valley. The approach includes petrographic and chemical analyses. The main objectives are to characterise the choices made by potters in the selection and processing of raw materials, and to analyse these choices in terms of adaptation and/or invention.

2 CERAMIC TECHNOLOGY AND THE SOCIO-POLITICAL ENVIRONMENT OF PREDYNASTIC EGYPT

Bajeot, Jade (Instytut Kultur Śródziemnomorskich i Orientalnych Polska Akademia Nauk)

This paper aims at presenting the results of the project TECHNOPREGYPT 2021/43/P/HS3/03262, whose purpose is to investigate the modes of pottery production in Predynastic Egypt (4th millennium BCE) to achieve a better understanding of the evolution of the production system during the process of state formation and, consequently, have a better knowledge of the dynamics that led to the birth of the Egyptian state. The chosen method is the technological approach which was applied on pottery from several Egyptian Predynastic sites investigated in the Aswan region by the Aswan-Kom Ombo Archaeological Project, and on the museum collections of the Egyptian Museum, Turin, and of the Museum of National Archaeology, Saint Germain-en-Laye. The analysed material ranges from Naqada IC to Naqada IIIB (c. 3700-3100 BCE) and comes from several domestic and funerary sites of Upper and Middle Egypt.

During the presentation the various identified chaînes opératoires will be illustrated and their evolution and interaction will be followed over time.

Alongside the traditional method adopted to study the ceramic fragments kept in Egyptian storehouses (naked eye and binocular microscope), it was possible to apply X-rays microtomography to a series of samples from the Museum of National Archaeology, Saint Germain-en-Laye. This non-destructive technique allowing to investigate the inner structure of ceramics to highlight the characteristics of the clay paste and the manufacturing techniques is now necessary in the case of complete pots and material from museum collections. The outcomes and potential of this non-destructive analysis will therefore also be shown.

3 CULTURAL IDENTITY WITHIN POTTERY: A GEOCHEMICAL APPROACH TO TRANSITIONAL POTTERY FROM BORDER ZONES IN THE SOUTHERN LEVANT

Coad, Mikayla (University of Oxford)

Tel Burna, Israel is a border site situated between the Israelites, Canaanites, and Philistines. As a border site, Tel Burna offers unique insight into cultural changes over the Late Bronze Age to Iron Age (1550-586 BCE) (LBA-IA) transition in the Southern Levant. The primary objective of this research was to elucidate the markers of cultural identity present within the pottery of the Canaanites and Israelites over a period of cultural change and ethnogenesis in this border zone. This research used a two-part approach of examining specimens using X-Ray Diffraction (XRD) and X-Ray Fluorescence (XRF) to investigate changes in pottery manufacture between the LBA-IA at Tel Burna, while also investigating the presence of surface contamination from deposition on sherd exteriors. Both of these techniques were used to identify any changes in pottery manufacture that may reflect changes in cultural identity, which can be used to understand the transition between the Canaanite and Israelite cultures. There were no trends identified in the XRD and XRF data. The consistency of the data indicates a lack of substantial change in manufacturing techniques from the LBA to the IA. This supports the theory that the emergence of Israelite culture in the Iron Age was a slow development from within the preceding indigenous Canaanite culture. The analysis of the surface contamination present on the sherds was conducted by analyzing both the exterior and the interior of the sherds separately. There were no consistent changes noted between the interior and exterior of each sherd.

4 EXPATRIATE POTTERS, EGYPTIAN TECHNOLOGIES, AND CULTURAL TRANSFERENCE IN THE CERAMIC ASSEMBLAGE AT JAFFA IN CANAAN

Pierce, Krystal (Brigham Young University)

The Late Bronze Age and early Iron Age site of Jaffa in the Levant features a fortress that contained large amounts of Egyptian and Egyptian-style material culture, including a ceramic assemblage that is one of the largest early collections of this corpus type in the Levant. These vessels were utilized by Egyptian expatriate administrative and military personnel, who played an authoritative role in the settlement during the New Kingdom period of Egyptian hegemony in Canaan. The ceramic assemblage at Jaffa includes some high value vessels directly imported from Egypt; however, the bulk of the corpus consists of quotidian vessels that were locally produced using regional clays and materials, but with Egyptian manufacturing technologies that differed from local Canaanite techniques. A thorough examination of the manufacturing technologies of the assemblage demonstrates that the potters had a detailed and intricate knowledge and understanding of the Egyptian New Kingdom ceramic industry, demonstrating that these potters were either Egyptians themselves or had been professionally trained in Egyptian techniques. After the Egyptians retreated from Jaffa and the Egyptian-style pottery disappears from the site, some of these Egyptian technologies began to

appear in the Canaanite ceramic corpus. In this paper, the ceramic assemblage from Jaffa will be analyzed in terms of Egyptian manufacturing technologies, including morphology, fabric, temper, firing procedures, production techniques, surface treatment, and decorative elements, in order to understand the impact of Egyptian expatriate potters and cultural transference of technology into the Canaanite tradition.

5 THE POTS INSIDE THE POT. GROG TEMPER AS A PROXY OF TECHNOLOGICAL CHANGES DURING THE CHALCOLITHIC PERIOD IN SOUTHERN ROMANIA

Opris, Vasile (Research Institute of the University of Bucharest (ICUB), Archaeosciences Platform; Bucharest Municipality Museum) - Stoicescu, Daniel (Research Institute of the University of Bucharest (ICUB), Archaeosciences Platform) - Fehér, Kristóf (Hungarian National Museum, National Institute of Archaeology, Archaeometry Laboratory) - Manea, Bogdan (Research Institute of the University of Bucharest (ICUB), Archaeosciences Platform) - Dumitrescu, Sebastian (Research Institute of the University of Bucharest (ICUB), Archaeosciences Platform) - Balázs, Henriett (Hungarian National Museum, National Institute of Archaeology, Archaeometry Laboratory) - Lazar, Catalin (Research Institute of the University of Bucharest (ICUB), Archaeosciences Platform) - Kreiter, Attila (Hungarian National Museum, National Institute of Archaeology, Archaeometry Laboratory)

The intensive use of grog-tempered pottery in the Lower Danube region began around 5200/5000 BCE, marking a significant shift from the earlier Neolithic practices of incorporating organic and/or mineral tempers into the pottery clay matrix. The transition appears to be diachronic and exhibits local characteristics, with limited knowledge regarding the origin, dispersion, and intensity of this technological practice.

Firstly, the aim of our presentation is to frame the Chalcolithic grog-tempered pottery from Southern Romania in this general context, by presenting data on clay tempering practices collected from various sites in the region dated during the fifth millennium BCE.

Secondly, our attention will be directed towards the specific case of grog-tempered ceramics found at the renowned Gumelnița site, where extensive research has been conducted on both Early and Middle Chalcolithic habitation layers in recent years. The selection for laboratory measurements was based on the outcomes of macroscopic and microscopic analyses, encompassing at least one representative from each fabric sub-type. Employing archaeometric methods, specifically thin-section petrography and SEM-EDS, we developed and applied an analytical protocol. This protocol involves a meticulous examination of the pottery matrix and all grog inclusions within the section, proving to be a time-consuming yet highly effective method for characterizing the technological features of both the grog inclusions and the pottery matrix.

The work of VO is supported by a fellowship within the Research Institute of the University of Bucharest (ICUB) under the project "The rise and fall of the grog-tempered pottery in the Southern Romania during the Chalcolithic period (5th millennium BCE)". The work of DS, BM, SB and CL is supported by a grant of the Ministry of Research, Innovation, and Digitisation, contract number 41PFE/30.12.2021, within PNCDI III.

6 FROM WATER TO FIRE: AN ARCHAEOMETRICAL INVESTIGATION OF SHELL-TEMPERED CHALCOLITHIC POTTERY FROM THE ARCHAEOLOGICAL SITE OF SĂVENI-LA MOVILE

Manea, Bogdan (Archaeosciences Platform, Research Institute of the University of Bucharest (ICUB), Romania; Interdisciplinary School of Doctoral Studies, University of Bucharest, Romania) - Stoicescu, Daniel (Archaeosciences Platform, Research Institute of the University of Bucharest (ICUB), Romania; Doctoral School of Physics, Faculty of Physics, University of Bucharest, Romania) - Dimofte, Daniela (Faculty of Geology and Geophysics, Department of Mineralogy, University of Bucharest, Romania) - Vlad, Florin (Ialomița County Museum, Slobozia, Romania) - Tiseanu, Ion (National Institute for Laser, Plasma and Radiation Physics, Bucharest, Romania) - Radu, Valentin (Archaeosciences Platform, Research Institute of the University of Bucharest (ICUB), Romania; National Museum of Romanian History, Bucharest, Romania) - Lazăr, Cătălin (Archaeosciences Platform, Research Institute of the University of Bucharest (ICUB), Romania)

The Săveni-La Movile archaeological site is located on the high terrace of the Ialomița River in the southern Bărăgan Plain, near the Săveni commune (Ialomița County), Southeast Romania. Excavations here revealed the presence of a Cernavodă I settlement (4th millennium BC), a phase distinguished by the addition of crushed shells into pottery, a technological feature that is different from those previously observed within Chalcolithic communities in the Muntenia region.

The current presentation will share some preliminary results of an archaeometrical analysis conducted on Late Chalcolithic Cernavodă I pottery fragments from the Săveni-La Movile site.

By involving a variety of research methods, including macroscopic investigation, thin-section petrography (coupled with malacology), X-ray CT scanning, Scanning Electron Microscopy (SEM), and experimental archaeology, various technological aspects of these shell-tempered pottery have been analysed.

The study provides information on the nature of the shells (fossil vs non-fossil), their presence (natural vs deliberate), morphology, dimensions, frequency, distribution, orientation (preferential vs non-preferential), firing parameters, potential species, and provenance. All the obtained data about species and provenance will be correlated with the aquatic faunal remains from the settlement, enabling insights into the practicality of these people through the recycling or non-recycling of household waste.

Ultimately, by integrating the findings of this study within a broader geographical and chronological perspective, we anticipate that this research will yield a better understanding of technologies and human-environment interactions during prehistory.

This work was supported by the Interdisciplinary School of Doctoral Studies of the University of Bucharest, Romania, and by a grant from the Ministry of Research, Innovation, and Digitization, contract number 41PFE/30.12.2021, within PNCDI III.

7 POTTERY FINDS OF VUČEDOL AND LJUBLJANA CULTURES OF THE 3RD MILLENNIUM BC IN CENTRAL SLOVENIA: A TYPOCHRONOLOGICAL AND ARCHAEOMETRICAL APPROACH

Leghissa, Elena (ZRC SAZU, Institute of Archaeology) - De Min, Angelo (Department of Mathematics, Informatics and Geosciences, University of Trieste) - Kasztovszky, Zsolt (Nuclear Analysis and Radiography Department, HUNREN Centre for Energy Research) - Szilágyi, Veronika (Nuclear Analysis and Radiography Department, HUNREN Centre for Energy Research) - Velicogna, Matteo (Department of Mathematics, Informatics and Geosciences, University of Trieste) - Vinazza, Manca (Department of archaeology, University of Ljubljana) - Bernardini, Federico (University Ca'Foscari Venezia; Multidisciplinary Laboratory, The "Abdus Salam" International Centre for Theoretical Physics)

The Ljubljansko barje region in central Slovenia during the late Copper Age (first half and middle of the third millennium BC) exhibits two distinct cultural phases. The earlier phase is associated with the Vučedol culture, while the later phase is marked by the emergence of the Ljubljana culture. Despite notable disparities in vessel forms and decorative techniques between the two cultures, a notable continuity suggests a strong influence of the Vučedol culture on the later settlement of the Ljubljansko barje during the Late Copper Age.

The pile-dwelling sites within the Ljubljansko barje region, attributed to the Ljubljana Culture, have yielded a diverse array of artefacts. These include finely crafted vessels decorated with barbed-wire decoration, typical of the Ljubljana Culture, as well as common ware resembling vessels from the Somogyvár-Vinkovci Culture. This study focuses on five contemporaneous sites: Dežman's pile-dwellings near Ig, Parte, Špica, Založnica, and Dušanovo pile dwellings, as part of the postdoctoral project "Exchange and mobility dynamics at Ljubljansko barje: The Late Copper age pile-dwelling Špica in Ljubljana." Material from these sites underwent archaeometric investigations conducted by an international team from Slovenia, Italy, and Hungary.

At the EAA conference, we will present comparative archaeometric analyses conducted using PGAA and optical microscopy techniques. The obtained data aim to elucidate the relationship between the Vučedol culture and the Ljubljana culture, as well as the interactions among contemporary sites from the middle of the third millennium BC.

8 CONTINUITY AND INNOVATION IN POTTERY TECHNOLOGY: THE KARST REGION FROM NEOLITHIC TO EARLY BRONZE AGE

Bernardini, Federico (University Ca' Foscari Venice; The Abdus Salam international Centre for Theoretical Physics) - Leghissa, Elena (ZRC SAZU, Institute of Archaeology)

The paper presents the findings of an interdisciplinary project exploring the development of pottery technology in the Trieste Karst region (northeast Italy) from the Neolithic to the Early Bronze Age (EBA). It also seeks to identify cultural links with other areas by examining potentially imported vessels. This research builds upon a long-term investigation into lithic raw materials used to craft polished stone axes in the Caput Adriae, aiming to enhance our understanding of the primary exchange networks operating during this period.

Archaeometric analyses, alongside a traditional typological examination, reveal significant differences between Neolithic ceramics (traditionally linked with the Danilo-Vlaška group) and the majority of Late Copper Age (LCA)/Early Bronze Age (EBA) pottery (usually primarily associated with the Ljubljana culture and a few with the Cetina culture). Neolithic pottery displays consistent characteristics across all vessel types, including coarse grain, prevalent sparry calcite temper, and the absence of grog. In contrast, most LCA and EBA vessels exhibit distinct features such as very fine-grained paste, no sparry calcite, notable use of grog temper, higher quartz and flint content, and relatively frequent muscovite occurrence in the matrix. Notably, from a technological perspective, the analysed Cetina vessels bear strong resemblance to the majority of LCA ceramics.

Certain potsherds attributed to the Ljubljana culture may not have been locally produced, given their mineralogical and petrographic composition, along with strong cultural ties to the Ljubljansko barje during the mid-3rd millennium

BC. Ongoing archaeometric studies on ceramics from the core area of the Ljubljana culture may facilitate comparison, revealing whether the Karst region and present-day Central Slovenia not only shared robust cultural connections but also exchanged ceramics alongside metal and stone artefacts.

9 NEOLITHIC POTTERY TRADITIONS IN THE ADIGE VALLEY: NEW DATA FROM RIPARO GABAN AND LA VELA (NORTH-EASTERN ITALY)

Deimichei, Giulia (Archaeometry Research Group, Eberhard Karls University of Tübingen; LaBAAF - Laboratorio Bagolini Archeologia, Archeometria, Fotografia, Dipartimento di Lettere e Filosofia, Università di Trento) - Amicone, Silvia (Archaeometry Research Group, Eberhard Karls University of Tübingen; Institute of Archaeology, University College London) - Armellini, Jacopo (Departament d'Història, Geografia i Art, Facultat de Ciències Humanes i Socials, Universitat Jaume I, Castelló de la Plana) - Pedrotti, Annalisa (LaBAAF - Laboratorio Bagolini Archeologia, Archeometria, Fotografia, Dipartimento di Lettere e Filosofia, Università di Trento)

The transition between the Early and Middle Neolithic in Trentino (north-eastern Italy) is marked by social changes well-reflected in a shift to a fully farming economy, that correspond to the emergence of the so-called Square-Mouthed Pottery Culture (SMP). The Neolithic pottery assemblages of the Adige valley hold great potential to shed new light on the developments that marked this period in north-eastern Italy.

This study focuses on the technological analysis of pottery from Riparo Gaban and La Vela – VII; these are key sites for the understanding of the Neolithic chrono-cultural sequence of the Adige valley. Riparo Gaban is a rock-shelter characterized by the presence of pottery attributed to the Gaban group, the first Neolithic evidence in the Adige valley (5200-4700 BCE).

La Vela is an open-air site, surrounded by a ditch, whose Early Neolithic layers are marked by the presence of pottery that can be related to the Gaban group (5000-4700 BCE) and by the appearance of the SMP Culture (4800-4300 BCE) during the Middle Neolithic.

Ceramic samples representing different fabrics and different chronological phases were selected from both sites, together with geological specimens collected in the Adige valley. These samples were studied with an integrated archaeometric approach including ceramic petrography and X-ray diffraction. Emphasis was placed on tracing phenomena of continuity and change in pottery raw material procurement strategies at the time of the emergence of the SMP material culture.

The results highlight a great variability in the choice of raw materials, reflecting a know-how of the various natural resources present in the area. They also reveal interesting phenomena of continuity and change in the selection and processing of raw materials over the timespan considered, that will be discussed in the framework of the important social developments that took place at that time.

10 EXPLORING CULTURAL PROCESSES THROUGH CERAMIC PRODUCTION: A CASE STUDY FROM CAMPANIA, SOUTHERN ITALY, DURING THE 3RD MILLENNIUM BC

De Falco, Maria (University of Modena and Reggio Emilia, Department of Chemical and Geological Sciences)

The aim of this paper is to analyse the relationship between ceramics and cultural processes taking place in Campania, and broadly in the Italian Peninsula, during the 3rd millennium BC. In particular, I draw new inferences from the ceramic production by using a holistic approach that integrates the typological and stylistic analysis, typical of Italian tradition, with a theoretically informed broader chaîne opératoire approach involving macroscopic observations and archaeometric analyses on a completely new dataset.

The 3rd millennium BC is characterised at European scale by the intense circulation of people, objects, models and ideas, as well as by significant innovations. In this framework, important cultural and socio-economic changes occur in Southern Italy and especially in Campania: large and structured settlements start to occupy plains as well as internal areas; complex collective funerary practices are substituted by large cemeteries of single graves; 'foreign' influences from Europe and the Mediterranean (e.g., the Bell Beaker phenomenon) impact the local communities in different ways, displaying diverse degrees of permeability and local adaptation across Copper Age periods.

These important socio-economic changes occurring in Southern Italy during the 3rd millennium BC resulted in radical changes in the production and purpose, and symbolic and material value, of ceramic objects. Through a comprehensive program of macroscopic and archaeometric analyses on four multi-phased key sites, this paper addresses continuities and discontinuities in the technological choices of Copper Age Campanian communities and possible drivers behind long term technological change. In particular, a shift in the demand for ceramic production, embedded in the cultural processes ongoing in this period, is proposed to explain the significant changes occurring in the ceramic repertoire and productive process.

11 INQUIRING SAMENESS AND DIFFERENCE IN EARLY TO LATE COPPER AGE POTTERY PRODUCTION: EXAMPLES FROM THE GROTTA DI SANT'ANGELO (CALABRIA, ITALY)

Carlioni, Delia (Groningen Institute of Archaeology, University of Groningen, Netherlands; Centro di Ricerca speleo-archeologica 'Enzo dei Medici', Italy) - Larocca, Felice (Gruppo di ricerca speleo-archeologica, Università degli Studi di Bari Aldo Moro, Italy; Centro di Ricerca speleo-archeologica 'Enzo dei Medici', Italy) - Pacciarelli, Marco (Università degli Studi di Napoli Federico II, Italy) - Attema, Peter (Groningen Institute of Archaeology, University of Groningen, Netherlands) - De Benedetto, Giuseppe (Dipartimento di Beni Culturali, Università del Salento, Italy)

The Copper Age in Italy (3700-2200 BC) denotes a period in which major socio-economic and cultural transformations took place and marked the shift from Neolithic to Bronze Age societies. In the course of the 4th and 3rd millennia BC the material culture constantly changes, and complex dynamics of interrelationships appear on both regional and extra-regional scales. Pottery stylistic variations mirrored these transformations in a way that is only partially understood and served as the cornerstone for the definition of distinct chronological phases. Archaeological sites with ceramic assemblages that cover the entire Copper Age time span are rare but represent case studies of crucial importance. As a matter of fact, such kind of contexts allow to observe continuity and discontinuity among communities that inhabited the same territory and likely exploited the same environment. The underground archaeological deposit at the Grotte di Sant'Angelo (Cassano allo Jonio, Calabria) includes a ceramic assemblage that covers all the phases defined for the Copper Age in Calabria region, testifying to the wide circulation of cultural models occurred during the 4th and 3rd millennia BC. This paper inquires sameness and difference in stylistic, technological, and functional aspects of Early to Late Copper Age pottery production at example of the Grotte di Sant'Angelo archaeological context. The combination of typological, traceological, petrographic, and organic residue analysis revealed to be a successful investigation strategy and allowed to look at pottery materials beyond the simple need for chrono-cultural determinations. This case study contributes to the wider research on the definition and the understanding of the changes that featured the Copper Age in the central Mediterranean basin.

12 PERSISTING WITHOUT CHANGE: CONSISTENCY OF POTTER'S PRACTICES AT LIPARI

Levi, Sara Tiziana (Dip. di Scienze Chimiche e Geologiche, Un. di Modena e Reggio Emilia; Institute for the Study of the Ancient World, New York University, NY, USA) - Cannavò, Valentina (Dip. di Scienze Chimiche e Geologiche, Un. di Modena e Reggio Emilia) - Brunelli, Daniele (Dip. di Scienze Chimiche e Geologiche, Un. di Modena e Reggio Emilia) - Di Renzoni, Andrea (Istituto di Scienze del Patrimonio Culturale - CNR, Montelibretti (RM)) - Bettelli, Marco (Istituto di Scienze del Patrimonio Culturale - CNR, Montelibretti (RM)) - Martinelli, Maria Clara (Parco Archeologico delle Isole Eolie, Museo Luigi Bernabò Brea, Lipari (ME))

At Lipari the ceramic production of Impasto pottery during prehistoric and protohistoric times is characterized by a strong tradition and continuity in the selection and preparation of the raw materials.

A single main local fabric -with volcanic glass and pumice- remains practically unchanged for 5000 years, showing an impressive consistency and standardization. The same "recipe" is used for the manufacture of pots of various shapes, dimensions and functions.

Major innovations in the ceramic pastes of Impasto pottery are only attested in two phases (1) during the Late Neolithic to produce the red monochrome Diana ware (2) during the second half of the protohistory when the local components are mixed with clay imported from Sicily.

This strongly conservative tradition is in contrast with the marked stylistic differences that reflect the complex events of the island characterized by multiple cultural contacts and demographic changes during the prehistory and protohistory.

The standardization and continuity at Lipari is unique compared to the pottery assemblages of other contexts in the Aeolian Islands and elsewhere, analyzed with the same methodologies (petrographic analysis and classification).

13 CRAFTING RESILIENCE: PERSISTENCE AND ADAPTATION OF THE CERAMIC MANUFACTURE AT ROCA VECCHIA FROM THE MIDDLE TO THE FINAL BRONZE AGE PHASES

Mentesana, Roberta (Cultura Material i Arqueometria UB (ARQUB, GRACPE), Dept. d'Història i Arqueologia, Facultat de Geografia i Història, Universitat de Barcelona, Catalonia, Spain) - Iacono, Francesco (Dipartimento di Storia Culture Civiltà, Università di Bologna, Italy)

Through the second millennium BC, Bronze Age communities of Southern Italy have shown a remarkable degree of resilience in coping with changes in cultural interaction and the landscape. The site of Roca (Melendugno-Lecce, IT) located on the coast of modern-day southern Italy hosted one of the most important Bronze Age communities in the Central Mediterranean, and experienced a complex history including phases of violent destruction and rebuilding phases, in a moment when the long-range connection with the Aegean world was at their historical peak. Roca was

also part of a broad landscape that has only now become accessible to being analysed thanks to the results of the Roca Archaeological Survey (RAS), the first systematic archaeological survey focusing on the hinterland of the site.

Through the analysis of ceramics coming from the Middle to the Final Bronze Age at the site and from the survey campaign, in this presentation, we will explore how changes in the complex history of the settlement and the surrounding landscape are matched in technological choices operated by the local community responsible for the production of impasto pottery. Ceramics were analysed using ceramic petrography and scanning electron microscopy to observe technological change occurring in fabrics and firing strategies along the phases.

The study already revealed consistent technological choices over the phases along with a later introduction of a new fabric with very different characteristics. These results brought us to reconsider resource availability and appropriation in the landscape surrounding the site of Roca. We will discuss the manufacturing choices for ceramics production present at the site compared with those of the survey material to reconstruct the manufacturing landscape around the site of Roca and whether it could be potentially linked to broader resilience strategies in the area.

14 **AN EARLY IRON AGE FORMAL VESSEL IN REDUCTIONIST FOCUS: FROM PETROGRAPHY AND CHEMISTRY TO EXPERIMENTAL REPLICATIONS, ORGANIC RESIDUES ANALYSIS AND CONTEXTUAL SYMBOLISM**

Vidale, Massimo (University of Padova) - Maritan, Lara (Department of Geosciences, University of Padova) - Pérez-Monserrat, Elena Mercedes (Department of Geosciences, University of Padova) - Pecci, Alessandra (Institut d'Arqueologia, Equip de Recerca Arqueològica - Arqueomètrica de la Universitat de Barcelona (ERAAUB, IAUB, INSA-UB)) - Baratella, Vanessa (Department of Cultural Heritage: Archaeology, History of Art, of Cinema and Music, University of Padova) - Giunto, Andrea (Department of Cultural Heritage: Archaeology, History of Art, of Cinema and Music, University of Padova) - Adesso, Francesca (Department of Cultural Heritage: Archaeology, History of Art, of Cinema and Music, University of Padova) - Famari, Valentina (Department of Cultural Heritage: Archaeology, History of Art, of Cinema and Music, University of Padova) - Forte, Vanessa (Department of Sciences of Antiquities, Sapienza University of Rome)

The production of ceramic drinking sets is well attested in the craft sector of Padova in the VIIIth century BCE, possibly in the framework of a substantial use of alcohol in banquets and meetings for building political consensus. "Situliform" vessels - tall truncated-cone vessels formally similar to bronze buckets - are prominent in elite funerary furnishings of the early Iron age of the Veneto Region (VIIIth-VIIth centuries BCE). Well recognized fragments are also found in dwelling contexts pertaining to the earliest wave of local urbanization. In spite of the relevance of the ceramic type, the involved techniques of production, objectual meaning and functions are still unknown, even though it is common archaeological sense that "situliforms" were used to present and serve special beverages during feasts and formal ceremonies in general. In order to gain insight on the entangled meanings of this type, multiple scientific investigations (petrography, XRD, XRF, SEM-EDS, experimental replicas of the forming process, GC-MS, 3D digital modelling) were applied to a specimen from a micro-stratified context excavated in the centre of Padova (securely dated by ¹⁴C to the second half of the VIIIth century BCE). The use for serving special, millet-based drinks is confirmed. Beyond the contingencies of materiality, it seems possible to glimpse some important symbolic implications of the ceramic type, both in the context of primary use and recycling in a technical environment completely different from the original one.*

* This research was funded by the Progetto di Eccellenza CA.RI.PA.RO. "La prima fonderia di Padova preromana - The earliest foundry of pre-Roman Padua".

15 **POTTERY AS A TRACKING TOOL FOR SOCIAL TRANSFORMATIONS THROUGH TIME. THE EVOLUTION OF NEOLITHIC OCCUPATIONS IN COVA GRAN (5200-1300 CALBCE)**

Rodríguez Pérez, Cèlia (Universitat Autònoma de Barcelona) - Martínez-Moreno, Jorge (Universitat Autònoma de Barcelona) - Mora Torcal, Rafael (Universitat Autònoma de Barcelona) - González Marcén, Paloma (Universitat Autònoma de Barcelona)

Prehistoric ceramics offer many approaches to analysis which have multiplied in recent years thanks to the introduction of new methodologies. In this work, the Neolithic occupations of Cova Gran de Santa Linya (Spain) were investigated using a typological and morphological study of the ceramic assemblage to characterize this type of product and propose their chrono-cultural assignment. In this approach, special emphasis has been placed on aspects of taphonomy aimed at evaluating processes related to the ceramic's erosion and fragmentation, in which refitting is applied to evaluate its spatial dispersion.

These taphonomic attributes on ceramics inform about the formation processes of the archaeological record, which both complement and can be contrasted by the information derived from typological indicators. The combination of

taphonomic and typological analyses on the ceramic assemblage from Cova Gran can help us unravel the apparent contextual chaos in the palimpsest of Neolithic archaeological unit 3N.

Level 3N presents a layer of pen deposits under which hearths, pits, and post holes are detected. These usually super-imposed archaeological structures generate a palimpsest that is difficult to read temporally and socially. The typological, morphometric, and taphonomic study of the ceramic group assists in defining a sequence of archaeological events that delineate various patterns of occupation of that space for almost 4,000 years.

Throughout the Neolithic, the Cova Gran has maintained uses related to the socio-economic organization of these groups, such as habitat, storage, and stabling of ovicaprines. The ceramic productions of these phases indicate important changes in the management of the use of the rock shelter of a temporal range between 5200-1300 CalBCE. Our approach suggests the interest in combining pottery typology, morphometry, and taphonomy to address the study of palimpsests by allowing us to propose changes in the orientation of the socio-economic organization during the Neolithic.

16 **HOW TO DEAL WITH THE CHANGE: POTTERY MANUFACTURE AND CONSUMPTION CHOICES IN SOUTHEAST IBERIA DURING THE POST-ARGARIC PERIOD**

López-López, Alberto (Universidad de Murcia)

The so-called Post-argaric period in Southeast Iberia (1550/1500 - 1350/1300 BC) is a transitional period between Argaric Bronze Age and Late Bronze Age. Concerning pottery, new types and decorative styles appeared and exchange networks became broader. The presence of Central Iberian and Mediterranean ceramics reveals the existence of long-range circuits, although some scholars conceive that ceramic production was not a specialised activity for this period. However, there are no in-depth research on ceramic assemblages of the period to accurately assess these issues.

This study aims to combine archaeological and archaeometric (thin section petrography, XFR, TG) techniques in order to define technological patterns, recipes and, in short, technical and technological traditions, as well as their (dis)continuities throughout the period. These results allow us to focus on productive and consumption choices regarding the vessels, which also leads us to explore exchange networks. For this purpose, the archaeological site of Murviedro (Lorca, Murcia) has been selected, whose excavation revealed two Post-argaric Bronze Age phases, making it a unique case study in the region. Considering that pottery manufacture is usually conservative, this theoretical and methodological approach will provide insights about:

1. How pottery manufacture changed or persisted in a time of deep social, economic and territorial transformations.
2. How potters and consumers dealt with new productions, and the choices they made in order to resist or accept change.
3. Potential and limitations of the methodological approach used.

17 **CULTURAL EXCHANGE AND POTTERY DYNAMICS: INSIGHTS FROM EARLY IRON AGE CERAMICS FROM LA FONTETA (SE IBERIA, 8TH - 6TH CENTURIES BC)**

del Pino Curbelo, Miguel (Universidad de Las Palmas de Gran Canaria) - Lorrio Alvarado, Alberto (Universidad de Alicante) - López Rosendo, Ester (Universidad de Alicante) - Torres Ortiz, Mariano (Universidad Complutense de Madrid)

The first millennium BC represents the final chapter of prehistoric times in various regions across the Mediterranean. In southern Iberia, these transformative shifts were instigated by the interaction between local communities and Phoenician settlers along the coast.

The advent of new trade routes, combined with the adoption of unfamiliar domestic species and advanced craft techniques, exerted significant influence on the evolution of daily life and institutional frameworks in Iberia, particularly from the 8th century BC onwards. The establishment of numerous coastal settlements, specializing in the intensive exploitation of local resources, facilitated the proliferation of distinct transport vessels, emblematic of a burgeoning pottery industry. Commodities like olive oil and wine, acting as catalysts for social change within local societies, were not only consumed locally but also traded with other colonial outposts.

Despite these developments, key aspects surrounding the establishment of pottery workshops, their integration with local artisanal traditions, and the distribution networks for their products remain poorly understood, especially following the latter half of the 8th century BC, when certain Phoenician settlements along the Andalusian coast achieved full maturity. Nonetheless, the economic landscape underwent significant transformations during the 7th and 6th centuries BC, evidenced by changes in typology and localized economic patterns.

This research presents an analysis of Early Iron Age amphorae (n=38) unearthed at the colonial settlement of La Fonteta (Alicante, Spain), with a chronology spanning from 8th to 6th centuries BC. The examination encompasses comparison with reference materials from Mediterranean workshops, as well as handmade ceramics recovered from

La Fonteta (n=9) and the nearby settlement of Peña Negra (n=36). The findings illuminate a great diversity of origins for La Fonteta, encompassing both Iberian and Mediterranean sources. Furthermore, connections with handmade wares from Peña Negra suggest the potential involvement of local populations in the adoption of emerging technological practices.

18 CERAMICS AND CULTURAL CHANGE IN 7TH CENTURY BC CRETE: THE POLYCHROME VESSELS FROM KNOSSOS

Kotsonas, Antonis (New York University) - Klesner, Catherine (University of Cambridge)

The Cretan polychrome vessels of the 7th century BC, though acknowledged as “bold and original creations of ceramic art” and featured in textbooks of Greek art and Greek pottery handbooks, have been subject to inadequate research. Found primarily at Knossos, in collective chamber tombs, they comprise neckless storage vessels and lids adorned with orientaling (including figural) decoration. This ware emerged during a period of heightened cultural and socio-economic interaction across the Mediterranean. Although it can be shown to have developed through the experimentation of Knossian potters, the inspiration for the ware has been sought in both local and non-local sources, including Minoan art, and Cypriot and/or Philistine bichrome pottery. Nevertheless, the potential influence of wall-painting of the 7th century BC remains unexplored.

Through non-destructive compositional and mineralogical analyses of 24 fragments of polychrome jars and lids, from eleven tombs excavated in different burial areas around Knossos, we have reconstructed some of the key aspects of the polychrome jars chaîne opératoire to evaluate previous hypotheses on the relation of this ware with other polychrome wares from the Aegean and Cyprus. The identification of two different types of white ground and a novel blue pigment lends analytical support to the empirical conclusion that the technique arose from local experimentation and emulation of imported goods, and undermines the possibility of direct knowledge transfer from abroad. The paper also addresses questions over the social significance of the innovation in this ware, the relatively short period of its production, and its nearly exclusive attestation in burial contexts at Knossos. More broadly, we reflect on the ways in which the introduction of Cretan polychromy relates to the integration of the island into broader Mediterranean networks, and we associate its demise with broader patterns of cultural change that swept Crete in the late 7th century BC.

995 SENSE AND SUSTAINABILITY IN FORAGING COMMUNITIES

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Bentsen, Silje (Nordland County Council; University of the Witwatersrand) - Grimm, Sonja (Zentrum für Baltische und Skandinavische Archäologie (ZBSA))

Session format: Session with presentation of 6 slides in 6 minutes

Palaeolithic and Mesolithic societies are characterized by remarkable adaptability and resilience in the face of environmental challenges. Our 2022 discussion session about the contribution of prehistoric experiences to current debates showed that this topic evokes intense discussions in our community. Therefore, we examine in this discussion session evidence for sustainability, resilience, adaptability, and change management within foraging societies from deep past to historic times. How did hunter-fisher-gatherers sense and make sense of the changes in their environment? How did they manage their resources, adapt to changing environments, and implement strategies for survival and growth? What were their strategies for shifting climates, resource constraints, and evolving social dynamics? From the answers, we can draw inspiration and valuable lessons, that can be gleaned from our ancestors, for addressing contemporary global challenges.

Key topics to be discussed in this session include:

Sustainable Resource Management: How did Palaeolithic, Mesolithic, and later foraging societies acquire, utilize, and conserve critical resources such as food, water, and materials? What can this teach us about sustainable practices today?

Technological Adaptations: Which innovations in tools and technologies allowed early humans to thrive in various landscapes? What are the implications for modern technological adaptation in the face of challenges like climate change?

Social and Cultural Strategies: Which roles do social structures, knowledge sharing, and cultural practices play in enabling hunter-fisher-gatherer communities to respond to environmental shifts and challenges?

Resilience and Change Management: How did foragers adapt to abrupt environmental changes and which relevance do their strategies have for modern change management and resilience-building efforts?

We aim to foster a rich dialogue among experts and attendees and invite thought-provoking contributions from Palaeolithic, Mesolithic, and/or ethnoarchaeological research (6 min./ 6 slides) to spark a stimulating discussion that

bridges the gap between prehistoric and modern sustainability, resilience, adaptability, and change management practices.

ABSTRACTS

1 ADAPTATION STRATEGIES OF EARLY TO MID-HOLOCENE HUNTER-GATHERERS IN THE NON-AQUATIC SAVANNAH ENVIRONMENT OF NW BUTANA, SUDAN

Varadzin, Ladislav (Institute of Archaeology of the CAS, Prague, Ladislav Varadzin) - Varadzinová, Lenka (Czech Institute of Egyptology, Faculty of Arts, Charles University, Prague, Czech Republic) - Juříčková, Lucie (Department of Zoology, Faculty of Science, Charles University, Prague, Czech Republic) - Hošek, Jan (Czech Geological Survey, Prague, Czech Republic) - Hošková, Kristína (Institute of Archaeology, Czech Academy of Sciences, Prague, Czech Republic) - Kapustka, Katarína (Institute of Archaeology, Czech Academy of Sciences, Prague, Czech Republic)

This presentation will contribute to the discussion on the sustainability of prehistoric hunter-gatherers facing environmental risks using data from the Shaqadud Archaeological Project (since 2019) and Butana Archaeological Project (from early 1980s) focusing on what is today a vast dry savannah in the NW Butana, Sudan, in the easternmost Sahel. Our project investigates the adaptation and resilience strategies of prehistoric hunters-gatherers in inland areas between 11.7 and 6.7 ka where cultural resilience was much more difficult for foraging groups because they could not rely on the buffering effect provided by rivers and lakes and their associated resources. After a brief description of settlement system, resource management, technology and social organization used by local people we then discuss the strategies that appear to have been crucial for them to respond to both strong seasonal variation and continental to global climate changes during five millennia. We conclude that to keep the responsiveness the local hunter-gatherers have consistently chosen the path of greater flexibility and opportunistic technologies at the cost of a small degree of specialisation and keeping groups small. Paradoxically, high degree of resilience of local hunter-gatherers has led to a low rate of change in most archaeological indicators of cultural evolution.

2 IN TUNE WITH NATURE? RESOURCE MANAGEMENT DURING LATE PLEISTOCENE AND EARLY HOLOCENE IN THE WESTERN FAÇADE OF IBERIA

Gameiro, Cristina (UNIARQ -FLUL, Universidade de Lisboa)

Climate change during Pleistocene-Holocene transition altered the environment and human populations had to adapt their foraging strategies.

Deglaciation resulted in sea-level rising, leading to an expansion of flooded areas. This, along with the expansion of woodlands, favoured coastal circulation, as can be inferred from site location. Subsistence strategies started to change during the tardiglacial period: there is a reduction in the representation of species within faunal assemblages and an increase of fish, birds, and small mammals (particularly rabbits), although deer and wild boar still predominate in early Holocene faunal assemblages.

These environmental shifts were accompanied by cultural changes. The preferential use of local raw materials indicates a contraction in the geographic areas explored. During this transitional period tool assemblages are characterized by miniaturization, a diversity of microlith types and a trend towards regionalism.

By analyzing site locations, subsistence strategies, raw material use and technological choices, this paper aims to elucidate how late Pleistocene and early Holocene communities of the Western façade of Iberia adapted their resource management practices to cope with these changing conditions. Furthermore, the relevance of these examples in promoting discussions on modern sustainability and adaptability will be explored.

3 MAGDALENIAN ALPINE IBEX HUNTERS IN THE HIGH MOUNTAINS

Valde-Nowak, Pawel (Jagiellonian University) - Kowal, Magda (Jagiellonian University) - Kraszewska, Anna (Jagiellonian University) - Kościuk-Zatupka, Julia (Jagiellonian University) - Nadachowski, Adam (Polish Academy of Science) - Sojak, Marian (Slovak Academy of Science) - Skłucki, Jakub (Jagiellonian University) - Wacnik, Agnieszka (Polish Academy of Science) - Kerneder-Gubała, Katarzyna (Polish Academy of Science)

Recently, excavations have revealed traces of a Late Paleolithic site in the high mountain landscape of the Tatra Mountains in Slovakia. The remains of a hearth, several hundred stone and bone artifacts, and the remains of hunted animals have been preserved in the Hučiva cave. Among them, many bones of the Alpine ibex are preserved, which is absent from these mountains region today. Accelerator Mass Spectrometry (AMS) dates point to the Bölling interstadial, and the tool inventory is dominated by forms such as shouldered points and other examples well-known from Western Magdalenian sites. The site itself is located in a cave near the upper edge of the forest, and below the front of the local glacier.

The presentation would focus mostly on the already derived results from the ongoing excavations, as well as shortly discuss the proposed further points and open questions, those need to be clarified during next seasons.

4 FOUR THOUSAND YEARS OF CLIMATIC VARIATION, FLEXIBILITY, AND RESILIENCE AMONG HOLOCENE HUNTER-FISHER-GATHERERS ALONG THE SUDANESE NILE

Varadinová, Lenka (Charles University, Faculty of Arts) - Varadin, Ladislav (Institute of Archaeology of the CAS, Prague; Charles University, Faculty of Arts) - Ambrose, Stanley (Department of Anthropology, University of Illinois, Urbana, IL, USA)

The Sahel region has among the highest inter-seasonal climatic variation in the world. It is characterized by a long dry season, with monsoon rains between May and September bringing sudden but comparatively short-term increases in biomass, including food resources. Local populations are adapted to this variation through their reliance on food-production, storage, and markets. However, droughts in the Sahel during the 1970s–1980s show the devastating impacts of short-term changes of the inter-seasonal variation on demography, political stability, and security, and the limits to adaptability in the Sahel. While more favourable climate prevailed in the Sahel during the African Humid Period (ca. 14.7–5.5 ka), inter-seasonal and inter-annual variation in climate likely constituted a major factor influencing the way of life in this region during that time. For the foraging communities along the Nile, the challenges the variation brought were in part balanced by the river, which constituted a stable source of water and diverse food resources, especially during the dry seasons. However, the Nile River is also characterized by intra- and inter-annual variations whose magnitude depends on climate in its headwaters. In this paper, we present the evidence from the Sabaloka Mountains on the central Sudanese Nile where Mesolithic hunter-fisher-gatherers managed to negotiate seasonal and inter-annual variations in rainfall and river levels and sustain continual settlement in this region for four thousand years. Their diverse settlement, subsistence, technological, and social strategies from the first postglacial reoccupation of central Sudan ca. 10.7 ka until the first arrival of food-production ca. 7 ka attest to both long-term flexibility and resilience not only in the face of the inter-seasonal variation and its changes, but also in the face of global climatic events.

997 CHAÎNE OPÉRATOIRE AND LIFE CYCLE OF PROTOHISTORIC AND ANCIENT BUILDING MATERIALS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Péfau, Pierre (École française de Rome) - Ducret, Pauline (École française de Rome) - Dessales, Hélène (École normale supérieure - Université PSL; Université de Lausanne) - Pizzo, Antonio (Scuola Spagnola di Storia e Archeologia di Roma)

Session format: Regular session

The aim of this session is to explore a key theme in research about architecture in ancient societies, that has been renewed since the end of the twentieth century: the chaîne opératoire and life cycle of building materials. Protohistoric and Ancient architecture has long been studied from a morphological point of view (floor plans, organisation of interior space, topographical insertion) or through construction techniques (typology of materials used to build the different parts of a construction: foundations, elevations, roofing...). The development of construction archaeology and the new technologies on which its methods are based have made it possible, in recent decades, to consider materials not just as elements of the construction techniques, but as objects of study for themselves. This allows researchers to document previously invisible aspects that were essential to have a detailed understanding of architectural practices: the economics of construction, site management and craft skills, the supply, transport, storage and trading of resources, maintenance, reuse and recycling.

We would like to bring together didactic contributions in order to create a synthesis organised by materials and comprising two complementary aspects: on the one hand, contributions presenting a material's chaîne opératoire, from its extraction/production to its primary and secondary use; and on the other hand, contributions proposing new methods for studying a material. The main building materials can be considered: stone (limestone, travertine, tuff, marble...), terracotta (bricks, tiles, technical elements) and raw earth (mud bricks, cob, rammed earth, wattle and daub), timber, plants (reeds, straw...), mortar, metals, glass.

The expected outcome is an overview of the technical processes and economics of construction in Europe for more than a millennium (8th c. BC - 5th c. AD). It could be an initial meeting to encourage the creation of a working group on building materials in order to share methods and results.

ABSTRACTS

1 'HOC OPUS BONUM SUO CUIQUE FACITO': WHAT THE ANCIENT TEXTS TELL US ABOUT THE LIFE CYCLE OF BUILDING MATERIALS

Pauline, Ducret (École française de Rome)

The notion of a "chaîne opératoire" is a modern one, applied to ancient monuments by the archeologists specialized in ancient construction. It is therefore an anachronism that allows today's researchers to take account of ancient realities.

Yet ancient texts on the subject, written in Greek or Latin, do exist. From Greek inscriptions to the Law of Pozzuoli, from Cicero's letters to Vitruvius' *De Architectura*, from Strabo to the Justinian Digest, texts, or rather fragments of texts, deal with the many operations involved in supply of materials: the selection of materials, the choice of extraction sites, the organisation of transport, the various stages of material processing, as well as storage, dismantling, reuse practices, the provision and maintenance of tools, etc. The texts are as diverse as they are rich on the subject and, although they do not offer a complete chaîne opératoire, they enable us to tackle virtually every stage in the life cycle of building materials.

These texts also help us to understand how the Ancients conceived the life cycles of materials. We will therefore try to determine which stages were considered to be complementary or were carried out by the same players, which were, on the contrary, decoupled from each other, where were the divisions and ruptures in the process, and whether they overlap with our contemporary conceptions.

2 VOLCANIC TUFF AND OTHER SOFT STONES IN ANCIENT CONSTRUCTION

Diffendale, Daniel (Scuola Superiore Meridionale)

While there are many different types of tuff, varying from volcano to volcano and eruption to eruption, shared geological characteristics give rise to similar physical characteristics relevant to the process of working the stone and its potential uses in construction—similar affordances—making it a useful analytical category to consider as a whole. From the point of view of stonecutters, calcareous tufa can also be considered along similar lines (indeed, the shared etymology is one index of this similarity), within a broader category of soft stones (the lapides molles of Vitruvius or the pietra dolce of later Italian stonecutters). Soft stones require less time, less labor, and less iron to extract and shape, and their lower densities make them easier to transport; they can thus be conceptualized as a midpoint between wooden and earthen architectures and those in harder stones, such as hard limestones and marbles. (Likewise, the relative quickness of their working can often be matched conceptually by the quickness of their erosion if left exposed to the elements.)

Developments in volcanology in recent decades have made it possible to study the quarry provenience of tuff used in ancient architecture, which allows for a better understanding of the beginning points of the chaîne opératoire; brief case studies from Rome will serve as examples.

Many of the other steps in the process must be read from the materials themselves (the softness of the stone and its aversion to polishing can allow for better preservation of toolmarks), or the quarries from which they were extracted, or inferred via more recent ethnographic parallels, such as the evidence for extraction of tuff around Naples in the early part of the 20th century.

3 FROM QUARRIES TO BUILDINGS: EXTRACTION, MANUFACTURING, TRANSPORT AND USE OF THE AURISINA LIMESTONE IN THE ROMAN AGE

Previato, Caterina (Università di Padova) - Giroto, Chiara (Università di Padova) - Dilaria, Simone (Università di Padova) - Bridi, Eliana (Università di Padova) - Bonetto, Jacopo (Università di Padova)

The exploitation of stone resources for building purposes played a fundamental role in the economics of the Roman Empire as well as their availability and features strongly influenced the shaping of ancient architecture. Generally, stone materials were selected on the basis of their quality and ease of procurement. In fact, it has been shown that in Roman times cities generally sourced stone from quarries situated at a distance no more than 20–30 km. In this general scenario, there are, however, some exceptions. This is the case, for example, of the Aurisina limestone, a stone quarried in North-Eastern Italy, not far from the cities of Aquileia and Trieste, which was not only used locally but also traded on a regional and extra-regional scale, being extremely appreciated for its aesthetic and physical-mechanical characteristics.

The present work aims at analyzing the entire process of extraction, manufacturing, transport and use of the Aurisina limestone in the Roman age. Through a multidisciplinary approach, incorporating archaeological data and archaeometrical analysis, this study explores the extraction dynamics employed in the Aurisina quarries, the craft skills

involved in shaping limestone into architectural elements, and the logistical challenges faced in transporting these materials across vast distances to construction sites.

A specific focus will be placed on the analysis of the type of artefacts produced, in order to reconstruct on the one hand the techniques and tools used to carve the Aurisina stone, and on the other to shed new light on the location (in the quarries? in the cities?) and organization of the stone workshops.

By investigating the different steps of the production process of Aurisina limestone, this research provides valuable insights into the exploitation and management strategies of stone resources in Roman times.

4 FROM QUARRY TO DECOR : AN EXPLORATION OF THE MARBLE PRODUCTION CHAIN IN ANTIQUITY

Barataud, Laura (Ausonius)

As a symbol of political and social prestige, marble was a key material in Roman architecture and ornamentation. The chain of operations for this raw material is a complex process that reflects the technical competence of marble craftsmen, from quarrying to the installation of decorations on building sites. Observing the traces left behind during the various phases of work also offers essential clues to a better understanding of decorative systems such as marble veneers, which are often found in fragmentary condition. Tracing the various stages involved in setting up the ornament, as well as the various elements inherent in its installation, reveals the technological imperatives with which ancient craftsmen may have been confronted. Their expertise in selecting materials, the understanding of marble's physical properties, as well as the solutions they found for maintaining veneers, demonstrate the high level of technical know-how involved and the extent of their thinking on the installation of marble decorations.

5 A THOUSAND YEARS, A THOUSAND RECIPES: THE CHAÎNE OPÉRATOIRE OF ANCIENT LIME MORTAR, BETWEEN KNOW-HOW AND USES

Coutelas, Arnaud (UMR 8546 AOROC (France))

Ancient lime mortar, or rather the famous "Roman concrete", has a truly legendary image. Ever since medieval times, people have praised the quality of these materials. Indeed, some of them are truly admirable, to such an extent that they are used as analogues for some of today's cements in order to analyse their degradation over time. But Roman production is not limited to these few remarkable concretes, prepared with lime and pozzolans. While these very special volcanic ashes may have travelled around the Mediterranean Sea, particularly from the Phlegraean Fields, for the main part the raw materials were always local and the nature of lime mortars therefore appears to have depended on the nearby geological environment, as well as on a form of local appropriation, which, on the scale of the Empire, offers us great diversity. This diversity also depends to a large extent on how the material is used in architecture. In fact, the recipe for mortar or concrete is not the same depending on whether it is used as a construction mortar, a decorative plaster or a technical element.

Even if this remains to be clarified, we now know that the whole range of Roman techniques emerged over time, originally through successive contacts with the Greek and Punic worlds, before developing in their own right. The know-how did not disappear after the fall of the Empire, but migrated to the East in conservatories such as the Byzantine world, where it evolved. In the West, oblivion was only relative, and there were even innovations in the chaîne opératoire, such as mechanical mortar mixers, an invention probably dating from the 7th century.

6 THE EXPLOITATION OF VOLCANIC POZZOLANS IN THE ROMAN WORLD. THE CURRENT STATE OF ART IN LIGHT OF RECENT DISCOVERIES

Dilaria, Simone (Department of Cultural Heritage, University of Padova; Inter-Departmental Research Centre for the Study of Cement Materials and Hydraulic Binders, University of Padova) - Secco, Michele (Department of Cultural Heritage, University of Padova; Inter-Departmental Research Centre for the Study of Cement Materials and Hydraulic Binders, University of Padova) - Bonetto, Jacopo (Department of Cultural Heritage, University of Padova) - Previato, Caterina (Department of Cultural Heritage, University of Padova)

The use of volcanic pozzolans to improve the hydraulic properties and cohesive capabilities of aerial lime-based mortars represents one of the most brilliant achievements of antiquity. Several Latin authors, such as Vitruvius and Pliny, celebrated the outstanding properties of the pulvis puteolanus. This is a peculiar volcanic ash, outcropping around the Gulf of Naples, that was particularly recommended for improving the durability of concretes in underwater conditions. Recent research indicates the rapid spread of Neapolitan pozzolans in Roman territories around the Mediterranean from the Augustan Age onward and this product monopolized markets due to its excellence in crafting long-lasting hydraulic mortars and concretes. The reasons for this massive commercialization probably lie in trade logistics: the outcrops are located close to the coast of the Bay of Naples, where some of the most important harbors of the Roman World, such as Puteoli, Baia and Miseno, were located.

Despite the prominence of Vitruvian pulvis, other effective pyroclastic products for ancient mortars were exploited in ancient times in the Provinces. Ongoing research reveals increased interest in the exploitation of "alternative" volcanic pozzolans across the Roman Empire, fostering developments in the geochemistry and materials science of ancient construction materials.

This contribution offers a concise overview of the current state of research on this topic. New evidence from various Italian sites, including Nora and Sant'Antioco in Sardinia, Aquileia in Friuli Venezia Giulia, Padova and Montegrotto in Veneto, and Lio Piccolo in the Lagoon of Venice, currently investigated at the Department of Cultural Heritage of the University of Padova, are shedding new light on the utilization of both "Vitruvian" and "alternative" volcanic pozzolans in ancient constructions. These findings provide intriguing insights into the deep technological understanding of ancient craftsmanship regarding local land resources and their optimal utilization for the production of robust and long-lasting concrete-based structures.

7 FROM FOREST TO BUILDING: CHAÎNE OPÉRATOIRE AND LIFE CYCLE OF TIMBER IN ANCIENT ROMAN WESTERN EUROPE

Péfau, Pierre (Ecole française de Rome)

Timber is rarely preserved on archaeological sites and can generally only be identified as imprints or holes. Because of these conservation difficulties and research traditions focused on stone and brick construction, timber is usually under-represented in Roman architectural studies. Recent excavations in wet contexts - particularly in urban areas - have revealed the importance of this material in ancient architecture. Moreover, timber is a first-rate environmental and technical marker that records its entire chaîne opératoire, from forest to building.

The study of wood anatomical features is essential for taxonomic identification and for understanding species selection. Dendrochronological and dendroprovenancing studies make it possible to date the tree's felling and to determine the geographical origin of a timber piece. Although it is generally considered an easily accessible material, timber was often imported over several hundred kilometres because of the forest decline in many European areas. Dendro-typological analyses provide valuable information on forest condition and management method, which influenced the architectural forms and tools used. Technological (shaping and slashing processes) and traceological approaches (toolmarks and carpenters' marks identification) are fundamental to understand woodworking methods and the timber framing achievement. As a precious resource, the beam lifespan often extends beyond its first use. Combining different methods will enable us to examine different cases of reuse and recycling.

The aim of this paper is to provide an overview of the various stages in the timber chaîne opératoire, while highlighting the different methods of studying timber. This synthesis is based on results of recent excavations carried out in Italy, France, Switzerland and United Kingdom, mainly in urban settlements dating from the 1st to 5th centuries AD. Ancient texts and ethnoarchaeological data will also be consulted within a critical comparative approach.

8 A PROPOSITION OF CHAÎNE OPÉRATOIRE FOR THE WOODEN ELEMENTS OF THE PARAPET WALK OF THE HEUNEBURG FORTIFICATION AROUND 600 BC

Remise, François (Independent researcher)

Around 600 BC, the community of the Heuneburg (southwestern Germany) built a fortification around the upper and the lower towns. The fortification of the upper town consisted in a mudbrick wall on a stone basement surmounted by a wooden parapet walk, replacing a more traditional fortification made of wooden boxes filled with earth. This 775 metres long parapet walk consisted in a timber structure of oak beams with a roof made of wood shingles. In this paper, I propose a chaîne opératoire of the wooden elements of this parapet walk, from felling trees to installing the wooden parts on the wall, including all transport and manufacturing phases of the various wooden components. An estimation of the costs related to all the phases of the supply, manufacturing and installing processes is then proposed, using the Architectural Energetics method with a choice of labour rates made after having considered the specialized literature and having taken advice from experts.

9 THE REALITY OF ANCHORING JOIST FOR WOODEN FLOORS AT OSTIA: INSIGHTS FROM TRACES IN THE WALL

Yoshimura, Yuji (Kyushu University) - Hori, Yoshiki (Kyushu University (Professor))

This study based on detailed 3D laser scanning to measure the wall sockets remained in Ostia. Although wooden joists had been now lost, methods of anchoring joist to wall have been reconstructed and divided into 6 groups by Ulrich.

From the data obtained, it is at least possible to reconstruct in detail the appearance of the remaining socket holes in the wall. Socket holes generally have one or two of the four corners missing from the square, a feature observed in many holes, and may represent the shape of the log ends.

When wood is generally used in structures, for aesthetic and practical reasons, the process of squaring is used to shape the timber into long blocks with a square or rectangular outside shape. Squaring is primarily done using axes (squaring axe, broad axe) and pit-saws. Particularly, to cut straight without being hindered by the grain of the wood, a tool called a framed pit-saw, with a blade fixed in the center of a wooden frame, was used.

Considering the shape of the socket holes observed in the ostia, it can be speculated that squaring resulted in a shape resembling the rounded end of a log at the corners. By using pit-saws to divide the section into two or four parts, it can be understood that the width and height of the beams were adjusted. In this technique, the initial squaring process may have been performed using simpler axes.

Meiggs mentions that in large residential developments like 2nd century Ostia, the use of wood changed from sturdy hardwoods to more easily worked softwoods such as fir and pine. Similarly, considering the cross-section of wood seen in socket holes, squaring may have been done practically to produce larger cross-section materials.

10 PERISHABLE, DEPRECIATED BUT AFFORDABLE: PLANT FIBRES AND THEIR « CHAÎNE OPÉRATOIRE » IN GREEK AND ROMAN CONSTRUCTIONS

Azzi, Clothilde (CRHEC - Université Paris-Est Créteil; AOrOc - ENS-PSL)

Although very common in Greek and Roman constructions, the use of plant fibres such as wheat and rye straw, reed, bulrush, hemp and wicker remains largely understudied. This general lack of interest can be explained by the scarcity of plant remains found through archaeological research, due to their perishable nature. Indeed their limited durability makes it difficult to reconstruct their "chaîne opératoire" - the waste produced during the processing of the stems disappears quickly after cutting and what remains from the finished product is often reduced to its imprint in other, more durable materials. The written sources are also disappointing from a technical point of view, as Greek and Roman authors did not bother to detail the processes involved in using these unpretentious materials, which were considered to be the preserve of the poor. It is also important to mention the particularities of the supplying and working process of plant fibres, the stages of which do not always follow a strictly defined sequence. As they are readily available in the surrounding environment and require minimal processing before use, plant materials have often been used in self-building constructions. For this reason, in the absence of clearly defined workers and professional networks, the question of the plant fibres' « chaîne opératoire » has long been ignored by researchers. However, combining the analysis of xyl-, anthrac- and palynological remains with data from textual and ethnographic sources, makes it possible to reconstruct the different phases of this « chaîne opératoire », which is more complex than it first appears. The entire life cycle of plant fibres can therefore be tracked down, from culture to harvest, transport to storage, application to maintenance.

11 METAL IN ROMAN CONSTRUCTION: EXAMPLES OF USE AND PRODUCTION STRUCTURES

Loiseau, Christophe (UMR 8546 (ENS-AOROC) - EVEHA)

In Roman construction, metal objects (iron, bronze, lead) have been very little studied, often due to salvage operations that have deprived us of a large part of the documentation. Yet ancient metals played a key role in fixing architectural elements, providing decorative supports, equipping and embellishing buildings, and sometimes even restoring them after damage. This presentation will illustrate the diversity and ingenuity of metal elements used in Roman construction. The presentation will focus on a number of specific examples. Metal parts in a variety of shapes were used in the construction of ceilings. The systems developed were adapted to the spaces built (galleries, thermal baths) and to the expected forms of construction (vaults, flat ceilings). Fixing brackets for marble decorations provide information on the craftsmen's skills and construction stages. The management and heating of water also suggest a variety of equipment, such as boilers and taps, in addition to pipe networks whose originality is not always fully appreciated. In some cases, builders set up temporary workshops on site to adjust and install these metal parts. These structures, which we'll also take a closer look at in a few examples, also inform us about the craftsmen's know-how and the relationships they maintained with the other trades present on site.

12 SUPPLY AND TRANSPORTATION OF BUILDING MATERIALS IN OSTIA ANTICA: THE "ISOLATO DELLE TRIFORE" AS A CASE STUDY

Vyverman, Sarah (École Normale Supérieure de Paris; UCLouvain; F.R.S.-FNRS)

While the topic of supply and transportation of building materials has been discussed extensively for the city of Rome, this research issue has thus far not been addressed properly for the city's main harbour, Ostia antica. This presentation aims to fill this research gap by focusing on the construction site of a particular city block: the "Isolato delle Trifore", located in the third region of Ostia antica. This urban block consists of two buildings that have been dated to the 2nd century AD, which were built on previous structures dating back to the end of the 1st century BC. In this talk, I will, firstly, analyse the different types of building materials of these structures, along with those belonging to the earlier phases of the Isolato delle Trifore of which we have traces in the archives. These building materials will be

examined through a method developed by Gilles Fronteau (University of Reims Champagne-Ardenne) that enables for classifying these materials according to the distance between their extraction/production site and their place of use. Thus, the building materials of the Isolato delle Trifore will be subdivided into different areas of supply, based on their proximity to the site: immediate, adjoining, local, regional, and extra-regional. Secondly, I will assess the manifold strategies of transportation of these building materials by land and/or river, from their original location to Ostia antica. By examining the process of supply and transport of building materials to one city block in Ostia antica, this paper aims to gain a better understanding of the practical organisation of construction in the urban landscape more widely, thus addressing significant issues related to the supply and transportation chain of building materials to and within Rome's main harbour.

13 FROM EARTH TO EARTH. CHAÎNES OPÉRATOIRES AND ECONOMY OF RAW EARTH : THE ABSOLUTE MATERIAL ?

Leal, Emilie (INRAP - National Institute for Preventive Archaeological Research; UMR 5140 Archéologie des Sociétés Méditerranéennes)

Among all the materials used in architecture, raw earth is the only one with absolute reversibility properties. This character, now recognized as an undeniable asset in terms of engineering and ecology, represents an ongoing challenge in terms of identification and understanding in archaeological contexts. So, while the technical definition of cob, mud bicks, rammed earth or wattle and daub has been the focus of a great deal of attention over the last twenty years, and analysis protocols have been greatly enhanced thanks to an interdisciplinary approach, archaeological examples regularly reveal the extent to which these different construction techniques are adapted, adaptable and go beyond their original limits. The concept of chaîne opératoire, still too rarely applied to this material, enables us to clarify its overall system and its implications (particularly economic, constructive, taphonomic and topographical), and also to understand its status alongside other materials. In this presentation, we address the question of raw earth in the light of this concept. We present the different techniques involved, and then take a closer look at the issue of supply, technical variations and the recycling processes highlighted in archaeological contexts, based on specific examples.

14 HEARTH OR PLASTER? A METHODOLOGICAL PROPOSAL TO INTERPRET FLAT SURFACE EARTHEN REMAINS FROM MEDITERRANEAN PROTOHISTORIC SECONDARY CONTEXTS

Belarte, Maria Carme (ICREA (Catalan Institution for Research and Advanced Studies); ICAC (Catalan Institute of Classical Archaeology)) - Mateu, Marta (ICAC (Catalan Institute of Classical Archaeology)) - Pastor Quiles, María (Universitat d'Alacant; ICAC (Catalan Institute of Classical Archaeology)) - Saorin, Carme (GRAP (Grup de Recerca en Arqueologia Protohistòrica), Institut d'Arqueologia de la Universitat de Barcelona (IAUB)) - López Reyes, Dani (ArqueoVitis, SCCL) - Canela-Gràcia, Joan (ICAC (Catalan Institute of Classical Archaeology)) - Corrales, Antoni (ICAC (Catalan Institute of Classical Archaeology)) - Prats, Georgina (Universitat de Lleida) - Anguera, Maria (ICAC (Catalan Institute of Classical Archaeology))

This paper addresses the methodological and interpretative challenge of studying fragments of constructions recovered out of context at protohistoric sites, often as part of the fill of pits. These often include a series of elements with a flattened surface, that, from a preliminary macroscopic observation, could be interchangeably interpreted as belonging to combustion structures or as earthen plasters, or even as other architectural remains.

Even though earth-building materials are being increasingly studied, the ones coming from secondary contexts are rarely the object of research, and so are the remains of combustion surfaces built with earth.

Applying an interdisciplinary methodology for the study of these materials increases the information about the construction processes. Also, about the use of the structures behind these materials. More precisely, we propose thin-section micromorphology and FTIR analyses, to identify the intervention of an intentional combustion process and distinguish surfaces of fire installations from other construction parts.

This research addresses earthen materials coming from the sites of Turó de la Font de la Canya, Mas Cap de Ferro and El Vilar de Valls (Catalonia).

15 LONG LIFE FOR AN EXCEPTIONAL BUILDING MATERIAL: FIRED BRICK AND TILE

Bukowiecki, Evelyne (École française de Rome) - Dessales, Hélène (École Normale Supérieure - Université PSL)

Fired bricks and tiles are emblematic building materials of Roman architecture, but have much older cultural origins. Wherever clay is found, these materials continue to play an essential role throughout the history of architecture, from the 6th century B.C. to the present day, both as new and recycled materials.

This article begins by drawing on examples from Rome and Pompeii to outline the key stages in the chaîne opératoire and life cycle of ceramic building materials: extraction and preparation of clay, shaping of elements, drying and possible stamping, firing, primary storage at production sites, transport, secondary storage in the city, transport to

building sites, storage on building sites, implementation and, possibly, organization of deconstruction sites, recovery and storage of materials for recycling, selection, transformation, redistribution and re-use of materials by other building processes.

In the case of Rome, we now have a good understanding of the entire brick chaîne opératoire, but less so for roof tiles. In the case of Pompeii, we can detect local specificities in the chaîne opératoire for flat tiles, re-cut for use in masonry.

The aim is then to position the chaîne opératoire of baked brick and roof tile within the chaîne opératoire of the other materials presented in this same session of the congress and, while identifying common points, to specify their technical, geographical and cultural specificities. This part of the contribution will draw on the many case studies presented at recent international conferences held in Italy on Roman brick, on the use of brick in imperial building sites in 2014 (“convegno Laterizio I”), on the birth of architectural terracotta in 2016 (“convegno Laterizio II”) and, finally, on the reuse and heredity of architectural terracotta in 2019 (“convegno Laterizio III”).

16 THE BRICK CONSTRUCTION INDUSTRY IN IMPERIAL ROME: WORKING PROCEDURES AND QUANTITATIVE ANALYSES

Camporeale, Stefano (Università di Siena) - Serlorenzi, Mirella (Soprintendenza Speciale Archeologia Belle Arti Paesaggio di Roma)

The contribution proposes a method for the quantitative study of masonry based on the dismantling of a number of structures from the Imperial age (brick-faced concrete) found in Piazza Dante in Rome and on a comparison with the substructures of the Domus Tiberiana, one of the imperial palaces on the Palatine Hill. The analysis is also set up according to an anthropological approach, careful to highlight the sequence of workings adopted for each type of brick. With regard to the context of Piazza Dante, some preliminary data were presented at the 2016 conference ‘Costi, tempi e metri cubi’ in Padua (published in 2017) and at the Third International ‘Laterizio’ Conference in Rome in 2019 (unpublished poster). Now the analysis has been completed on all the dismantled masonry, belonging to different chronological periods, and built using different techniques with both newly produced and salvaged materials.

All the elements that made up the masonry (core and facing) have been counted: the building process of these structures will be hypothesized, together with the time and labour needed for construction. New observations on the cutting and working procedures of the bricks will also be presented, focusing on the most attested types: bessales and roof tiles of a special format, which we can define ‘piccole tegole’ (small tegulae) on the basis of some previous studies (Steinby, Delaine, Camporeale). These observations will be compared with data coming from the study of other contexts in Rome, especially the Domus Tiberiana, of which a detailed stratigraphic reading of the substructures is available, especially in relation to the Hadrianic period, and Ostia.

1000 ADVANCED METHODOLOGIES FOR LIFE HISTORY RECONSTRUCTION IN BIOARCHAEOLOGY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Nava, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy) - Esposito, Carmen (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Madgwick, Richard (School of History, Archaeology and Religion, Cardiff University, Cardiff, UK) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main, Germany) - Buckley, Michael (Manchester Institute of Biotechnology, University of Manchester, Manchester, UK)

Session format: Regular session

The growing use of advanced scientific techniques has been revolutionising the study of the past, offering nuanced interpretations that were previously unimaginable. Advanced analyses of human and faunal remains from archaeological or palaeontological horizons are nowadays a constant presence in bioarchaeological studies, providing a detailed reconstruction of individual life histories and biocultural adaptation strategies.

High-spatial resolution multi-isotope (such as $^{87}\text{Sr}/^{86}\text{Sr}$, $\delta^{15}\text{N}$, $\delta^{13}\text{C}$, $\delta^{34}\text{S}$, $\delta^{18}\text{O}$) and multi-element (Sr, Ba, Zn, Mg, U, REE, etc.) analyses of human and faunal teeth and bones have become ever more common. Coupled with dental histomorphometry, palaeoproteomics and isoscapes, these methods have refined our understanding of people and animal diets, mobility, and nursing in the past, also allowing the quantification of the impact of diagenesis on the mineralized tissues. Furthermore, the use of laser-ablation mass spectrometry (LA-(MC)-ICP-MS) and multi-isotope analysis for detecting seasonal human and livestock mobility provides spatial-temporal patterns of behaviour with very high precision. These cutting-edge techniques interwoven with the archaeological record have dramatically improved our knowledge of the past. Nonetheless, our awareness of possible pitfalls within these methods is increasing. The proposed session offers the occasion to show diverse types of multidisciplinary projects, discussing outcomes and drawbacks, arising possible aspects that can be improved in the field. We welcome papers that provide the ap-

plication of the previously mentioned advanced techniques in bioarchaeological studies from different archaeological areas and periods and particularly encourage papers that demonstrate the potential of maximising multi-factorial data even from a single sample.

ABSTRACTS

1 SEA SPRAY EFFECT ON ^{14}C DATING AND BEYOND: ^{13}C AND ^{14}C ANALYSIS SHEDS LIGHT ON SEA SPRAY INDUCED PHYSIOLOGICAL REACTIONS

Göhring, Andrea (Christian Albrecht University Kiel; GEOMAR Helmholtz Centre for Ocean Research Kiel) - Hüls, C. Matthias (Leibniz Laboratory for Radiometric Dating and Stable Isotope Research Kiel) - Mayr, Christoph (Friedrich-Alexander-Universität Erlangen-Nuremberg; Ludwig-Maximilian-Universität Munich) - Hamann, Christian (Leibniz Laboratory for Radiometric Dating and Stable Isotope Research Kiel)

The transfer of marine aerosols to terrestrial environments via sea spray influences the stable isotope signature (e.g. $\delta^{13}\text{C}$) of coastal environments, including plants, animals, and humans. Although prior research has explored the influence of sea spray on the stable isotope fingerprint of coastal specimens, a notable knowledge gap exists regarding its effect on radiocarbon dating in terrestrial organisms within coastal regions. Beyond direct effects, the sea spray induces physiological reactions, particularly salinity stress-related responses. While the marine reservoir effect is known to affect the ^{14}C signal of terrestrial consumers of marine food, the sea spray affects the isotope signature of individuals consuming terrestrial food.

This study investigates the influence of sea spray on the ^{14}C concentration in plant tissues through an artificial sea spray experiment conducted in a greenhouse. Beach grass was sprayed with mineral salt solutions with only traces of NaCl or brackish water from the Schlei inlet or the Baltic Sea. These plants should exhibit a ^{14}C signal closely aligned with the contemporary atmospheric $^{14}\text{CO}_2$ composition. However, three treatment groups displayed distinct deviations in radiocarbon concentration.

Plants sprayed with Schlei water, Baltic Sea water, or a mineral salt solution with elevated bicarbonate concentration were depleted in ^{14}C compared to the atmosphere. The absorption of substantial amounts of ^{14}C (about 56-68%) from dissolved inorganic carbon (DIC) in spray water seem to partially mask the (opposed) effects of plant physiological responses to salinity or bicarbonate stress on ^{14}C , while these responses result in reduced discrimination against ^{13}C .

The results emphasize the necessity of a comprehensive understanding of these interactions, shedding light on the direct and indirect sea spray effect on the carbon isotope composition of both modern and archaeological plant and faunal tissues in coastal environments.

2 SR ISOTOPES SPATIAL DISTRIBUTION IN ITALY: GEOCOMPUTATIONAL TOOLS TO TRACK THE GEOGRAPHICAL ORIGIN OF HUMANS AND ANIMALS

Lugli, Federico (Institute of Geosciences, Goethe University Frankfurt) - Müller, Wolfgang (Institute of Geosciences, Goethe University Frankfurt) - Cipriani, Anna (Department of Chemical and Geological Science, University of Modena and Reggio Emilia)

Reconstructing the geographical origin, the provenance and the movements of humans and animals is key in many fields of study, including ecology, archaeology and forensic anthropology/medicine. To this end, strontium isotope tracers have historically played a central role due to their link with the lithological and geological features of the landscape. Yet, to accurately interpret provenance through isotope systematics, it is paramount to have reference datasets of geobiological/environmental samples from the area of interest as comparison. Such data can be spatially modelled through canonical geostatistical and machine learning techniques, to obtain continuous maps of isotope distribution, i.e. isoscapes. In addition, these maps can be ‘queried’ e.g. by Bayesian methods to obtain estimated probability of geographical origin and possibly overcome ‘eyeball’ approaches. Here, we present the current state of the Italian Sr isoscape and novel freely available online-tools that can be used to test the geographical origin of biological samples. Specifically, we will show flaws and merits of traditional interpolation methods (e.g. Kriging), compared with novel automated learning algorithms such as (Spatial) Random Forest, and we will demonstrate how sample provenance can be defined numerically by combining isoscapes, related spatial uncertainties and Bayesian inversion methods. Overall, these approaches can strengthen our interpretation of human and animal provenance and mobility, within a robust statistical framework.

3 TRACING MOBILITY: EXPLORING ISOSCAPES AND STATISTICAL METHODS IN ASSESSING ALLOCHTHONY OF PAST POPULATIONS

Stuart, Emma (Sapienza University of Rome, Rome, Italy) - Esposito, Carmen (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Bondioli, Luca (Department of Cultural Heritage, University of Padua, Italy; Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy) - Di Renzoni, Andrea (CNR-ISPC (Consiglio Nazionale delle Ricerche – Istituto di Scienze del Patrimonio Culturale)) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main, Germany) - Vanzetti, Alessandro (Sapienza University of Rome, Rome, Italy)

Strontium isotope analyses ($87\text{Sr}/86\text{Sr}$) have increasingly gained prominence in reconstructing past human mobility. For this purpose, anthropological samples are typically compared to various kinds of samples pertaining to areas varying in proximity to the site of provenance, forming a local baseline, which reflects the isotopic fingerprint of a specific area. Although many Italian studies have traditionally utilised this approach, isotopic maps, namely isoscapes, are now being widely employed.

Isoscapes cover entire regions and can be based on bioavailable or non-bioavailable materials, depending on the research objectives. The bioavailable isotope is often favoured in archaeological research, as it is deemed more representative of the isotopic fingerprint of living beings. The reliability of isoscapes depends on the samples used and the statistical methods employed, including ordinary kriging, universal kriging and machine learning techniques.

Several isoscapes have been developed for the Italian territory, using various geostatistical and theoretical approaches. This research aims to create and evaluate an updated version of the Italian isotope, while in parallel re-elaborating and comparing data by using different geo-statistical and statistical methodologies. We therefore propose an analysis of a number of prehistoric and protohistoric case studies (taken from existing literature), where ranges of values are delineated around the burial site, based on distances calculated in walking hours, known as isochrones, representing varying degrees of mobility from the site in question. The results are then statistically processed in order to understand the degree of autochthony of individuals, aiming to transcend the rigid local versus non-local dichotomy that sometimes characterises isotopic analyses.

4 NOTHING GOES TO WASTE: A NOVEL PROTOCOL TO OPTIMIZE DESTRUCTIVE SAMPLING OF ANCIENT TEETH

Esposito, Carmen (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Galbusera, Alessia (Department of Cultural Heritage, University of Padua, Padua, Italy; Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy) - Gigante, Melania (Department of Cultural Heritage, University of Padua, Padua, Italy) - Higgins, Owen (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy; Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Lugli, Federico (Institute of Geosciences, Goethe University Frankfurt, Frankfurt Am Main, Germany; Frankfurt Isotope and Element Research Center (FIERCE), Goethe University Frankfurt, Frankfurt am Main, Germany; Department of Chemical and Geological Science, University of Modena and Reggio Emilia, Modena, Italy) - Müller, Wolfgang (Institute of Geosciences, Goethe University Frankfurt, Frankfurt Am Main, Germany; Frankfurt Isotope and Element Research Center (FIERCE), Goethe University Frankfurt, Frankfurt am Main, Germany) - Madgwick, Richard (School of History, Archaeology and Religion, Cardiff University, Cardiff, United Kingdom) - Coppa, Alfredo (Department of History Anthropology Religions Performing Arts, Sapienza University of Rome, Rome, Italy) - Benazzi, Stefano (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Nava, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy)

Advancements in archaeological sciences through innovative scientific techniques applied to ancient human remains have been increasingly transforming the study of the past. Micro-destructive analyses of human bioarchaeological or palaeontological specimens (e.g., dental histology, stable and radiogenic isotope analyses – at high-spatial resolution or with a bulk approach – serial sampling of dentine, trace element analysis of dental mineralised tissues, 14C dating, proteomic analysis, and ancient DNA) are today pervasive methodologies in bioarchaeological research. Notably, mineralized dental tissues, and especially dental enamel, have proven to be optimal for opening a window on individual life histories. The main issue of these techniques is the need for destructive sampling. Nonetheless, without these analyses, the depth of our understanding of the past would not have been as refined. In this context, in compliance with the ALARA standard (As Low [damage] As Reasonably Achievable), we present a standardized protocol for the optimization of tooth sampling for histology and biogeochemical analyses applied to a sample of $n = 29$ human teeth from the Villanovan necropolis of Sala Consilina (Early Iron Age, Campania, southern Italy). The proposed protocol enables the collection of multiple high-resolution evidence from minimal sampling of a single dental specimen, ensuring the preservation of most of the tooth and possibly of its morphology, and overall balancing scientific investigation

with the conservation of valuable archaeological and paleontological specimens guaranteeing the feasibility of future analyses.

5 HOW LONG IN THE TOOTH? DISCUSSING THE TRIALS AND TRIBULATIONS OF MULTI-SAMPLING HUMAN TEETH FOR ISOTOPE ANALYSIS

Griffith, Jacob (Archaeology, Environmental Changes, & Geo-Chemistry Research Group (AMGC), Vrije Universiteit Brussel (VUB), Brussels, Belgium.) - Schulting, Rick (Research Laboratory for Archaeology and the History of Art, School of Archaeology, University of Oxford, Oxford, UK.) - James, Hannah (Archaeology, Environmental Changes, & Geo-Chemistry Research Group (AMGC), Vrije Universiteit Brussel (VUB), Brussels, Belgium.) - Geritzen, Carina (Archaeology, Environmental Changes, & Geo-Chemistry Research Group (AMGC), Vrije Universiteit Brussel (VUB), Brussels, Belgium.) - Veselka, Barbara (Archaeology, Environmental Changes, & Geo-Chemistry Research Group (AMGC), Vrije Universiteit Brussel (VUB), Brussels, Belgium.) - Zariņa, Gunita (Institute of Latvian History, University of Latvia, Riga, Latvia.) - Ordoño, Javier (Department of Archaeology and New Technologies, Arkikus, Spain.) - Črešnar, Matija (Centre for Interdisciplinary Research in Archaeology, Department of Archaeology, Faculty of Arts, University of Ljubljana, Ljubljana, Slovenia.) - Snoeck, Christophe (Archaeology, Environmental Changes, & Geo-Chemistry Research Group (AMGC), Vrije Universiteit Brussel (VUB), Brussels, Belgium.)

In the past 20 years, bioarchaeological development has led to a greater understanding of human tooth formation and growth. Alongside the development of bioarchaeological techniques (i.e., isotope, proteomic, and DNA analyses), we can now recreate the lifeways of past individuals better than ever before. Currently, numerous multi-sampling techniques are being proposed for isotopic analysis, including incremental dentine sampling (slicing or puncturing), incremental enamel sampling, and in-situ analyses, meaning that dietary and mobility history changes can now be observed across the period of tooth formation.

However, issues surrounding which technique is appropriate to use or prioritise, are beginning to emerge. Whilst robust, human teeth hold a limited volume of material, meaning that all forms of analysis can rarely be applied. Further, many of these techniques have been developed on modern, unworn teeth. Applying them to archaeological, often worn, teeth is also complicated, with techniques requiring adaptation, or being impossible altogether.

This paper combines the multi-sampling (enamel and dentine) and multi-isotope data from multiple archaeological sites: Zvejnieki burial ground, (Mesolithic/Neolithic Latvia), Legaire Sur (Neolithic/Chalcolithic, Spain), Wilsford Henge (Bronze Age, England), Staje (Iron Age, Slovenia), and Koekelberg cemetery (Post-Medieval, Belgium). We review what techniques were appropriate to apply; where, how, and how much to sample, how successful they were, and what the limitations of the techniques were. The overall aim of this study is to navigate how to appropriately acquire the most lifeway data from a singular tooth, whilst being as minimally destructive as possible.

6 UNRAVELLING HORMONAL HISTORIES: PRELIMINARY FINDINGS FROM A NOVEL METHOD TO DETECT REPRODUCTIVE HORMONES IN HUMAN REMAINS USING ENZYME IMMUNOASSAY ANALYSIS

Barlow, Aimee (University of Sheffield) - Hemer, Katie (University College London) - Craig-Atkins, Elizabeth (University of Sheffield)

To date, the only hormone that has been detected in human hard tissues is cortisol, using Enzyme-Linked Immunosorbent Assay (ELISA) analysis (Nejad and Jeong, 2016; Quade, Chazot and Gowland, 2021; Quade et al., 2023). However, other steroid hormones (e.g. progesterone) have been identified in the baleen plates, teeth, and tusks of marine mammals (e.g. Hunt et al., 2017; Hudson, Matthews and Watt, 2021), suggesting that it could be possible to detect reproductive hormones in human dental structures. If successfully detected in humans, the hormones oestrogen, progesterone and testosterone hold the potential to provide an insight into the fertility and reproductive histories of past populations, thus opening opportunities to further explore concepts such as the mother-infant nexus. Progesterone is of particular interest as it is a known biomarker of pregnancy, detectable in blood serum, hair, saliva, and urine. Currently, there are no standardised protocols for the preparation of teeth, bones and calculus for ELISA analysis. Furthermore, oestrogen, progesterone and testosterone have not previously been investigated in human hard tissues.

Here, we will present a novel method for the preparation of archaeological bone, dental calculus, dentine and enamel for ELISA analysis. This method enables the identification of multiple reproductive hormones. To investigate whether hormones could be used as a marker of pregnancy in skeletal remains, 10 individuals were analysed as part of this study; two females with in utero fetal remains, two females associated with fetal remains, alongside three males and three females (determined via aDNA analysis) who act as controls. Oestrogen, progesterone and testosterone were detectable in tooth structures and bone samples. In addition, progesterone and testosterone were detectable in dental calculus. This presentation will explore the preliminary results and interpretation of this multidisciplinary study, and discuss the challenges faced when conducting ELISA analysis on human bone and teeth.

7 'THE AGE OF WISDOM'. EXPLORING AGE-AT-MENARCHE IN WOMEN'S WISDOM TEETH: A TOOL FOR THE BIOARCHAEOLOGICAL STUDY OF FEMALE REPRODUCTIVE LIFE-HISTORIES

Gigante, Melania (Department of Cultural Heritage, University of Padua, Padua, Italy) - Cerrito, Paola (Department of Evolutionary Anthropology, University of Zürich, Zürich, Switzerland) - Bondioli, Luca (Department of Cultural Heritage, University of Padua, Padua, Italy); Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main, Germany; Frankfurt Isotope Element Research Center (FIERCE), Goethe Universität at Frankfurt, Frankfurt am Main, Germany; Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Modena, Italy) - Mahoney, Patrick (School of Anthropology and Conservation, University of Kent, Kent, United Kingdom) - Anczkiewicz, Robert (Institute of Geological Sciences, Polish Academy of Science Research Centre, Cracow, Poland) - Müller, Wolfgang (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main, Germany; Frankfurt Isotope Element Research Center (FIERCE), Goethe Universität at Frankfurt, Frankfurt am Main, Germany) - Nava, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy)

Compared to other primates, humans undergo a complex and longer period of postnatal maturation and growth. Postnatal ontogeny is divided into stages, each characterised by the attainment of peculiar physiological, cognitive, behavioural, and reproductive milestones.

Puberty is a crucial stage of growth, marking the onset of sexual maturity and adult social life. In girls, puberty is marked by the onset of menarche (i.e., first menstruation cycle), which represents a crucial milestone in women's reproductive life-history.

Age-at-menarche is determined by an interplay of genetic and environmental factors, as an adaptive response to maximise female reproduction opportunities. Variations in the age-at-menarche is a sensitive measure for assessing women's health, as well as for estimating the impact of both environmental changes and human behaviours on female reproductive life-history across space and time.

Although the secular trends of the age-at-menarche in women from contemporary societies are well-known, there are still significant gaps in our understanding of how female reproductive scheduling has changed in recent human evolution. Traditional bioarchaeological approaches to reconstructing puberty rely on skeletal and dental maturation, albeit with some limitations.

This contribution presents the preliminary results of the first multiproxy study on the wisdom teeth (i.e., the third permanent molars) for reconstructing the evolution of menarche in past skeletal populations. Using dental histology and LA-ICPMS (laser ablation inductively coupled plasma mass spectrometry), we identified variations in Sr/Ca and Ba/Ca elemental profiles at the onset of first menstruation in $n = 2$ contemporary women with known life-histories. The identification of these biochemical markers opens up an unexplored avenue for unravelling the timing of first menstruation in past human populations, which may contribute to the question of how current life-history trajectories evolved.

8 BLOOD OF MY BLOOD: MATERNAL HEALTH AND DIET INFERRED FROM HIGH-RESOLUTION HISTOLOGY-DRIVEN, BIOGEOCHEMICAL ANALYSIS OF PRENATAL DECIDUOUS TOOTH ENAMEL

Galbusera, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy; Department of Cultural Heritage: Archaeology and History of Art, Cinema and Music, University of Padua, Italy) - Higgins, Owen (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy; Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Lugli, Federico (Institut für Geowissenschaften Goethe-Universität, Frankfurt, Germany; Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Italy) - Anczkiewicz, Robert (Institute of Geological Sciences, Polish Academy of Sciences, research Centre in Kraków, Poland) - Coppa, Alfredo (Department of Environmental Biology, Sapienza University of Rome, Rome, Italy) - Benazzi, Stefano (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Bondioli, Luca (Department of Cultural Heritage: Archaeology and History of Art, Cinema and Music, University of Padua, Italy) - Müller, Wolfgang (Institut für Geowissenschaften Goethe-Universität, Frankfurt, Germany; Frankfurt Isotope and Element Research Centre (FIERCE), Goethe University Frankfurt, Germany) - Nava, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy)

Deciduous teeth start forming early during pregnancy and the enamel that develops during the intra-uterine period permanently records information encompassing the mother's dietary habits, environment and potential physiological stresses during pregnancy. Indeed, the study of human prenatal dental enamel provides a wealth of information about the early moments of the mother-infant dyad. However, despite the great potential offered by the study of prenatal enamel, this field remains under-explored.

The present work aims to investigate the diachronic evolution of the mother-infant dyad taking advantage of an integrated approach involving high-temporal resolution histological and biogeochemical analyses using laser-coupled mass spectrometry (LA-ICPMS) on the prenatal enamel of 41 deciduous teeth selected from contemporary ($n=13$) and modern ($n=15$) individuals with known life histories, as well as from archaeological contexts ($n=13$). Histological results report enamel growth trajectories and crown formation times, but also the timing of physiological stresses expressed in the enamel as Accentuated Lines. The combination of histological and biogeochemical analyses can detect changes in trace element patterns throughout the individual's gestational life. Strontium (Sr), Barium (Ba) and Magnesium (Mg) are used as proxies for maternal diet allowing the estimation of the mother's trophic level during the last months of pregnancy. Moreover, the presence of heavy metals such as lead (Pb) can provide information on the mother's potential exposure to pollutants and their incorporation by the foetus during gestation.

This work offers a novel and nuanced view of the mother-infant nexus, not limited to the development and health of the infant, but also inferring on the mother's life, health and diet during pregnancy, as derived from the infant's prenatal dental tissue.

9 A BLESSING OR A CURSE: USING LEAD CONTAMINATION TO SUPPLEMENT SR/CA AND BA/CA STUDIES OF ROMAN INFANT NURSING PRACTICES

Oldershaw, Leigh (The Ohio State University) - Lugli, Federico (Laboratory of Osteoarchaeology and Paleoanthropology (BONEs Lab), Department of Cultural Heritage, University of Bologna, Italy; Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Italy) - Sperduti, Alessandra (Museum of Civilizations, Bioarchaeology Service, Italy) - Coppa, Alfredo (Department of History, Anthropology, Religion, Arts and Performing Arts, Sapienza University of Rome, Rome, Italy) - Guatelli-Steinberg, Debbie (Department of Anthropology, The Ohio State University, United States) - Bondioli, Luca (Department of Cultural Heritage, University of Padua, Italy; Department of Cultural Heritage, University of Bologna, Italy) - Anczkiewicz, Robert (Geochronology and Isotope Geochemistry Laboratory Institute of Geological Sciences Polish Academy of Sciences, Kraków, Poland) - Nava, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Rome, Italy)

Bioarchaeological research provides vital information about infant health, breastfeeding, and weaning in past human populations. Recent examinations of Ancient Roman infant nursing practices have focused on using Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry (LA-ICP-MS) time-resolved analyses of Sr/Ca and Ba/Ca, in tandem with traditional histological methods, to reconstruct individual weaning timelines. Here, we introduce the novel use of lead to supplement Sr/Ca and Ba/Ca weaning profiles in 52 molars from 48 individuals from across Roman Italy dating from the 1st-5th centuries AD. Lead exposure in Roman communities has been extensively documented, with potential exposure routes for infants including the consumption of drinking water from lead pipes, tanks, and water containers, foods containing lead based preservatives and sweetening agents, wines, juices boiled in lead or pewter cauldrons (including the herbed grape juice syrup Sapa), drugs, and elixirs. Given the degree of lead pollution to which many Roman populations were exposed, lead provides a solid secondary means of identifying supplementation in the infant diet. Utilizing multiple sources of evidence for weaning behavior as shown here provides more reliable interpretations of infant nursing practices in the past.

10 TESTING ISOTOPIC AND ELEMENTAL APPROACHES TO DOCUMENTING NURSING BEHAVIOUR IN THE TEETH OF LIVING CHILDREN

Smith, Tanya (Griffith Centre for Social and Cultural Research, Griffith University, Australia; Australian Research Centre for Human Evolution, Griffith University, Australia) - Ávila, Janaína (Griffith Centre for Social and Cultural Research, Griffith University, Australia; School of the Environment, University of Queensland, Australia) - Arora, Manish (Department of Environmental Medicine and Public Health, Icahn School of Medicine at Mount Sinai, USA) - Austin, Christine (Department of Environmental Medicine and Public Health, Icahn School of Medicine at Mount Sinai, USA) - Sudron, Emma (Griffith Centre for Social and Cultural Research, Griffith University, Australia; Australian Research Centre for Human Evolution, Griffith University, Australia) - Wang, Yue (Research School of Earth Sciences, Australian National University, Australia) - Williams, Ian (Research School of Earth Sciences, Australian National University, Australia)

Scholars employ knowledge of tooth chemistry and development to document the weaning process in recent humans and fossil hominins. Nitrogen isotopes ($\delta^{15}\text{N}$) are the most widely used system. Conventional methods involve sampling dentine from sequential 1 mm thick sections; this produces an averaging effect where each section integrates months of formation. Similarly coarse studies of oxygen isotopes ($\delta^{18}\text{O}$) have also suggested a parallel oxygen-18 enrichment during nursing. Others have examined calcium-normalized barium (Ba/Ca) and strontium (Sr/Ca) distributions with laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS). Here we employed a Sensitive High Resolution Ion Microprobe (SHRIMP) to sample dentine $\delta^{15}\text{N}$ and enamel $\delta^{18}\text{O}$ values on a weekly-to monthly-basis along the developmental axis in M1s of two healthy children from Australia and New Zealand. We

also created comprehensive Ba/Ca and Sr/Ca maps with LA-ICP-MS. By relating sample positions to enamel growth lines, we identified the initiation of suckling at birth, as well as the ages of postnatal samples over more than three years. We found rapid postnatal dentine $\delta^{15}\text{N}$ increases of ~ 2 - 3 ‰ while the children were exclusively breastfed, followed by gradual declines as the frequency of breastfeeding decreased until weaning was complete. Enamel $\delta^{18}\text{O}$ values did not show a similar oxygen-18 enrichment during nursing, consistent with SHRIMP studies of nonhuman primates. Barium did not show an immediate postnatal increase, but rose after a few months until ~ 1 - 1.5 years of age, then fell until or shortly after the cessation of suckling, as expected. Strontium unexpectedly remained low beyond the period of exclusive suckling, eventually rising and remaining high long beyond the cessation of nursing. High-resolution $\delta^{15}\text{N}$ measurements minimize time averaging and can be precisely related to nursing histories. In buried teeth with poor collagen preservation, Ba/Ca distributions are the most promising alternative for estimating weaning ages.

11 GROWTH PATTERNS AND DEVELOPMENTAL TRAJECTORIES OF FIRST DECIDUOUS MOLARS: A MULTIDISCIPLINARY APPROACH COMBINING HISTOMORPHOMETRIC AND AMELOGENIN ANALYSES

Magri, Stefano (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Higgins, Owen (Department of Cultural Heritage, University of Bologna, Ravenna, Italy; Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Italy) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main, Germany; Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Modena, Italy) - Silvestrini, Sara (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Vazzana, Antonino (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Bondioli, Luca (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Italy) - Nava, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome, Italy) - Benazzi, Stefano (Department of Cultural Heritage, University of Bologna, Ravenna, Italy)

The pace and temporal patterns of dental tissue development provide significant insights into both individual and populational ontogenetic pathways and biological rhythms. The systematic, rhythmic, and appositional development of dental mineralized tissues enables direct quantification of individual growth rates and odontogenic patterns. A quantification that has largely been explored for permanent dentition but is still limited for the deciduous teeth. Additionally, the application of histomorphometric analysis in conjunction with enamel proteomics offers enhanced insight into potential diversification in developmental trajectories, allowing sex determination even in immature individuals.

This study combines results from histomorphometric and amelogenin analyses conducted on 34 first deciduous molars selected from the geographically proximate Early Medieval Italian necropolises of Casalmoro and Guidizzolo (Mantua, Italy). The findings reveal a notable consistency in the daily secretion rates of inner enamel across dental arches and sexes, and between the two necropolises, reflecting closely data from archaeological populations. However, a marked contrast was observed when comparing these rates with those of published modern populations. Additionally, initiation of enamel matrix deposition was found to occur earlier in maxillary first molars than in mandibular molars, with variations in crown formation times and ages at crown completion between dental arches. Notably, no significant sex-related differences were detected.

The collection of enamel developmental data enabled the development of a robust linear model, resulting in a regression formula specifically designed for pre-industrial populations. This formula facilitates the tailored reconstruction of odontogenic trajectories, even in cases where enamel microstructure may be partially obscured.

In conclusion, this methodological investigation significantly enhances our understanding of the growth and development of first deciduous molars, exploring potential differences between sexes and between two contemporaneous, neighbouring groups. These findings underscore the efficacy of an integrated approach, allowing a more nuanced comprehension of developmental processes in past populations.

12 TOOTH HISTOLOGY AND STABLE OXYGEN AND STRONTIUM ISOTOPE PROFILES TO RESOLVE A CLIMATE-STRESS-RELATIONSHIP OVER INDIVIDUAL HUMAN EARLY LIFE COURSES

Witzel, Carsten (Department of Biology, University of Hildesheim, Germany) - Fauth, Inga (Department of Biology, University of Hildesheim, Germany) - Wang, Yue (SHRIMP Facility, Research School of Earth Sciences, Australian National University, Canberra, Australia) - Williams, Ian (SHRIMP Facility, Research School of Earth Sciences, Australian National University, Canberra, Australia) - Knowles, Brett (ICP-MS Facility, Research School of Earth Sciences, Australian National University, Canberra, Australia) - Darabi, Hojjat (Institute of Archaeology, Razi University, Kermanshah, Iran) - Soltysiak, Arkadiusz (Department of Bioarchaeology, Faculty of Archaeology, University of Warsaw, Poland)

Hot and dry climate conditions will cause the preferential evaporative loss of ^{16}O in environmental water, food items, and the bodies of animals and humans. In the enamel of human tooth crowns several years of growth are recorded

and the analysis of incorporated stable oxygen isotope ratios ($\delta^{18}\text{O}$ ‰ VSMOW) allow for the assessment of such fluctuations in that high (or more positive) values account for dry seasons or periods. The high-resolution recording of $\delta^{18}\text{O}$ -values in enamel of sectioned teeth along the enamel-dentine junction enables the identification of successively occurring highs and lows. Establishing the chronology of crown formation by using incremental features in enamel will date these successions and an analysis of correspondence with developmental disturbances both on the macroscopic and microscopic scale could be performed.

We analysed human canines recovered from the Neolithic (7500-7200 cal. BC) site of Ali Kosh, Iran. Four teeth of different individuals, two of them exhibiting a pattern of multiple linear enamel hypoplasia (LEH) indicative of seasonal disturbances, were embedded and axiobuccolingually sectioned. Section surfaces were either prepared as microscopic thin sections or investigated in a Sensitive High-Resolution Ion Micro-Probe (SHRIMP) for their $\delta^{18}\text{O}$ -values. To exclude a modification in these values due to a change of the source of drinking water we will also measure sequential in situ profiles of $^{87}\text{Sr}/^{86}\text{Sr}$ values by mass spectrometry (LA-ICP-MS).

Measured $\delta^{18}\text{O}$ -values ranged between 16.01 and 23.22. Especially the teeth with consecutive LEHs exhibited up to 5 profile peaks. An in-depth analysis of the chronology of the sampling locations (resolve timing below a month) and areas of disturbed enamel formation will shed light on the affection of tooth formation of individual humans living through these fluctuations and thereby on the relationship between climate conditions and developmental stress.

13 HIGH SPATIAL RESOLUTION MEASUREMENTS OF SR ISOTOPES AND TRACE ELEMENT ABUNDANCE IN DENTAL TISSUES: IMPLICATIONS FOR MOBILITY AND SEASONALITY STUDIES

Anczkiewicz, Robert (Polish Academy of Sciences, Institute of Geological Sciences, Poland) - Nava, Alessia (Sapienza University of Rome, Italy) - Bondioli, Luca (University of Bologna, Ravenna, Italy) - Spötl, Christoph (University of Innsbruck, Austria) - Lugli, Federico (Goethe-Universität, Frankfurt, Germany) - Posth, Cosimo (University of Tübingen, Germany) - Müller, Wolfgang (Goethe-Universität, Frankfurt, Germany) - Dądela, Maria (Polish Academy of Sciences, Institute of Geological Sciences, Poland) - Koziarska, Marta (Polish Academy of Sciences, Institute of Geological Sciences, Poland)

Bio-apatite, the main skeleton-forming compound, assimilates via food and water a wide range of trace elements whose abundance and isotopic composition reflect in vivo processes. Although there is little doubt about dental enamel being the most resilient to post-depositional changes tissue, sampling strategies and analytical approaches are debatable. Considering the prolonged time of mineralization of dental tissues, high spatial resolution techniques became methods of choice. Among them, laser ablation coupled with single and/or multi-collector inductively coupled plasma mass spectrometers (LA (MC)-ICP-MS), permitting simultaneous measurements of a wide range of elements and precise analyses of Sr isotope composition, belong to the most commonly used. In this study, we combined histomorphometry with LA (MC) ICP-MS to select the optimal sampling side in dental tissues. Using matrix-matched standardization, we evaluated the precision and accuracy of Sr isotope composition and trace element concentration measurements. Furthermore, we tested the effect of maturation on obliterating the earliest, secretion stage, biogenic signature and evaluated the reliability of trophic level indicators. Supporting trace element abundance measurements with high spatial resolution Sr and O isotope composition determination, we verified trace element usability for seasonality studies. We showcase the established methodology by studying woolly mammoth mobility patterns in Central and Eastern Europe throughout the Upper Palaeolithic.

14 A MULTI-PROXY ANALYSIS OF LIFE AND DEATH HISTORIES AT MAYA ARCHAEOLOGICAL SITES: INTRODUCING THE ISO-HISTOLOGICAL APPROACH

Rand, Asta (School of History, Archaeology and Religion, Cardiff University) - Madgwick, Richard (School of History, Archaeology and Religion, Cardiff University)

The reconstruction of individual life histories has a long tenure in prehispanic Maya archaeology. This research now regularly incorporates the analysis of strontium, carbon, nitrogen and most recently sulfur isotopes that contribute nuanced understandings of Maya subsistence practices and migration processes. While such studies have built a better understanding of prehispanic Maya lived experiences, especially when combined with osteological data, the cultural and taphonomic processes that occurred after death have received less attention. This may be because Maya mortuary behaviours were complex, ranging from immediate burial, to bundling, excarnation, exhumation, display, and curation of human bodies or their parts, depending on what the deceased represented to the living. These past behaviours have a direct impact on the interpretation of isotopic data from human skeletal remains as well as the degree to which they have been impacted by diagenesis. While diagenetically altered samples are typically discarded because they cannot speak to an individual's life history, their isotopic data may offer the key to reconstructing their death histories. Here, we present a multi-proxy framework that combines histology and multiple isotope analyses into an iso-histological approach for understanding not only the life histories of Maya individuals, but also what happened to their bodies after death. The results will provide important insights into prehispanic Maya mortuary behaviour and help

to refine understandings of Maya subsistence and migration, while demonstrating how the iso-histological method may be applied more broadly in other archaeological and forensic contexts.

15 LIFE HISTORY RECONSTRUCTIONS OF ENSLAVED AFRICANS IN CARIBBEAN COLONIAL CONTEXTS

Laffoon, Jason (Leiden University)

Isotope analysis has proven highly effective owing to the fact that it can provide direct evidence of individual behaviors and thereby permits investigations of inter-individual differences. Traditional isotope paleodiet studies have generally relied on a single bone sample per individual to make inferences about long-term (years to decades) average dietary intake at the end of an individual's life (usually of adults). More recently, there has been increasing research interest in using serial sampling of incrementally growing tooth dentine as it allows for the study of dietary change at much higher temporal resolution (months). Additionally, isotope studies of paleomobility have also become commonly employed and effective tools for investigating human and animal mobility patterns and. Multiple isotope studies of human dental enamel coupled with better understanding of spatial isotopic variation permit more reliable identification of nonlocal migrants and improved assessments of geographic origins. This paper presents the preliminary results of an ongoing project utilizing multiple isotope analyses of dental enamel and incrementally sampled dentine of individuals from enslaved contexts in the Caribbean region. These include the identification of a very high proportion of first generation migrants; indications of extremely diverse origins, assessments of the age of migration, and reconstructions of migration-related dietary change. The paper also explores some of the major limitations of such studies to date, including the limited precision of geographic provenance assignments and problems linking isotope values to specific ages within an individual lifetime.

16 SCORCHING THE SURFACE: CREATING MORE NUANCED LIFE MOBILITY HISTORIES OF THE CREMATED DEAD

Loeffelmann, Tessi (Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium; Department of Archaeology, Durham University, South Road, Durham, DH1 3LE, UK) - Snoeck, Christophe (Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium) - Claeys, Philippe (Archaeology, Environmental Changes & Geo-Chemistry, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium) - Montgomery, Janet (Department of Archaeology, Durham University, South Road, Durham, DH1 3LE, UK)

Strontium isotopes ($^{87}\text{Sr}/^{86}\text{Sr}$) and concentrations ($[\text{Sr}]$) are a useful proxy to investigate the mobility of individuals from a wealth of archaeological contexts. From bedrock lithologies, strontium weathers into overlying soils and water, and is taken up by plants. The element is then integrated into skeletal tissues of those animals and humans who are eating these plants or drinking the water. This process enables bioarchaeologists to look at whether people moved during or after childhood (tooth enamel). More recently, the method has been developed to include the analysis of cremated bone, which, when fully calcined, is resistant to diagenetic exchanges with the soil. This has led to a wealth of new isotope data, covering many archaeological periods and locations.

At the same time, the use of cremated bone for strontium isotope analysis requires a specific repertoire of knowledge which takes into account other challenges than those that apply to uncremated remains. This includes knowledge of bone remodelling mechanisms which are tied to many factors, such as age, sex, and the health status of the individual. In order to move away from very generalised interpretations of strontium data, these factors should be considered where possible and integrated into the life-history reconstruction of cremated individuals. This presentation uses $^{87}\text{Sr}/^{86}\text{Sr}$ and $[\text{Sr}]$ data from different skeletal elements (otic capsule, femur, tibia, rib, and cranium), in conjunction with information from the osteological analysis of 54 individuals from the early medieval cremation cemetery at Cleatham (Lincolnshire, UK), to highlight how individual mobility histories can be explored in a more nuanced way.

17 ISOTOPES AND PEPTIDES. THE MULTI-DISCIPLINARY STUDY OF THE MIDDLE IRON AGE NECROPOLIS OF CUS-PIOVEGO, PADUA, ITALY

Capasso, Giusy (Department of Cultural Heritage, University of Padova, Italy) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt am Main, Germany; Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Italy) - Armadori, Elena (Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Italy) - Cipriani, Anna (Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Italy) - Madgwick, Richard (School of History, Archaeology and Religion, Cardiff University, UK) - Prillo, Vito (Department of Cultural Heritage, University of Padova, Italy) - Gigante, Melania (Department of Cultural Heritage, University of Padova, Italy) - Bondioli, Luca (Department of Cultural Heritage, University of Bologna, Ravenna, Italy; Department of Cultural Heritage, University of Padova, Italy) - Vidale, Massimo (Department of Cultural Heritage, University of Padova, Italy) - Cupitò, Michele (Department of Cultural Heritage, University of Padova, Italy)

Since the end of the 19th century, the phenomenon of bi-ritualism in Iron Age Veneto has been the subject of considerable interest. Although cremation was the predominant burial practice, a considerable number of inhumations are also attested. Significant differences between inhumation and cremation burials, such as the almost exclusive association of wealthy grave goods with cremations - whereas these are very simple or absent in inhumations - have led to the hypothesis that inhumation rites might have been reserved for individuals of low social status or different origin. The CUS-Piovego necropolis (half of the 6th century B.C. - first half of the 4th century B.C.) is the largest bi-ritual necropolis in pre-Roman Padua. The integration of archaeological, osteological, isotopic, and palaeoproteomic data provides new insights into the individual life histories of individuals buried at the site.

Amelogenin analysis of dental enamel of $n=19$ inhumed individuals confirmed osteological sex estimates in 100% of cases while assessing the sex in subadults.

$^{87}\text{Sr}/^{86}\text{Sr}$ isotope analysis performed on M1 tooth enamel of $n=22$ inhumed individuals and petrous bone of $n=45$ cremated individuals identifies 19.4% of individuals as 'non-local' ($n=13$), with a higher prevalence in inhumations ($n=8$, 36.4% vs. $n=5$ cremations, 11.1%). The integration of $^{87}\text{Sr}/^{86}\text{Sr}$ and $\delta^{18}\text{O}$ isotope data characterises the Alpine region as the most likely area of origin for non-locals. The $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ isotope analysis of rib bones of $n=19$ inhumed individuals reveals a relatively poor diet, primarily consisting of C3 and C4 cereals.

The higher prevalence of non-locals and the evidence of poor diet and trauma in some of the inhumed individuals suggest that these might have pertained to a lower status.

Through a multi-proxy approach to the study of ancient human societies, this research provides a deeper understanding of social structures and mobility dynamics in Middle Iron Age Veneto.

18 VIRTUAL BONE HISTOLOGY FOR THE ASSESSMENT OF LIFE HISTORY: A MULTIMODAL APPROACH FOR THE CHARACTERISATION OF KRAPINA NEANDERTHAL SKELETAL MICROSTRUCTURE

Lemmers, Simone (Elettra Sincrotrone Trieste S.C.p.A.; Harvard Medical School; Center for Genomic Medicine, Massachusetts General Hospital) - Nava, Alessia (Department of Odontostomatological and Maxillofacial Sciences, Sapienza University of Rome) - Bondioli, Luca (Department of Cultural Heritage, University of Padua) - Radovic, Davorka (Croatian Natural History Museum) - Mahoney, Patrick (School of Anthropology and Conservation, University of Kent) - Mancini, Lucia (Slovenian National Building and Civil Engineering Institute (ZAG)) - Drossi, Diego (Elettra Sincrotrone Trieste S.C.p.A)

Human bone microstructure preserves information on an individual's growth, life history variables, age-at-death estimation, diet, pathologies, and activity patterns. Therefore, it is extremely valuable in archaeological contexts, preserving information through deep time. Although conventional palaeohistology requires sectioning of bone specimens for microstructure assessment, virtual histology, using synchrotron X-ray computed microtomography (μCT), allows non-destructive analysis, opening opportunities for assessing precious materials, including those of early Homo. However, bone microstructure analysis can be severely hampered due to varying levels of diagenesis, which can lead to microstructure destruction and challenge performing successful μCT imaging. In this contribution, we discuss the first results of the virtual bone histological analysis of an important set of Neanderthal skeletal remains from the site of Krapina (Croatia, ca 130 ka), obtained at the Elettra synchrotron in Trieste (Italy). We present a multimodal approach, using lab-based and synchrotron X-ray μCT for the analysis of Krapina long bones and ribs. We also provide preliminary results of complementary techniques (FTIR and XRD) on faunal remains from the same contexts, allowing us to comment on the preservation status of the material, mineralisation levels, and the quality of the data obtained. We then proceed to discuss the opportunities and limitations of using virtual bone histology for life history reconstruction in the context of human evolution. Although paleo-bone histology has been successfully incorporated into the evolutionary study of other vertebrate groups, examining bone microstructure to decipher ontogenetic patterns,

maturational timing, and physical activity has rarely been employed in the study of the evolution of our own, human, lineage. Therefore, this presentation is meant as a discussion on how we can bring this field forward, drawing lessons from the Krapina collection, outlining the next steps of life history analysis, and suggesting possible applications to future collections for the study of human life history evolution.

19 SEX ESTIMATION AND PHYLOGENETIC CHARACTERIZATION OF PLEISTOCENE FAUNAL ENAMEL

Parker, Glendon (University of California - Davis, USA) - Egeuz, Natalia (University of California - Davis, USA; Universidad de La Laguna, Spain) - Burk, Kyle (University of California - Davis, USA) - Buonasera, Tammy (University of Alaska - Fairbanks) - Eerkens, Jelmer (University of California - Davis) - Morales, Jessica (University of California - Davis) - Eubanks, Jill (University of California - Davis) - Stafford, Thomas (Stafford Research LLC) - McDonald, Greg (retired) - Spicer, Ashley (California Department for Fish and Wildlife)

Hominin hunting practices comprise a dynamic interplay of human behavior, ecological availability and resource optimization. Deconvolution of these factors often depends on using fragmentary skeletal material to identify the species and sex of hunted animals. Here we report that fragmentary enamel can be processed to detect amelogenin peptides that are Y- and X-chromosome biomarkers, which can be detected through proteomic mass spectrometry. Initially developed for human sex estimation, the analysis can also be applied to faunal species. Sex chromosome-specific markers have been identified and characterized for a range of relevant prey species and carnivores. A precondition of proteomic mass spectrometry is that accurate protein amino acid sequences are elucidated for use in reference proteomes. Currently, faunal amelogenin sequences are inaccurate, poorly annotated, and incomplete. The authors, therefore, conducted a systematic bioinformatic analysis of the X- and Y-chromosome amelogenin sequences of respective species. These sequences were used in conjunction with sample processing and proteomic mass spectrometry methods developed for human proteomic sex estimation. Sex estimation was successfully conducted on faunal enamel (20 mg) from Pleistocene contexts: *Bison cf. priscus*, *Bos primigenius* (Auroch), *Canis lupus* (Wolf), *Ursus spelaeus* (European cave bear), *Mammuthus primigenius* (Woolly Mammoth), and *Mammuth americanus* (American Mastodon). Sex estimation was also conducted on modern exemplar species: *Bison bonasus* (European bison), *Bos taurus*, *Canis lupus familiaris*, *Ursus arctos arctos*, and *Odocoileus hemionus californicus*. In this study, data were obtained across a 400,000 year time frame. The analysis also provides phylogenetic information, to at least the taxonomic level of Family. This approach also makes it possible to determine the sex of mammalian taxa that are not obviously morphologically sexually dimorphic. In this way, information from enamel fragments contributes to a deeper understanding of prey selection and the complex interactions between human hunters and their environment.

20 SEASONALITY OF RED DEER (*C. ELAPHUS*) REVISITED USING TOOTH CEMENTUM ANNULATION AND ELEMENTAL ANALYSIS BY FIELD-EMISSION SEM-EDS

Boric, Dusan (Department of Environmental Biology, Sapienza University of Rome; Department of Anthropology, New York University) - Peripoli, Beatrice (Sapienza University of Rome) - Cristiani, Emanuela (Sapienza University of Rome) - Csorba, Gabor (Hungarian Natural History Museum) - Dimitrijevic, Vesna (Laboratory for Bioarchaeology, Faculty of Philosophy, University of Belgrade) - Hu, Bin (Department of Molecular Pathobiology, New York University College of Dentistry) - Bromage, Timothy (Department of Molecular Pathobiology, New York University College of Dentistry, New York, NY; Department of Anthropology, New York University; New York Consortium in Evolutionary Primatology) - Cerrito, Paola (Collegium Helveticum, ETH, Zürich)

Reliable means of determining the season-at-death in living organisms has for some time been important in fields as diverse as wildlife management and zooarchaeology. In this contribution, we focus on the study of tooth cementum annulation (TCA) in modern and subfossil specimens of red deer *Cervus elaphus*. Histological thin sections were prepared for 15 teeth from 14 modern male and female red deer individuals with known season-at-death found in different locations in the Carpathian Basin region of Hungary. We also analyzed 13 archaeological red deer teeth from Mesolithic (9600–6000 cal BCE) and Early Neolithic (6000–5500 cal BCE) layers of the sites of Lepenski Vir and Padina in the Danube Gorges region of Serbia. Environmental and climatic conditions, including seasonal variations and other external physiological stressors, are similar between the two study areas, making these two populations comparable. Transmitted light microscopy observations were used to estimate both age-at-death and season-at-death for all specimens. We find high inter-observer correspondence when estimating age-at-death but poor visibility of the outer edge of cementum and inter-observer correspondence when estimating season-at-death. We employed field-emission scanning electron microscopy and energy-dispersive X-ray (SEM-EDS) analysis on the same specimens to measure the relative concentrations of silicon, oxygen, phosphorus, calcium, sodium, magnesium, potassium, sulfur, and zinc. Elemental analyses indicate that seasonality is present in all teeth and all elements except for four elements in one specimen. To make predictions about season-at-death we used a machine-learning supervised classification algorithm known as random forest. We find 34.8% error rate in predicting season-at-death using

a four-season (fall-winter-spring-summer) classifier and significantly improved 1.7% error rate in predicting it using a two-season (summer-winter) classifier.

21 ANIMAL LIFE HISTORIES AND THE ECONOMY OF AN EARLY NURAGHE: ZOOARCHAEOLOGY AND ISOTOPE ANALYSIS AT SA CONCA 'E SA CRESIA

Holt, Emily (Cardiff University) - Madgwick, Richard (Cardiff University)

Understanding the animal economy of the early Nuragic Culture is an essential component of reconstructing the culture's socioeconomic foundations. The site of Sa Conca 'e sa Cresia, an archaic nuraghe (c. 1750-1300 BCE) located on the Siddi Plateau in the Marmilla region of south-central Sardinia, provides an opportunity to investigate how animals were raised, transported, and consumed at an early Nuragic settlement. Ongoing excavations at Sa Conca 'e sa Cresia have recovered thousands of faunal remains that are the subject of the research project ZANBA: ZooArchaeology of the Nuragic Bronze Age. ZANBA combines morphological analysis of Sa Conca 'e sa Cresia's faunal assemblage with carbon, nitrogen, and strontium analysis of domesticated animal remains to assess hunting, animal husbandry, and patterns of mobility at the site. The results from ZANBA contribute to new understandings of the changing economic strategies practiced at an early Nuragic site, as well as their relationship to the growth of power at the site.

22 UNDERSTANDING ANIMAL LIFE HISTORIES AND BIOCULTURAL ADAPTATIONS TO CHALLENGING ENVIRONMENTS THROUGH MULTI-ISOTOPE ANALYSIS OF NEONATAL FAUNAL REMAINS

Jones, Jennifer (University of Central Lancashire; Evoadapta Research Group, University of Cantabria) - Mulville, Jacqui (Cardiff University)

Neonatal animals are frequently neglected in stable isotope archaeological research as they can skew baselines and mask trends due to the nursing effect. However, the application of stable isotope analysis of neonatal animals can be an invaluable tool to investigate the mothers of the neonatal animals when they were in utero, informing on how pregnant animals were treated during their gestation. This can help to establish individual life histories of animals, as well as biocultural adaptations in the management of domestic stock.

In the Outer Hebrides, on the West Coast of Scotland, UK, in the Bronze Age, Iron Age and Norse periods the zooarchaeological assemblages are characterised by large numbers of neonatal and infant animal remains (up to 20%). Discussions centre on whether this is due to poor management strategies and insufficient fodder provision in these challenging environments, or deliberate culling linked to resource management or milking strategies.

Here 91 cattle and sheep bone collagen specimens (aged between foetal up to 3 months) from the sites of Cladh Hallan and Bornais, dating from Bronze Age, Iron Age and Norse period are analysed for $\delta^{13}C$, $\delta^{15}N$ and $\delta^{34}S$. Results show that individual diet of sheep was highly varied, with some individuals having access to seaweed in pregnancy and others not, suggesting less formal stock management. Clear differences in $\delta^{15}N$ between nursing animals and foetal animals informs on the relationship between parents and offspring. Cattle results suggest that they were consistently provided with terrestrial fodder, supporting the hypothesis that they were being carefully managed for milking.

The stable isotope analysis of juvenile and neonatal animal bone collagen helps to provide an holistic understanding of pastoral strategies in the past, informing on the life stories of individual animals as well as wider herd management.

23 STABLE ISOTOPE ANALYSES OF CATTLE TEETH FROM A NEOLITHIC EARTHWORK IN LOWER SAXONY, GERMANY: INSIGHTS INTO BIRTHING SEASONS AND MOBILITY

Knipper, Corina (Curt Engelhorn Center Archaeometry, Mannheim) - Geschwinde, Michael (Independent researcher) - Grefen-Peters, Silke (ossatura.de)

Monumental earthworks are prominent archaeological sites of the central European younger Neolithic. A center of their distribution are the northern German lowlands northwest of the Harz Mountains in Lower Saxony. Aerial prospections revealed over 30 of these sites. They consist of ditches of at least 1500 m length, which encircle areas of seven hectares and more and date to between ca. 4100 and 3400 cal. BC. Extensive collections of faunal remains recovered from the ditches of the earthworks provide evidence for slaughtering livestock and point to a function of the sites in a possibly mobile system of animal husbandry. Oxygen and strontium isotope analyses on serially sampled cattle teeth are well-established approaches to explore herding in geologically different landscapes and linking it to the seasonal cycle. These methods are currently applied to cattle teeth from the site of Niedersickte. So-called "re-cuttings" into pre-existing ditches of this Younger Neolithic earthwork revealed numerous faunal remains. The presentation will introduce stable isotope data of 18 well-selected cattle teeth, representing different animal individuals. Indication of opposing birthing seasons implies varying availability of meat and dairy products over the year.

Moreover, linking strontium isotope data to enamel formation in summer or in winter provides the basis for discussing the role of seasonal mobility of the herds.

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TRACKING ARCHAEOLOGICAL SHEEP BREED DIVERSITY IN SOUTHWEST ASIA IN PALEOPROTEOMIC

Vuillien, Manon (Université Côte d'Azur, CEPAM, CNRS, Nice; AASPE, Muséum national d'Histoire naturelle, CNRS, Paris) - Bray, Fabrice (MSAP - Université de Lille, CNRS, USR3290) - Chahoud, Jwana (Archéorient, CNRS, University of Lyon 2; Department of Archaeology, Lebanese University) - Davoudi, Hossein (Bioarchaeology Laboratory, Central Laboratory, University of Tehran) - Fathi, Homa (Bioarchaeology Laboratory, Central Laboratory, University of Tehran) - Berthon, Rémi (AASPE, Muséum national d'Histoire naturelle, CNRS, Paris) - Al Besso, Moussab (Archéorient, CNRS, University of Lyon 2) - Mashkour, Marjan (AASPE, Muséum national d'Histoire naturelle, CNRS, Paris; Bioarchaeology Laboratory, Central Laboratory, University of Tehran) - Vila, Emmanuelle (Archéorient, CNRS, University of Lyon 2)

In the framework of the ANR EvoSheep project an exploratory study in paleoproteomics was carried out on wild and domestic sheep and goat bones from 14 Neolithic to Late Bronze Age sites distributed from Northern Levant to Eastern Iranian Plateau. The objectives were 1) to quantify the preservation degree of peptide chains contained in the COLA1 and COLA2 to confirm and complete the taxonomic identifications for geometric morphometrics analyses 2) to study the amino acid mutations sequences in the specific peptide chains and their evolution over time, from the wild ancestor to the first sheep breeds. This work is based on 70 samples, of which 66 correspond to archaeological specimens and 3 to modern species. Between 1 and 5 mg of bone powder was collected and treated according to the preparation protocol recently published by F. Bray and his team. Identifications were realized by MALDI-FTICR and LC-MS/MS.

MALDI-FTICR analysis identified collagen in 100% of the samples, validated and completed taxonomic identifications. The results correlated with 97% of the archaeozoologists identifications. Collagen quality was measured using the percentage of glutamine deamidation in modern (1.6% +/- 0.5%) and ancient (11% +/- 2.4%) samples. The results highlight a very good preservation of collagen in archaeological bones despite taphonomic conditions of burial, storage and handling. Archaeological sites climatic and environmental conditions did not have significant impact of deamidation value. The LC-MS/MS analyses performed identified more than 70% of the type I collagen sequence. Post-translational modifications were observed such as hydroxylations, acetylations but no mutation has been observed at this stage, but future investigations must be conducted to confirm this observation.

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TRACKING THE LIFE HISTORY THROUGH THE MICROARCHITECTURE OF THE HUMAN BONE

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Figus, Carla (Department of Cultural Heritage, University of Bologna, Ravenna Campus, Italy) - Colombo, Antony (Department of Life and Earth Sciences, Ecole Pratique des Hautes Etudes (EPHE) - Paris Sciences & Lettres Université (PSL) University, Paris, France; Unité Mixte de Recherche (UMR) 6034 Archéosciences Bordeaux, Centre national de la recherche scientifique (CNRS) - Université Bordeaux-Montaigne, Pessac, France) - Saers, Jaap (Naturalis Biodiversity Center, Vertebrate Evolution, Development, and Ecology, The Netherlands)

Session format: Regular session

Both cortical and trabecular bone microarchitectural studies play a crucial role when investigating developmental changes and behaviors from the first hominin species to the modern human populations. Trabecular bone, thanks to its rapid functional adaptation through efficient bone remodeling, has been proven useful in biological anthropology to better understand locomotor and manipulative behaviors, able to provide insights into patterns of physical activity and infer health conditions and processes as well as their modifications through the different stages of life.

On the other hand, the cortical bone, with its dense structure, is essential for understanding long-term loading and behaviors. Analyzing cortical bone can reveal adaptations to specific behaviors, helping to identify patterns of repetitive stress or strain on bones, and shedding light on activities like tool use, agriculture, or hunting.

In light of innovations in medical and 3D imaging, and advances in artificial intelligence for image processing, confronting or combining both trabecular bone and cortical bone studies - in addition to the classical bone external morphological analysis - offers a comprehensive approach to unraveling the complex interplay of biology and culture in human evolution and behavior. It is one of the very promising ways to better understand ontogeny, environmental adaptations, and cultural impact, and reconstruct behaviors and health in the past.

This session aims to bring together trabecular and cortical studies from different historical, geographical, and cultural backgrounds, promoting these works and the interaction among different research groups, with the purpose of fostering the exchange of ideas and knowledge.

ABSTRACTS

1 SKELETAL DEVELOPMENT PROVIDES NEW TOOLS TO RECONSTRUCT THE EVOLUTION OF HOMININ LOCOMOTION AND LIFE HISTORY

Saers, Jaap (Naturalis Biodiversity Center)

Modern human locomotion and its development are unique among the apes. Humans are bipedal, fully terrestrial, and develop slowly (altricial). The other apes are arboreal to varying extents and develop much quicker (precocial). It is likely that early hominins followed an ape-like developmental trajectory, with a mixed arboreal and terrestrial repertoire and precocial locomotor development. Investigating the nature of hominin locomotion and its development throughout hominin evolution requires reliable developmentally plastic traits that are responsive to locomotor loading and can be identified in the fossil record. Extant great apes provide a natural experiment to examine the relationship between age-related variation locomotor activities and bone structure: humans are fully terrestrial bipeds, chimpanzees and gorillas are highly arboreal as subadults and transition to terrestrial knuckle walking during ontogeny, finally, orangutans and gibbons remain predominantly arboreal throughout life.

In this paper I compare the development of bone structure in the ankle and shoulder of these five ape genera with varying locomotor repertoires and developmental trajectories. The objectives are 1) to determine if skeletal ontogeny reflects behavioural variation in arboreal locomotion among taxa, and 2) to test a previously proposed model where primate skeletal ontogeny was found to be strongly associated with brain development.

Results indicate a strong correspondence between age-related variation in locomotor repertoire and bone structure in extant apes. Developmental trajectories additionally correlate with brain development, further supporting the neuromuscular maturation model of bone development. Findings therefore suggest that analyses of hominin skeletal ontogeny can provide new insights into the evolution of two characteristic human traits: our slow rate of maturation and the evolution of fully terrestrial bipedalism.

2 INSIGHTS FROM THE TRABECULAR DEVELOPMENT OF THE JUVENILE HUMAN DISTAL TIBIA AND TALUS

Reid, Rebecca (Centre for Anatomy and Human Identification, University of Dundee) - Davies, Catriona (Centre for Anatomy and Human Identification, University of Dundee) - Cunningham, Craig (Centre for Anatomy and Human Identification, University of Dundee)

It is postulated that early trabecular form is under genetic control whilst skeletal loading drives changes in the post-natal skeleton. However, it remains unclear how factors such as vascularisation and ossification patterns influence the development of trabecular bone. By comparing two anatomically different bones that share similar locomotive demands, this study aims to investigate how developmental and biomechanical factors interact.

Forty-one tali and 69 distal tibiae from the Scheuer Collection, ranging from 28 intrauterine weeks to 8 postnatal years were microcomputed tomography scanned. Scaled volumes of interest (VOIs) were placed within the distal tibia and talus. Within each VOI, degree of anisotropy (DA), bone volume fraction (BV/TV), and trabecular thickness, trabecular separation, and trabecular number were quantified. VOIs were compared using Kruskal-Wallis H tests to assess trabecular heterogeneity at different stages of development. Mann Whitney-U tests and Independent T-tests were used to compare trabecular parameters between pairs of articulating distal tibia and talus. Additionally, bone volume fraction and anisotropy vector fields were mapped.

All trabecular parameters, except DA, shared a developmental trajectory within the distal tibia and talus. Both bones exhibit rapid accumulation of bone mass during the fetal period, followed by a reduction in BV/TV during the first year of life. Structural heterogeneity then increases as each bone adapts to the acquisition and maturation of the bipedal gait. Prior to the onset of the bipedal gait, it is postulated the talus is more isotropic than the tibia due to differences in ossification and vascular patterns. Once the bipedal gait has developed, the transmission of weight-bearing forces likely results in differences in DA.

Overall, this research provides insight into how trabecular bone responds to developmental and biomechanical factors during the early stages of life.

3 CORTICAL AND TRABECULAR BONE RESPONSE TO BIPEDALISM IN AN EXPERIMENTAL RAT MODEL

Campillo, America (Department of Anthropology, Pennsylvania State University) - Kuo, Sharon (Department of Biomedical Sciences, University of Minnesota Duluth; Technological Primates Research Group, Max Planck Institute for Evolutionary Anthropology) - Foster, Adam (Department of Anatomy, School of Osteopathic Medicine, Campbell University) - Ryan, Timothy (Department of Anthropology, Pennsylvania State University)

Combining cortical and trabecular bone analyses is useful to address questions regarding human evolution and behavior, specifically behaviors related to the evolution of human bipedalism. However, when using archaeological or fossil remains, it is difficult to directly relate cortical and trabecular bone structure to specific aspects of locomotion (activity level vs posture). This study provides the unique opportunity to use an experimental rodent model, which induced bipedal gait using a treadmill-mounted harness system, to assess the response of cortical and trabecular bone to locomotor and postural forces. For 12 weeks, rats walked on a treadmill with different locomotor modes and split into five groups: fully-loaded bipedal walking, partially-loaded bipedal walking, bipedal standing, quadrupedal walking, and no-exercise controls (n=70, 14/group). Cortical and trabecular bone structure was analyzed in the femur using μ CT. Cortical bone cross sectional geometric properties were quantified at 10% increments along the diaphysis and trabecular bone volume fraction (BV/TV), degree of anisotropy (DA), and trabecular thickness (Tb.Th.) were quantified in the distal femur. Femoral cortical bone exhibits an anteroposterior flattening in the distal diaphysis of the activity groups compared to the control group ($p < 0.05$). Trabecular BV/TV is higher in the medial condyle of the bipedal groups than the quadrupedal and control groups, suggesting skeletal adaptation to bipedal gait. The quadrupedal group has higher DA throughout the epiphysis compared to the bipedal and control groups, suggesting less variability in locomotor posture. Bipedal groups have higher Tb.Th. than the quadrupedal and control groups. This study shows that cortical bone is sensitive to changes in locomotor activity level, while trabecular bone is responsive to changes in both locomotor posture and activity. These results are useful for reconstructing locomotor and postural behavior in skeletal remains.

4 RE-STRUCTURING OF CORTICAL BONE AT THE FEMORAL MIDSECTION DURING EARLY GROWTH AND LOCOMOTOR DEVELOPMENT OF CHILDREN

Swan, Karen (Natural History Museum, London) - Ives, Rachel (Natural History Museum, London) - Humphrey, Louise (Natural History Museum, London)

Cortical bone structure changes throughout life via the modelling and remodelling of the internal and external bone surfaces. The amount and distribution of cortical bone within a diaphyseal cross-section is influenced by mechanical, hormonal and metabolic factors and can have important mechanical implications in terms of bone strength and resistance to bending. As humans are an altricial species, they are not born with the ability to locomote independently. The first few years are characterized by a wide range of postural and locomotor behaviours, which vary in the nature and frequency of loading, and coincide with increasing body mass and skeletal growth. Here we use micro-CT scanning to visualize and quantify changes in cortical bone structure at the femoral midsection and consider the mechanical implications of these changes during this highly complex and physiologically demanding life stage. The sample comprised femora from 89 individuals from 18th and 19th century London aged from birth to 8.5 years. Femora were virtually aligned to a common anatomical plane and cross-sections were extracted at 50% of maximum intermetaphyseal length. Outlines of the sub-periosteal and endocortical border were used to measure cross-sectional shape, relative medullary area and intracortical porosity area. Relative medullary area decreased markedly between birth and 6 months representing a displacement of bone material further from the neutral axis, which creates a more mechanically advantageous structure by the time infants typically start loading their lower limbs. A transient period of increased intracortical porosity was documented during infancy which was shown to rebound at about the age of 1 year when children typically start to walk independently. Cross-sectional shape varied throughout the age range reflecting the direction of loading associated with gait maturation. These results collectively illustrate a complex interplay of mechanical and non-mechanical factors during growth during and the transition to bipedality.

5 DEVELOPING DURING THE YOUNGER DRYAS: INSIGHTS INTO GROWTH PATTERNS OF HUNTER-GATHERERS FROM ITALY

Ciappi, Giorgia (Department of Biology, University of Florence, Italy) - Dori, Irene (Department of Biology, University of Florence, Italy) - Mori, Tommaso (Department of Biology, University of Florence, Italy; University Museum System, Anthropology and Ethnology Section, University of Florence, Italy) - Riga, Alessandro (Department of Biology, University of Florence, Italy) - Moggi-Cecchi, Jacopo (Department of Biology, University of Florence, Italy) - Sparacello, Vitale (Department of Life and Environmental Sciences, University of Cagliari, Italy)

European foragers during the cold phases of the Late Pleistocene had to adapt, biologically and culturally, to rapid climatic fluctuations and harsh environmental conditions. Upper Palaeolithic (UP) people show low genetic diversity and

small effective population sizes, and their funerary behaviours seem to emphasize “exceptional people and exceptional events”, such as disease (often congenital) and violent deaths, which could jeopardize the survival of small bands of hunter-gatherers. The apparent selection of the individuals to whom the formal burial was accorded renders difficult the reconstruction of the general health status and developmental patterns of UP people. The Epigravettian skeletal series from Arene Candide (Liguria, Italy ca. 12,900-11,600 cal BP), with more than 20 individuals of various age classes buried during the Younger Dryas cooling event, provides a unique opportunity to explore the interplay between environmental conditions and cultural factors on the paleobiology of the last Pleistocene foragers.

Individuals undergoing developmental stress due to environmental insults exhibit slower rates of growth, delayed maturation, prolonged growth, and smaller final adult size. We compared the proportion of mean adult size (femoral bone length and cross-sectional total area at midshaft) attained during growth in seven children/adolescents from Arene Candide, whose age-at-death was independently estimated from dental development. These growth patterns were compared with a modern healthy sample (the Denver Growth Study). All children from Arene Candide between the age of 1 and 6 years show growth faltering when compared to the DGS, suggesting long-term developmental disturbances. Interestingly, this is not the case in two UP and one Mesolithic children dating from before and after the Younger Dryas cooling event (Grotte des Enfants, Grotta della Madonna). Although funerary selection may have still played a significant role, growth patterns at Arene Candide may have been affected by worsening environmental conditions during the last glacial peak.

6 BONE MICROARCHITECTURAL ANALYSIS: A WAY TO DETECT, UNDERSTAND AND DIAGNOSE PATHOLOGICAL CONDITIONS AND PROCESSES IN CHILDREN

Colombo, Antony (Ecole Pratique des Hautes Etudes - Paris Sciences et Lettres Université; UMR 6034 Archéosciences Bordeaux)

Micro-computed tomography (μ CT) is a non-invasive and non-destructive X-rays imaging technique which allows to analyze bones internal structures at a microscopic scale, without altering their integrity. Since the 2000's, this method has become an increasingly important technique for investigating bone structures, as well as for cortical bone as for trabecular bone, and morphology in biological anthropology. Nevertheless, μ CT imaging is still relatively less widely used in paleopathology.

However, it offers a unique opportunity to reconstitute, at the microarchitectural level, the pathological processes which are at the origin of macroscopic lesions, and thus provides an important aid to retrospective diagnosis.

After a brief summary of the utilization of μ CT imaging in paleopathology through the specialized scientific literature, this paper will present the benefits of the μ CT imaging for paleopathology through different examples of non-specific bone lesions, of deficiency and congenital diseases. For these paleopathological examples, μ CT analysis has been proven decisive in analyzing lesions, reconstructing processes, understanding their impact on normal development, and helping for the diagnosis of osteoarchaeological cases.

7 AGE EFFECT ON TRABECULAR BONE ORGANISATION UNDER INSERTIONAL CORTICAL OSTEOLYSIS(ICO): 3D- μ CT ANALYSIS OF ENTHESIAL CHANGES ON A JUVENILE OSTEOARCHAEOLOGICAL SAMPLE

Navarre, Gwladys (Ecole Pratique des Hautes Etudes; UMR 6034 Archéosciences-Bordeaux) - Dutailly, Bruno (UMR 6034 Archéosciences-Bordeaux; UMR 5199 PACEA) - Vanderesse, Nicolas (UMR 5199 PACEA) - Dutour, Olivier (Ecole Pratique des Hautes Etudes; UMR 6034 Archéosciences-Bordeaux) - Coqueugnot, H el ene (UMR 6034 Arch eosciences-Bordeaux; Ecole Pratique des Hautes Etudes)

Entheses occupy an important place among the skeletal markers of activity and have been explored since the 1980s using clinical, radiological, histological and osteo-archaeological methods. Some studies have highlighted age-related variations in the morphology of enthesial changes: localised cortical osteolysis is frequently observed in immature skeletons, in contrast to the osteophytic processes seen in adults. The development of μ CT and 3D imaging methods is leading to a better understanding of these mechanisms.

Recent studies have focused on the microarchitecture of growing bone, both normal and pathological, in order to better understand its variability. For entheses, the microarchitecture of the cortical canal network was studied to determine the structural variability between normal insertion, metabolic enthesopathy and mechanical enthesopathy, but the trabecular structure under enthesial changes has not yet been studied in detail.

Insertional cortical osteolysis (ICO) is interpreted either as normal developmental variations or as the result of bio-mechanical overload on a growing skeleton. This hypothesis should be confirmed by the orientation of the trabecular bone under the enthesis, which should follow the main direction of biomechanical forces, in accordance with Wolff's law. This pattern needs to be clarified using 3D reconstructions of μ CT analyses of these ICOs.

Our preliminary results of 3D- μ CT analyses of the humeral insertion of the latissimus dorsi muscle on osteoarchaeological samples from immature individuals of various ages with ICO have shown that the main orientation of the trabecular bone varies with individual's age. Although this observation needs to be confirmed on a larger sample, it suggests that the architectural organisation of the trabecular system, in response to the same biomechanical overload, also depends on the period of growth during which the activity occurs. These first results confirm the need to take age into account when studying skeletal markers of activity in bioarchaeology.

8 MICROARCHITECTURAL DEVELOPMENTAL PATHWAY OF THE CRIBRA ORBITALIA: MICRO-CT ASSESSMENT OF CRIBROUS CHANGES

Mikasinovic, Veda (Centre of Bone Biology, Faculty of Medicine, Belgrade) - Djukic, Ksenija (Centre of Bone Biology, Faculty of Medicine, Belgrade) - Djuric, Marija (Centre of Bone Biology, Faculty of Medicine, Belgrade)

The investigation of cribrous changes, particularly cribra orbitalia (CO), on skeletal remains has become a prominent subject in bioanthropology, primarily due to the high prevalence of these conditions and the diverse interpretations they offer. CO is manifested by varying degrees of porosity, thinning of the outer surface of the orbital roof, and the expansion of intertrabecular spaces, resulting from bone marrow hyperplasia. While previous research has mainly focused on macroscopic observation, evaluating CO severity and the degree of activity/healing in CO lesions, the microstructural changes induced by CO remain less understood. This study employs micro-CT analysis to elucidate cortical and trabecular microstructural changes in non-adults under 15 years of age, both with and without macroscopic traces of CO (n=28), in relation to the severity of the CO lesion, using a widely employed 5-grade scoring system. Micro-CT analysis was used to examine cortical and trabecular microstructural changes in relation to the severity of CO lesions.

Our analysis demonstrated that microstructural changes in both bone compartments are equally influenced by the presence of CO and the severity of CO lesions. However, intergrade comparisons indicated that, for most analyzed microstructural variables, there was no statistical significance between closely related types of lesions, including the comparison of the control group with the mildest form of CO lesions. Despite this, our study suggests that microstructural changes do not progress linearly. Instead, a trend of linear progression was observed from the mildest to the most advanced forms of CO.

In conclusion, our study contributes to the understanding of microstructural changes induced by CO in non-adults.

1008 FOOD PROCESSING AND COOKING PRACTICES IN EUROPE, NORTH AFRICA, AND WESTERN ASIA (NEOLITHIC TO IRON AGE)

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Dalla Longa, Elisa (CNR-ISPC (Institute of Heritage Science - National Research Council of Italy)) - Alberti, Maria Emanuela (SAGAS Department, University of Florence) - Arena, Alberta (Österreichische Akademie der Wissenschaften / Österreichisches Archäologisches Institut) - Tsafou, Evgenia (Université catholique de Louvain)

Session format: Regular session

Studies on ancient diet and cooking practices are well developed and help shedding light on various aspects of social and daily past life. Some issues are still to be unraveled in the scholarly debate: to overcome regional and chronological specialisations; to reach a broader perspective; to discern the resources used in food preparation and the use of food-related tools. Additionally, there is an increasing need for the examination of resources as salt, milk, products derived from cereals and legumes, dairy products, natural sweeteners, and other minor ingredients. With this session we aim at bringing together researchers working on different areas and periods, to share methods, contextual and diachronic perspectives, artifacts' studies, including pottery typology and technology, use of tools, petrographic and residue analysis, as well as experimental activities, actual recipes, and palaeobiological dataset.

We intend to: examine the material characteristics of artefacts, structures, and facilities for food production; uncover the tools employed in the creation of food products; explore the allocation of settlement areas for food production and the production itself. The extensive chronological and geographical scope considered allows us to elucidate how these practices change in tandem with economic and social structures from the Neolithic to the Iron Age. Methodologically, we will adopt a multidisciplinary approach, welcoming contributions in archaeology, archaeometry, functional analysis (use-wear and residue), experimental archaeology, and ethnographic comparison.

The session is the output of the collaboration of two research groups: Elisa Dalla Longa (CNR-ISPC, IT), Alberta Arena (OeAI, AT), Florencia Inés Debandi (DISCI-UniBO, IT), Juan Francisco Gibaja (IMF-CSIC, ES), Giulio Lucarini (CNR-ISPC, IT); and Emanuela Alberti (SAGAS-UniFI, IT), Bartłomiej Lis (IAEPAN, PL), Jerolyn Morrison (Baylor University, US), Evgenia Tsafou (AEGIS Group, UC-Louvain, BE).

According to the number of participants and the themes of the presented papers, the session may be subdivided into distinct sub-sessions.

ABSTRACTS

1 BUILDING A STRONG REFERENTIAL: WHEN ETHNOGRAPHIC WORK CAN HELP ARCHAEOLOGICAL INVESTIGATIONS ON FOOD PROCESSING

Malergue, Alex (Université Côte d'Azur; CEPAM) - Martignac, Louise (Université Côte d'Azur) - Drieu, Léa (CNRS; CEPAM) - Buvry, Océane (IPMC) - Debayle, Delphine (IPMC) - Sall, Moustapha (Université Cheikh Anta Diop) - Mayor, Anne (Université de Genève) - Regert, Martine (CNRS; CEPAM)

Studying subsistence strategies, management of plant and animal resources, and food practices of populations of the past is one of the focal points of archaeology, and mobilizes a number of specialties. While archaeozoology and archaeobotany, when ecofacts are preserved, can provide many answers to our first two questions, access to a detailed understanding of culinary practices and the processes involved in preparing some foods remains limited.

Technical and methodological advances in the analysis of organic residues have made it possible to characterize certain molecules preserved in the walls of archaeological ceramic vessels, and thus identifying processed or preserved food. To go further in the identification of animal and vegetal species prepared in ceramics, we offer to present a methodology based on the analysis of specific components, triacylglycerols, using gas chromatography and liquid chromatography-tandem mass spectrometry.

Those molecules are present in all living organisms, with specific distributions, and thus present a strong chemotaxonomic potential. In this communication we detail the construction of a new modern referential, which relies in particular on fresh material, ethnographic and experimental collections collected in Senegal, as part of the Sinergia project "Foodways in West Africa".

These methodological developments, on a class of biomarkers present in several archeological contexts where organic matter is well preserved (lacustrine sites, acid soils in Corsica and on the Atlantic coast in particular), already show interesting results when it comes to distinguish between species used as dairy livestock (cow, sheep), or to discriminate between vegetable oils (linseed, olive oil, shea butter...). Reaching this level of resolution of the data is necessary to better understand food systems and the function of pottery, and triacylglycerols might be the way to obtain better results than previous methods, especially to approach the different steps of some "chaînes opératoires".

2 TAPHONOMIC PROCESSES AND DEGRADATION OF PLANT-BASED FOODS IN CERAMIC VESSELS: BIOMOLECULAR DATA FROM A LONG-TERM BURYING EXPERIMENT

Morandi, Lionello (University of Pisa, Department of Civilisations and Forms of Knowledge; Eberhard Karls University Tübingen, Archaeometry Research Group) - Mattonai, Marco (University of Pisa, Department of Chemistry and Industrial Chemistry) - Amicone, Silvia (Eberhard Karls University Tübingen, Archaeometry Research Group; University College London, Institute of Archaeology) - Ribechini, Erika (University of Pisa, Department of Chemistry and Industrial Chemistry)

Fruits and vegetables have played a crucial role in the subsistence and diet of several prehistoric and early urbanised societies. Their dietary intake is usually investigated through stable isotope analysis of human bioapatite and collagen and through archaeobotanical techniques looking at macro and micro-remains from archaeological sites. Aside from plant oils and waxes, organic residue studies have mostly focused on lipids of animal origin, due to their better preservation and diagnosticity. Therefore, the contribution of plant components to the overall diet remains a challenging point to address. With this paper we present results from a long-term field and laboratory experiment aimed to assess the visibility of plant-derived compounds from sherds deposited within a series of modern soils, mimicking various depositional environments. A selection of fruits and vegetables native to an area extending from Africa to the Near and Far East have been subjected to different cooking preparations. Ceramic fragments of known porosity, purposely produced for the experiment, have been placed in contact with processed and unprocessed plant material and buried within the topsoil of sites displaying a range of pH values, to simulate the taphonomic processes at work in archaeological sediments. The degradation over time and the potential for preservation in the pottery of plant proxies such as polyphenols and pigments were then investigated using analytical methods based on chromatography and mass spectrometry.

3 NEOLITHIC FOODWAYS: TOWARDS AN UNDERSTANDING OF FOOD-PROCESSING ACTIVITIES AT NEOLITHIC ÇATALHÖYÜK

Tsoraki, Christina (University of Leicester)

Ethno-archaeological research invariably shows that food-processing activities are dynamic social practices that contribute to the socialisation of small-scale communities and enable the construction of different social categories. Stone implements such as querns are an essential element in the processing of cereals, legumes and other plants that were consumed during different types of meals and forms of social engagement (routinized meals/feasts). Hence, while grinding tools played an important role in the workings of the subsistence economy, they were also instrumental for the social reproduction of prehistoric communities.

The Neolithic site of Çatalhöyük in Türkiye, dating from 7100 BCE to 5900 BCE, provides an excellent case-study to explore these themes in depth. Capitalising on the rich dataset of grinding tools, ecofacts and well-preserved architecture this paper provides insight into the organisation of food processing activities during the long habitation of the site that spans over 1500 years. Questions about food production, and the location and scale of plant processing activities at Çatalhöyük have been approached through the technological, contextual and microwear analyses of the grinding implements. Microwear analysis confirms their use for plant-processing activities including the processing of cereals, and legumes, while morphometrical analysis of the grinding tools and their use-faces provides insights into processing techniques and motor habits adopted during the execution of grinding tasks. Spatial and contextual analysis demonstrates that grinding activities had strong associations with houses and their occupants and were among the practices that structured the perception and use of physical and social space.

By applying an integrated approach on the study of grinding tools from different contexts this paper considers the social and material histories of food activities at a single settlement.

4 UNVEILING THE 'FOCACCIA' CULINARY TRADITION IN LATE-NEOLITHIC UPPER MESOPOTAMIA THROUGH EXPERIMENTAL, USE-WEAR, PHYTOLITH, AND ORGANIC-RESIDUE ANALYSES

Taranto, Sergio (Sapienza University of Rome, LTFAPA; Autonomous University of Barcelona, Department of Prehistory) - Breu Barcons, Adrià (Autonomous University of Barcelona, Department of Prehistory; Koç University of Istanbul, College of Social Sciences and Humanities) - Portillo, Marta (Institució Milà i Fontanals (IMF) Department of Archaeology and Anthropology, Archaeology of Social Dynamics; CSIC Spanish National Research Council) - Le Miere, Marie (CNRS-Université Lyon 2, MSH Maison de l'Orient et de la Méditerranée) - Gómez Bach, Anna (Autonomous University of Barcelona, Department of Prehistory) - Molist, Miquel (Autonomous University of Barcelona, Department of Prehistory) - Lemorini, Cristina (Sapienza University of Rome, LTFAPA)

This paper presents the results of doctoral research concerning the function of a Late Neolithic Near Eastern pottery type commonly referred to as the 'husking tray.' Fragments belonging to this ceramic form have been unearthed across the Near East, spanning from the Mediterranean coast to the Iranian plateau. Our research employs an integrated approach, combining ethnographic comparisons, experimental archaeology, and analyses of use-wear, phytoliths, and organic residues, with a primary focus on shards from Southeast Turkey and Northern Syria. The study strongly suggests that these vessels could have been used as baking pans for bread-like products sometimes enriched with various ingredients such as animal fat or plant oil. Notably, we highlight the importance of integrating different types of analyses and the advances introduced in the observation of macro and micro use-wear evidence as a new methodological development for the functional study of archaeological ceramic materials. By utilizing a multi-faceted approach, we aim to provide a comprehensive understanding of the function and significance of the 'husking tray' in Late Neolithic Near Eastern societies, shedding light on their culinary practices and technological innovations in pottery usage.

5 DECIPHERING OF GRINDING-MILLING TOOLS USE: FOOD PROCESSING ACTIVITIES AT MIDDLE CHALCOLITHIC GÜVERCINKAYASI, CENTRAL ANATOLIA

Doležalová, Kristina (Institute of Archaeology of the CAS, Prague; Institute of Classical Archaeology, Faculty of Arts, Charles University) - Řídký, Jaroslav (Institute of Archaeology of the CAS, Prague) - Pilař, Daniel (Institute of Archaeology of the CAS, Prague; Department of Archaeology, Faculty of Arts, Charles University) - Šíďová, Barbora (Institute of Archaeology of the CAS, Prague) - Gülçür, Sevil (Prehistoric Archaeology Department, Istanbul University)

Grinding-milling tools (thereafter GMT) are key to understanding everyday activities such as processing and preparation of food. The shape of GMTs is influenced by many circumstances, such as the availability and characteristics of raw materials, human skills, traditions, and cross-community interactions. Multiple shapes lead to the same functional use and, on the other hand, the same shape can have many functional applications. The use-wear analysis combined with the experimental program can shed light on the use of these tools. This paper presents the study of GMT assem-

blage from Middle Chalcolithic site Güvercinkayası located in Central Anatolia. Twenty artefacts were submitted to use-wear analysis to better understand the kinematics and life of the tools and how function is connected to shape or raw material and whether the tools were used at all. The study is complemented by the experimental program designed to investigate the development of wear from the grinding of various plant substances on rhyolite GMT replicas. The study has yielded several important findings related to the function and kinematics of food processing tools and has shed new light on their users. Most tools show similar use-wear traces that can be associated with the grinding of organic plant matter materials, such as cereals or legumes. Thanks to the pattern of use-wear traces, it was possible to determine the position of the user relative to the grinding stones. Some of the tools have proved to be unused. Furthermore, the analysis helped to distinguish mortars from containers.

6 FIRE INSTALLATIONS ON THE ANATOLIAN PENINSULA: A COMPARATIVE ANALYSIS FROM THE LATE BRONZE AGE TO THE IRON AGE

Casucci, Giacomo (Università degli Studi di Pavia)

The paper presents a comparative analysis of fire installations that have been discovered in Anatolia over a century of excavations. The aim is to provide a new perspective on the continuities and/or discontinuities that characterise a crucial moment in the history of the ancient Eastern Mediterranean, specifically the Late Bronze Age and the first half of the Iron Age (ca. 1650-650 BCE). Ovens, hearths, and andirons emerge as the basic categories of fire installations discernible across archaeological strata spanning the 2nd and 1st millennia BCE at various Anatolian sites. Discussing typology, construction methods, materials and location of the various fire installations, this study attempts to delineate their functions at different stages of culinary preparation (i.e. boiling, stewing, roasting, and baking) with the aim of highlighting possible continuities and discontinuities in space and time. Interpretations will be based on the analysis of artefacts found in the contexts of the fire installations (e.g. cooking pots and trays), together with considerations of the archaeobotanical and archaeozoological remains associated with them. In addition, insights from quantitative analyses, experimental archaeology, and observations derived from ethnoarchaeological observations will be incorporated for a comprehensive exploration.

7 BREWING STONES. THE LITHIC PRODUCTION FROM THE PREDYNASTIC BREWERY OF HELIOPOLIS, EGYPT

Lucarini, Giulio (National Research Council of Italy, Institute of Heritage Science, CNR-ISPC, Rome) - Manclosi, Francesca (National Research Council of Italy, Institute of Heritage Science, CNR-ISPC, Rome) - Lombardi, Lorena (University of Pisa; National Research Council of Italy, Institute of Heritage Science, CNR-ISPC, Rome) - Marsilio, Adelaide (University of Bari Aldo Moro; National Research Council of Italy, Institute of Heritage Science, CNR-ISPC, Rome) - Ugliano, Federica (Museo Egizio, Turin; National Research Council of Italy, Institute of Heritage Science, CNR-ISPC, Rome)

Located on the outskirts of Cairo, the site of Heliopolis stands as one of Ancient Egypt's most significant cities. Inhabited since the middle of the 4th millennium BC during the Predynastic period, the site has yielded crucial archaeological evidence spanning a considerable timeframe.

In 2019, the Egyptian-German Heliopolis Project team uncovered a diverse set of structures and artifacts in Area 251, including a rich lithic assemblage, mud-brick walls, and pits, connected to brewery installations. These findings offer new insights into the poorly understood Predynastic occupation of the site.

While Predynastic breweries are known from various sites in Upper and Lower Egypt, existing data primarily focus on the installations and residue analyses from associated ceramic vessels. However, there remains a knowledge gap concerning other materials linked to these production facilities.

This paper presents preliminary results on the chipped-stone artefacts associated with the brewery, aiming not only to suggest functional correlations between flint tool-types and beer production, but also to provide deeper insights into the organization of specialized activities and the socio-economic structure of Predynastic communities in the Delta during the 4th millennium BC.

Considering the location and dimensions of the brewery, beer production stands out as one of the earliest specialized activities exceeding domestic needs. The paper delves into the integration of the lithic system within this framework by comparing chipped-stone assemblages from both the brewery and the broader Predynastic settlement, including the artefacts of the rich Schiaparelli's collection from the Museo Egizio of Turin. Our aim is to observe differences and analogies in flint tool production and use.

8 THE NEOLITHIC SETTLEMENT OF LA MARMOTTA (ITALY): A WINDOW INTO THE PAST TO LEARN ABOUT WORKING TOOLS AND FOOD PROCESSING

Gibaja, Juan (IMF-CSIC) - Mineo, Mario (Museo delle Civiltà) - Mazucco, Niccolò (Pisa University) - Caruso, Laura (Conicet) - Morell, Berta (IMF-CSIC) - Remolins, Gerard (Regirarocs, S.L.) - Arranz, Amaia (Basque Country University) - Rottoli, Mauro (Laboratorio di Archeobiologia dei Musei Civici di Como) - Portillo, Marta (IMF-CSIC) - Hamon, Caroline (CNRS)

Lake settlements often preserve many archaeological remains that are not commonly found in most terrestrial sites. The lack of oxygen allows for the preservation, particularly of resources and tools made from biotic materials such as wood, plants, etc. This is the case of the Early Neolithic settlement of La Marmotta, discovered under the waters of Lago di Bracciano in the late 80s.

As one of the Neolithic sites of reference for understanding those societies and their expansion throughout the Mediterranean, it has been understudied in recent years. However, this has changed in recent years thanks to the collaboration between the Museo delle Civiltà in Rome and the Spanish National Research Council, supported by the project PID2020-112513RB-I00/AEI/10.13039/501100011033 funded by the State Research Agency of the Spanish Ministry of Science, Innovation and Universities. An international working group has been set up to reconstruct much of the archaeological information deposited in the museum and to address many aspects related to the economic and social organization of those early Neolithic groups that occupied central Italy in the mid-6th millennium BC.

In this paper we present a generic representation of the hundreds of lithic and wooden instruments related to the collection and production of resources, such as bows, sickles, spoons, axes, etc. Likewise, we show the link between these instruments and the documented food remains in the work processes related to their processing and cooking. If the fauna remains provide us with relevant information on livestock, hunting and gathering practices, the remains of thousands of seeds and processed foods such as bread, show us the variety of domesticated and wild plant species consumed and the processing of certain goods.

9 ATYPICAL FOOD CHOICES AND STRATEGIES OF A MID NEOLITHIC COMMUNITY AT MOLINO CASAROTTO (NE ITALY)

Breglia, Francesco (Department of Geosciences, University of Padua, Italy) - Prillo, Vito (Department of Cultural Heritage, University of Padua, Italy) - Dal Corso, Marta (Department of Geosciences, University of Padua, Italy) - D'Aquino, Silvia (Department of Cultural Heritage, University of Padua, Italy) - Polisca, Federico (Department of Cultural Heritage, University of Padua, Italy) - Piazzalunga, Giorgio (Department of Cultural Heritage, University of Padua, Italy) - Salzani, Paola (Soprintendenza Archeologia, Belle Arti e Paesaggio per le Province di Verona, Rovigo e Vicenza) - Nicosia, Cristiano (Department of Geosciences, University of Padua, Italy)

Molino Casarotto is a Middle Neolithic site of the Squared-Mouthed Pottery Culture located near the ancient shore of Lake Fimon (Vicenza province, northern Italy). Archaeological excavations took place in 1969-1972, and in 2022 a new archaeological campaign, included in the ERC CoG GEODAP project, yielded brand new data from a single structure, especially thanks to a systematic sampling for bioarchaeological studies. The food choices and strategies of this community clearly differ from what is commonly understood as a salient feature of Neolithic societies, i.e. the productive economy based on cereal agriculture and livestock.

The results on food remains revealed a peculiar connection with the lacustrine environment. The most abundant plant remains are water chestnuts (*Trapa natans*), which were collected from the lake, roasted and possibly ground to produce dough products. These fruits may have been consumed as a staple food, effectively replacing cereals, which are very scarce at the site. Other wild fruits, such as acorns and hazelnuts, were also gathered. Numerous fish vertebrae and cranial remains have also been recovered, mainly referring to pike (*Esox lucius*), of medium to large size, and secondly to tench (*Tinca tinca*). Abundant fragmented mollusc shells (especially of the genus *Unio*) further support the site's reliance on freshwater resources. Notably, some fish and mollusc remains exhibit distinctive burning traces, possibly suggesting culinary practices applied to species that often remain elusive in archaeological contexts.

The economic relevance of foraging and fishing at Molino Casarotto could constitute a cultural identity factor, as well as an economic strategy linked to the adaptation to available environmental resources. This is especially the case shall a seasonal occupation at Molino Casarotto be demonstrated. Both these aspects will be discussed in this paper, also in light of the comparison with archaeobotanical and archaeozoological data available from other Lake Fimon Neolithic settlements.

10 CHARACTERIZATION OF COOKING STONES FROM EARLY NEOLITHIC SITES IN SOUTHWESTERN EUROPE

Cantelli, Margherita (Institute of Environmental Science and Technology (ICTA-UAB) and Department of Prehistory, Universitat Autònoma de Barcelona, Bellaterra, Spain; Université Côte d'Azur, CNRS, CEPAM, Nice, France) - Terradas, Xavier (Spanish National Research Council (IMF-CSIC), Barcelona, Spain) - Binder, Didier (Université Côte d'Azur, CNRS, CEPAM, Nice, France) - Regert, Martine (Université Côte d'Azur, CNRS, CEPAM, Nice, France) - Colonese, André Carlo (Institute of Environmental Science and Technology (ICTA-UAB) and Department of Prehistory, Universitat Autònoma de Barcelona, Bellaterra, Spain)

Cooking stones, while commonly found in prehistoric sites, remain one of the least studied elements of the archaeological record, of which little is known about their geographic, chronological and cultural distribution, as well as of its competitive advantage in relation to other food processing techniques. Their investigation has the potential to expand our knowledge of prehistoric culinary practices, the evolution of cuisine, and its impact on the overall diet and economies in the past. To address this research gap, we conducted an analysis of archaeological stones that were potentially used for the preparation of foodstuffs and other products in Early Neolithic sites in southwestern Europe. Specifically, these stones (sandstones, marl and limestones) were recovered from contexts with evidence of culinary activities at the Neolithic sites of La Draga (Spain) and Abri Pendimoun (France). Using a combination of morphological techniques (3D and photogrammetry), visual inspection (evaluation of fractures, shape and colour), and organic residue analysis (ORA) of extracted lipids (via GC, GCMS and GCCIRMS), we identified distinctive classes of stones with differing thermal alteration patterns and isotope compositions. The results suggest that some stones may have been used for processing or manipulating plants at La Draga, while others were also likely involved in meat and dairy use at Abri Pendimoun. This study sheds light not only on the varied prehistoric culinary techniques, but also highlights the significance of these practices in shaping past diets and economies. Moving forward, further investigation into cooking stones promises to provide invaluable insights into the evolution of cuisine and its enduring impact on human societies throughout history.

11 AEGEAN COOKING SETS AND COOKING TRADITIONS - A COMBINED COMPARATIVE APPROACH

Tsafou, Evgenia (Université Catholique de Louvain) - Alberti, Emanuela (SAGAS Department, University of Florence) - Lis, Bartłomiej (Institute of Archaeology and Ethnology, Polish Academy of Sciences) - Morrison, Jerolyn (Baylor University, US)

New excavations and approaches to ceramic studies in the recent decades have led to the development of the research on cooking vessels, highlighting their role in defining of the socio-cultural aspects of ancient societies. Studies of the Aegean Bronze Age produced new datasets of cooking vessels, leading to new definitions of their typochronological development, the composition of cooking sets, the use of different types of cooking vessels, as well as to new interpretations of the social aspects of cooking practices.

This paper presents the results of studies on cooking pottery from the Aegean during the Middle and Late Bronze Age (1700-1050 BCE). These results highlight recent insights into possible cooking practices in the Aegean based on the study of individual cooking pots as well as the reconstruction of entire cooking sets. The case studies discussed include cooking pottery from selected sites in Minoan Crete and the Mycenaean Mainland. This wide range of case studies provides a distinct opportunity to compare Aegean cooking traditions across time and space in order to better understand their development and mutual relationships, which could be the result of a multitude of factors, including social tradition, technological constraints, political developments and human mobility.

12 COMBINING USE-WEAR ANALYSIS AND EXPERIMENTAL ARCHAEOLOGY. A FOCUS ON COOKING WARES FROM MIDDLE BRONZE AGE PHAISTOS (CRETE)

Sandei, Irene (Ca' Foscari University of Venice)

Recent studies on cooking ceramics explore the function and use of these materials employing two innovative approaches: use-wear analyses and experimental archaeology. Use-wear analysis examines surface alterations related to the use of the vessel to evaluate its interaction with heat sources, as well as the cooking method and consistency of the content. Combined with experimental archaeology, the replication of a vessel provides valuable insights into the manufacture and function of its elements, thereby enhancing the understanding of the performance of cooking activities.

Given limited knowledge of cooking ceramics during the Middle Bronze Age in Crete, the typological study and new edition of Protopalatial (Middle Minoan IB-Middle Minoan IIB, XIX - XVII cent. BC) cooking wares from Minoan Phaistos aims to address this gap. This is particularly significant, considering that the Protopalatial period is a crucial moment in Crete, owing to the foundation and development of the First Palaces. Additionally, Phaistos is the sole site on the island preserving structures and ceramic contexts associated with in situ Protopalatial materials. Through

comprehensive functional and use-wear analyses combined with an experimental archaeology approach, the study targets the understanding of the use of these specific cooking ceramics.

The Protopalatial cooking wares from Phaistos include several cooking vessels meant for cooking and heating food, such as cooking jars, tripod cooking pots and tripod cooking dishes, and cooking dishes. A distinct type, the side-spouted jar, has been identified, yet its use and function remain uncertain. Widely attested at Phaistos and in several Minoan sites in Southern Crete, the side-spouted jar has been interpreted as a typical shape for this area. The experimental production of this unique vessel, combined with a typological and use-wear analyses, aims to better understand the use and function of the type, as well as the actions and ergonomics of its components.

13 COOKING AND CONSUMPTION PRACTICES ON MINOAN PEAK SANCTUARIES: THE CASE OF PANTOTINO KORYFI AND STAVROMENOS ANATOLI, IERAPETRA, SOUTHEASTERN CRETE

Kalara, Antigoni (National and Kapodistrian University of Athens)

The present study explores the role of practices related to the preparation and consumption of food in the ritual context of Minoan peak sanctuaries during the Protopalatial and Neopalatial period. The examination is based on the pottery evidence from two neighboring sites, Pantotinou Koryfi (Middle Minoan IB – II) and Stavromenos Anatoli (Middle Minoan III – Late Minoan I), in the region of Ierapetra, southeastern Crete. Despite pottery being the most abundant category of finds and a significant source of information about the nature of activities at these sites, the majority of the excavated ceramic material remains inadequately studied and unpublished. The author's study of the ceramic assemblages of Pantotinou Koryfi and Stavromenos indicates that the preparation and/or massive consumption of food and drink held a central role in the cult from the Protopalatial to the Neopalatial period. The analysis brought to light a diverse range of fabrics and shapes associated with at least four different pottery production centers in eastern Crete. Both assemblages display a wide variety in the size and capacity of vessels, reflecting the coexistence of various cooking habits, recipes, and consumption practices at these rural shrines. Contextual analysis of the pottery further elucidates the extent and spatial distribution of these practices at each sanctuary. In conclusion, a comparison of the results from Pantotinou Koryfi and Stavromenos suggests a shift in ritual practices during the Neopalatial period, with a notable emphasis on cooking practices performed by communities from a broader region, along the south and north coast of the Isthmus of Ierapetra.

14 USING MINOAN COOKING POTS: EXPERIMENTAL COOKING & ORGANIC RESIDUE ANALYSIS

Morrison, Jerolyn (Baylor University) - Tsafou, Evgenia (Sissi Excavations)

Developing typologies and chronologies of cooking pots in the Aegean Bronze Age has been practiced since the mid to late 1900's in Greece. This critical work on domestic wares has generated dialogue in the scholarship that defines cooking sets and at least one component of the Minoan kitchen. Beyond this descriptive work, cooking experiments using ceramic pots has been conducted to demonstrate basic culinary techniques. Yet despite this knowledge, there are practical aspects of the cooking process that remain unclear for each individual Aegean Bronze Age type of cooking vessel. Perhaps uncertainty and lack of clarity should be expected when exploring the "how to's" of ancient domestic tasks as a modern individual; as domestic jobs today and in the past can be accomplished many ways. Even with accepting this reality there are observational tools that can be applied to ancient domestic studies that allow scholars to explore how daily tasks were performed. By taking a multidisciplinary approach, this paper sheds light on the different ways that Minoan cooking vessels were used to prepare food. This approach includes the analytical methods of experimental archaeological and functional analysis (with a combination of use wear analysis and organic residue analysis). In particular, cooking practices related to cooking dishes from three case studies settlements, Mochlos, Sissi and Malia, and from contemporary archaeological contexts of the Neopalatial period will be presented.

15 COMPARING BRONZE AGE COOKING SETS FROM CRETE AND SARDINIA

Alberti, Maria Emanuela (Università degli Studi di Firenze, Dipartimento SAGAS)

Bronze Age Mediterranean interconnections are a well-investigated topic. Besides written sources, the archaeological indicators for connectivity that are usually considered are imported raw materials or products, prestige objects, technologies, and relevant local imitations/interpretations.

It is now time to bring the discussion further, to examine the sphere related to habits and practices, especially concerning daily life. Were there some shared habits, some Mediterranean ways of life, diffused widely among common people of the various Mediterranean regions? This is a subject requiring a highly diversified archaeological background, calling specialists of the various areas to cooperation. However, a first and limited attempt is proposed here, just to throw a stone into the pond.

The average cooking sets from Bronze Age Crete and Sardinia show striking similarities: both are composed of tripod cooking pots of various sizes and wide shallow cooking dish (tegami in Italian), some with rounded bottom (coppe di cottura), and cooking plates (piastre di cottura). This set is attested in both islands from early times (e.g. the evidence

from EBA Myrtos Phournou Koriphi in Crete, and Copper Age Selargius Su Coddu in Sardinia) to the late phases of the LBA (e.g. LM IIIB/C Phaistos in Crete and RBA Nuraghe Arrubiu in Sardinia). It implies that boiling, stewing, roasting, baking, frying, etc. were performed in similar ways consistently during centuries. The presence of large shallow cooking dishes is especially noteworthy, pointing to the possible use of flat bread/loaf in both areas. This is also attested in Anatolia.

It seems then that a Mediterranean shared culture was not only made of worked ivories, transported terebinth and ingots, travelling metallurgical skills, but also of more mundane and common elements, such as cooking and eating.

This parallel is proposed to foster the discussion, with the hope to have more food for thoughts during the session.

16 EXPLORING THE TECHNOLOGICAL AND FUNCTIONAL FEATURES OF VESSELS WITH INTERNAL HANDLES IN THE BRONZE AGE VILLAGE OF MURSIA, PANTELLERIA

Debandi, Florencia (University of Bologna) - Magri, Alessandra (ISPC-CNR - Roma)

This paper aims to investigate the use of vessels with internal handles from the Bronze Age settlement of Mursia on Pantelleria island (1800-1450 BC). These ceramic vessels, similar to baking trays, are characterized by large and shallow basins equipped with two opposite handles on the inside surface, placed just below the rim. The rim is often offset, dipping down and forming a broad spout. The bottom is flat and usually thinner than the walls.

The specific configuration of these basins provides an opportunity to undertake a thorough functional investigation, looking for similar specimens in Sicily and in the broader Mediterranean context and highlighting the need to map their distribution. The methodological approach involves the description of the morphological, technological, and functional attributes (clay fabric; surface treatment; types of handles; refractoriness; use-wear traces), including macroscopic analyses, experimental replications, and ethnographic comparisons.

As for the case study of Mursia, the handles' structure and position imply that these containers can be easily and repeatedly handled and moved. The lowered rim is suitable for pouring substances. The afore-mentioned elements and the contextual analysis, with the retrieval of these basins in association with fire installations belonging to the recent phases of the settlement (c. 1550-1450 BC), allow to hypothesize these objects were involved in activities related to fire, used as cooking or heating devices.

In order to better assess the role of these vessels, a protocol for their experimental reproduction has been developed, following the models attested at Mursia and testing the hypothesized operating modes and uses.

These specialized containers identify culturally significant objects introduced by the people of Mursia in their daily cooking practices during the last phases of the settlement and represent highly diagnostic elements for a deeper understanding of Bronze Age culinary traditions, from both a technological and cultural perspective.

17 MULTIPLE PERSPECTIVES ON CULINARY TRADITIONS IN 2ND MILLENNIUM BCE NORTHERN PO PLAIN

Dalla Longa, Elisa (CNR-ISPC (Institute of Heritage Science - National Research Council of Italy)) - Dal Corso, Marta (Department of Geosciences, University of Padua, Italy) - Rottoli, Mauro (Laboratorio di Archeobiologia dei Musei Civici di Como, Italy) - Manfrin, Maria Sofia (PrEcLab – Laboratorio di Preistoria, Protostoria ed Ecologia Preistorica del Dipartimento di Beni Culturali e Ambientali – Università degli Studi di Milano, Italy) - Fapanni, Francesca (PrEcLab – Laboratorio di Preistoria, Protostoria ed Ecologia Preistorica del Dipartimento di Beni Culturali e Ambientali – Università degli Studi di Milano, Italy) - Varalli, Alessandra (CNRS, Aix Marseille Univ, Minist Culture, LAMPEA, UMR 7269, France; CASEs Research Group (Culture, Archaeology and Socio-Ecological Dynamics), Barcelona, Spain) - Nicosia, Cristiano (Department of Geosciences, University of Padua, Italy)

What is currently known about subsistence, diet, and food processing in the Northern Po Plain during the 2nd millennium BCE? To what extent are different proxies analysed collectively in the current published literature? How can data obtained from diverse proxies be most effectively integrated? How can research in this field be advanced through the integrated analysis of multiple datasets? This contribution aims to address these questions by proposing a two-step research path. Taking the Northern Po Plain in the 2nd millennium BCE as a case-study, our first goal is to provide a comprehensive review of published data on the following proxies: 1) food-related objects; 2) structures and facilities associated with food processing; 3) archaeobotanical datasets on edible plants; 4) zooarchaeological datasets on edible faunal resources; 5) isotopic data obtained from human and animal remains. As a second step, we propose an integrated analysis of the mentioned datasets in the case-study region, aiming to understand if a specific characteristic or change detected in one of the explored fields has implications in one or more of the others. For example, is there a correlation between the introduction of a new crop and the material culture? Does the succession in archaeological cultural aspects manifest in changes in the type of diet? The goal of this research is to develop a method for gaining a deeper understanding of this crucial part of human history, which we believe can only be understood through the integration of knowledge. This will not only contribute to establishing a common ground that will

refine the interpretation of archaeological contexts in field research, but also lead to the formulation of new research questions that expand our knowledge of the lives of people in the past. This work is in collaboration with the ERC CoG project GEODAP (Geoarchaeology of Daily Practices).

18 AN HOLISTIC APPROACH TO THE STUDY OF DIETARY PRACTICES AT THE BRONZE AGE SITE OF PEÑALOSA (BAÑOS DELA ENCINA, SPAIN)

Tinoco Domínguez, Lucía (University of Granada) - Contreras Cortés, Francisco (University of Granada) - Moreno García, Marta (Institute of History, CCHS, CSIC) - García Martínez, Victoria (University of Granada) - Alarcón García, Eva (University of Granada)

The main goal of this research is to study the dietary practices of the inhabitants from the Bronze Age settlement of Peñalosa (Baños de la Encina, Jaén, Spain) in a diachronic and synchronic perspective using an holistic approach. Firstly, the archaeozoological analysis helps to assess the role that meat played on the social and historical development of this Argaric society (2200 – 1550 cal BC) of the Upper Guadalquivir.

Therefore, the remains of all medium and large-sized mammal are analysed with the aim to identify potential preferences based on taxa, sex and age of these animals. Likewise, the taphonomic study, specifically the analysis of cut-marks and burned marks, throws some light on different processing and cooking techniques including the occurrence of specialised butchers in the settlement.

The data collected is understood not only in its temporal context and in a microspatial level, but also in relation to other archaeological materials such as ceramic vessels. Pottery morphology together with the identification of certain anatomical parts allow us to gain some knowledge on the different cooking techniques used. Moreover, organic residue analysis identifies animal products consumed or selected for other uses. Finally, stable isotopic studies on faunal remains are compared with those carried out on human bones and botanical macro remains and phytolith analysis from mills provide additional data to understand on food activities.

19 THE ROLE OF PLANT SUBSTANCES IN THE ANCIENT DIET OF CORSICAN PROTOHISTORIC SETTLEMENTS: A BIOMOLECULAR APPROACH APPLIED TO CERAMICS

Turini, Maïlys (Université Côte d'Azur, CNRS, CEPAM) - Drieu, Léa (Université Côte d'Azur, CNRS, CEPAM) - Malergue, Alex (Université Côte d'Azur, CNRS, CEPAM) - Mazuy, Arnaud (Université Côte d'Azur, CNRS, CEPAM) - Buvry, Océane (IPMC) - Debayle, Delphine (IPMC) - Paolini-Saez, Héléne (Laboratoire Régional de l'Archéologie) - Peche-Quilichini, Kewin (Collectivité de Corse) - Perrin, Thomas (Université de Toulouse Jean Jaurès, CNRS, TRACES) - Regert, Martine (Université Côte d'Azur, CNRS, CEPAM)

Recent organic residue analyses of samples relating to the food content of pottery and residues from the soil have demonstrated the excellent preservation of organic matter in South of Corsica (France). The Mediterranean area is known for its poor conservation of lipids, however, these large-scale studies have highlighted the diversity of natural substances exploited on the island during the First Iron Age, which may have resulted from artisanal practices and/or cooking activities (animal fats, plant oils and waxes). The subsistence economy of Corsican societies seems to be based on an agro-pastoral system and the collection of wild resources.

In this presentation, we will explore the foods that were stored, processed and consumed in pottery during the Bronze Age and Iron Age on the island, with a focus on the plant part of the diet. At some sites, vessels containing edible plants probably used in culinary activities have been found in significant proportions, an unusual result compared to data published in the literature, where animal fats are ubiquitous. We will present the range of foods consumed in protohistoric Corsica, especially plant foods, using conventional solvent extraction and gas chromatography-mass spectrometry. Some plant resources such as olive oil, wild fruits, vines are poorly preserved, we will carry out lipidomic analyses of well-preserved triacylglycerols (together with extraction analysis of short-chain fruit acids).

The foods identified by organic residue analysis in pottery will be compared with archaeobotanical data to investigate procurement and dietary practices related to plant foods, in particular questions related to the domestication of plant species such as the olive tree and the grapevine.

20 RITUAL LIBATION VESSELS BETWEEN TRANSDANUBE, AUSTRIA AND NORTHERN ITALY IN THE BRONZE AGE AND EARLY IRON AGE

Jankovits, Katalin (Pázmány P. Catholic University) - Dalla Longa, Elisa (Institute of Heritage Science, CNR of Italy) - Arena, Alberta (Österreichische Akademie der Wissenschaften, Archäologisches Institut)

In scientific literature, various vessel typologies, such as askos, rhytons, and boot-shaped or animal-shaped vessels, have frequently been associated with ritual and religious practices of libation in pre-protohistorical times. Recently, the interpretation of some of these shapes as libation vessels has been substantiated through organic residue analysis,

exemplified by the discovery of animal hemoglobin traces in an askos from the Middle Bronze Age of Hungary, and by technological insights, such as the functional study of holes on boot-shaped vases.

This contribution aims to analyze several pottery shapes well-known in the Bronze Age Transdanube region, drawing comparisons with similar artifacts found in Austrian and Northern Italian contexts during the 2nd millennium BCE and the early 1st millennium BCE. By identifying specimens in the three analyzed regions and focusing on archaeological contexts, our objective is to determine whether shared religious/ritual practices can be discerned across the entire area during a specific chronological phase or if an origin-and-diffusion pattern can be assumed for certain vessel shapes.

Taking boot-shaped vessels as an illustrative example, we will draw a general overview of their chronological and geographical distribution. These vessels make their initial appearance in the Danube region during the Tumulus period and continue to be in use for an extended period. Notably, 22 such vessels were discovered in 19 burials of the Urnfield Culture Budapest-Békásmegyer cemetery. Boot-shaped vessels are also documented in Austria (12th-9th century BCE) and Northern Italy (9th-8th century BCE and later Iron Age occurrences). Are there discernible connections between these pots with different chronological and geographical distribution? Is any change or continuity in use or context of discovery traceable? How can these considerations help scholars to deal with the complexity of Bronze Age and Early Iron Age societies of the involved areas?

21 FOOD PRACTICES IN LATE BRONZE AND EARLY IRON AGE IN KARST (WESTERN SLOVENIA) - VISIBLE VS. UNVISIBLE REMAINS

Vinazza, Manca (Department of Archaeology, University of Ljubljana) - Potočnik, Doris (Jozef Stefan Institute) - Ogrinc, Nives (Jozef Stefan Institute) - Tolar, Tjaša (Institute of Archaeology ZRC SAZU) - Toškan, Borut (Institute of Archaeology ZRC SAZU) - Rogan Šmuc, Nastja (Department of Geology (OG), Faculty of Natural Sciences and Engineering (NTF).)

The transitional period from the Late Bronze to the Early Iron Age marked a highly dynamic period, which is evident in the archaeological material from Karst. Only in recent years have we uncovered archaeological data that shed light on past dietary practices. Through archaeological excavations conducted at two hillforts in the Karst, Tabor near Vrabče and Štanjel, dating from the Late Bronze to the Early Iron Age, we have unearthed ceramic artifacts, alongside significant archaeobotanical and archaeozoological remains. The relatively well-preserved stratigraphic context, complemented by absolute dates, enables the identification of dynamics during this time.

A typo-chronological analysis on the ceramic assemblage has unveiled the emergence of new ceramic forms, with a predominant presence of forms associated with hearth activities. These transformations align with changes in food preparation patterns, evident in both archaeozoological and archaeobotanical remains. The study is upgraded by mineralogical-petrographic analyses of the specific ceramic forms. Additionally, organic residue analysis on ceramics contributes to the identification of practices such as maceration and fermentation. The identified practices reflect the integration of Karst hillforts into a broader geographical context, extending westwards into the region of northern Italy and eastwards into central and eastern Slovenia. Nevertheless, alterations in fundamental subsistence patterns suggest a concurrent changes in social organization, characterized by smaller social units during the Early Iron Age.

22 THE USE OF MODULAR OVENS IN IRON AGE HOUSEHOLDS IN THE CAPUT ADRIAE REGION

Tasca, Giovanni (Museo Civico di San Vito al Tagliamento (Pordenone-Italy); University of Padua) - Groppo, Veronica (University of Venice) - Vinazza, Manca (Department of Archaeology, University of Ljubljana, Slovenia)

Between the Late Bronze Age and the end of the Early Iron Age a distinctive type known as the modular oven was in use in northeast Italy and the region of Caput Adriae. Fragments of these ovens, referred to as “concotti”, have been identified among different archaeological sites, like Oderzo, Montebelluna, Pozzuolo del Friuli, Udine, and Most na Soči. The constituent elements of the modular oven and its dimensions only partly correspond to the model of a modular oven attested in the Iron Age across a broader area of Central Western Europe.

Analytical observations, analyses such as ceramic petrography, XRD, pXRF, and SEM-EDS, along archaeological experiments and analogies with the Western model, have enabled the reconstruction of the forming technique and the firing process. This appears to be directly related to the function of food cooking. One of the particularly characteristic element of the modular oven under discussion seems to be its versatility of use, which could have included roasting, baking bread, or cooking other foods. In this presentation, we intend to showcase and discuss the analysis performed on samples from the Early Iron Age site of Montereale Valcellina (6th-5th centuries BC).

23 CONSTRUCTING MESSAPIAN FLAVOURSCAPES: DETECTING FLAVOURFUL WILD FOOD PLANTS IN PRE-ROMAN SOUTHEAST ITALY

Morris, Marc (University College Dublin, School of Archaeology)

Archaeobotanical research focuses primarily on grains, pulses and other domesticated crops that make up the staple diet of many agricultural societies, past and present. Archaeobotanical studies have shown to be of great importance to understanding the processes of domestication, diversification and management of these crops, as well as their centrality to ancient life in terms of diet, land use and labour. Less understood are the plants that flavoured and complemented these staple foods when they were prepared into meals—herbs, spices, fruits and vegetables—and contributed both to a nutritious and satisfying diet. This is especially true in the archaeology of the Messapian culture, which inhabited the Salento peninsula (Apulia, southeast Italy) in the first millennium BC up to the Roman conquest. This paper will summarise initial findings from a brief study aimed at detecting flavourful wild food plants and their culinary applications in the Messapian archaeological record by examining archaeobotanical remains and food crusts in cooking pots, in order to gain a closer understanding of Messapian society and daily life and their interactions with the landscape.

24 SIMMERING FRUIT, BEANS, AND HONEY IN THE LAB: EXPERIMENTAL LIPID RESULTS FROM RARELY IDENTIFIED PLANT-BASED RESOURCES IN ORGANIC POTTERY RESIDUES

Vykukal, Rachel (Department of Chemistry and Pharmacy, Friedrich-Alexander-Universität Erlangen-Nürnberg) - Gabiger, Anastasia (Department of Chemistry and Pharmacy, Friedrich-Alexander-Universität Erlangen-Nürnberg) - Whelton, Helen (Organic Geochemistry Unit, University of Bristol) - Pitts, Martin (Classics and Ancient History, University of Exeter) - Cramp, Lucy (Department of Anthropology and Archaeology, University of Bristol) - Hammann, Simon (Department of Chemistry and Pharmacy, Friedrich-Alexander-Universität Erlangen-Nürnberg)

Plant or plant-derived foods, like fava beans, figs, and honey, are very difficult to identify in pottery residues, due to their ephemeral nature and/or their scant lipid profile. Although it is well-established that lipids from cooked or processed foods can become trapped in the walls of clay vessels and survive for millennia, plant foods tend to be masked by fattier meat-based substances and their actual contribution to ancient diet is often ambiguous. Thus, in order to gain a more complete picture of ancient diet and culinary practices within the archaeological lipid data, it is important to explore how to identify relatively lipid-poor resources in pottery residues. We approached this issue through experimental lab-based archaeology; a series of cooking experiments were conducted to investigate eight plant or plant-based foods from the Iron Age and Roman period Britain in replica cookware. This is part of the Roman Melting Pots project, where over 900 archaeological pottery samples are currently being analyzed to explore cultural diversity and integration through culinary practices. A main aim of the experiments was to investigate potential novel biomarkers for currently underrepresented or invisible resources using two complementary high-resolution techniques, specifically liquid chromatography and gas chromatography coupled with high-resolution mass spectrometry [LC-HRMS, GC-HRMS]. We compared these to the lipid signatures of raw food extracts. Biomarker results and observations in lipid absorption behavior will be discussed, in addition to preliminary archaeological findings.

1009 BEYOND THE LENS: CONTEMPORARY METHODS AND INTERDISCIPLINARY SYNERGIES IN ARCHAEOBOTANY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Kriti, Alexandra (Institut Català d'Arqueologia Clàssica) - Moricca, Claudia (Department of Environmental Biology, Sapienza University of Rome) - Vignola, Cristiano (Department of Environmental Biology, Sapienza University of Rome) - Andonova-Katsarski, Mila (Division of Palaeobotany and Palynology, Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences) - Audiard, Benjamin (Institut des Sciences Analytiques, UMR 5280 CNRS, Université Claude Bernard; Laboratoire de Géographie Physique : Environnements Quaternaires et Actuels, UMR 8591 CNRS - Universités Paris 1 Panthéon Sorbonne et UPEC)

Session format: Regular session

Archaeobotany, the study of plant remains from archaeological contexts, used to be exclusively performed in a lab; isolated individuals sorting out and identify seeds through a stereoscope's lens. The traditional analytical approaches to study plant macro- and micro-remains are usually focused on the reconstruction of plant exploitation, as well as past landscape and footprints of human activities.

In the last decades, innovative protocols have been developed to investigate past environmental conditions, agronomic practices, and the past exploitation of plants. Morphometry, stable isotopes and organic residues analyses, and the recovery of ancient DNA have highlighted the role(s) of plants in the daily activities of ancient communities.

The simultaneous advance of digital humanities, the spread of social media and the introduction of AI tools in various inter- or cross- disciplinary project collaborations have forced the discipline to move fast-forward.

As a result, the agency of past individuals and/or communities and their interaction(s) with plants is being re-visited by many researchers and professionals across Europe. These attempts re-frame archaeobotany as a discipline that can be conducted outside the lab and is relevant to its age and era by utilising cutting edge technology.

In this session we aim to explore contemporary methods and synergies attempting to re-visit old questions in archaeobotany with new digital tools, re-use of botanical collections, agricultural archives and/or ethnographic records, perform ambitious experiments inside and beyond the lab, and re-introduce the wider audience to ancient agriculture and cuisine through inclusive remote and/or participatory actions.

We welcome contributions from researchers and professionals associated with archaeobotany, anthropology/history of food, ethno-archaeology/botany, and experimental archaeology to share experiences illustrating how contemporary inter- and/or cross-interdisciplinary methods in archaeobotanical research can bridge the gap between archaeology and the modern natural and physical sciences, as well as ordinary people of the 21st century and their past.

ABSTRACTS

1 TESTIMONIES OF RUIN. SYNERGISTIC ANALYSES OF ARCHAEOBOTANICAL REMAINS FOUND IN A POTTERY DEPOSIT IN CIEPŁE STRONGHOLD, POLAND

Nowosadzka, Ilona (University of Warsaw, Poland) - Kobjek, Weronika (University of Warsaw, Poland)

The early medieval cluster of settlements, strongholds and cemeteries in Ciepłe, Poland, has been under scrutiny of many researchers. In the most recent project we aim to thoroughly examine the Ciepłe 3 site, which is the current well-boding object of archaeologists' interest, we use Interdisciplinary research linking archaeobotanical, archaeozoological approaches and landscape archaeology to the traditional archaeological methods.

During the 2023 expedition we stumbled upon a deposition of three ceramic pots stacked inside one another in interchanging directions. On their sides there was a plurality of charred organic remains that became the main subject of our study.

Our goal to reconstruct the pots, understand their purpose and the circumstances in which they were deposited will be met by morphological, stylistic and typological, as well as the petrographic analysis of the ceramic fragments. The archaeobotanical identification of organic remains, in the context of their absolute chronology obtained from the AMS method, locations of which were measured and appraised by the RTK GPS technology, will be supplemented by the carpological analysis.

By this we hope to achieve not only the direct interpretation of this deposit, but also the fate of the stronghold as a whole. We are aware that our initial chronological assessments of Ciepłe show us a rather short span of activity. A deposit, especially such an unusual one, may shed some light on some dramatic events from the stronghold's history.

2 ETHNOLOGICAL APPROACH TO ACORN UTILIZATION IN PREHISTORY

Tang, Mengxia (Zhejiang University) - An, Ting (Zhejiang University) - An, Juhui (Zhejiang University)

Acorn remains are reported from prehistoric sites across the world. Acorn is argued to have been a significant food resource for humans in prehistory. However, relevant research is still limited and it is often challenging to recognize archaeological remains relating to acorn utilization. This research tackles the acorn processing pathway through a case study of 'mook making' in South Korea, employing semi-structured interviews and direct participant observation. The case study provides an explicit record of the acorn processing method, which consists of collecting, grinding, rinsing and filtering, starch-shell separation, boiling, solidification and serving. We draw attention to laborious nature of acorn processing and to different methods of acorn processing due to different species and culinary tradition. Particularly, the method in our case is about starch extraction, a specific form of acorn processing that might have been unique to East Asia due to culinary traditions. Additionally, the paper highlights potential archaeological and archaeobotanical markers associated with each step of the acorn-processing procedures and considers the chances of residue preservation under different conditions. These insights contribute to new perspectives on the archaeological interpretation of acorn remains.

3 LAB-INDUCED HEATING OF GREEK BARLEY (H.VULGARE) LANDRACES; A SET OF EXPERIMENTAL METHODS TO EXPLORE PAST AGRICULTURAL PRACTICES

Kriti, Alexandra (Institut Català d' Arqueologia Clàssica) - Livarda, Alexandra (Institut Català d' Arqueologia Clàssica) - Orenge, Hector (Institut Català d' Arqueologia Clàssica) - Mylonas, Ioannis (Hellenic Agricultural Organization-Dimitra, Institute of Plant Breeding and Genetic Resources) - Ninou, Elissavet (Department of Agriculture, International Hellenic University)

Experimental cultivations of 21 Greek barley (H.vulgare) landraces were conducted during the winter cultivation seasons of 2020-2022 in Themi, Thessaloniki in Greece as part of the collaboration between the Catalan Institute of Classical Archaeology/GIAP and ELGO-Demeter. The harvested grain from 3 landraces with different geographical and climatological zones' origin were chosen for further analysis.

A set of lab-induced heating experiments took place during late 2023 and early 2024 to explore -under controlled conditions, the morphological impact of heating on the surface of selected grains. Beyond the meticulous data collection that is recommended by the relevant literature, we also conducted -for the first time, extensive 3D scanning on all selected grains.

3D GMM comparable analysis on the shape of fresh and heat affected grains, combined with a new heating protocol that aims to record all laboratory-based observations, provides us with a unique insight on the effect of various heating treatments on the morphology of the grains. Additionally, each grain's morphology -either fresh or heat affected, is associated with a particular landrace and cultivation regime, opening another level of understanding of contemporary and/or ancient heat affected crops' grains.

The implementation of such a tool in archaeobotany, may provide the opportunity to further explore ancient crops regional origin and movement(s), as well as to investigate past cultivation practices in the Aegean and beyond.

4 TWO IN DISTRESS MAKES SORROW LESS: HOW SHARING FAILS CAN BRING DISCIPLINE FORWARD

Garay Palacios, Blanca (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educativa 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.) - Berihuete-Azorín, Marian (Universitat Autònoma de Barcelona (UAB), Departament of Prehistory, Edifici B, 08193, Bellaterra (Cerdanyola del Vallès), Spain.; Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educativa 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.) - Expósito, Isabel (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educativa 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili, Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.)

One of the main focuses of Archaeobotany is the study of the relationship between prehistoric groups and their environment. Through the study of plant remains we can understand how this environment was like, but also how it was used and exploited by humans. However, in some cases, recovery, processing, and identification of these archaeobotanical micro- and macro-analyses are not enough, and we need to carry out experiments and use other discipline's methodologies to interpret them.

From the more basic reference collection to the many options of charring regimes, processing techniques, or even cultivation, many different types of experiments have been carried out. The problem is that the lack of detailed protocols can make the experiment design a whole process on its own, where you must start with experimenting with different variables before getting to the point.

Moreover, almost only successful protocols are usually published, when mistakes or unsuccessful experiences are just as important, and all of them can be used as a starting point for the next experiment. In this communication, we will present some experiments, protocols, successful results, and also, failed experiments. We want to take the opportunity to encourage the scientific community to share all their results/experiments, no matter the outcome, since this may be key to building up a corpus of information and bringing forward our discipline.

5 ADAPTABILITY AND RESILIENCE: FARMING PRACTICES IN THE IRON AGE SOUTHEASTERN BALTIC

Minkevicius, Karolis (Nature Research Centre) - Kisielienė, Dalia (Nature Research Centre)

Traditionally, the period between the 1st and the 5th century AD in the Southeastern Baltic has been perceived as a time of flourishing and prosperity. The increasing access to prestigious artifacts, growing social complexity, and

changing settlement patterns are all supported by archaeological evidence. Unsurprisingly, this has resulted in an idealized image of well-established rural communities thriving on local agricultural produce.

However, recent inquiries into human-environment interactions during the Roman period have started to question such narratives. Archaeobotanical studies of charred crop assemblages from numerous sites in Lithuania, coupled with stable carbon and nitrogen isotope analysis of the main cereal taxa, have indicated significant regional variation, different farming strategies, landscape maintenance practices, and a range of environmental challenges. There is also evidence of varying degrees of success in agricultural activities.

This highlights the importance of applying interdisciplinary methods to geographically and archaeologically diverse datasets. Such an approach not only permits a more grounded overview but also offers more opportunities to analyze and understand settlement life-cycles on a case-by-case basis.

6 THE STUDY OF STABLE CARBON ISOTOPES ON ARCHAEOLOGICAL CHARCOALS TO RECONSTRUCT THE PALEOCLIMATE DURING LATE BRONZE AGE IN CENTRAL ITALY

Reggio, Chiara (Department of Science of Antiquities, Sapienza University of Rome, Italy; Department of Environmental Biology, Sapienza University of Rome, Italy) - Vignola, Cristiano (Department of Environmental Biology, Sapienza University of Rome, Italy) - Bettelli, Marco (National Research Council, Institute of Cultural Heritage Sciences (CNR-ISPC), Rome, Italy) - Cardarelli, Andrea (Department of Science of Antiquities, Sapienza University of Rome, Italy) - Dallai, Luigi (Department of the Earth Sciences, Sapienza University of Rome, Italy) - Di Renzoni, Andrea (National Research Council, Institute of Cultural Heritage Sciences (CNR-ISPC), Rome, Italy) - Masi, Alessia (Department of Environmental Biology, Sapienza University of Rome, Italy) - Sadori, Laura (Department of Environmental Biology, Sapienza University of Rome, Italy)

The study of past environmental conditions for plant growth is pivotal in tracing the socio-economic evolution of ancient societies, whose developments were closely linked to plant exploitation and crop production. This is especially true for the Bronze Age, one of the most controversial periods in Prehistory when important cultural changes occurred in association with strong climatic fluctuations and drought crises. From an archaeobotanical perspective, the application of stable isotope analysis to plant remains offers the possibility to reconstruct the palaeoenvironmental conditions in which plants grew, especially the stable carbon isotopes that record past water availability.

We present preliminary results of archaeobotanical and stable isotope analyses carried out at Monte Croce-Guardia (Arcevia, central Italy), one of the most important Late Bronze Age sites in Italy. The settlement arose in the 12th century BC, in parallel with complex changes in the settlement layout in Marche and surrounding areas (such as the collapse of Terramare in the Po Valley), and was abandoned about two centuries later, precluding the formation of the cultural entities of pre-Roman Italy.

We identified charred wood remains recovered from primary archaeological deposits, such as hearths, working surfaces, and other activity areas located on terraces connected to the settlement, covering the entire occupational sequence. Among woody taxa from different vegetation types, we selected charcoals of deciduous and evergreen *Quercus* to measure the stable carbon isotope ratio ($\delta^{13}C$). The isotopic signals provide useful information for reconstructing local precipitation patterns during the study periods. In addition, differences between the two oak species are interpreted in relation to ecological and physiological characteristics. These data will be further compared with the stable carbon isotope records of cereal remains to investigate how past climatic conditions influenced agricultural activities and, in general, social developments at Monte Croce-Guardia at the end of the Bronze Age.

7 LATE UPPER PLEISTOCENE CLIMATIC OSCILLATIONS IMPACT ON AN ENDANGERED SPECIES BASED ON GEOMETRIC MORPHOMETRY. THE CASE OF COREMA ALBUM

Martínez Varea, Carmen María (Departamento de Prehistoria, Historia Antigua y Arqueología, Universidad de Salamanca, Spain; ISEM-UMR 5554, Université de Montpellier, CNRS-IRD-EPHE, Montpellier, France) - Bouby, Laurent (ISEM-UMR 5554, Université de Montpellier, CNRS-IRD-EPHE, Montpellier, France) - Ivorra, Sarah (ISEM-UMR 5554, Université de Montpellier, CNRS-IRD-EPHE, Montpellier, France) - Audiard, Benjamin (Institut des Sciences Analytiques, UMR 5280 CNRS, Université Claude Bernard Lyon 1, France; Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València, Spain) - Badal García, Ernestina (Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València, Spain)

The Palaeolithic sequence of Cova de les Cendres (Alicante, Spain) has provided a rich archaeobotanical assemblage. In the carpological assemblage, *Corema album* (Portuguese crowberry) outstands. Its remains are abundant during the Gravettian, scarce during the Solutrean and completely absent during the Magdalenian (Martínez-Varea et al., 2019). The current main population of this taxon is limited to the Atlantic coast of the Iberian Peninsula, and just 11 plants survive on the Mediterranean coast, hence its Pleistocene evolution in this region is of great interest for its conservation.

We hypothesise that Late Upper Pleistocene climatic oscillations, especially during the Last Glacial Maximum (c.27 – 19 ka cal BP), profoundly impacted the ancient Mediterranean populations of *Corema album*, affecting their fructification. Geometric morphometry of the archaeological pyrenes has been performed to detect changes that could be related to these fluctuations. This methodological approach has been applied to cultivated taxa (e.g. grape, legumes) to identify species and infra-specific morphotypes or to shed light on the domestication process (Bouby et al., 2021; Tarongi et al., 2024). Their application to wild species is not frequent.

The results of the geometric morphometry analysis are correlated to other palaeoclimatic proxies available in Cova de les Cendres, such as the isotopic analysis ($\delta^{13}C$) of *Juniperus* sp. wood charcoal and the anthracological analysis.

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8 A MULTI ANALYTIC APPROACH TO DISCRIMINATE VARIETIES OF TRITICUM DURUM CARYOPSES IN ARCHAEOLOGICAL CONTEXT

Stella, Matilde (Laboratorio di Archeobotanica e Paleoecologia, Dipartimento di Beni culturali, Università del Salento) - Grasso, Anna Maria (Laboratorio di Archeobotanica e Paleoecologia, Dipartimento di Beni culturali, Università del Salento) - Capone, Martina (Laboratorio di Archeobotanica e Paleoecologia, Dipartimento di Beni culturali, Università del Salento) - Laghetti, Gaetano (IBBR-CNR Institute of Biosciences and BioResources) - Blangiforti, Sebastiano (Stazione Consorziale Sperimentale di Granicoltura per la Sicilia) - Fanizzi, Francesco Paolo (Laboratorio di Chimica generale e inorganica, Dipartimento di Scienze e Tecnologie Biologiche ed Ambientali, Università del Salento) - De Benedetto, Giuseppe Egidio (Laboratorio di Spettrometria di massa analitica ed isotopica, Dipartimento di Beni culturali, Università del Salento) - Fiorentino, Girolamo (Laboratorio di Archeobotanica e Paleoecologia, Dipartimento di Beni culturali, Università del Salento)

During the archeological research you can come across in granaries, in storage or transport containers where it is common to find large numbers of caryopses. Distinguishing varietal groups of species among fossil plants is still one of most difficult tasks in archaeobotany. Succeeding in this, however, means being able to reconstruct trade dynamics, to interpretate past agricultural management and to identify selection strategies. The aim of this work is testing new investigation methods capable of distinguishing wheat caryopses (in particular *Triticum durum*) from a varietal point of view. The experimentation was carried out on fresh and charred samples of modern durum wheat varieties (commercial and local), applying multiple analytical methods (biometry, morphometry, NMR, IRMS). The study focuses on the numerical, dimensional and morphological caryopses variations in relation to their ear position. Some varieties were also subjected to metabolomic and $\delta^{13}C$ e $\delta^{15}N$ isotopic analyses with the aim of discriminating the varieties from each other by edaphic and environmental factors.

9 ADDING ANCIENT DNA TO MULTI-PROXY ARCHAEOBOTANICAL STUDIES OF COPROLITES YIELDS FURTHER INSIGHT INTO NEOLITHIC DIETARY DIVERSITY

de Groot, Arjen (Wageningen UR; Utrecht University) - Kubiak-Martens, Lucy (BIAX Consult) - Özdoğan, Kadir (Utrecht University; Wageningen UR) - Plets, Gertjan (Utrecht University) - Huisman, Hans (University of Groningen; Cultural Heritage Agency of the Netherlands)

Archaeobotanical study of fossilized faeces, i.e. coprolites, provides invaluable information on the diet and health of ancient societies, as it offers direct evidence of their food consumption. This holds particular significance for studies of Neolithic cultures in NW-Europe, where local populations are thought to have shifted from hunter-gathering to agricultural practices, leading to changes in dietary patterns for both humans and their domesticated animals. A recent multi-disciplinary project addressed these inquiries by analyzing a set of coprolites from the mid-Neolithic Swifterbant Culture (4300–4000 cal BC) in The Netherlands, employing a variety of methods, including micro-CT and SEM analysis, along with the microscopic study of phytoliths, pollen and other microfossils. This revealed a unique picture of a ‘community diet’ in which both humans and domestic animals combined ‘wild’ natural food sources with new agricultural products. However, this research was confined to identifiable dietary components retrieved from the coprolite samples. In this paper, we present new insights gained through the re-examination of the same coprolites using ancient environmental DNA analyses. This new technique allows the extraction of DNA from environmental samples, either within or outside organic remains. We show how these new data partially confirmed existing results,

but also added new information on dietary composition and provided new evidence on the identity of the coprolite producers.

10 HARNESSING INNOVATION TO DECODE THE SECRETS OF PALEOLITHIC GROUND STONE TOOLS

Sorrentino, Giusi (Department of Environmental Sciences, Informatics and Statistics - Ca' Foscari University of Venice) - Cagnato, Clarissa (Department of Environmental Sciences, Informatics and Statistics - Ca' Foscari University of Venice) - Longo, Laura (Department of Environmental Sciences, Informatics and Statistics - Ca' Foscari University of Venice) - Semenzin, Elena (Department of Environmental Sciences, Informatics and Statistics - Ca' Foscari University of Venice) - Marcomini, Antonio (Department of Environmental Sciences, Informatics and Statistics - Ca' Foscari University of Venice) - Porpora, Francesca (Department of Chemistry “Ugo Schiff” - University of Florence) - Carretti, Emiliano (Department of Chemistry “Ugo Schiff” - University of Florence) - Badetti, Elena (Department of Environmental Sciences, Informatics and Statistics - Ca' Foscari University of Venice) - Dei, Luigi (Department of Chemistry “Ugo Schiff” - University of Florence)

Starch, a reserve of polysaccharides stored in plant amyloplasts, was discovered alongside use-wear traces on ground stone tools (GSTs) dating back to the Late Pleistocene: Marine Isotopic Stage 3 (MIS 3, 60–25 ka BP). This suggests that *Homo sapiens* (HS) was actively processing various plant organs during its diffusion into Eurasia. Traditional starch grain analysis involves morphometric characterization using optical microscopy with bright and polarized light, typically after sampling from archaeological artifacts using wet or dry extraction procedures.

We propose an integrated methodology for the characterization of starch grains adhering to the archaeological GST working areas, testing different approaches for their extraction. Indeed, traditional removal procedures can interfere with their physico-chemical characterization and impact on the GST use-wear trace analysis. Additionally, proper characterization necessitates a comparative reference collection. Our approach relies on the combination of traditional morphological characterization merged with cutting-edge chemoprofiling techniques enhanced by innovative extraction procedures. Moreover, it has allowed further analysis including the comparison with a tailored reference collection of starch granules from plants potentially available during MIS 3 in the relevant geographical area(s). Through this multidisciplinary approach we aim to enhance the narrative on the exploitation of available resources by hominins thriving in a given territory.

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11 BRIDGING DIMENSIONS IN CEREAL PHYTOLITH IDENTIFICATION: A COMPARATIVE STUDY OF 2D AND 3D MORPHOMETRIC DATA

Hermans, Rosalie (Archaeology, Environmental Changes and Geo-Chemistry (AMGC), Vrije Universiteit Brussel, Pleinlaan 2, Brussels 1050, Belgium.) - Li, Mao (Donald Danforth Plant Science Center, Olivette, MO 63132, USA) - Brightly, William (Department of Plant and Animal Sciences, University of Sheffield, Sheffield S10 2TN, UK) - Gallaher, Timothy (Bishop Museum, Honolulu, HI 96817, USA) - Strömberg, Caroline (Department of Biology, University of Washington, Seattle, WA 98195, USA) - Nys, Karin (Archaeology, Environmental Changes and Geo-Chemistry (AMGC), Vrije Universiteit Brussel, Pleinlaan 2, Brussels 1050, Belgium.) - Snoeck, Christophe (Archaeology, Environmental Changes and Geo-Chemistry (AMGC), Vrije Universiteit Brussel, Pleinlaan 2, Brussels 1050, Belgium.)

This research focuses on silica plant microfossils, called phytoliths, and particularly, a specific phytolith morphotype that is frequently encountered in grass inflorescences, ELONGATE DENDRITIC. In archaeological contexts, this morphotype is often ascribed to the presence of cereals. However, its formation in both cereals (wheat, rye, oats, and barley) and wild grasses forms a challenge in making definitive taxonomic distinctions, casting uncertainty on their reliability as a cereal marker. The primary objective is to explore the capability of ELONGATE DENDRITIC to differentiate between cereals and wild grasses, and to determine the extent to which they can be used to accurately classify cereals at genus and species level.

Last year, we prepared a substantial phytolith reference dataset of cereals and wild grasses that we used to develop a 3-D phytolith model dataset (n = 1.850 surface meshes). This dataset was created using confocal microscopy and Imaris image processing software. This year, we introduce a 2D phytolith image dataset (n = 9.100 phytolith outlines), generated using conventional light microscopy and ImageJ processing software. This dataset aims to provide a more accessible and cost-effective alternative for the identification of cereal phytoliths.

To quantify the morphology of the phytoliths, morphometric features were extracted from the 3D surface meshes and the 2D phytolith outlines. This included both traditional shape and size features and features deriving from Persistent Homology, which is a technique from algebraic topology used to quantify complex shapes.

By using a set of machine learning models, the study evaluates the performance of both datasets to identify phytoliths at species and genus level. The study also reflects on the usage of Persistent Homology as a quantification technique in phytolith research. Our goal is to ascertain the optimal balance between taxonomical precision and practical applicability in the identification of cereal phytoliths in archaeobotanical studies.

12 CHARCOAL CHEMISTRY: UNCOVERING THE MOLECULAR MYSTERIES. FROM PRESERVATION TO THE IDENTIFICATION OF TAPHONOMIC PROCESSES IN ARCHAEOLOGICAL CONTEXTS

Roversi, Deborah (University of York; French National Centre for Scientific Research | CNRS · CEPAM UMR 7264) - Théry-Parisot, Isabelle (French National Centre for Scientific Research | CNRS · CEPAM UMR 7264) - Penkman, Kirsty (University of York) - High, Kirsty (University of York)

Compared with archaeological wood and other organic remains, charred materials survive in various climatic conditions. As such, they represent the main source of organic materials in some archaeological contexts, thus playing an important role in the study of past human practices. Although for decades charcoal has been considered an inert material, some preservation issues related to the deposition environment have been highlighted (Ascough et al. 2010; Braadbaart et al. 2009). These observations raise important questions about the representativeness and potential biases of anthracological assemblages in assessing past vegetation and fuel management.

To further investigate the changes induced by the charring and the depositional process, and how this could be affecting the preservation of the charcoal itself, a comprehensive investigation into the molecular structure of charred materials is needed.

This study applies Fourier transform infrared spectroscopy (FT-IR) analysis to give an insight into how different processes commonly encountered in an archaeological context (e.g fungal attack, different soil acidity, freeze cycles, etc.) can affect the molecular structure, and therefore the level of preservation and accurate representation of charcoal in archaeological assemblages.

The primary goal is to establish a correlation between the chemical composition of charcoal and specific anatomical indicators, such as vitrified charcoal, whose origins remain ambiguously identified. As part of this research, experimental and archaeological charcoal, subjected to different processes and/or conditions, has been characterised through Fourier transform infrared spectroscopy (FT-IR) enabling the identification of chemical group differences and comparisons of structural changes. Although infrared spectroscopy has been utilised in industrial charcoal characterization, its application to archaeology is hindered by diverse research approaches and material complexities. The purpose of this presentation is to address these challenges and explore the potential of adapting this technique for anthracological studies.

1011 INVESTIGATION OF NEOLITHIC LITHIC TECHNOLOGY AND EXPERIMENTATION: AN APPROACH TO TECHNICAL VARIABILITY

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Minguell López, Arnau (PhD student in Universitat Autònoma de Barcelona) - Ménager, Cécile (Dr and associate researcher to Archéorient (UMR 5133 - CNRS)) - Defranould, Elsa (UMR7264-CEPAM) - Terradas, Xavier (Spanish National Research Council (CSIC-IMF, Barcelona)) - Palomo, Antoni (Universitat Autònoma de Barcelona)

Session format: Regular session

Knapped lithic productions and experimentation emerge as crucial elements in the research of the Neolithic period, playing a fundamental role in understanding the technological complexities of this era. This session delves into a meticulous analysis of lithic technology, exploring the evolution of tools throughout the historical development from early Neolithic communities to the emergence of the first metals.

We examine how the tradition, cultural progression, and technological advancements of Neolithic communities are reflected in lithic assemblages. Special attention is given to experimental methodologies that shed light on the manufacturing and use of these productions, providing a detailed insight into the skills and techniques employed.

This session calls for contributions addressing archaeological, experimental, and analytical studies related to lithic technology in Neolithic contexts. The goal is to enrich the understanding of this crucial phase in human history, fostering interdisciplinary dialogue, experimental reconstructions, and technological analyses.

The diversity of perspectives will allow for a comprehensive overview of the significance of lithic knapped productions in the daily life, economic activities, and cultural practices of Neolithic communities. By exploring the intersection between the materiality of lithic tools and the human experience, this session aims to deepen our understanding of lithic productions in Neolithic societies.

ABSTRACTS

1 RAW MATERIALS, WORK TOOLS, AND PRODUCTION PROCESSES IN THE EARLY NEOLITHIC OF CORO TRASITO (TELLA.SIN, HUESCA)

Clemente-Conte, Ignacio (CSIC-IMF) - Hansen, Jakob (Departament de Prehistòria. Universitat Autònoma de Barcelona) - Rey Lanaspá, Javier (Dpto. de Presidencia, Interior y Cultura. Diputación General de Aragón.) - Sierra Saiz-Aja, Alejandro (Departament de Prehistòria. Universitat Autònoma de Barcelona) - Saña Seguí, María (Departament de Prehistòria. Universitat Autònoma de Barcelona) - Gassiot Ballbè, Ermengol (Departament de Prehistòria. Universitat Autònoma de Barcelona) - Díaz Bonilla, Sara (Departament de Prehistòria. Universitat Autònoma de Barcelona) - Barba Pérez, Marcos (Departament de Prehistòria. Universitat Autònoma de Barcelona) - Mazzucco, Niccolò (Dipartimento di Civilizzazione e Forme del Sapere, Universidad de Pisa)

The tools of the Early Neolithic period in the Coro Trasito cave, on the southern slope of the Central Pyrenees, are diverse and were crafted from different raw materials. Thus, lithic instruments are recorded in various materials such as chert from different sources, quartzite, fibrolite, granite, sandstone, hornfels, and limestone. Depending on the instrument to be manufactured and the work to be done, a specific lithic raw material is chosen, which due to its physical characteristics will be more precise or effective for carrying a specific productive task. In the same way, instruments made from other non-lithic raw materials are used, such as bones from both domestic and hunted animals, deer antler, tusks or teeth from animals, and shells from marine mollusks. It is also noteworthy the use of ceramic fragments as tools or spatulas, as well as the presence of materials such as leather, vegetable fiber, and bundles of grass for the treatment of ceramic surfaces during their manufacture.

We present the results of the traceological analyses of all these materials, grouping the instruments according to the productive activity in which they intervened. In this way, we have been able to record the different instruments that were used in the same productive process. Thus, we have registered instruments used for the production of lithic products, others for hunting and meat processing, for working animal hide, the instrumental set for ceramic production, those used for the production of vegetable fibers and the weaving in basketry, instruments involved in agriculture or the processing of agricultural products, and the working of wood and/or hard animal materials.

2 TECHNO-MORPHOLOGICAL ANALYSIS OF THE LITHIC INDUSTRY OF THE ANCIENT NEOLITHIC IN THE CENTRAL SOUTHERN CENTRAL PYRENEES

Barba Pérez, Marcos (Departament de Prehistòria. Universitat Autònoma de Barcelona) - Clemente-Conte, Ignacio J. (CSIC-IMF (Institució Milà i Fontanals)) - Gassiot Ballbè, Ermengol (Departament de Prehistòria. Universitat Autònoma de Barcelona) - Mazzucco, Niccolò (Dipartimento di Civilizzazione e Forme del Sapere, Universidad de Pisa)

The study of human occupation of these areas of southern Europe has experienced very important development in recent decades, with a high volume of unpublished data, relevant innovations within archeology and an increase in interdisciplinary work. This increase in data is also reflected in a greater number of lithic assemblages from a larger number of excavated sites.

This presentation outlines a brief synthesis of recent information that will focus primarily on the techno-morphological study of the lithic materials from three upland sites in the southern central Pyrenees, the rockshelter: Abric de Obagues de Ratera, Cova del Sardo de Boí and Abric del Portarró. All of them are located in the Aiguestortes i Estany de Sant Maurici National Park, at altitudes between 1800 and 2320 m. asl. The excavations carried out at the different sites have documented large archaeological sequences, with various phases of occupation during the Neolithic. The analysis of the lithic material has made it possible to explain the technological strategies involved in the places under study and to delimit the existence of different production trajectories of the raw materials present in the archaeological record, characterizing the lithic technology of the different places and identifying the technical development and technological changes produced related to the Neolithic and recent prehistory in the Pyrenees. We understand these lithic remains as social products, the result of the collective work of women and men who inhabited the past, being a reflection of the modes of production developed in certain prehistoric and historical periods. Thus, their study allows us helps to know the economic, social and technical practices of human communities, the dynamics of management and exploitation of the environment and the characterization of the evolutions and breaks of technical traditions.

3 LITHIC PRODUCTION ON THE LATE NEOLITHIC SITE OF VINČA-BELO BRDO (SERBIA)

Radinovic, Mihailo (University of Belgrade)

The Late Neolithic levels of Vinča-Belo Brdo site have yielded an abundance of lithic finds that were deposited during the 800 years of continuous occupation. The previous studies have reconstructed various aspects of lithic organi-

zation, but many questions still remain unanswered. Are there differences between chert and obsidian technology? What are the predominant knapping techniques and are there diachronic changes in this aspect? Are there traces of hafting? Is there any evidence for specialization in lithic production? Previous studies have provided different answers to these and other questions. In this study, I present the results of the analysis of Belo Brdo lithic material, arguing that different qualitative and quantitative approaches can be used as complementary tools in reconstructing different aspects of lithic organization. I also discuss the obtained results in the context of other relevant data about the site and the studied period, bringing new data to the study of the Late Neolithic of the Central Balkans.

4 A NEW APPROACH TO INDIRECT PERCUSSION: FROM EXPERIMENT TO ARCHAEOLOGY

Menager, Cecile (Archéorient)

This presentation shows the results of an experiment on indirect percussion carried out as part of a doctoral thesis. The aim of this project was to redefine the lithic knapping technique, which has often been superficially characterized. A 1473-flint-blade-experimental collection was made by five knappers. Two categories of indirect criteria could be observed on all of these blades: there were scars, a result of the use of the knapping technique, and morphological characters related to the shape of the core. These criteria were then classified into three groups according to their statistical frequency: symptomatic (ripples, no interrupted bulb, striking angle (between 80 and 90°), mesial and distal hackles, proximal hackles, no discontinuity under the bulb, no lip and, curved profile), less symptomatic (sinuous and straight arris, spontaneous retouching on the edges, convergent edges, trapezoidal or irregular sections, salient points of impact) and secondary (plain striking platform, quadrangular or ogival proximal part, bulb scars, butt inclination, broken blades, hinged or plunging blades, cracked butt, double bulb, a tongue fracturing and thick butt). Three variables were finally identified as playing a role in the frequency of these criteria: the type of the punch, the knapper and the striking angle. The criteria were then observed and compared on four laminar Neolithic collections from northern Greece (Dikili-Tash, Promachonas-Topolnica, Dimitra and Mikri Volvi), dated from Early to Late Neolithic. This method for detecting indirect percussion is intended to be trialed on other archaeological material in order to be further developed and have its accuracy improved.

5 PUNCHES AND BLADE PRODUCTIONS IN THE EARLY NEOLITHIC OF THE NORTH-EAST OF THE IBERIAN PENINSULA

Palomo, Antoni (Universitat Autònoma de Barcelona) - Terradas, Xavier (Spanish National Research Council (CSIC-IMF, Barcelona)) - Clemente, Ignacio (Spanish National Research Council (CSIC-IMF, Barcelona)) - Minguell, Arnau (Universitat Autònoma de Barcelona, Departament de Prehistòria) - Rosillo, Rafael (Independent researcher) - Piqué, Raquel (Universitat Autònoma de Barcelona, Departament de Prehistòria)

The determination of the knapping techniques used in the blade productions of the Early Neolithic has traditionally been a difficult question to resolve. The analysis of the technomorphological characteristics and comparisons with experimental collections has been the most common way to make inferences about the technique and tools used. The documentation of a series of deer antler points interpreted as punches at the Early Neolithic sites of La Draga (Girona, Spain) and Coves del Fem (Tarragona, Spain) has opened other approaches for the determination of knapping techniques. Our work has addressed the functional study of possible archaeological punches by comparing the use-wear of a set of experimental punches used in the replication of blade productions documented in the sites. The study enables us to propose various functional criteria to validate the determination of deer antler tools as punches.

Besides, the study has also contemplated the analysis of the archaeological collections from a technomorphological perspective and their comparison with the experimental productions carried out. This has, on the one hand, generated valuable data of technical characteristics associated with the use of indirect percussion and, on the other hand, has reinforced the general interpretation of the knapping techniques used during the Early Neolithic in the Northeast of the Iberian Peninsula.

1013 FUNERARY RITES IN EUROPEAN PREHISTORY: KNOWLEDGE TRANSFER IN A WORLD OF WORLDS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Brinkmann, Johanna (Institute of Pre- and Protohistoric Archaeology, Kiel University; Cluster of Excellence ROOTS, Kiel University) - Brunner, Mirco (Institute of Archaeological Sciences, Bern University; Oeschger Centre for Climate Change Research (OCCR), Bern University) - Gorgues, Alexis (UMR 5607 Ausonius, Université Bordeaux Montaigne) - Pape, Eleonore (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig) - Blank, Malou (Department of Historical Studies, Gothenburg University)

Session format: Regular session

Examining European Prehistory through the lens of funerary archaeology reveals overarching trends such as single or collective burials, diverse burial forms like flat graves or burial mounds, and shifts in burial practices across the continent, including transitions from inhumation to cremation. On a local scale, however, we find a mosaic of local burial rites merging into “one” big picture. Besides the spread of specific burial rites (e.g., the use of passage tombs in the Neolithic or in the Bronze and Iron Age cremation burials in metal urns), we see an adoption of ideas from distant or neighbouring regions, a resumption of earlier traditions and local innovations. Whereby the application of scientific methods like isotopes and aDNA shifts our perception and challenges established narratives (Kristiansen 2014). Here, in the spread of funerary rites a transfer of knowledge becomes visible in the material culture.

In this session we examine the spread of (specific aspects of) funerary practices and their temporal and spatial expansion across Europe exploring the concept of knowledge transfer. The term knowledge has been used in archaeology mostly intuitively (Hansen 2018) rather than systematically (Renn 2012), although different dimensions of knowledge (e.g., cosmological, political, and technological) are evident in funerary rites.

We welcome studies ranging from the Neolithic to the Iron Age which approach the topic on a Europe-wide scale as well as those who integrate local practices into a bigger picture. The session is open to theoretical contributions that conceptualize the notion of knowledge transfer in archaeology, as well as ethnological and ethno-archaeological studies and contributions from the archaeological sciences. We seek to identify visible routes of knowledge transfer and contacts as well as barriers, boundaries and fringes of knowledge. We inquire whether this concept can extend the discussion beyond terms like mobility and exchange.

ABSTRACTS

1 THE CONCEPT OF KNOWLEDGE AND KNOWLEDGE TRANSFER IN ARCHAEOLOGY

Brinkmann, Johanna (Institut fuer Ur- und Fruehgeschichte Kiel; ROOTS Cluster of Excellence)

Knowledge and the transmission of knowledge are essential components in all societies. Be it the passing on of technical knowledge, knowledge about certain kinds of craftsmanship, social and cultural norms, or traditions (like burial customs). Knowledge may be gained, accumulated, transferred or lost in various ways depending on the societal preconditions. In the discipline of archaeology, knowledge is omnipresent in a dual sense: on one side we as archaeologists try to reconstruct knowledge about past societies lost over time, on the other side knowledge was an essential element in prehistoric societies themselves. Who had access to which kind of knowledge, which knowledge was passed on, which forgotten or even obliterated? From De Long's (2004) division into human, social, cultural and structural knowledge to Renn's (2012) globalization of knowledge there are many concepts that can be adapted for archaeological research. This contribution will explore how the concept of knowledge and knowledge transfer can be utilized looking at archaeological phenomena. A special emphasis will be on the transmission of knowledge in funerary practices using two examples from the Neolithic and the Late Bronze/Early Iron Age, namely the spread of passage tombs and of cremation burials in metal urns.

2 THE MAIN ROAD TO PREHISTORY. THE EXCAVATION OF A BURIAL GROUND ADJOINING AN ANCIENT CROSSROAD

Wickberg, Ylva (Sydsvensk Arkeologi AB)

During an excavation, with the limitations that comes with contract archaeology, a previously unknown burial field was discovered. The project was conducted because of the widening of a road, located between the villages of Fjälkinge and Gualöv in southern Sweden. The burials proved to have an origin in the late Neolithic and the shift between Early and Late Bronze Age. A part of the graves showed to be a mix between the rituals of inhumation and cremation: The earliest ones included a coffin shaped pit, where the deceased and burial gifts was placed and then covered with stones. After a gap in time the burial ground was resumed, but now the deceased were cremated, and the remains, unburned gifts and a stone filling was placed in a - still human sized - pit. In the youngest tombs cremated remains were

placed, sometimes in a vessel, in small, shallow pits. We know that the same change of the burial rituals take place in very large geographical areas. How did the cultural transfer of new traditions and beliefs proceed in this area? New ideas spreading is depending on communication, trading, travelling, and thanks to recent years of interdisciplinarity and wide range of scientific analyses, the knowledge about people and goods movement in regional and interregional landscape is increasing. The location of the site is interesting considering this: Adjoining a modern crossroad, that historical maps confirm also existed AD 1684. Several known prehistorical settlements and burial sites also follow these roads, indicating its very ancient origin. The landscape in the area has been characterized by wetlands and bogs, and the topography makes the options of travelling limited. Have the now modest hillside once been a link in the chain of change?

3 MEGALITHIC GRAVE ARCHITECTURE AND MORTUARY PRACTICES IN NEOLITHIC WESTERN SWEDEN AS INDICATOR FOR KNOWLEDGE TRANSFER

Blank, Malou (University of Gothenburg) - Brinkmann, Johanna (Kiel University)

The building of megalithic graves was a widespread phenomenon in Neolithic Europe. Within the Scandinavian and Northern German Funnel beaker complex, the grave constructions and burial practices seem to follow defined patterns and rules, although regional differences occur. In Western Sweden the use of the megalithic graves within a Funnel beaker context is followed by c. 500 year hiatus, during which other burial customs prevailed. Then, in the Late Neolithic gallery graves emerged and spread over vast areas in Scandinavia. The Late Neolithic gallery graves are by many scholars considered as a reinvention of earlier megalithic traditions. The close connection between the Funnel beaker and the Late Neolithic megalithic graves is especially prominent in Western Sweden where large gallery graves, the reuse of earlier megaliths and the deposition of bones from earlier graves in gallery graves have been observed. The knowledge of megalith building was thus passed through the ancient monuments which were also used to emphasize a fictional belonging to mythological ancestors. Furthermore, political, and ideological knowledge were spread and established through the construction and use of these graves.

4 DECONSTRUCTING THE DEAD: EVIDENCE FOR POST-MORTEM BODY PROCESSING FROM MILLIN BAY LATE NEOLITHIC CAIRN, NORTHERN IRELAND

White, Lisa (Queen's University Belfast) - Megarry, Will (Queen's University Belfast) - Murphy, Eileen (Queen's University Belfast)

Ireland's position at the western-most part of Neolithic Europe proffers a unique and important reference point for understanding change during the Neolithic period. The mortuary record concerning the Late Neolithic period in Ireland (c.4000–2500 BC) evidences a variety of complex funerary practices which will have been impacted by concepts of social, cultural, and spiritual identity. One aspect of the mortuary record which connects many of the major burial complexes in Ireland, yet remains little understood, is the evidence of post-mortem body processing. Cut marks on human bone attesting to dismemberment and/or defleshing practices, have been identified at Carrowkeel Passage tomb complex, Co. Sligo (Geber et al., 2017), Carrowmore megalithic complex, Co. Sligo (Burenholt, 1998) and Millin Bay Late Neolithic cairn, Co. Down (Murphy, 2003; White et al. forthcoming). Yet, a cross-comparative analysis of how the living interacted with the dead during this rite has not been fully explored. Identifying patterns, or the lack thereof, in the post-mortem processing of the dead across the island of Ireland and comparing this to the wider British and European Neolithic context, may reveal networks and models of knowledge transfer on a local, regional and national scale. This paper presents the initial results of an ongoing study into the cut marks evidenced on skeletal human remains recovered from Millin Bay Late Neolithic cairn and discusses whether 'ritual' behaviour can be identified both within the site and on a wider scale.

5 THE MEMORIES OF THE GENERATIONS: VISIBLE ROUTES KNOWLEDGE TRANSFER

Higginbottom, Gail (El Instituto de Ciencias del Patrimonio (Incipit, CSIC))

To rephrase a conclusion by Bueno Ramírez et al. 2022, this presentation will demonstrate that the key to the construction & location of dolmens as well as their internal imagery is the ideological weight of visual expression and its connection to the way societies construct and see themselves. This is, of course, part of the feedback mechanisms between materialities upheld in phenomenological philosophy. However, whilst this paper sees megalithic art as inextricably linked to death, its relational place or association with the world of death is not constrained to the cult of the ancestors but expands to the passings and pasts of all things. This implies, too, that not only are the memories of a line of individuals encapsulated here (memories of generations, Bueno Ramírez et al. 2022: 185), but so too the 'the memories of the generations', knowledge of all things held by the society through time and is thus intricately linked to knowledge care-taking as well as knowledge transfer. Through the examination of dolmen associations and landscapes, this work will show that dolmens and the elements that make them, entail the answers to the central on-

tological question - "What is there?", thereby identifying the visible routes of knowledge transfer for both those of the past, present and continued generations and that some of these 'knowledges' were transferred around Iberia.

6 TRACING THE TRANSFORMATIVE SHIFT IN BURIAL CUSTOMS IN NORTHERN JUTLAND DURING THE EARLY CORDED WARE PERIOD

Nielsen, Simon (Vesthimmerlands Museum)

From around 2850 BCE and in the subsequent centuries, a significant cultural shift occurred on the Jutland peninsula in western Denmark, leading to the emergence of the Single Grave Culture within the broader Corded Ware (CW) complex. This transformative shift introduced a distinct set of burial customs, supplanting the funerary traditions of the preceding Funnel Beaker (TRB) period. This phenomenon mirrored a broader trend observed across Europe, where newly formed CW groups replaced existing practices. Recent revelations of steppe DNA within CW groups across Eastern, Central, and Northern Europe have reignited discussions surrounding immigration theories. The focus has shifted from questioning the arrival of new groups at the outset of the CW period to exploring the processes that unfolded locally and regionally, including migration as an integral component. In the southern areas of Jutland, these changes occurred in locations minimally influenced by interference from the existing late TRB groups. Conversely, in the northern regions, existing cemeteries exhibited spatial consistency, indicating localized integration between newly arrived groups and established communities. This is further exemplified by certain resummptions of the funerary rites in the region across the transition. This presentation, based on recent analyses, provides a nuanced exploration of these local developments. Specifically concentrating on Northern Jutland, it examines the integration of the new CW burial practices into a confined local region, shedding light on communication routes, knowledge transfer and cultural admixture during one of the most significant cultural shifts in the region.

7 EXPLORING THE SPREAD OF KNOWLEDGE IN CORDED WARE BURIAL PRACTICES - INFORMATION TRANSMISSION IN THE THIRD MILLENNIUM BCE

Helmecke, Florian (Leiden University)

With the rise of the Corded Ware phenomenon at the beginning of the third millennium BCE, the widespread sharing of novel burial practice principles marked a significant change in the cosmologies of Neolithic communities inhabiting the continent. This successful spread of an idea on how to bury (and equip) the dead was accompanied by major demographic shifts, which significantly altered the European gene pool according to recent aDNA studies. Current conceptualisations of these dynamics connect the changes in the archaeological record with an uptick in mobility and an influx of people from the steppes. Yet, the mechanisms behind the spread of the Corded Ware phenomenon remain largely unexamined. Explanation attempts either navigate along subjectively selected sites and findings from archaeogenetic and isotopic studies or only re-theorise broader archaeological trends. But while the former are only valid for specific times and places and widely ignore the entire funerary record at hand, the latter lack a systematic and methodological examination of the available burial data. The heart of the matter, however, remains unaddressed: Burials represent short-term social events in which collective behaviour synthesised into considerate actions of part-takers, some of which materialised in the archaeological record. These practices can be identified to investigate past knowledge transfer and understand how shared information on persistent burial practices emerged, disseminated and became transmitted over vast areas during the first half of the third millennium BCE. By reconstructing the degree of similarity between burials in a network approach, a probabilistic method is proposed to investigate the spread of knowledge between practitioners exchanging and adhering to information on world views and ideas.

8 BRONZE AGE BURIAL RITES AND SETTLEMENT DYNAMICS IN THE CENTRAL ALPS

Brunner, Mirco (University of Bern)

This study provides a detailed overview of the state of Bronze Age research in Switzerland between the Swiss Plateau and the Alps. During the Early Bronze Age, numerous rich Bronze Age burials occur in western Switzerland, which are often associated with the emergence of bronze metallurgy and the exploitation of local ore deposits. These graves contain grave goods and material culture, especially bronze artifacts, which have close links to trans-European forms of prestige and status expression. The development of bronze consumption during the three phases of the Bronze Age in the central Alpine region is discussed.

In the pre-phase (BzA1), 2200 to 2000 BCE, metal finds such as shovel head needles and daggers remain sparse. Only in the classic phase (BzA2) between 1900 and 1750 BCE can particularly rich graves be recognized, as in Thun-Renzenbühl. There are significantly more graves; the first hoard finds are deposited during this period. In addition, gender-specific distinctions in the burial rite become more regular and are visible in the grave furnishings. The spatial expansion and increasing density of settlements in the Alpine foothills and in the Alpine valleys indicate the importance of access to trade routes and resources. This development is supported by dendro and 14C data from lakeside and hilltop settlements. Between 1750 and 1550 BCE, gender-specific grave goods show strong contacts

with Central Europe. Although we observe increasing inequality in burial dress, the development of Alpine settlement dynamics, subsistence and metallurgy is a complex process that should not be subsumed under social evolutionist models of the development of a hierarchical society. The transference of knowledge plays a crucial role in this context. Between 2200 and 1600 BCE, burials were fairly uniform, but from 1600 to 1350 BCE, a wide variety of burial practices emerged. After 1350 BCE, cremation became the standard.

9 BURNING ISSUES... ADOPTION OF THE "NEW" BURIAL RITE IN MIDDLE BRONZE AGE IN THE AREA OF POLAND

Strózyk, Mateusz (Archaeological Museum in Poznan)

The presented paper concerns on the adoption of the cremation burial rite in the Middle Bronze Age (ca. 1600-1300 BC) and chronological dynamics of that process. In Central Europe, the role of the key substrate in the process of the transformations from inhumation to cremation was played by the local groups associated with the Tumulus Culture. The still lively traditions of inhumation under barrows often coexisted with a new type of burial in the form of cremation graves.

The research was conducted in relation to area of Western Poland. Some preliminary results of chronological analysis of materials from crucial funeral sites will be presented. The main sources for analysis will be the forms and ornamentation of metal objects, finding analogies in other areas of Europe during this period. Often the ornamentation remained the same, but the materials on which it appeared varied according to the needs of the host culture. In general, the main aim of mentioned research is to conduct a multidimensional analysis and interpretation of the genesis of the transformation process of Middle Bronze Age funeral rite in Poland. The submitted paper will seek answers to key questions about the nature of the profound burial rite change related to the appearance and development of the Tumulus Culture community.

10 DEVELOPMENTS OF THE BURIAL RITES BRONZE AGE MORAVIA, CZECH REPUBLIC

Šabatová, Klára (MUNI - Ústav archeologie a muzeologie) - Parma, David (Institute for Archaeological Heritage Brno) - Cheung, Christina (Department of Anthropology, Chinese University of Hong Kong) - Snoeck, Christophe (Vrije Universiteit Brussel)

This abstract focuses on the examination of Bronze Age burial rites in Moravia, shedding light on the transmission of knowledge and cultural customs in the Bronze Age Europe. At the beginning of this paper was an effort to understand the transition between the skeletal and cremation rite in the Middle Bronze Age more accurately. After obtaining radiocarbon data and in part strontium data, it turns out that some changes in the burial rite have the character of a long process and are very complex, but others are very fast.

Questions of changes in burial rite from skeletal cemeteries of the Early Bronze Age to small burial sites of the Middle Bronze Age will be illustrated based on radiocarbon data from various well typologically dated burials. The analysis of Urnfield cemeteries, characterized by cremation burials in urns, represent a significant funerary tradition spanning from the Bronze Age to the Iron Age. Through the lens of funerary archaeology and scientific radiocarbon and strontium data from cemetery Přáslavice and radiocarbon dates from other selected sites this study explores the temporal and spatial expansion of urn burial rites in Moravia, highlighting the interconnectedness of communities and the exchange of ideas within the region. By investigating the material culture associated with Urnfield burials, including grave goods the study aims to discern patterns of knowledge transfer and cultural interaction. This paper proposes a multi-disciplinary approach, integrating archaeological and scientific perspectives, but also shows the limits of scientific data and archaeological record. Still, we hope to elucidate the complexities of Burial rites in Moravia and their significance in the broader context of European prehistory.

11 IN THE MIDST OF CHANGE: MIDDLE BRONZE AGE CREMATION PRACTICES AND BURIAL MOUNDS OF UNTERRADLBERG, LOWER AUSTRIA

Skerjanz, Hannah (Austrian Academy of Sciences)

During the Middle Bronze Age Tumulus Culture (1600-1300/1200 BC), the predominant burial practice changed from inhumation to cremation within the time span of just 300 years, ultimately leading to uniform urnfield cemeteries in the Late Bronze Age. The construction of burial mounds is characteristic and eponymous for this culture, although mound building practices vary among regional groups. In this contribution, the site Unterradlberg in the Lower Austrian Traisen Valley serves as the basis for investigating cremation burials and mounds during the transitional period from the Middle to Late Bronze Age. Despite the challenges of poor preservation, this study entails a detailed bio-archaeological approach to the cremated remains, exploring aspects such as the identification of multiple individuals, mobility and absolute dating through osteological assessment, strontium isotope analysis and C14 analysis. In addition, the comparative archaeological evaluation of features aims to shed light on funerary behaviours such as experimenting with different ways of constructing mounds as well as entrances that grant access to the cremated re-

mains in the grave chamber. This paper aims to contribute to the overall discussion of knowledge transfer and possible belief systems during the Middle to Late Bronze Age transitional period, proposing a gradual change, adaptation and loss of certain traits that can be observed both on a regional and super-regional level.

12 RECONSTRUCTING A LATE BRONZE AGE COMMUNITY USING ARCHAEOGENETICS: THE EXAMPLE OF THE NECROPOLIS OF LOS CASTELLETTS II (MEQUINENZA, SPAIN)

Bretos, Marina (University of Zaragoza, Zaragoza, Spain) - Royo Guillén, José Ignacio (Dirección General de Cultura y Patrimonio, Gobierno de Aragón, Avenida de Ranillas, 5 D., 50018 Zaragoza, Spain) - Papac, Luka (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany) - Rohrlach, Adam B. (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany; School of Mathematical Sciences, University of Adelaide, Adelaide, South Australia, Australia) - Gómez Lecumberri, Fabiola (Independent researcher) - Risch, Roberto (Department of Prehistory, Universitat Autònoma de Barcelona, Barcelona, Spain.) - Krause, Johannes (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany) - Picazo Millán, Jesús V. (University of Zaragoza, Zaragoza, Spain) - Haak, Wolfgang (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany) - Villalba-Mouco, Vanessa (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany; Institute of Evolutionary Biology, CSIC-Universitat Pompeu Fabra, Barcelona, Spain)

The genetic makeup of the prehistoric European populations has been shaped by key demographic events, one being the genetic influx of Pontic-Caspian steppe pastoralists from 3000 BCE to 2000 BCE. However, throughout the Bronze Age (BA, ~2,200 - 800 cal BCE), diverse cultural groups emerged and disseminated throughout the continent, phenomena explained by culture-historical archaeology through diffusionism and/or migrations. The Late Bronze Age (LBA) in Europe (~1,300-800 cal BCE) was predominantly marked by the appearance of the so-called Urnfield culture, which extended westwards, from Central Europe to the Northeast of the Iberian Peninsula (~1,250 cal BCE), and established cremation as main burial practices. Regional disparities and the inherent challenge in genetically examining cremated individuals have contributed to the complexity of its understanding and its coexistence with older traditions.

To shed light onto the population dynamics within the northeastern part of the Iberian Peninsula during the Late Bronze Age, we generated genome-wide data from 24 individuals inhumated in a collective "traditional" mound at the archaeological site of Los Castelletts II (Mequinenza), a necropolis where inhumation and cremation practices co-occurred for several centuries and where transfer of knowledge is under archaeological debate. Our results reveal no significant changes in their genetic profile of the individuals when compared with preceding local BA groups. However, our ancestral modeling shows a better fit with two mixed ancestry sources: one more enriched in steppe-related ancestry and a second more enriched in central/western Mediterranean ancestry than locally preceding BA populations. Additionally, the results obtained from the biological relatedness analysis showed that all buried individuals were biologically related, ranging from 2nd to 6-7th degree. More specifically, we identified one adult male with significantly more relatives than any other individual at the mound. This suggests that the tumulus represented a single extended family mausoleum.

13 LATE BRONZE AGE AND EARLY IRON AGE FUNERARY RITES IN SOUTHERN CARPATHIAN BASIN: LOCAL PRACTICES BETWEEN GREAT WORLDS

Ložnjak Dizdar, Daria (Institute of Archaeology, Zagreb, Croatia)

The southern Carpathian Basin, with its diverse landscape, has great communication lines along the Drava, Sava, and Danube, which affected the different flows of ideas and partial adoptions of funerary rites. During the Late Bronze Age, and especially at the beginning of the Early Iron Age, the funerary rites in the southern Carpathian Basin sat at the border between different worlds. During the Bronze and Iron Ages, the dominant form of burial in the Balkans was inhumation; in the Pannonian Plain, it was cremation. In the Balkans, burial under tumuli was practised throughout the Bronze Age and spread to the north in the Iron Age.

This lecture will present the local and regional variations in funerary rites on the border of different worlds and periods, but also the different networks of contacts that influenced this archaeological picture. The transfer of knowledge in funerary rites is visible archaeologically in the perception and (non)adoption of parts of the rite by contacts, non-acceptance of changes (e.g. longer practice of cremation), changes in societies (e.g. tumuli) and adaptation to the economic capacities of communities (e.g. portions of meat in graves). Local and regional customs are interwoven into a meticulous tapestry of material and spiritual contacts, exchanges, adoptions and changes from the 11th to the 7th century BC. It is important to recognize that this intensive tapestry includes the threads of individual differences, which were influenced by the identity of the deceased and the communal decisions about the funeral. Preserved material evidence and multidisciplinary analyses (anthropological, zooarchaeological, radiocarbon, organic residue anal-

ysis, stable isotope analysis) provide data for archaeological reconstructions and interpretations of funerary rites. We almost always use intuition to reconstruct the lost pieces of the puzzle of material culture.

14 THE TRACES OF THE FUNERARY RITE WITH CINERARY URNS IN TUMULAR NECROPOLISES IN KOSOVA AND NORTHEASTERN ALBANIA

Buqinca, Arianit (Institute of Albanology)

The remnants of the burial ceremony involving cinerary urns in tumular necropolises found in Kosova and northeastern Albania hold significant historical and cultural value. The existence and utilisations of urns associated with the non-tumular burial custom of Bërnica in Kosovo is a distinguishing feature of the transitional period between the late Bronze Age and the early Iron Age. This practice is predominantly observed in the flat burial grounds known as the “Urnfield Culture” in Bërnica, predominantly located in eastern Kosovo. It is worth noting that this ceremonial tradition ceases during the subsequent phase of the iron age. Nonetheless, although in significantly reduced frequency, urns are still encountered in the tumulus burial sites from the 7th to 6th centuries BC, such as Shirokë, Kënetë, Volljakë-Dush, Ujzë, and Karagaç. While the occurrence of this practice declines even further in the tumular necropolises of the 6th to 5th centuries BC. In the event that the so-called culture the urnfields culture or Bërnica is indeed associated with “urnfield culture” of north-west Europe, so it becomes paramount to acknowledge the northern origine of these “rites” during the transitional phase between the Bronze Age and the Iron Age, followed by a swift assimilation into the local culture. Typically, these burial mounds were attributed to a tribal collective or a closely related family, thus the coexistence of multiple burial customs within the same mound, during approximate time periods, serves as evidence of religious disparities and temporal variations. Particularly, the practice of interring the urn containing the ashes of the deceased in the central and initial grave of the mound, as observed in the tumulus of Shiroka, Ujza, Karagaç, and Volljaka, stands as the most compelling testament to this alignment.

15 BETWEEN THE ALPS AND THE JURA MOUNTAINS: KNOWLEDGE TRANSFER AND EARLY IRON AGE BURIAL MOUNDS IN WESTERN SWITZERLAND

Geitlinger, Timo (University of Zurich)

During the Early Iron Age, western Switzerland is a key area in between the Alps and the Jura mountains, connecting the upper Rhine valley and the Rhone basin. Looking at the *longue durée*, the Early Iron Age burial mounds are preceded by Middle Bronze Age mounds and Late Bronze Age flat burials and succeeded by Late Iron Age flat graves. A similar, yet regionally more divergent pattern can also be reconstructed for the fluctuation between cremation and inhumation burials. Early Iron Age burial mounds have been subject of some meritorious compilations (Drack 1958, 1959, 1960, 1961; Dunning 2004), yet, neither their landscape context, nor their relationship with each other have so far been systematically studied.

This paper presents preliminary results of a dissertation project and focuses on the Early Iron Age burialscape of western Switzerland. Looking at their spatial distribution and changing similarity connections, the spatio-temporal development of the burial mounds is approached. By these means, differences in how burials reference earlier monuments, how they connect with adjacent areas, and their relationship with each other manifest themselves in the burial context. As will be argued, this sheds light on potential Early Iron Age routes and circulation areas of knowledge transfer in western Switzerland.

16 A NECROPOLIS IN NETWORK: THE CASE OF GELOUX (LANDES, FRANCE) DURING THE IRON AGE

Bertaud, Alexandre (Archaeological service, Département du Lot)

The necropolis of Geloux (Landes, France), recently excavated, offers the possibility to understand the practices of a specific group through time. Indeed, the funerary practices allow for approaching the complexity of the organization of a local group and its connections concerning the ideologies related to death. The building of burial mounds and peripheral, associated graves, during the First Iron age on the one hand, and the subsequent reorganization of the funerary space during the Second Iron age on the other hand will be analysed in relation with other practices observed throughout Europe. The erection of mounds shows strong connections with northern horizons, especially in relation with the division of space. Whereas the building techniques can be interpreted in terms of knowledge transfer, they were adapted to local resources, especially wood. Grave goods are the other main field through which exchanges can be observed. From one period to another, grave goods change and reflect a more or less strong integration into wide exchange networks. This is particularly visible during the Second Iron Age when metal artefacts are associated with different material cultures of the centre of Europe or the Atlantic regions. The transfer of goods and knowledge influence the creation of a specific material culture in the Landes during the Iron Age, and the funerary record is the main expression of that process.

1015 ETERNAL REST IN THE WEST: FUNERARY CONTEXTS IN WESTERN MEDITERRANEAN PROTOHISTORY

Session theme: 6. The Mediterranean from Within

Session organisers: Carbonell Pastor, Sonia (Grup Arqueològic de Recerca Protohistòrica (GRAP). Universitat de Barcelona) - Smith, Alexander (Assistant Professor of Anthropology. SUNY Brockport University) - Coll Sabater, Margalida (Grupo de Investigación de Arqueología Mediterránea (GRACME). Universitat Pompeu Fabra)

Session format: Regular session

In recent decades, there has been a proliferation of research on the mobility of human groups during different periods. The Mediterranean was both an agent of unification and confluence for many cultures that developed during the 1st millennium BCE. At the same time, local cultures took on different forms, exhibiting variations based on where they developed and the nature of contact between different socio-economic groups and external or foreign actors.

This diversity of circumstances translates into the development of distinctive cultural characteristics that are understood as defining elements of the social groups that adopt them. In this session we will focus on one of the more potent material manifestations of the cultural dimension of these past groups: funerary materiality. Our aim is to provide a space for meeting and discussing the changes observed in funerary practices in different scenarios in the central and western Mediterranean focusing on the chronological period compressed between the 6th and 1st centuries BCE.

For this reason, this session will be oriented towards reflection and debate on different theoretical and methodological proposals, along with new narratives and methodologies that deal with the subject of death during the protohistoric era of the central and western Mediterranean.

This session will be open to various proposals on the proposed theme, some of the possible points for discussion will be:

- Techniques for documenting and excavating archaeological contexts. Excavation problems and strategies for solving them, such as documentary recording in fieldwork (documentary workflow, how the information is subsequently managed and the results obtained) can be addressed.

- New techniques applied to the study of funerary materiality. Studies derived from applied sciences (micromorphology, palynology, carpology, content analysis, etc.), implemented techniques (GIS, automatic remote sensing, photogrammetry, etc.) can be addressed.

- Comparisons of data and interpretation. Discussions of differing and variable funerary practices in the central and western Mediterranean with an eye toward a comparative regional lens, including grave types, treatment of the body based on age, sex, or gender, ritual practices surrounding interment, and funerary architecture.

- Knowledge Transfer. This is one of the least studied lines in the study of funerary materiality, perhaps because of the difficulty of its approach. By this we mean all the actions aimed at communicating to the general public how death was conceived in protohistoric Mediterranean societies and at making this knowledge accessible to everyone.

ABSTRACTS

1 DEATH ACROSS THE MEDITERRANEAN AND BEYOND: RITUAL SIGNIFICANCE AND COMPARATIVE ANALYSIS OF TOMBS FROM THE BALEARIC ISLANDS, ARABIA, AND PERSIA

Ramsay, Jennifer (State University of New York Brockport) - Smith, Alex (State University of New York Brockport)

The act of burial, a deeply ingrained ritual in ancient societies, reflects unique cultural nuances and symbolic representations. While burial practices vary widely across different civilizations, comparative analysis offers valuable insights into the underlying meanings and societal values embedded within these rituals.

This paper explores the rock-cut tombs of Menorca, Spain, dating back to the Iron Age, and examines their similarities with the Nabatean tombs of Arabia and the Persian tombs of Naqsh-e Rostam in Iran. Despite originating from distinct geographical and cultural contexts, these tombs exhibit intriguing morphological resemblances that warrant examination and interpretation. Their shared chronological timeframe provides a compelling opportunity to explore potential influences and interconnections, albeit speculative in nature.

By juxtaposing these burial traditions, the paper aims to illuminate previously overlooked connections within the Mediterranean world. Through this comparative study, we endeavor to deepen our understanding of the region's interconnectedness and unravel hidden layers of cultural exchange and influence. Ultimately, this exploration contributes to a more nuanced comprehension of ancient burial practices and their role in shaping Mediterranean societies.

2 RITUAL PRACTICES IN PROTOHISTORIC MENORCA: THE COURTYARDS OF THE ROCK-CUT TOMBS

Carbonell Pastor, Sonia (Grup de Recerca en Arqueologia Protohistòrica (GRAP)) - Coll Sabater, Margalida (GRACME)

During the second half of the 1st millennium BCE, a series of changes occurred in the postalalyotic society of Menorca. The interactions with external groups and the progressive social complexity acquired by the Menorca local groups were reflected in the funerary sphere. These changes are evident in funerary spaces, the so-called artificial caves or rock-cut tombs, as well as in ritual practices associated with these environments. This work presents the initial results of excavations carried out in the front courtyard of one of these artificial caves, specifically cave No. 45. The courtyards, open outdoor spaces carved into the rock, precede the entrance to the artificial caves. Multiple theories exist regarding the functionality of these spaces, with one suggesting a connection to the ritual practices and beliefs of the human groups that utilized them. However, very few archaeological interventions have been conducted to truly understand why they were used and for what exactly. The excavation of this space, carried out from a new methodological perspective, addresses several questions: What was its functionality? Were they covered with water, as some authors suggest? What significance could it have in the context of funerary ritual practices? What was its last moment of use? What was the human group like that built this cave?

3 FROM DARKNESS TO LIGHT: LATE IRON AGE CHILDREN'S BURIALS IN MALLORCA

Coll Sabater, Margalida (GRACME- Universitat Pompeu Fabra; ArqueoUIB- Universitat de les Illes Balears) - García Rosselló, Jaume (ArqueoUIB- Universitat de les Illes Balears) - Calvo Trias, Manuel (ArqueoUIB- Universitat de les Illes Balears)

During the Late Iron Age in Mallorca (550-123 BC), a unique funerary practice emerged for young individuals, marked by their placement in various containers across the island. Initially, infant containers were positioned alongside other community members, but later, they were isolated in exclusive areas. Anthropological data reveal that these individuals, fetuses, newborns, and very young infants, were deposited in ceramics and limestone containers upon death, symbolically safeguarding them, reminiscent of the maternal womb.

This distinct treatment compared to adults is also reflected in the activities conducted by the living in connection with the deceased. Infants are not adorned, dressed, or included in ritual consumption, lacking funerary offerings. Their involvement in funeral activities is less pronounced than in adult burials. In an initial phase, both infants and adults share the same burial spaces, humid caves with characteristic smells and darkness. However, from the 2nd century BC onward, the community decides that infants should be moved from the caves to open-air spaces exclusively designated for their burials.

Although they remain within the darkness of their small personal caves, the containers, the ones truly emerging into the brightness of the outdoors are the living individuals who participate in the burial process. The light, along with the spaciousness of the new areas, might suggest the realization of similar activities documented inside the caves, but quite the opposite; the only elements emerging from the caves are the infants. Therefore, we encounter a distinctive form of burial manifested through the safeguarding of containers, the phenomenological variety within spaces, and, principally, the omission of specific rituals by the living.

4 THE SOCIAL STRUCTURE THROUGH THE NECROPOLISES: POWERFUL WOMEN IN THE THE FUNERARY SPACES OF THE SOUTHEAST IBERIAN PENINSULA

San Quirico-García, Raquel (Universidad de Alicante)

The aim of this contribution is to propose new interpretations on the role of women in the communities of the Iberian Iron Age in the southeast of the Iberian Peninsula. A model of social organisation with women as an essential axis in the structures of power is based on the study of several necropolises located in this area. These funerary areas cover a wide chronological framework that shows the evolution of this society over the centuries.

Thanks to anthropological studies of the bone remains of the tombs, we know of the high presence of women in the necropolis in the central centuries of the first millennium BC. Many of them are also found in prominent places, inaugurating burial spaces that will give order to the necropolis and where new tombs will later be buried. Likewise, the grave goods that accompany them reveal a high social status, often related to productive activities, such as textiles, which were of great importance in the economic structure of these communities.

These aspects have led to some authors (Vives-Ferrándiz, Grau, Comino) to propose a model of social organisation based on bilateral descent and on heterarchical structures in which power is shared by various competing groups. Following these theoretical proposals, I am going to deeper into the archaeological interpretation of some of the most important necropolis of the area. The application of this socio-political schemes would also contribute to balance the androcentric view of Iberian society that has long been held and incongruously, given the archaeological evidence.

5 CARTHAGE IN GADIR. ANALYSIS OF THE NEW PUNIC-CARTHAGINIAN FUNERARY ASSEMBLAGE FROM C/ HUERTA DEL OBISPO 9-13 (CÁDIZ, SPAIN)

Pérez Infantes, Carolina (Universidad de Cádiz; Balteus, Arqueología y Patrimonio; PAIDI HUM-509 Research group) - Niveau-de-Villedary-y-Mariñas, Ana (Universidad de Cádiz; PAIDI HUM-509 Research group) - Legupín-Tubío, Isaac (Balteus, Arqueología y Patrimonio) - Martelo-Fernández, Marcos (Balteus, Arqueología y Patrimonio) - López-Sánchez, Natalia (Universidad de Cádiz; PAIDI HUM-509 Research group) - Sicre-González, Pablo (Universidad de Cádiz; PAIDI HUM-509 Research group)

The recent discovery of a Punic funerary ensemble in the necropolis of Gadir allows us to re-evaluate the extent of the footprint left by the Carthaginians in the Far Western city after the end of the Second Punic War.

The characteristics of the burial pit, the typology of the graves and the composition of the crockery in this context are different from the usual ones in Gadir and are, in turn, reminiscent of the funerary and ritual expressions of the central Mediterranean.

The fact that the complex is dated to a historical moment (end of the 3rd - beginning of the 2nd century BC) when, according to the sources, Gadir had already achieved its total separation from the North African state, indicates that the reality must not have conformed so closely to what the Roman propaganda has conveyed and that the Gadirites and the new arrivals continued to coexist in the city with the individuals from North Africa, who maintained their funerary customs and beliefs.

6 "GLOCALIZED" IN DEATH? FUNERARY PRACTICES IN HELLENISTIC NORTH INLAND ETRURIA

O'Donoghue, Eoin (Brandeis University)

This paper will examine funerary practices in North Inland Etruria between the 4th and 2nd centuries BCE. The specific area examined here is bound by the Chianti hills to the north and Monte Amiata to south, to the west by the Colline Metallifere, and the Apennines to the east. In the period considered here it comprised small urban communities that controlled dispersed rural agricultural populations. This contrasts with the well-established city-states of South and Coastal Etruria with large urban centers that are often described as metropolises. A curious feature of the funerary traditions of this region is the homogenous nature of burial practices. The dominant rite was cremation and burial in cinerary urns that were placed within chamber tombs associated with the descent group. This consistency is remarkable even if some variation exists chronologically and, in the form, the cinerary urns take; it contrasts sharply with the diverse funerary practices of the Coastal and Southern Etruscan city-states. The uniformity in practice is echoed within regional groupings with epigraphic evidence demonstrating exogamic connections between socio-political networks across the region, especially in the area around Chiusi, but it is also apparent around Asciano and Siena. This paper seeks to understand how and why there is such cohesion in funerary practices. It will argue that the limited urban character of the settlements enabled greater socio-political cooperation, rather than competition as it did elsewhere in central Italy. Another related focus will be how these communities engaged with the pan-Mediterranean cultural phenomenon of "Hellenization. This is clearly seen in the region's burials through the presence of highly ornate personal items, black gloss pottery, and the representation of Greek myths on cinerary urns. This engagement with the material cultural trends of central Italy and the Mediterranean will be interpreted through the lens of a "glocalizing" framework.

7 DEATH IS DRESSED IN WHITE. NEW FUNERARY MONUMENTALITY IN THE BRONZE AGE IN GALICIA (NW OF IBERIA)

Prieto-Martínez, M. Pilar (University of Santiago de Compostela; CISPAC) - Cordeiro-Maañón, Luis (University of Santiago de Compostela) - Alonso-Toucido, Francisco (Tempos Arqueólogos SL)

The so-called circular enclosures in Galicia are a new type of site identified in 2006 for the first time, 8 sites have been excavated so far and their formal characteristics are beginning to be defined but their functional interpretation is still controversial. We call them 'roda type' (Galician word that means wheel) because it is its most common toponym and its formal imprint on the landscape. We think that the 'rodas' respond to a new type of funerary monumentality unknown in Galicia at the end of the second half of the second millennium BC in accordance with the new European social rationality.

The objective of this presentation is to show the validity of this hypothesis based on various methodologies and sources of information: (1) Based on the data obtained in the excavation of O Corro dos Mouros site (Adai, Lugo province) and establishing a comparison with 7 other sites excavated so far. (2) Based on field survey data and laboratory work with cartography, aerial photography, LiDAR and GIS from 50 sites distributed throughout the region. The results will be aimed at defining more adequately the 'roda' type contexts: architectural features, material culture, radiocarbon dates, function and distribution and location patterns, hoping that it will allow us to more adequately focus this type of sites in their regional and European context.

1016 INTRA-MURAL BURIALS AND THEIR CULTURAL LANDSCAPE IN EUROPE AND THE MEDITERRANEAN FROM PREHISTORY TO THE MIDDLE AGES

Session theme: 6. The Mediterranean from Within

Session organisers: Fulminante, Francesca (Bristol University; Oxford University; University Roma Tre) - Laneri, Nicola (University of Catania; University La Sapienza) - Hodson, Claire (Durham University)

Session format: Regular session

Discussant: Prof. Paolo Carafa, University "La Sapienza."

The use of intra-mural graves within the city walls as well as in private houses and palaces as part of the funerary customs of ancient societies of both the Old and New World is a widely spread phenomenon in the history of humankind. In fact, the presence of these graves is in fact recognizable in numerous archaeological contexts that can be interpreted, for example, as an archaeological indicator of the cult of the ancestors.

In this session we aim to discuss intra-mural burials within European and Mediterranean contexts in relation to their different ritual, cultural, economic, social, and political landscape. From a quick review of studies in intra-mural burials it seems that, while there are some examples from continental Europe as well, the phenomenon seems to have its origin in the Near East in the Neolithic. Then it travels to the Aegean and Greece during the Bronze and Iron Age when it reaches the central Mediterranean as well, but not in all regions homogeneously. For example, in central Italy they are present in Latium vetus but not in Etruria. During the Republican and Imperial Period, they are found both in Italy and the Provinces and finally in the Middle Ages they are present as children burial around the churches both in Europe and the Mediterranean.

By definition, the existence of intra-mural burials is related to the beginning of settled life and the first villages in the Near East, but which is the significance of intra-mural burials for their communities? Is there a link between expanding urbanization and intra-mural burials? Which is the ritual, social, political, and economic significance of intra-mural burial across space and time? To discuss these issues and possibly find some answers collectively we ask for papers, which discuss intra-mural burials, either of children or adult, in relation to their cultural landscape to allow a comparative, multi-regional and diachronic perspective.

ABSTRACTS

1 **CHERISHED LIVES: EXPLORING INTRA-MURAL INFANT BURIALS IN CHALCOLITHIC ASIA MINOR**

Yildirim, Burcu (Leiden University, Faculty of Archaeology) - Hackley, Laurel (The University of Memphis, Department of Art and Design)

Intra-mural burials within Chalcolithic communities of Asia Minor are visible signs of enduring ritual practices, passing down through generations amidst changing social dynamics and spatial arrangements. Particularly notable are infant burials, which are part of a broader ritual tradition involving special deposits, preserving ancestral memory, and ensuring continuity in religious beliefs over centuries. Despite changes in social organization, the consistent presence of these burial rituals highlights their significant impact on community identity and religious practices over time. This research aims to provide a clear understanding of the social importance of fetal, infant, and child burials, ultimately contributing to our knowledge of how the lives and deaths of these young individuals may have influenced the development of complex social networks. Methodologically, the study uses archaeological analysis and interpretation, focusing on sites across Asia Minor, with specific attention to Çadır Höyük, to investigate the practice of in-site infant burials within the broader socio-cultural context of the Chalcolithic period. Through this interdisciplinary approach, the research aims to deepen our understanding of the complex relationship between burial practices, social dynamics, and cultural continuity in ancient communities.

2 **INTRAMURAL BURIALS DURING THE CHALCOLITHIC PERIOD OF THE SOUTHERN LEVANT**

Gošić, Milena (Department of Archaeology, University of Belgrade)

The Chalcolithic period of the southern Levant is known for the diversity of its rituals and burial practices, including extramural primary and secondary burials and intramural primary burials. Most of the scholarly attention has been devoted to extramural secondary burial, except for the early Chalcolithic settlement at Gilat, which features numerous intramural primary burials that were extensively published. However, intramural primary burials are present, usually in small numbers, at most Chalcolithic settlements. They are commonly interpreted as a sign of continuity with the earlier period, unlike the secondary burials in ossuaries that are understood as a possible foreign influence. They are usually found in flexed positions in pits of various sizes and with no apparent burial offering. The present paper aims to offer a comprehensive overview of the available data on intramural burial to see if these burials have common traits

3 **THE KISPUM IN THE HOUSE: MATERIAL RELIGION AT TELL MUHAMMAD, BAGHDAD, DURING THE OLD BABYLONIAN PERIOD**

Russo, Sergio (University of Catania) - Pappalardo, Chiara (University of Catania) - Laneri, Nicola (University of Catania)

Drawing upon archaeological evidence, this paper investigates the role of the kispum ritual in framing domestic religiosity at Tell Muhammad (Baghdad) during the Old Babylonian period. The kispum is an ancient Mesopotamian family funerary ritual performed regularly to commemorate the ancestors. Typical of the second millennium BCE, according mainly to written sources, it involved libations, food offerings, and invocations of the dead. Texts also inform us that the kispum could be performed in different places, either within the domestic space, on an altar before family intramural tombs or at the gravesite. In the house, the ritual occurred in the aširtum, generally the rear hall or room of the building. This space had built-in ritual furnishings, including altars or platforms, small fireplaces, and libation pipes. Archaeologically, such contexts have been found in a few settlements, such as Ur and Sippar Jahrum. However, recent excavations at the Old Babylonian site of Tell Muhammad, within the metropolitan area of Baghdad, have unveiled new, outstanding material evidence for the occurrence of the kispum. In the rear room of the so-called House 1, in fact, the presence of an altar for pouring water, several pot burials and offerings, and fire traces clearly indicate the existence of an aširtum, the ritual space in which the kispum was performed. By contextually analysing such fresh material evidence, this case study offers the opportunity to shed light on family-based ritual and religious practices, thereby enriching our comprehension of the relationship between material culture, the mortal remains of the deceased, and funerary spaces in the creation of forms of ancestral commemoration of the dead in the lived experiences of Old Babylonian society.

4 **CRADLE AND GRAVE: INFANT INTRAMURAL BURIALS IN THE EBRO VALLEY FROM BRONZE AGE TO THE BEGINNING OF 20TH CENTURY AD**

Salcines-Montaña, Javier (University of Valladolid) - Fernández-Crespo, Teresa (University of Valladolid)

Infant intramural burial was a funerary treatment, mainly restricted to perinatal individuals, that was essentially practiced during the Late Bronze and Iron Ages in some western Mediterranean regions, including Iberia. There, while cremation was the main funerary practice for the aforementioned periods, more than 800 infant intramural burials have been identified, particularly in north-eastern and central regions. The exceptionally high number of burials recorded in some sites of the upper-middle Ebro valley such as La Hoya (n = 260) or Atxa (n = 49) is particularly noteworthy, while the rest rarely exceed a dozen. Available radiocarbon dating suggests that the phenomenon could have begun around the 10th century BC in the Ebro valley, and continued after the end of the 1st millennium BC, when Rome conquered and occupied the territories, and even far beyond. Surprisingly, this region has provided evidence of infant intramural burials in medieval and modern sites and for contemporary ethnographic accounts, which describe the persistence of such burials as late as the first quarter of the 20th century. Here, we present one of the longest regional diachronic sequences for infant intramural burials detected in Europe revealing interesting patterns of continuities and discontinuities over time.

5 **INTRA-MURAL INFANT BURIALS IN IRON AGE LATIUM VETUS IN THE WIDER CONTEXT OF THE MEDITERRANEAN PREHISTORY: WORK IN PROGRESS**

De Paolis, Paolo (Sapienza Università di Roma) - Fulminante, Francesca (University of Bristol; University of Oxford; Università Roma Tre)

In Latium Vetus infant burials in inhabited areas are documented in ritual contexts (especially in Rome) and in domestic contexts. In this last case, the phenomenon of the so-called suggrundaria is well known, and can be found in Ficana, Fidenae, Satricum, Gabii et al. but also in Rome itself, during Iron and Orientalizing Age. The documentation regarding these phases is rather relevant but lesser and lesser during the later phases. These are very simple burials: children, usually under 3 years old, are often placed in amphora or between tiles, with poor burial objects or totally absent, although there are sporadic cases of infants that seem to receive particular consideration.

In aims with the objective of the session, in this paper we aim to present the phenomenon of suggrundaria in central Italy in the wider context of Mediterranean Prehistory. As emphasised in the session call there seems to be some general transmission from east to west, from the Neolithic onwards, and a particular significant within settled communities. But which is the ritual, social, political, and economic significance of intra-mural burial across space and time?

Without the ambition to be exhaustive we will collect some of the material published in the last few decades in order to have a first assessment of these issues to propose and discuss together with the research and evidence discussed by other colleagues.

6 **BABIES IN THE YARD: EXPLORING THE OSTEOLOGICAL AND CONTEXTUAL IMPLICATIONS OF 41 INFANT BURIALS AT YEWDEN ROMAN VILLA, HAMBLEDON, ENGLAND**

Hodson, Claire (Durham University) - Pitt, Rebecca (University of Reading)

Excavations in 1912 at Yewden Villa, Hambledon in south-west Buckinghamshire, England, revealed 97 infant burials dating to the Roman period (1st-4th century CE). All but two were recovered from an enclosed area to the north of the main villa, nicknamed 'the yard' by the excavators. Although not all these infant skeletal remains have survived for analysis today, recent reassessment has identified a total of at least 64 non-adults aged up to 1.5 years from articulated and disarticulated material. Of these skeletons, 41 (64%) fetuses and perinates (aged below 42 weeks of gestational age) were identified. Previous studies have focused on the superfluity of these very young individuals, many of whom are suggested to have died around the time of birth (circa 40 gestational weeks), using such evidence to support a narrative for infanticide. Yewden Villa complex has consequently, also been interpreted as a 'brothel', owing to the high number of foetal-perinatal individuals buried here. Yet, intra-mural burials of foetal, perinatal, and infant individuals are abundant with Romano-British villa complexes; why then is Yewden purported to be different? This paper presents a reanalysis of the foetal-infant individuals, exploring evidence of palaeopathological changes, growth disruption and early-life experiences which may have impacted these brief lives. As such, considerations of community practices associated with infant care and death, as well as the sociocultural, ritual, and political landscapes within which these young individuals were buried, will be discussed. Consequently, the authors present an alternative narrative; both the temporal longevity of this burial tradition, as well as a myriad of biocultural factors, should be considered in the context of infant mortality, and demonstrates the continued practice of deliberate and careful burial of these young individuals within the yard at Yewden Villa.

7 **INTRA-MURAL VS URBAN BURIALS IN CRETE: AN EARLY BYZANTINE MEDITERRANEAN PERSPECTIVE**

Lapacciana, Nicola (Sapienza)

Analysing post-Roman funerary contexts approaching urban living spaces encounters the need to define specific scopes and conventional categories to frame a complex phenomenon susceptible to interpretative ambiguities. This difficulty often originates from the impossibility of nailing down what can be interpreted as "urban space" from an anthropological-cultural and topographical perspective. Over the years, the study of these themes has been primarily Western-centric, heavily based on Italian urban archaeology cases. The discussion on this topic has revolved around a clear and conventional limit that eases the definition of "urban burials," namely the presence of urban walls. The expression "Intra-mural" reflects an interpretation of the phenomenon tied to a well-established model of post-Roman cities derived from studies in Western contexts. However, such a scheme is not always applicable to the "urban image" that the research on the early Byzantine city is revealing.

In Eastern contexts, there are frequent examples of cities only partially enclosed by walls during the early Byzantine period or only later provided with a defensive system. Furthermore, the discovery of burials within urban areas during the changing early Byzantine era raises questions regarding the laws implemented by the centralized state to regulate this phenomenon, as they contrast with the seemingly divergent archaeological data.

The case of Cretan cities, especially Gortyn, well encapsulates the issue. Due to its position in the eastern Mediterranean, Crete is a privileged case study on urban transformations between the 5th and 8th centuries. Its unique urban history is influenced by specific geographical, historical and cultural factors. The cases presented in this contribution thus seem to emphasize the need to address new methodological and terminological issues to define the study areas regarding the relationship between the living spaces and the spaces of the dead, resulting from dissimilar dynamics of urban transformation across the Mediterranean.

1018 **MORE THAN JUST DATA: THE ROLE OF ARCHAEOLOGICAL THEORY IN REFINING GEOSCIENCE-DRIVEN RESEARCH QUESTIONS**

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Costanzo, Stefano (Department of Earth Sciences, University of Milan) - Wright, David (Department of Archaeology, Conservation and History, University of Oslo) - Loftus, Emma (Institute for Prehistory, Ludwig Maximilian University Munich) - Sulas, Federica (Department of Historical Studies, University of Gothenburg) - Lane, Paul Jeremy (University of Cambridge)

Session format: Regular session

Since the establishment of humans as active ecosystem engineers, every performed action came with consequences. Whether intentional for improving subsistence opportunities in certain locations, or unintentional catalysts of novel geogenic processes in otherwise stable environments, landscape modifications and niches construction have had direct or downstream impacts on ecosystem evolutionary pathways. Notable examples include the diversion of rivers and the construction of canals, which may have stimulated new forms of farming; husbandry in semi-arid margins, which may have caused loss of inhabitable and cultivable land; intensive deforestation worldwide, which has caused slope instability and enhanced alluviation of valleys. In later times, the construction of dams in indigenous lands caused severe disruptions in the local economies of upstream and downstream population.

In past research, some instances of cause-and-effect were easily deciphered thanks to the magnitude of the land modifications, sometimes with iconography and historiography providing motives and precise time brackets. However, when examining data from events at smaller scales, causality and rationales attributed to past communities often were subject to environmentally deterministic and oversimplified interpretations. Such interpretations ultimately risk leading to flawed paradigms. Nowadays, in the light of post-processualism and the widely shared idea that human agency is ultimately driven by composite and cumulative individual experiences, geoarchaeologists are tasked with tackling interpretational riddles acknowledging the full spectrum of theories belonging to the archaeological and social sciences at large. This session welcomes novel studies, review works and paradigmatic challenges throughout all ages and across geographies and climates. We aim to showcase the full and real potential of applied geosciences in solving variously-paced complex entanglements between human agency, landscape modifications and societal changes, when supported by solid and sensible theory.

ABSTRACTS

1 **BUNDLE OF STICKS: WEAVING ARCHAEOLOGICAL TAPESTRIES FROM CABLES OF GEOSCIENTIFIC RESEARCH**

Wright, David (University of Oslo)

In a series of papers near the turn of the millennium, Alison Wylie argued for 'cabling' the past to build solid archaeological interpretations. By interlacing independent strands of evidence, she argues that the basis of archaeological inquiry is able to get beyond the paradox that 'the data do not speak for themselves' yet overcome the overly subjective 'anything goes' approach of relativism. The incorporation of geoscientific tools into archaeology has opened new possibilities to cable the archaeological past, but it also offers the temptation to engage in what Tim Sørensen calls 'the fetishization of data'. In the absence of solid archaeological theory, geoarchaeological information becomes white noise that is difficult for all but a few specialists to understand. Here, I argue that the construction of so many independent cables of knowledge about the human past has opened previously unimagined possibilities to build tapestries of understanding. However in the absence of solid archaeological theory and commitment to address the so-called 'Grand Challenges' of archaeological research, geoarchaeology risks becoming a navel-gazing subdiscipline that speaks only to itself. The effective incorporation of theory into geoarchaeology will allow for the construction of a human past in the form of a clear, interpretable tapestry predicated on solid, testable facts.

2 **EVOLUTIONARY GAME THEORY LINKS ANCIENT DEMOGRAPHY, LANDSCAPE, AND PALEOENVIRONMENT TO EXPLAIN THE CULTURAL TRANSFORMATION OF SAMOA**

Cochrane, Ethan (University of Auckland)

In this research we identify the evolutionary-ecological processes that explain 1000 years of behavioural change recorded in landscape modifications and geoscience data from the Polynesian islands of Samoa. Our analyses combine lidar mapping and ground survey to reveal an extensive landscape of archaeological features: rock walls, ditches, and platforms, linked in a robust feature chronology. Soil nutrient analyses and geoarchaeological coring indicate spatial differences in the agricultural potential of the valley, and human modification of the environment over time. Our results demonstrate that the construction of large rock walls, some several hundred meters long, began approximately

900-600 years ago, shortly after dramatic population rise in Sāmoa. This was followed by the building of small rock walls, often enclosing rectilinear fields or platforms. Densities of both rock wall types are associated with areas of higher agricultural potential. The earliest wall construction was penecontemporaneous with partial forest removal that created a more productive wetland environment in the southeastern region of the valley, an area later a focus of agricultural ditching. We propose that with population rise the variable fertility of agricultural land became a significant resource gradient, influencing the population in two ways. First, areas of more fertile agricultural land promoted territorial behaviour, including large rock walls, and led to a familiar collective action problem. Second, niche construction in the form of human-mediated forest removal created a productive wetland agricultural system that was enhanced with a reticulate ditch network, the maintenance of which also led to a collective action problem. We conclude that in Sāmoa, collective action problems were the cause of increased social hierarchy and may underlie the origins of complex society throughout Polynesia.

3 THE MORE THINGS CHANGE? INTERPRETING LONG-TERM HUMAN-ENVIRONMENT DYNAMICS ON THE NORTHERN COASTAL FLATS OF PAPUA NEW GUINEA

Golitzko, Mark (University of Notre Dame) - Uy, Mirko (University of Notre Dame) - Power, Mitchell (Utah Museum of Natural History; University of Utah) - Berke, Melissa (University of Notre Dame)

Archaeologists working in lowland tropical environments have often struggled to fit their data into models of domestication and resource intensification borrowed wholesale from more temperate latitudes. What is sometimes called “neolithization” is often viewed as an inevitable process once human modified or domesticated plants and animals are available, after which the human footprint on the landscape dramatically increases. On New Guinea at present, a wide range of subsistence modes continue to be practiced, including intensive horticulture with substantial raising and tending of animals, arboriculture, mobile hunting and gathering, or even trading to obtain the bulk of foodstuffs. Subsistence differences are often ascribed to either differences in environment and the productive capacity of land, or to historical contingency, whether and when people long resident on the island came into contact with particular language groups associated with the spread of root horticulture and stock rearing. We report results of coring and paleoenvironmental analysis in the Aitape area of northern lowland Papua New Guinea. At present, people there rely heavily on arboriculture and hunting, however, the history of subsistence practices and forest management are poorly understood. Using a number of environmental proxy measures including charcoal, geochemistry, and chemical biomarkers, we document both natural shifts in environment (sea-level rise and fall, formation of coastal flats, changes in ENSO intensity and frequency), as well as likely shifts in production strategy including periodic horticultural intensification as the landscape was reshaped dramatically after the mid-Holocene Thermal maximum, when major lagoon systems first formed and then in-filled. This study highlights the dynamism of environment near Aitape over the last 12,000 years, but also suggests that people living there remained flexible as to how they acquired resources and managed the local environment including possibly intentionally abandoning horticultural intensification when it proved unsustainable.

4 AMAZONIAN DARK EARTHS AS HUMAN NICHE CONSTRUCTION: EXPLORATION THROUGH GEOARCHAEOLOGICAL PROXIES

Sagan, Wiktoria (Institute of Archaeology, University College London) - Arroyo-Kalin, Manuel (Institute of Archaeology, University College London)

Amazonian Dark Earths (ADE or terra preta) have long been cited as an example of anthropogenic landscape management and a long-lasting ecological legacy of indigenous people of Amazonia. Current broad research questions about Amazonian Dark Earths revolve around their formation (anthropogenic/anthropic/natural), geographical spread, dating, usefulness to the present and future sustainability. On a local scale ADEs can inform about periods of occupation, socio-cultural stability and resilience, village layout, cultivation practices. Even though majority of archaeological studies into ADE are very localised, their conclusions are often extrapolated across the whole basin. Currently, one of the most pressing questions is what theoretical tools are appropriate for local scale interpretation of ADEs? The key emerging interpretative model for ADEs applicable at multiple scales of observation is the cultural niche construction theory. This paper will discuss the research outcomes and limitations of NCT as applied to recent archaeological research into ADEs. Then, based on a case study of an ongoing project in northwestern Brazil, we will focus on how geoarchaeological proxies can be used to answer specific questions that emerge from treating ADEs as culturally constructed niches.

5 PALAEOECOLOGY, OR MEDIA (ECO-)ARCHAEOLOGICAL SCULPTURING TO EVOKE CONCEPTUAL DISPLACEMENT. TOOLS TO REFORMULATE THE NATURE/HUMAN DIVIDE IN MESOLITHIC WETLAND ARCHAEOLOGY

Blaesild, Paulina (University of Gothenburg)

Palaeoecological studies, investigating environment history and interrelated anthropogenic signals, are commonly perceived as external proxies to archaeological practice and its respective scope of interests. The common understanding of landscape reconstruction as belonging to geo- or natural sciences; quaternary geology, biology or botany, contributes to a situation where cultural and natural heritage research objectives are (irreversibly) separated, as well as their study objects, archival records and means for past narration. These habitual, uncalled-for and classificatory conditioned systems mark a central problem for past environment/human studies as it creates obstacles for seamless research programs—further, it exemplifies a contemporary conceptual divide between nature and culture that is manifesting within research.

Questions on how to reflexively address definition constants, operating through intricate and historically (i.e., messy) interwoven systems of protocol, end up relying on theoretical frameworks to solve discursive knots. Still, structural change will require critical evaluation and initiative, applied within each particular site where archaeological knowledge production take place. It regards the archaeological site and instance of fieldwork as well as places for analysis like laboratories, offices or storage facilities where materials re-couple into new spatial/ecological networks. Reformulation and action are thereby inseparable, applying differently to each place and its network of people (employees, visitors), materials and datasets.

This paper deals with the reflexive responsibilities accompanying material sciences such as archaeology—focusing on ethical dimensions inherent in the narrating of nature, ecological dynamics and data-to-landscape translation acts, foundational for such interpretative works. The paper asks if theoretical frameworks may facilitate norm-critical models for past environment/human affairs, in turn with capacity to impact scientific inquiry systems. The discussion is set out from a study on Mesolithic wetland sites within the Dagsmosse basin, south-central Sweden, and a critical assessment of the preconditions enabling creations of site-specific, interpretative ecological models (with humans in them) at first stance.

6 CHALLENGES IN GLOBAL GEOARCHAEOLOGY: FROM GEOSCIENCES TO ARCHAEOLOGY AND BACK

Zerboni, Andrea (Università degli Studi di Milano, Dipartimento di Scienze della Terra “A. Desio”)

The application of Earth Sciences methodology to solve archaeological and anthropological questions has a long history. Since the second half of the last century, geoscientists and archaeologists have collaborated to investigate major issues related to the effects of climate and environmental changes on settlements, the exploitation of natural resources, and the formation and preservation of archaeological sites. Simultaneously, Archaeological Sciences have contributed to understanding the dynamics of natural processes in the Quaternary and to disentangling the contribution of humans in shaping our planet and modulating natural surface processes.

In this perspective, as geoarchaeologists, we may ask ourselves what the next step in collaboration between Earth Sciences and Archaeological/Anthropological Sciences is. Today, an increasing number of investigations are revealing the non-linear and complicated nexus between climate change, environmental modification, and human agency. These contributions explain that humankind’s imprint on natural processes started several millennia earlier than expected, well before the formal definition of the Anthropocene epoch that is ongoing. For that reason, one of the major challenges in Geoarchaeology is to investigate the archaeological record of human agency on pristine ecosystems and support the definition of the Anthropocene not merely as a geological epoch or event, but as the diachronic and geographically differentiated emergence of Homo sapiens as a major geological and geomorphological agent. Such occurrences are well-preserved in the archaeological record, and a synergic investigation can reveal their tempos and modi.

1021 EAA COMMUNITY FOR CLIMATE CHANGE AND HERITAGE (CCH) ROUNDTABLE

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Davies, Mairi (HES Historic Environment Scotland) - Martens, Vibeke (NIKU Norwegian Institute for Cultural Heritage Research) - Biehl, Peter (University of California, Santa Cruz)

Session format: Round table (without formal abstracts)

In September 2023, Climate Heritage Network launched a Global Call to Put Cultural Heritage, Arts and Creative Sectors at the Heart of Climate Action. A milestone was reached when the first ever high-level ministerial dialogue for culture-based climate action took place at COP28 in Dubai in December 2023. This is an important step towards

culture being included in the core work of the UN Framework Convention on Climate Change. How, though, can we ensure that cultural heritage, and archaeology, make a substantial and visible contribution to culture-based climate action? As we face the challenges of Net Zero and the Race to Resilience, we need tangible progress in ensuring that interdisciplinary research on responses of previous societies to environmental change informs our response to climate change. We have as background the statements on climate change and heritage released by the EAA 2021 (<https://www.e-a-a.org/2021Statement>), SACC 2021 (<https://www.jma.uni-kiel.de/en/research-projects/sacc/sacc-statement-2021.pdf>) and the SAA 2022 Statement on Climate Change and Cultural, which all point to different important aspects on how archaeology and archaeologists can contribute.

This eighth roundtable organized by the EAA Community for Climate Change and Heritage (CCH) builds on the success of the previous ones and hopes to focus further on the translation of archaeological research into practical adaptation and resilience solutions.

We are inviting representatives of key archaeology associations as well as specialists in climate change and heritage research as a sounding board for the CCH activities. The roundtable session will provide an update on the work done in and by the community since the previous meeting and discuss next steps for the Community to grow and extend its network and activities to help adapt to a global climate crisis, find good solutions for adaptation and thus increase heritage and societal resilience.

1022 RETHINKING ANCIENT MEDITERRANEAN INCARCERATION AND EXILE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Larsen, Matthew (University of Copenhagen) - Letteney, Mark (University of Washington)

Session format: Regular session

Ancient traces of incarceration, exile, and other forms of punitive unfreedom have historically been ignored or under-documented, a problem stemming both from prevailing historiographic dogmas that prisons were at most a marginal element of pre-modern societies (Durkheim, Foucault, Mommsen) and the difficulty in securely identifying evidence and remains of these practices in ancient Mediterranean archaeological contexts. Yet various literary and documentary sources give ample evidence that sites of incarceration were commonplace in many cities and that exile was a widespread ancient practice. This session seeks to address this imbalance by inviting papers focused on material aspects of incarceration and exile in ancient Mediterranean contexts (600 BCE to 600 CE). The goal of the session is to explore how to identify such carceral spaces, what were the types and forms of such sites, who inhabited them (both as captors and those being detained), and how the public perceived and conceived of such spaces. Possible paper topics include: reports on prisons attested in archaeological excavations; analysis of inscriptions which relate to any aspect of the practices, spaces, or experience of incarceration; and visual materials which represent spaces of incarceration, prison personnel, or depictions of prisoners.

The three hour session will include six papers of fifteen minutes, a fifteen minute response from a specialist, and an hour and fifteen minutes of discussion.

ABSTRACTS

1 A CARCER CASTRENSIS IN VINDOBONA?

Mosser, Martin (Museen der Stadt Wien - Stadtarchäologie)

In the legionary fortress of Vindobona a special building could be identified during two construction projects of the last years. It is a cellar room reaching up to 4 m in depth and measuring 30 x 15 m, of which one cellar window was found to be completely preserved. At the western end of the building, the lowest steps of a stone staircase leading to an upper floor has been discovered. The room was additionally surrounded by outer walls, which makes it possible to reconstruct a corresponding circumferential corridor. At first, a storage building was suspected, but further research now suggests most likely a prison building (carcer castrensis) erected in the 3rd century AD. A prison of this size would be unique along the Pannonian Danube Limes. Comparisons with similarly structured cellars in Lambaesis, Simitthus or Sarmizegetusa should confirm this thesis, even if there is no clear evidence to date. Furthermore, the context in which a prison of this dimension is to be seen in connection with a legionary fortress must be considered. Were prisoners of war or slaves imprisoned here, or are convicted criminals simply to be assumed here?

2 THE CIVIC PRISON OF SUFETULA?

Letteney, Mark (University of Washington)

Little can be said for certain about the foundation of Sufetula (Subaytilah, Tunisia), though Roman inhabitation is evidenced from the middle of the first century CE forward, and the city's forum was heavily renovated in the middle

of the second century. At the northwest side of Sufetula's forum lies a spectacular triple Capitolium: three temples stand side-by-side, one likely dedicated to each of the three gods worshiped in the Capitoline Temple at Rome, each on a high, imposing pediment.

This paper will suggest that the central temple at Sufetula attests an otherwise unknown phenomenon of Roman municipal planning: a civic prison constructed underneath a Capitolium. While this particular combination of features at Sufetula are (thus far) unique, many of its characteristics are rather common. Second century contexts attest prisons underneath temples (Lambaesis), directly adjacent to the forum (Cuicul), and underneath civic tribunals (Sarmizegetusa). Architectural comparison with securely identified carceral spaces suggests the possibility that the area underneath the Capitoline temple at Sufetula served a similar function, and the parallel but distinct case of the triple Capitolium at Baelo Claudia offers further opportunity to understand Sufetula's forum as a unique concatenation of a common set of characteristics. In the end, I will suggest that it is more likely than not that the space was designed to serve as the Sufetula's civic prison.

3 EVERYDAY OBJECTS OF CONTAINMENT: THE REFLEXIVE USE OF ROMAN METAL OBJECTS DEPICTING CAPTIVES AND PUNISHMENT

Levitan, Rebecca (King's College London) - Pearce, John (King's College London)

Objects from Rome's northern provinces related to the captivity, incarceration, and the punishment of criminals are rare, and when they do emerge, their use and primary contexts often remain enigmatic. This paper examines two categories of these images taking the form of everyday metal objects, which were themselves likely used in processes of containment (locking and binding).

A unique copper-alloy key handle excavated from a town house in Roman Leicester decorated with two groups of figures likely depicts a scene of *damnatio ad bestias*: a manner of execution that was both punishment and spectacle (Pearce et al. 2021). As well as having affinities with other key handles in figural form, the Leicester object is stylistically similar to another class of copper-alloy objects – the so called “bound-captive figurines. About twenty of these small figures have been recovered in the northern provinces; all depict a seemingly naked captive or enslaved person bound around the neck, hands, and feet (Jackson 2005). The captive figures are perforated in two axes, implying that cords or straps were passed through the small bodies to wrap or bind, although the exact use of these objects remains unknown. In examining the reflexive nature of these objects, which both depict captives and themselves are tools of containment, we aim to interrogate ancient conceptions of unfreedom at the everyday scale.

4 THE RIGHT TO BIND: INCARCERATION IN ANCIENT ATHENS BETWEEN MATERIALITY AND IDEOLOGY

Lovisetto, Giovanni (Columbia University)

In ancient Greece, the semantics of incarceration prominently featured corporal binding, as evidenced by the designation of the incarcerated person as “the bound” (ὁ δεσμώτης) and the prison as “the place of those who are bound” (δεσμωτήριον). While literary sources confirm that inmates could indeed be physically bound, corporeal constraint does not seem to consistently characterize prison life. Challenging scholarly accounts that interpret this apparent incongruity solely in linguistic or pragmatic terms, this paper argues that the association between binding and imprisonment influenced the public perception of the latter, facilitating a rhetorical utilization of the prison space and the figure of the inmate for ideological and political purposes. First, Athenian legal speeches reveal how the binding aspect of incarceration was utilized to liken it to civic punitive measures involving physical restraint, such as the pillory, public torture, and execution – of which the shackled bodies from the Phaleron provide compelling material evidence. Orators grounded the polis' authority over these forms of restraint in the transition from private to state-regulated confinement, presented as a historical reality based on Solonic norms. Accordingly, in legal speeches, narratives about private incidents of unjust binding construed individual appropriation of the polis' “right to bind” as anti-democratic behavior undermining civic norms and fostering societal discord. Moreover, by mobilizing common associations of physical confinement with captivity and slavery, orators ideologically construed punitive forms of binding, including incarceration, as lawful, civic “degradation ceremonies” that temporarily altered the social standing of the convict. Significantly, all these narratives targeted members of the political elite. The paper ultimately illustrates how Athenian orators exploited the semantic link between imprisonment and restraint, partially grounded in material practices, to present incarceration as the polis' “right to bind. Thereby, they utilized incarceration to advance political and ideological objectives under the guise of promoting societal stability.

5 TRACES OF INCARCERATION FROM MARESHA: FROM BRONZE FIGURES TO PRISONER PETITIONS

Larsen, Matthew (University of Copenhagen)

While spaces of incarceration have been the topic of focus of recent studies, what is needed now is sustain attention to material objects related to incarceration and integration with a larger understanding of the traces of ancient Mediterranean incarceration within the archaeological record. To do so, this paper focuses on the small finds and non-architectural aspects of incarceration within a certain city over a select period of time. Specifically, it considers the finds related to the practices and cultural conceptions of incarceration from Maresha, a town located in the Judean mountains ca. 2 kilometres southeast of Beit Gubrin. The finds from Maresha have been dated from the Hellenistic period up through the 2nd century CE and include bronze figurines to terracotta dolls to prisoner petition inscribed on a limestone slab. As such, they provide the opportunity to consider a variety of ways in which incarceration left its mark on the material record from a particular place over a span of several centuries. The paper will situate the finds in relation to other prisons or sites of incarceration and other visual culture in the region.

6 AGENS CURAM CARCERIS. LINKS BETWEEN THE FRUMENTARII OF THE ROMAN LEGIONS AND THE CARCERAL SYSTEM IN THE ROMAN EMPIRE

Bargfeldt, Niels (University of Copenhagen)

The paper undertakes to trace the role that the legionary frumentarii could play in the Roman carceral system. By looking in depth at their role within the system it is possible to address issues related to prison personnel in general.

In the literary sources we often find references to prison personnel as supporting actors in the main storyline. And from excerpts from later law texts, we know of some of the tasks they were assigned to perform and the punishment that negligence or outright breach of rules could lead to. Present representations of prison personnel in the past regularly cast them as grim and boorish men that are often sadistic and are inclined to accept bribes. Even though the evidence for prison personnel is sparse considering the size of the Empire, and the accessible sources are eclectic, the overall picture represented is much more heterogeneous than this stereotypical characterization. The frumentarii of the legions played a variety of roles that were not directly linked to incarceration. And the main scholarly interest has been focused on their assignments as police agents and carriers in the service of both the emperor and the provincial governors. However, epigraphic and literary sources hint that they could be tasked with not only hunting down fugitives and relaying messages, but also with the transportation of prisoners. The evidence shows a link between the prison personnel and the much better-known cadre of the emperor's and the governors' administrators and agents.

1023 CONNECTING THROUGH VITREOUS MATERIALS: MULTIDISCIPLINARY APPROACHES TO MEDITERRANEAN NETWORKS IN THE 2ND-1ST MILLENNIUM BCE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Loncaric, Valentina (HERCULES Laboratory, University of Évora) - Bettineschi, Cinzia (Department of Classical Archaeology, University of Augsburg) - Koch, Leonie (Institute of Prehistoric Archaeology, University of Cologne) - Oikonomou, Artemios (Science and Technology in Archaeology and Culture Research Center, STARC, The Cyprus Institute) - Angelini, Ivana (Department of Cultural Heritage: Archaeology and History of Art, Cinema and Music, University of Padova)

Session format: Regular session

Vitreous materials, including glazed stones, faience (and glassy faience), Egyptian blue and glass, played a significant role in early human history, and were some of the oldest brilliantly coloured, artificial materials. Current studies of this fascinating material continue to diversify and focus on numerous aspects and avenues of research, such as provenance, working techniques, chemical compositions, as well as cultural contacts and trade and exchange networks galvanized by glass.

With this session, we hope to encourage interdisciplinary discourse on glass from the second and first millennium BCE, contribute to a deeper understanding of vitreous materials, and help develop directions for future research. Spanning a wide geographical and chronological range, this session will focus on new finds, compositional changes, technological advancements, and changes in glass production during this period, extending to their social implications, such as consumption, exchange and contacts facilitated by these colourful artifacts. We are especially interested in contributions related to the ancient Mediterranean and Eurasia during the 2nd and 1st millennium BCE, before the introduction of glass blowing.

We invite scholars, researchers, and experts in the field of archaeology, archaeometry, material science, and related disciplines to contribute their insights, findings, and methodologies including (but not limited to): novel technological studies, experimental replications, typological studies, presentation of specific collections, archaeological contextualization and chronology, theoretical explorations, use/reuse/recycling, provenance studies, and other interdisciplinary research.

ABSTRACTS

1 UNDERSTANDING SPANISH VITREOUS MATERIALS: ARCHAOMETRIC INVESTIGATION OF BRONZE AGE AND EARLY IRON AGE BEADS FROM THE IBERIAN LEVANT

Bettineschi, Cinzia (Department of Classical Archaeology, Augsburg Universität (Germany)); Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice (Italy) - García Atiénzar, Gabriel (University of Alicante (Spain)) - Barciela González, Virginia (University of Alicante (Spain)) - Hernández Pérez, Mauro S. (University of Alicante (Spain)) - Lorrio Alvarado, Alberto (University of Alicante (Spain)) - Graells i Fabregat, Raimon (University of Alicante (Spain))

This contribution will present the results of the project ArGART, funded by the Rakow Grant for Glass Research of the Corning Museum of Glass (USA). This collaborative research marks the launch of the first systematic archaeological and archaeometric study on vitreous materials from the Bronze Age and early Iron Age in the Levant region of Spain.

Approximately 35 beads and perfume containers for a total of ca. 43 samples coming from 7 different sites dated to the 2nd and early 1st millennium BCE underwent a multi-analytical protocol that combined morphometric, textural, and chemico-mineralogical analyses. Additionally, typo-chronological, and spatial investigations were used to diachronically quantify the distribution of these objects and highlight how their recipes vary over time.

Based on our preliminary results, we documented the very first recognized mixed alkali (LMHK) glassy faience in the Iberian Peninsula at the El Amarejo site, even though the predominant recipe for the oldest Spanish glasses is always plant ash (HMG). Natron glasses (LMG) appear only later on, during the local Final Bronze Age (10-9th century BCE) and show, at first, the Fe-rich, and the dark blue Al-Co variants that are already testified in numerous beads from European and Mediterranean contexts dated from the 10th to the 8th century BCE. During this same period, we can assign the earliest appearance of an Egyptian blue bead in Western Europe/Mediterranean at the site of Peña Negra.

From the 8th to the 6th century BCE, the compositions stabilize towards the standard natron glass, but peculiar black and red faience beads can be found associated with the classic blue occurrences, again suggesting strict and direct connections with the eastern Mediterranean.

2 OPAQUE AND TRANSPARENT GLASS BEADS FROM COLCHIS IN THE 1ST QUARTER OF THE 1ST MILLENNIUM BC (EVIDENCE FROM TSAISHI CEMETERY)

Vachadze, Gvantsa (Georgian National Museum)

This research is the introductory study of the appearance and intensification of glass in Colchian Culture and is based on the artefacts found between 2003 and 2007 years in Tsaishi cemetery, located in Samegrelo, western Georgia.

Before the 1st millennium BC, vitreous materials are registered in small quantities in the archaeological records of Western Georgia. Meanwhile, the discovery of transparent glass items or glass vessels is completely uncharacteristic. From the 8-7th centuries BC, the rise in the quantity of opaque and transparent glass jewellery in Colchis is best illustrated in the assemblages found in the burial pits N1 and N2 at Tsaishi.

At this stage, the study aims to shed light on previously unknown glass jewellery items from Colchis by representing beads' typological features and giving a thorough examination of the stylistic parallels in order to demonstrate similarities and/or differences between the glass products in Colchis and in other regions.

Some of the glass artefacts have local parallels, while others, such as zoomorphic samples (bird pendants), have no morphological analogues and find stylistic ties in Greece (Rhodes, Euboea), Levant, Egypt, and in central and northern Italy (Bologna, Vetulonia, Campania..etc). Part of the assemblage appears to be unique, namely the opaque anthropomorphic beads.

The future goal of the research is to study the chemical composition of 41 opaque and transparent glass beads from Tsaishi, using LA-ICP-MS. Compilation of the laboratory and archaeological studies will provide better founded assessment concerning Colchis' position in the processes related to the circulation of glass and in general, ancient trade/exchange relations, especially with the Middle East and the Aegean.

3 FROM THE MEDITERRANEAN MARKET TO THE HOUSE IN OLBIA PONTICA: SPATIAL PATTERNS OF THE DISTRIBUTION OF CORE-FORMED GLASS VESSELS

Kolesnychenko, Anzhelika (Institute of Archaeology of National Academy of Sciences of Ukraine)

The current methodology of recording archaeological finds allows us to raise the problem of the spatial distribution of core-formed glass vessels within large archaeological complexes, such as the Northern Black Sea city of Olbia and the agricultural area of the polis, as well as beyond in the VI – I c. BCE.

The collection from Olbia includes about 300 items. In other sites of the Lower Southern Buh region, there are only a little more than 20 vessels, 16 of which were found directly in Borysthène (Berezan Island). Vessels from Olbia comprise of almost every significant typological kind of such vessels known in the Mediterranean basin. Only Panticapaeum has a similar variety of vessels in the North Pontic region. In Olbia core-formed glass vessels were found in the following contexts: funeral, temple-sacral, public and residential. Public contexts refer to agora objects. Finds in the residential contexts are rare. The vessels were found in the three temene and there are more finds here than in public or residential contexts. The glass vessels were put into burials of Olbians from VI up to I century BC.

The set of vessel types in Olbia differed from those in other Northern Black Sea cities not only in the number of types but also in their selection. For example, Panticapaeum has no fewer types than Olbia, but the sets of types are different. Thus, the diversity of core-formed vessels has the potential to reveal the trade relations of the ancient Greek city. We illustrate this by constructing networks of archaeological similarity for core-formed vessel finds from the Black Sea region and from the Mediterranean, placing Olbia's ego-network in a broader context.

4 INSIDE EARLY IRON AGE FASHION: THE MEDITERRANEAN HEART OF GREAT STEPPE GLASS CUBIC BEADS

Nykonenko, Dmytro (Università degli Studi di Torino) - Yatsuk, Oleh (Università degli Studi di Torino) - Gulmini, Monica (Università degli Studi di Torino)

Early Iron Age glass beads are a powerful indicator of the development of glass-working technology, trade and cultural interactions between different areas and tribes. Glass beads were relatively inexpensive, but still valuable and desirable jewellery, easy to transport and capable of infinite creative expression by their makers. Despite the enormous variety of shapes, colours and decorations, glass beads tended to repeat themselves over time. On rare occasions, however, completely new types of beads appeared and spread over vast areas before disappearing forever after a relatively short period of use. Such vivid traces of ancient fashion include cubic beads decorated with chevrons, which archaeologists have found from the Vistula Basin in the west to the Ural Mountains in the east. The area of distribution of these decorations is about 2 million sq. km. They are found in the monuments of different archaeological cultures, but they are always reliable chronological indicators of the 4th century BCE. The production workshops of these beads are still unknown, but it is generally accepted that they originated from the northern Black Sea region.

Starting from a Scythian burial site on the island of Khortytsia in Zaporizhzhia (modern Ukraine), the authors have carried out a comprehensive study of beads of this type, involving a large interdisciplinary team of researchers. Photogrammetry and micro-CT scanning were used to reconstruct the technological stages of bead production, their sequence and characteristics. The study of the samples by LA-ICP-MS, XRF, FORS, μ -Raman and μ -XRD allowed us to determine the elemental composition of the beads, their colourants and opacifiers. The overall results support the idea that glass beads can be divided into two chrono-compositionally distinct groups that overlapped during the 4th century BCE. It was imported from the eastern Mediterranean, one part from Egypt, the other from the Levant.

5 CONTINUITY OR CHANGE? AN IN-DEPTH ANALYSIS OF CORE FORMED GLASS FROM CENTRAL GREECE

Oikonomou, Artemios (The Cyprus Institute; Institute of Nuclear and Particle Physics, NCSR Demokritos) - Oikonomidis, Stavros (Arcadia University, Glenside, USA; Albanian Archaeological Project at Prespes) - Skoumi, Nelli (Ephorate of Speleology and Palaeoanthropology, Athens, Greece)

Glass, one of the latest pyrotechnological products invented by man, has been used in the form of beads and minor decorative objects since the 4th millennium BC. The earliest glass vessels were manufactured with the core forming technique in Mesopotamia and Egypt during the second half of the 2nd millennium BC (16th-15th c. BC).

The spread of the core-forming technique resulted in a large number of glass vessels produced in the Mediterranean area during the 1st millennium BC. The so-called Mediterranean core formed bottles, which were manufactured in three successive industries between the mid-6th c. BC to the beginning of the 1st c. AD, termed as Mediterranean Groups I, II and III, respectively, circulated extensively all over the Mediterranean.

Numerous glass objects, including a substantial number of fragments from core-formed vessels, were discovered during various excavation seasons in Cave Coroneia (a well-known panhellenic sanctuary operating from Late Bronze

Age to the 2nd century CE), in Boeotia, Central Greece. The fragments cover the three manufacturing industries and belong to Groups I, II and III. The assemblage was investigated using various analytical techniques in an effort to understand changes or/and continuity among the three periods of manufacture and give insights about the technological choices of the glassmakers and the provenance of the raw materials and hence the glass itself.

6 STRINGING A STORY: GLASS ASSEMBLAGES FROM ZAKOTORAC AND NAKOVANA BURIAL MOUNDS (PELJEŠAC, CROATIA)

Loncaric, Valentina (HERCULES Laboratory, University of Évora; IN2PAST Associate Laboratory, University of Évora; Department of Earth and Environmental Sciences, KU Leuven) - Perkic, Domagoj (Dubrovnik Museums, Archaeological Museum) - Dizdar, Marko (Institute of Archaeology) - Potrebica, Hrvoje (Faculty of Humanities and Social Sciences, University of Zagreb) - Costa, Mafalda (HERCULES Laboratory, University of Évora; IN2PAST Associate Laboratory, University of Évora) - Degryse, Patrick (Department of Earth and Environmental Sciences, KU Leuven)

Southern Dalmatia during the 1st millennium BCE is a melting pot of cultural influences from the Adriatic (Dalmatian, Liburnian, Iapodean), the western and central Balkan Interior (Glasinac), and the Mediterranean (S Italy and the Aegean). Recent archaeological investigations of Iron Age burials on the Pelješac peninsula (Croatia) yielded over 500 glass beads and pendants, as well as metal and amber objects and painted pottery testifying to intense cultural contacts between Southern Dalmatian communities and the wider Mediterranean during the Iron Age. The explored graves were used for multiple burials, sometimes containing over a dozen individuals of all age groups. The communal nature and the continuous use of burial mounds at Nakovana and Zakotorac, as well as subsequent robbing in some cases, resulted in a culturally mediated loss of information about how glass beads were used as part of the funerary attire, who they belonged to, and whether there were any noticeable patterns to how they were combined together.

This work puts forward a question of if (and how) integrating multiple approaches – typology, traceology, and glass composition – can help fill the knowledge gaps arising from depositional context and string a coherent narrative from disjointed elements. A working typology based on morphometric attributes and manufacture techniques serves to present an aspect of the aesthetics and visual identity of South Adriatic communities and compare it to neighbouring regions. The typological overview of the material was used to design a research strategy and make informed decisions regarding sampling for archaeometric analyses.

7 FROM SOUTH TO NORTH? MORAVIAN HALLSTATT GLASS: ORIGIN, COMPOSITION AND PRODUCTION

Melichar, Petr (Palacký University Olomouc) - Golec, Martin (Palacký University Olomouc) - Golec Mírová, Zuzana (Charles University Prague) - Kučera, Lukáš (Palacký University Olomouc) - Kučerová, Pavla (Palacký University Olomouc)

Glass in its natural form enticed human interest since the oldest times and the secret of its production was unraveled as early as the Bronze Age – but it was not until the Iron Age that glassmaking saw its extraordinary development and spread of glass products across regions. Czech project “From South to North? Moravian Hallstatt Glass: Origin, Composition and Production” tracks the bloom of Hallstatt Period glassmaking in relation to Moravian territory (Czech Republic), primarily based on the study of the so far biggest known collection of Hallstatt Period glass north of the Alps, coming from the Býčí skála Cave sanctuary (575–450 BC), containing elite burials. This collection, comprising more than 4500 pieces of glass beads, supplements reference glass material from selected Moravian hoards and graves. Methodologically, we followed a complex approach, taking into account the wide range of analytical possibilities that vitreous materials offer. Therefore, beside optical description, typology and analogies, we also work with results of SEM/EDS measurements, opening topics of chemical composition, type and possible provenance of glass. Acquired data are compared with contemporary finds from regions of Bohemia, Slovenia, Poland, Italy and the question of the origin of Moravian glass is tested. The material is likewise commented on in relation to the Amber Road, of which Moravia was an integral part. The role of glass as a counter-value of southern centres for goods of northern origin, long-distance trade of Hallstatt Period Moravia with some glass production centres, based on specific types of beads, as well as the question of possibility of primary glass melting in the Central European context, is discussed.

8 VERUCCHIO CONNECTED. ON SOME IMPORTED GLASS BEADS FROM VERUCCHIO (EMILIA-ROMAGNA, ITALY)

Koch, Leonie (University of Cologne, Germany – Institute of Prehistoric Archaeology)

Verucchio, in the hinterland of Rimini, with its Early Iron Age necropolises has provided many new insights into the Villanovan culture of the Romagna in recent decades. The most recent excavations, carried out by Patrizia von Eles in 2005-2009, provided the opportunity for a personal and detailed archaeological study of the glass bead finds.

Peculiar shapes dating from the mid-8th century B.C., which have no parallels to date, and the specifically Italic shape of the glass bow fibula make local glass processing in Verucchio very likely.

More recent finds include the famous glass bird beads, probably from the Aegean. Other items and a special form of pendant can be considered as imported objects. These forms of jewellery made of vitreous materials belonging to the female sphere are presented and their parallels (known to the author) are given. They complete our picture of the Early Iron Age Emilia-Romagna, which is rather poor in imports, even if direct links with the areas of origin cannot be taken for granted.

9 ETRUSCAN GLASSES FROM FORCELLO DI BAGNOLO SAN VITO (NORTH ITALY): A NEW ARCHAEOLOGICAL AND TECHNOLOGICAL STUDY

Malaman, Elisabetta (University of Padua) - Angelini, Ivana (University of Padua) - Rapi, Marta (University of Milan)

Considering Etruscan materials and productions, glass remains one of the less explored areas. Until now, scholars have primarily focused on typological and decorative studies of Etruscan glasses, leaving information on the composition and origins of glass relatively scarce. To enhance our understanding in this field, we have chosen to investigate 28 glass beads and 4 fragments of unguentaria from the Etruscan site of Forcello di Bagnolo San Vito (Mantua, Italy). We conducted analyses on both the glass body and coloured decorations, totalling 56 samples. The analysed set include the majority of finds from archaeological excavations, and few objects from archaeological surveys. The materials can be dated between the end of the VI century BC and 380 BC, corresponding to the different phases of the Forcello site. This research aims to reconstruct their manufacturing techniques, identify the raw materials and colouring agents used, and discuss the possible provenance of the glass. The initial phase of our work involved an examination of the artefacts through stereomicroscopy. This step aimed to assess the conservation state and identify production markers. While the vessels can be categorized within the Mediterranean core-formed groups, their fragmentary state renders them typologically unclassifiable. The beads primarily fall into the annular and eyed types, with bodies produced using the winding technique while the eyes exhibit various creation methods. The studied artefacts underwent micro-sampling, and the resulting glass fragments were comprehensively characterized from a chemical, mineralogical, and textural perspective. Chemical characterization of the glass phases and crystalline inclusions was achieved through the application of optical microscopy, SEM-EDS, EPMA, and/or LA-ICP-MS analyses. Micro-Raman was employed to characterize the mineralogy of opacifiers and remains of raw materials. The obtained results will be discussed in relation to data available in the literature concerning coeval glass objects with comparable typologies.

10 CONTEXTUALISING VITREOUS MATERIALS IN ETRURIA. THE CASE STUDY OF THE MONTE ABATONE NECROPOLIS

Briesack, Christian (University of Bonn)

From the Orientalising period onwards, the Etruscans buried their dead with a wide range of grave goods, including jewellery, precious vessels and other valuable objects made of glass and related materials. These burials, which belonged to the upper class of the society, were a constant reminder of their wealth and power. Vitreous artefacts were also found at the Monte Abatone necropolis of the famous Etruscan city of Cerveteri, which has been under investigation by an international cooperation of several universities together with state authorities for years. In the period between 2018 and 2022, excavation campaigns were carried out on site by the group. This paper will present some vitreous materials from the necropolis, based on the excavation results of the University of Bonn, which is involved in the cooperation. The archaeological finds range from the well-known glass beads to spiked vessels to pendants and amulets made of faience. In a second step, these objects will be analysed in the context of the necropolis as a whole. Having done that, they finally need to be compared with materials found in the other Caeretan burial sites, like Banditaccia, Laghetto, Bufolareccia and Sorbo. This is necessary to get an overall interpretation of glass and related materials at Monte Abatone.

1024 UNDERSTANDING BEHAVIOURAL CHANGES THROUGH MATERIAL STUDIES - ADAPTATION AND SOCIAL COMPLEXITY OF THE HOMO SAPIENS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Petrović, Anda (University of Belgrade) - Vinet, Alice (Aix-Marseille University; UMR 7269 LAMPEA) - Debels, Pauline (UMR 8215 Trajectoires) - Macane, Aija (University of Helsinki; University of Latvia)

Session format: Regular session

The aim of the session is to understand the adaptations and traditions of prehistoric groups from the Paleolithic to the Bronze Age by qualifying and quantifying behavioural changes through material studies. The study of the complete

chaîne opératoire of an artefact, from raw material procurement to production, use and discard brings significant information that contribute to the understanding of the relationships within and outside the community.

The geo-chronological frame of the session is intentionally broad to tackle short and long-term lifestyle changes by studying the biographies of the tools used daily in prehistory, whether the changes are economical, sociological, environmental, and/or a matter of survival. The methodological frame of the session encompasses raw material procurement strategies, production, use-wear, technological and typological studies that question the knowledge transfer and adaptability of the past populations. The session welcomes papers based on both archaeological and ethnographic records that address the activities which are considered to develop a social connection within the community, such as subsistence or craftsmanship with broader discussion on their influence and development of social skills. The goal is to address the reasoning behind certain processes, such as the unconventional role of flint tools and changing relationships towards animal remains in funerary rites of hunter-gatherer communities of NE Europe, or, for example, how hunting was appraised in Chalcolithic of Central Anatolia when it became nonessential for survival.

ABSTRACTS

1 IMPORTS AND OUTCROPS: OBSIDIAN PROCUREMENT AND THE EVOLUTION OF HOMO SAPIENS BEHAVIOR IN THE LATE PLEISTOCENE HORN OF AFRICA

Smith, Benjamin (CEPAM, Université Côte d'Azur) - Johnson, Lucas (Far Western Anthropological Research, Inc.) - Brandt, Steven (University of Florida)

The emergence of hominin behavioral complexity in Africa during the Middle and Late Pleistocene is associated with increased trade in exotic raw materials, increased foraging ranges, and the development of new settlement and material procurement strategies. Identifying the scale and directionality of stone procurement in the Late Pleistocene Horn of Africa is essential if we are to explore the emergence and dispersal of Homo sapiens during this time. However, we still need more well-dated sites and identified obsidian sources. Here we characterized forty-two obsidian samples from the Baantu obsidian source in southwestern Ethiopia, including 25 outcrop samples and 17 surface artifacts, using portable X-ray fluorescence spectroscopy. We then compared these source data to 116 obsidian artifacts from Mochena Borago Rockshelter. Results indicate that at least three geochemical source clusters are represented at the Baantu source: one derived from sampled outcrops and two deriving from as-yet unknown source locations. Comparing these data to obsidian artifacts at Mochena Borago excavated from levels dated to >50 ka and ~44 ka BP, early levels dating to > 50 ka preserve obsidian from as many as six as-yet unidentified sources, while Baantu obsidians were in the minority. By ~44 ka cal BP Mochena Borago occupants procured most if not all of their obsidian from the Baantu source. The occupants of Mochena Borago Rockshelter clearly adapted to periods of major ecological and social change during the Late Pleistocene through their procurement and use of stone raw materials. The data we present here are part of a growing body of research that fills a gap in our spatial and temporal knowledge of stone procurement during this period in Homo sapiens behavioral evolution.

2 NEW INSIGHTS INTO THE LITHIC ASSEMBLAGES FROM BURIAL CONTEXTS AT ZVEJNIEKI, LATVIA

Petrovic, Anda (Department of Archaeology, Faculty of Philosophy, University of Belgrade) - Macane, Aija (Department of Cultures, University of Helsinki; Institute of Latvian History, University of Latvia) - Nordqvist, Kerkko (Helsinki Collegium for Advanced Studies, University of Helsinki) - Zagorska, Ilga (Institute of Latvian History, University of Latvia) - Edmonds, Mark (Department of Archaeology, University of York) - Little, Aimee (YEAR Centre, Department of Archaeology, University of York, PalaeoHub)

This paper presents new results, and offers preliminary interpretations, of a recent functional study of lithic artefacts from burial contexts at Zvejnieki, carried out as part of the AHRC-funded Stone Dead Project. Zvejnieki is one of the largest Stone Age hunter-gatherer burials grounds in NE Europe, located along a drumlin on the northern shore of Lake Burtieks in northern Latvia. According to the radiocarbon dates cemetery was used between 7500 – 2500 cal BC. Through a combination of geology, technology, trace wear analysis, and spatial/contextual studies, we have been able to identify patterns in the choice of objects placed into the graves, some of them used, others made specifically for burial. By combining this information with biographical data for the associated human skeletal remains, it becomes possible to identify the kinds of links that were made between specific categories of artefact and different kinds of people during Baltic Stone Age mortuary rites and rituals.

3 PRODUCTION AND USE OF ANIMAL TOOTH PENDANTS IN THE STONE AGE SETTLEMENT OF ZVEJNIEKI II, NORTHERN LATVIA

Macane, Aija (Institute of Latvian History, University of Latvia; University of Helsinki) - Zagorska, Ilga (Institute of Latvian History, University of Latvia)

The well-known Zvejnieki cemetery contains one of the largest collections of osseous artefacts from hunter-gatherer burial contexts in Europe. Numerous studies have examined various aspects of personal ornaments, tools and animal remains from burials. However, the nearby settlement materials of Zvejnieki II have not received similar attention. This paper presents new study on the collection of animal tooth pendants from the settlement context, which was carried out in the project "Skills in synergy, crafts in context: an integrated study of eastern Baltic Stone Age technologies" at the Institute of Latvian History. Osteological, technological, and contextual analyzes provide new insights into animal species, production, and use of pendants in the settlement. The results show differences between the production of tooth pendants from settlement and cemetery contexts. This is an important contribution to better understanding human choices regarding the manufacture and use of pendants, e.g., the selection of certain animal species and technological solutions used in the Zvejnieki settlement compared to the cemetery.

4 WHAT STORIES DO THE DECORATED HUNTER-GATHERER OSSEOUS TOOLS TELL? RECENT RESEARCH AND RESULTS FROM LITHUANIAN TERRITORY

Rimkus, Tomas (Vilnius Academy of Arts, Vilnius, Lithuania; Institute of Baltic Region History and Archaeology, Klaipėda University, Klaipėda, Lithuania)

Bone and antler artefacts are frequently found in Lithuanian territory in wetland sites and as stray finds. In recent years, their AMS 14C dating and technological studies have provided new insights into the knowledge of Final Palaeolithic, Mesolithic and Neolithic organic tools production. As these studies have shown, some of the artefacts are decorated with various types of different or sometimes similar ornaments. Most of them form simple or complex, extended geometric compositions. In past Lithuanian archaeological works, these artefacts were mainly treated from the ritual perspective of a hunter-gatherer symbolic worldview. For some reason, the tool itself and its technological aspects were not discussed further. However, the tool itself and its different technological aspects could provide more data about the ritual in the past, changes in human behaviour and adaptation. In 2024, a new research project was initiated focusing on decorated bone and antler artefacts found on the territory of Lithuania. It aims to shed light on the aspects of tool and ornament preparation, their type and dating, and the determination of the raw materials. Microscopic, 3D scanning, AMS 14C dating and ZooMS methods were used. These integrated methods have provided new data on hitherto little studied ornamented organic artefacts. This paper will therefore aim to present and discuss (1) the aims of the project, (2) the studied objects and (3) the results of the complex research.

5 QUANTIFYING CULTURAL CHANGE THROUGHOUT LITHIC MATERIAL STUDIES: THE CASE OF MIDDLE NEOLITHIC IN DEHESILLA CAVE (SOUTHERN IBERIAN PENINSULA)

Barrera-Cruz, María (University of Valencia) - García-Rivero, Daniel (University of Seville)

The Neolithic includes a broad spectrum of human behaviors. In the Iberian Peninsula, farming groups arrived in the first half of the sixth-millennium cal. BC, and the spread of new populations continued after that. The highly diverse material culture of the Neolithic has been interpreted as a reflection of multiple origins and as the regionalization that followed. That cultural variability is mostly explored via pottery studies; in Southern Iberia, during the early Neolithic, cultural traits shared with other regions, such as impressed and incised wares, coexisted with others specific to the area, such as the bright red almagra pottery. Over time, studies detected generalized changes in the material record (c. second half of the fifth millennium), e.g., in the decoration dynamic in the pottery assemblage, in the size average of blade production, or the faunal and botanical record. In addition to the abovementioned changes, there are further particularities, such as the Middle Neolithic A (MNA) documented in Dehesilla Cave. Within a broad archaeological sequence that includes occupational events from several Neolithic phases (c. 5600-3800 cal BC), Dehesilla presents the MNA record dated between c. 4800-4500 cal BC, seemingly different from the assemblage recovered from that found for the area's previous, and later phases, as well as contemporary assemblages. Along with introducing engraved decoration in the material culture and changes in the economic pattern, we detected some particularities in the lithic record. Nevertheless, to what extent does the lithic technology accompany the particularities already known from the MNA of the Dehesilla cave? Here, we introduce an advance of the comparative study between the lithic assemblage recovered for MNA and the toolkit used by human groups in different Neolithic phases, thereby completing the information about apparent changes in the lifestyle of prehistoric human groups between the sixth and the fourth-millennium cal. BC.

6 CELT PRODUCTION PROCESSES AND LOCI IN NEOLITHIC GREECE: THE CASE OF THE THRACIAN SITE OF MAKRI

Stroulia, Anna (University of Southern Indiana) - Bekiaris, Tasos (Aristotle University of Thessaloniki) - Melfos, Vasilios (Aristotle University of Thessaloniki) - Stergiou, Christos (Aristotle University of Thessaloniki)

Celts represent one of the most studied macrolithic (i.e., ground stone) types from Neolithic Greece. Reports offering various degrees of detail are available for more than 25 assemblages. Due to archaeological biases, however, these assemblages are not evenly distributed geographically. Most derive from the regions of Macedonia and Thessaly, with other areas represented minimally or not at all. Equally important, light has been shed on raw material types and acquisition systems, manufacturing techniques, aspects of use, practices of discard, as well as non-utilitarian dimensions. Yet, very little is known about the whereabouts of celt production. In this contribution, we attempt to address both gaps by turning our attention to the region of Thrace in the northeastern part of the country and focusing on the 200 or so celts excavated at the Middle-Late Neolithic site of Makri. We discuss these tools' lithologies and chaînes opératoires, revisit a structure identified by the excavators as a celt workshop, bring in relevant data from other sites, and, last but not least, deconstruct the celt workshop concept itself.

7 ADDRESSING SOCIAL BEHAVIOR IN NEOLITHIC ANATOLIA THROUGH TECHNO-FUNCTIONAL STUDY OF CHIPPED STONE TOOLS

Vinet, Alice (Aix Marseille University; UMR 7269 Lampea)

Beginning in the Late Neolithic (ca. 6500 BC), changes took place in central Anatolia that affected numerous aspects of daily life among local communities. These changes demonstrate increased social competition as expressed in funeral practices, craft production, human and pastoral mobility, and social interactions. The lithic industry, however, does not seem to be impacted by these upheavals. Central Anatolia, with its widely distributed obsidian sources, is a key region for investigating community development through the lenses of raw material exploitation, economy, and technology.

This communication will highlight the behaviors related to the production, use, and abandonment of the obsidian industry of Tepecik Çiftlik (Cappadocia) and Çatalhöyük West (Konya plain). The results contribute to the definition of two cultural groups in central Anatolia between 6000 and 5500 calBC by providing new data on the production and use of obsidian from domestic and ritualized contexts.

A diverse range of activities occurred at both sites, in which the work of minerals, plants and hide played a major role. Certain endeavors, like hunting, transcended mere survival needs, acquiring social and symbolic significance. This evolution in the role of hunting reveals the complexity of social relations within Anatolian Neolithic communities, highlighting their resilience through the transformation of their collective identity.

8 ECHOES FROM THE CAVE: EXPLORING THE LIFE-HISTORIES OF MACROLITHIC ARTIFACTS FROM LATE NEOLITHIC DRAKAINA CAVE, KEPHALONIA ISLAND, WESTERN GREECE

Bekiaris, Tasos (Aristotle University of Thessaloniki)

Drakaina Cave is a small, karstic cavity located on the steep slopes of Poros Gorge at the SE part of Kephallonia Island, Ionian Sea, Western Greece. Excavations at the site revealed a complex cultural sequence, dated both to the historic (late 7th – early 2nd centuries BC) and prehistoric periods (Early Helladic – Late Neolithic, circa mid-6th – late 3rd millennium BC). Late Neolithic deposits comprise the bulk of the prehistoric sequence of the site (circa 5500 – 3700 cal BC). They have yielded several architectural features (e.g. lime-plastered floors, hearths) and rich datasets of organic (e.g. terrestrial and sea faunal remains, charred woods, seeds) and inorganic finds (e.g. pottery, ornaments, chipped stone and macrolithic implements). The macrolithic assemblage of Drakaina Cave comprises nearly 470 implements, of a rather conserved typology, that included grinding tools, percussive tools, and a few stone celts.

In this paper, we explore the life histories of the macrolithic implements from Drakaina Cave. Through the detailed study of their technological attributes, mainly their raw materials, manufacture and curation patterns, macroscopic use-wear and discard practices, we attempt to interpret the presence of the macrolithic implements in the Cave and comprehend the character of the activities, which they have supported. Based on the current evidence, it is suggested that only specific types of macrolithic implements were brought to Drakaina Cave, in order to be used for short time periods, within the context of specific tasks, and that their life cycles ended upon the completion of these tasks. Those visits may have had the character of small group gatherings of a symbolic and/or social character.

9 ECHOES OF NEOLITHIC LIFE: DECIPHERING FLINT ARTEFACT BIOGRAPHIES FROM CAUSEWAYED ENCLOSURES

Bye Jensen, Peter (Vejle Museer)

This paper centres on the depositional practices at Neolithic causewayed enclosures, utilising use-wear analysis, and surface modifications on flint tools to construct artefact biographies that illuminate activities and practices within these monuments. By integrating use-wear analysis with a detailed examination of the flint tools surface modifications, one can decode a fossilised record of these artefacts—from procurement and manufacture to use and eventual discard or deposition. This approach reveals not only the functional aspects of tool use but also the sheds new light on depositional practices Neolithic societies.

Focusing on a selection of assemblages from causewayed enclosures from southern Britain and southern Scandinavia, tracing the biographies of flint tools to understand their roles and how they could have become artefacts in Neolithic rituals practices and social interactions. The study employs a robust methodological framework, combining microscopic analysis of wear patterns with contextual archaeological evidence, to interpret the surface modifications as narratives of past human behaviour.

This paper contributes to a nuanced understanding of Neolithic causewayed enclosures, showcasing how the detailed narrative of flint artefacts' life biographies can enrich our understanding of complexities and activities of Neolithic societies.

10 UNDERSTANDING SOCIAL RELATIONS OF BRONZE AGE COMMUNITIES IN THE CARPATHIAN BASIN: CERAMIC PETROGRAPHIC ANALYSIS IN THE MAKLÁR MICROREGION (NE HUNGARY)

Mengyán, Ákos (Hungarian National Museum; University of Miskolc)

The primary step of chaîne opératoire of pottery production is the collection and transformation of the clay material that includes the selection of the raw material, tempering, and paste preparation. These are defined by various social and cultural habits that can refer to the social identity of its producer. Ceramic petrographic analysis can help us to identify the raw materials and fabric techniques and to determine the provenance and the type and quantity of the temper of the raw materials as well. Therefore, the analysis of technological choices, including raw materials and fabric techniques, can enable us to assess the nature of social relations between communities.

On the Northern Great Hungarian Plain, two cremation cemeteries are known 1.5 km from each other in the Maklár microregion (North-Eastern Hungary), dated by relative chronology around 1500–1300 BC. On Maklár-Kospérium, 121 and on Maklár-Nagyret II., 210 burials were excavated that can be assigned to the Tumulus culture. In its development, small-scale migration and the evolution of local population might have played an important role in this area. Thus, territorial groups can be distinguished based on ceramic typology, which might have their roots in the preceding regional cultures.

Besides typological and stylistic analyses, this microregional research focusing specifically on the raw material preparation and fabric techniques of the pottery grave goods, applying thin section petrography. The aim of this study is to explore patterns in the raw materials and tempering that allows us to identify and understand social connections within and between the two distinct and contemporaneous Maklár cemeteries. Furthermore, the relationships between raw material selection and typological and stylistic analysis offer a unique opportunity to shed light on to the social relations of the Maklár Bronze Age communities.

11 ASSESSING 100 YEARS OF EVOLUTION OF FOOD PRACTICES IN A SENEGALESE VILLAGE, THROUGH THE USE-WEAR ANALYSIS OF THE POTTERY ASSEMBLAGE

Debels, Pauline (LabEx DynamiTe - UMR 8215 Trajectoires; ARCAN - University of Geneva) - Vieugué, Julien (UMR 8068 TEMPS) - Sall, Moustapha (Cheikh Anta Diop University) - Mayor, Anne (ARCAN - University of Geneva)

Middens are valuable study subjects for archaeologists. While objects made of ceramic, fauna, lithic, metal or plastic bring significant information on the state and evolution of a material culture, ecofacts contribute to the reconstruction of the environment, as well as the fraction humans choose to take and transform from that environment.

As part of the SNF Sinergia project Foodways in West Africa, a midden spanning throughout the entire 20th century has been archaeologically investigated in the village of Edioungou (Lower Casamance, Senegal). This contribution offers the results of the functional analysis of the ceramic assemblage (MNI 365) with the aim of understanding the evolution of the use of pots and subsequently, food habits. The method is based on the macroscopic (naked eye and stereomicroscope) observations of addition traces (sot, carbonized residues, carbonate formation...), subtraction wear (abrasions, carbonate dissolutions...) and modification of the pot surface or structure (oxydisation, fractures, cracks...)

This study has highlighted different paces of changes. Some pots such as water storage jars show a great continuity because of technical performances, while others, formerly used for a large range of activities from transport to hygiene, have nearly completely disappeared through time in favour of similar shapes made from more efficient material such as plastic, glass and enamelled metal. Some of them have also been simply abandoned following behavioural changes. Different phenomena (performance characteristics, religion, food habits and availability) have driven the evolution of pottery use in Lower Casamance and at different rates. These insights help understand archaeological rhythms of changes and disappearances in pottery shapes.

1027 HOW TO HUNT? HOW TO HERD? NEW APPROACHES TO OLD QUESTIONS ON HUMAN-NONHUMAN/ANIMAL ENTANGLEMENTS

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Windle, Morgan (Kiel University) - Lemke, Ashley (University of Wisconsin-Milwaukee) - Piezonka, Henny (Freien Universität Berlin)

Session format: Regular session

With the expansion of posthumanist approaches in archaeological research, pivotal moments in the human past can be reinvigorated by novel perspectives. Perhaps most prominently, the decentering of human agency has elucidated the dynamic co-production of cultural practices and landscapes that can occur between humans, nonhuman animals, and the environments they share. Such methodologies offer fertile ground for transdisciplinary investigation that may expand our capacity for understanding human-nonhuman pasts. Particularly with regards to questions concerned with hunting and husbandry strategies, niche-construction, and the domestication of animals, the posthumanist turn can offer explanations for specific processes of human-nonhuman relationships beyond traditional behavioral ecology models.

The hunting and herding of animals are often considered in isolation of one another, or as a binary. But what of those societies engaged in both? How can we better understand hunting and/or herding knowledge systems of the past? What sort of insights could be yielded by examining the entirety of the hunting-herding spectrum through a posthumanist lens simultaneously?

This session focuses on theoretical and practical aspects of modeling human-nonhuman animal entanglements, with emphasis on how we understand past human hunting and/or herding strategies. We welcome theoretical, methodological, and case study contributions that reflect the complex relations between human and nonhumans regardless of time and space. Moreover, we are especially interested in the approaches that seek to describe and present cultural landscape transformation through non-anthropocentric frameworks. In order to guide the session, we invite contributions that tackle one or more of the following questions:

- What are relevant environmental, spatial or landscape features, and what roles do they play in the development of human/nonhuman communities and their socio-economic strategies?
- How can complex human-nonhuman/animal entanglements be modelled allowing the application of anthropological theory to archaeological data?
- What tools and approaches provide the data needed for a post-humanist framework?

ABSTRACTS

1 RECONCEPTUALIZING HUMAN AND DOMESTIC ANIMAL ENTANGLEMENTS: ECONOMY, DEMOGRAPHY, AND METHODOLOGICAL CHALLENGES OF SMALL-SCALE PASTORALISM

McClure, Sarah (University of California, Santa Barbara)

Studies of ancient pastoralism in Europe have often centered on efforts to reconstruct domestic animal management systems to assess the economic contributions of having herds. Using basic zooarchaeological techniques such as epiphyseal fusion data and tooth eruption and wear, scholars have reconstructed mortuary profiles of sheep, goats, and cattle, and made inferences about the types of products (meat, milk, wool) herd managers were targeting, along with the scale of production within differing socio-economic and cultural spheres. While many of these studies have provided insights into ancient pastoral practices on large scales, this paper explores the theoretical and methodological challenges posed by this approach for small-scale pastoralism. Using ethnographic and historical accounts, along with archaeological data from Neolithic sites on the Dalmatian coast of Croatia, this study highlights the discord between applied methodologies and their theoretical premises with the nature of the archaeological record and assumptions about the scale, role, and purpose of pastoralist activities within small-scale farming communities. It illustrates the fundamental problem with using mortuary profiles to reconstruct economic contributions in these contexts, and explores alternative methodological approaches to assess the nature, scope, and practice of herding in agropastoral

societies. Ultimately this approach has implications for re-envisioning Neolithic cultural landscapes based on human-animal entanglements and provides incentive to pursue other lines of inquiry for characterizing Neolithic material and non-material interactions.

2 HOW TO HUNT? THE BEHAVIOUR OF ANIMALS AS A GUIDE FOR HUNTERS IN 13TH-14TH CENTURY NORTHERN FENNOSCANDIA

Jääskeläinen, Emilia (Archaeology, University of Oulu) - Salmi, Anna-Kaisa (Archaeology, University of Oulu)

Hunting is about knowing how the game animals behave, what kind of tracks they leave behind and what kind of landscapes they inhabit. In other words, the behaviour of the animals affected the hunter's movement and perception of the landscape. In this paper, we will present a case study from the Finnish Late Iron Age (800-1300 AD) when hunting was still an important way of life for local communities living in the North. Our focus is on two animal species, the European beaver (*Castor fiber*) and the wild reindeer (*Rangifer tarandus*), as these species were identified in the zooarchaeological analysis of animal bone assemblages from a 13th-14th century settlement site called Illinsaari 3, in Ii, Northern Ostrobothnia. With the help of animal ecology, ethnographic analogies, and known historical hunting methods we investigate how these two animals behaved, what kind of tracks and traces they might have left behind, and how hunters perceived these and the landscape when trying to find hunting grounds and prey.

3 INTEGRATING TRADITIONAL ECOLOGICAL KNOWLEDGE IN ARCHAEOLOGY: APPLICATIONS IN THE MODELLING OF HUMAN-RANGIFER INTERACTIONS IN NORTH AMERICA AND NORTHWEST ASIA

Windle, Morgan (Christian-Albrechts-Universität zu Kiel) - Lemke, Ashley (University of Wisconsin-Milwaukee) - Piezonka, Henny (Freie Universität Berlin)

Indigenous epistemologies reveal an intimate immersion in, and deep knowledge of, the nonhuman elements of human habitats. Indigenous cultures worldwide demonstrate the futility in attempting to disentangle humans from the environments they inhabit. Knowledge is instead constructed through transgenerational ecological observations, oral history and narrative, as well as animate interspecies interactions which form the basis for Traditional Ecological Knowledge (TEK). Recent incorporations of Indigenous methods (like TEK) into various branches of anthropology and biology have demonstrated their immense capacity to guide data interpretation and be utilized as a valid scientific method. Despite this, integrations of TEK into archaeological approaches remain on the periphery of the discipline, only applied where archaeologies directly overlap with descendant communities e.g., in Indigenous-led research. These methodologies offer transformative, transdisciplinary opportunities to expand our capacity for understanding human-nonhuman pasts. A key example of this is human-Rangifer relationship research. Rangifer tarandus (reindeer/caribou) have helped shape the complex cultural fabric of both North American and Northern Eurasian societies; however, the intricacies of human-Rangifer systems contradict archetypes of domestication modelling and are not yet easily replicated in a digital space.

This paper will demonstrate how TEK can be integrated by comparatively exploring human-Rangifer relationships across two temporal landscapes: the small-scale reindeer herding amongst modern hunter-fisher communities in Northwest Asia; and the 9,000-year-old legacy of caribou hunting strategies in North America recorded via underwater archaeology. Despite their disparity in time and place, these two studies offer examples of prominent nonhuman agency in the formation of cultural landscapes and show how deep ecological knowledge can shape niche-constructing activities inherent to human-nonhuman relationship dynamics. These case studies attempt to move beyond common behavioral ecology models through the implementation of TEK in collaborative archaeology, relational approaches, and virtual reality modeling.

4 COLLECTIVES ON THE MOVE: EVENKI HUNTERS AND THEIR REINDEER CARAVAN IN THE TAIGA OF EAST SIBERIA AND FAR EAST

Brandisauskas, Donatas (Lithuanian Institute of History)

In my presentation I aim to introduce to how domestic reindeer is perceived by indigenous nomadic Evenki reindeer herders and hunters as individual person with own distinguished characters, responses, physicality rather than mere instinct driven herd animal as it was often seen in studies of hunters and gatherers or pastoralists. These knowledges of diversity of reindeer also help to organize reindeer into caravan successfully performing cargo activities in mountainous taiga landscape. In contrast to the human/animal models stressing the role of autonomy and intermittency of relations with animals in Northern Asia, I aim to show how embodied interactions, intentions and established mutual communication of Evenki and their individual reindeer can be deeply convolved in their joined activities and intentions this way bonding integrity of the human/reindeer social continuum. The presentation is based on my long-term eth-

nographic research among different communities of Evenki reindeer herders and hunters of East Siberia and Russian Far East (Russian Federation).

5 RECREATIONAL HUNTING IN PREHISTORY

Scutt, Win (English Heritage)

We know from ethnological studies that the hunting of animals is not only a subsistence practice but also sometimes a recreational activity. It can be used in rites of passage or as entertainment that brings societies together to share a common experience. The opportunities for competition and excitement are an important incentive for groups from far and wide to gather at certain times of the year. There is good documentary evidence from the Greek Iron Age in the form of the Panathenaic and Olympic Games for festivals that combined sport with religious observance; and evidence for sport in the archaeological record, for example, bull leaping in Minoan Crete and ball games in Mesopotamia. But sporting activities rarely impact on the archaeological record.

This paper will explore the possibility that *Cursus* monuments of the British Neolithic were used as performance areas for sporting activities. When the first *Cursus* was identified by Stukeley in 1723, he decided it was a Roman chariot racecourse. Since then, some 100 *cursus* monuments have been identified in Britain and are dated to c.3600-2900 BCE, in the Early and Middle Neolithic.

What sort of sporting activities and social interaction would such arenas afford? We shall explore whether these activities might have involved animals as sporting performance; which species of animals might have best suited these spaces; how participants and spectators interacted with the activity; and how these performances may have played out. In conclusion, the most likely scenario afforded by the dimensions, topography and resources of *Cursus* monuments is that they were used for deer coursing as a social activity.

6 THE RELEVANCE OF "BEING WILD"? THE 3RD MILLENNIUM BCE IN CENTRAL AND SOUTHERN PORTUGAL

Almeida, Nelson (CHAIA, Universidade de Évora, PT; UNIARQ, Universidade de Lisboa, PT) - Guinot, Catarina (Universidade de Évora, PT) - Ribeiro, Inês (CHAIA, Universidade de Évora, PT) - Basílio, Ana (ICArEHB, Universidade do Algarve, PT)

The southwestern Iberian Peninsula is an area with an important amount of research concerning the 3rd millennium BCE archaeological records, corresponding roughly to the Chalcolithic and transition of the Early Bronze Age. Several major sites are known in this region, some of them with historically recognisable relevance to the extra-regional discussion of this Late Prehistory period.

Different types of sites are known, comprising funerary megalithic and non-megalithic structures and ditched and walled enclosures. Among the most frequently recovered materials, especially at the latter sites, are the zooarchaeological remains. These show the relevance that domesticated animals had to these groups' economic and non-economic spheres. Almost inexistent in some of the zooarchaeological records, while present and even common in others, wild species have also been of importance to economic and other-than-economic behaviours. Isolated or in anatomical connection, animals and animal body parts have been recovered in significant archaeological contexts, such as structured depositions or commensality events. At the same time, they are known in rock art depictions, and their figures or parts are recognised in material culture, as is the case with pottery, loom weights, or figurines.

We present a state-of-the-art zooarchaeological record of the Central and Southern Portuguese territory during the 3rd millennium BCE. This is considered, together with the use of animals, animal body parts, or their representation, to discuss the changing papers that different species add to the scope of human-animal relations.

7 THE LAST HUNTERS FROM THE GUMELNIȚA CULTURE (4500-3900 CAL BC, ROMANIA)

Balasescu, Adrian (Institute of Archaeology, Romanian Academy)

The archaeological investigations conducted over the past three decades within the Gumelnița sites (4500-3900 cal BC), located in the southeastern region of Romania, have shown that hunting activity in the area rises to unprecedented levels for the Neo-Eneolithic. Thus, of the 21 Gumelnița sites studied from an archaeozoological point of view, it can be observed that in at least seven of them, the remains of wild mammals exceed 50%, and in more than half of them the weight of game exceeds 30%.

The remarkable diversity of wild mammals encountered within the Gumelnița environment (21 taxa), allows us to observe that these hunters exploited different environments found near the settlements, which proves the existence of forested massifs, but also open spaces.

In most of the Gumelnița sites, the red deer (*Cervus elaphus*) ranks first in terms of the number of remains, followed by the wild boar (*Sus scrofa*) in only six samples and the aurochs (*Bos primigenius*) with three lots. We note the pres-

ence of the wild horse (*Equus ferus*) with a percentage exceeding 5%. As can be seen, large and very large animals were hunted with preference.

The abundance of meat, but also other products provided by game, suggests, at this stage of the study, a possible specialisation in this activity by some individuals within the Gumelnița communities in different locations, where hunting plays a primary role.

The purpose of this presentation is to capture the evolution of this hunting activity across different tell-type sites, thereby facilitating an observation of societal transformations influenced by various environmental and climatic factors.

8 OF PIGS, FORAGERS AND HERDERS OF THE IRANIAN HIGHLAND

Thomalsky, Judith (German Archaeological Institute)

The Iranian highland counts to one of the origin centers of domestication. Not only the first steps towards husbandry practices but also plant management can be observed in the intermountain valleys of the Zagros range. This process was an indigenous one, and proceeded by local hunter-gatherer communities, including a “transitional phase” that started from around 10.000 BC. In almost all related sites the number of hunted (wild) animals remained relatively high, at least until Neolithic lifestyle was adopted throughout the Iranian plateau around 6000 BC. While it is clear that in particular the goat was the focus of early animal management along the Zagros fringes, domestic sheep appeared considerably later and most probably during a second wave of domestication in W-Asia. Another important group of early domesticates are pigs. Possible transitional and also hybrid forms were recently reported from Jarmo, a highland Zagros site of sedentary groups dated into the late 8th mill. BC. Possible domesticated pigs appeared considerably later in isolated, but “fully neolithized” village communities in NW-Iran. Interestingly, the appearance of pigs in NW-Iran can be equally associated with growing forestation in the respective region. Moreover, relevant settlements were located to swamp and watered areas. The evidence raises the question, whether swine husbandry has taken place in concordance of changing ecosystems, or was brought by migrating groups inclusive pig flocks beyond other domestic species. It lets us also consider another scenario: animal management as a highly adaptive technology of groups that combined hunting and herding in the rising forests of the Iranian highland.

1029 CHANGING PERCEPTIONS ON TILE, BRICK, AND ARCHITECTURAL TERRACOTTA ? NEW RESULTS AND DIRECTIONS IN RESEARCH

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Hamari, Pirjo (University of Helsinki; Finnish Heritage Agency) - Rheeder, Annalize (German Archaeological Institute) - Wagner, Natalie (German Archaeological Institute)

Session format: Regular session

Made from fired clay, brick, tile and decorated architectural terracottas are among the most abundant material remains from Antiquity. In recent years, there has been a renewed interest in this material, recognised as an underutilised source of information in archaeological research. New results demonstrate that there are now better possibilities than before for using ceramic building materials as evidence and drawing further conclusions. For example, more detailed scientific analyses, a better understanding of the production and use processes, and emerging, more detailed knowledge of forms and types are producing interesting results and new data. New research also reveals gaps in our knowledge and highlights many possible approaches to this material.

This session invites researchers interested in this material to join the discussion and share their latest findings and discuss new research avenues and growing collaboration. We are inviting contributions from the entire Mediterranean region, spanning from the Classical to Medieval period. The session is particularly interested in contributions that focus on, e.g.:

1. New methodologies in tile, brick and ceramic building material research.
2. Individual finds of different kinds, contributing to a better understanding of emerging typologies (local, regional, trans-regional).
3. A closer examination of production methods, individual workshops, or the identification of elements related to serial production.
4. Questions related to production, construction, and maintenance processes.
5. How objects change and are reused, including their secondary life-cycles.
6. Chaîne opératoire and technical variability.
7. Scientific analysis, including elements, petrography, colours, applicability, and new results.
8. Technical characteristics of the material.

9. New methods for documenting and analysing data.

10. Other tile and brick-related topics.

ABSTRACTS

1 CERAMIC BUILDING MATERIALS IN THE BATHHOUSES OF THE SOUTHERN LEVANT

Kowalewska, Arleta (The Zinman Institute of Archaeology, University of Haifa)

This presentation brings together and discusses various types of CBM (ceramic building materials) that occur in construction of hypocausta of Roman-style bathhouses in the Southern Levant. Although bathhouses and bathing suites are among the common types of buildings in the Roman and Byzantine Southern Levant, the CBM used for the hypocausta construction is an understudied and underpublished topic, disregarded in excavation reports and general studies of the regional economy.

First, the typology of the CBM (various bricks, tubuli, rooftiles, and cylinders) is presented, based on the material collected in the Database of Roman to Early Islamic Bathhouses of Iudaea/Syria-Palaestina and Provincia Arabia (<https://ochre.lib.uchicago.edu/BATHS/>). Then the CBM types are compared to their counterparts from other regions of the Roman World, concluding on the typical products as well as regional innovations and preferences. Last, remarks are given on the CBM's provenience, production, and distribution in the Southern Levant, emphasizing on the still open research questions and possible research avenues to answer them.

2 CBM IN ITS CONTEXT - A CASE STUDY FROM GERASA/JERASH (JORDAN)

Ebeling, Philip (University of Münster)

Within my contribution to the session, I want to report about the insights gained by comparing different contexts in which CBM was retrieved from one settlement only. Several areas of excavation researched by the Danish-German Jerash Northwest Quarter Project in Gerasa (Jordan) held various types of CBM, mostly roof tiles. The comparison of these collections makes differences in types, amounts and nature of deposition clear. All these different characteristics demand interpretation. Also, the differences in composition and nature makes for insights concerning the different ancient roof-scapes of the city of Gerasa. Thus, CBM has the potential to provide significant evidence for a much larger network of knowledge. However, comparing the results of in-depth object studies (several typologies, production marks, petrography, etc.) gives valuable insights into how ancient people approached CBM. Considering, that all these results are connected to objects, not just in space, but also in time, we can, with growing knowledge, find more chronological markers within CBM and “make it datable” in the future.

3 CERAMIC BUILDING MATERIALS FROM THE PROMONTORY PALACE AT CAESAREA MARITIMA

Gleason, Kathryn (Cornell University) - Wissinger, John (Crozier Fine Art)

The Promontory Palace at Caesarea, built into the Mediterranean just south of the city's harbor, was constructed by Herod the Great between 22-12 BCE (Burrell 2014) and was occupied continuously for the next four hundred years. (Gleason 1998) At various points it featured a tile roof, as well as a wide array of heated rooms, bath suites, and irrigated gardens employing CBMs. Drawing upon the materials found during the University of Pennsylvania/Hebrew University excavations from 1990 to 1996, the authors created a preliminary typology of all CBMs, observing two distinct roofing systems, each comprising a variety of fabrics and brick stamps, but not interchangeable.

Caesarea Maritima was an entrepôt for trade routes around the Roman world, offering the potential to examine the palace's CBMs within the current discourses on tile shipment and regional production (Mills 2013). This paper raises key questions, e.g., the date and source of tiles for roofing, as Herod the Great's other palaces were flat roofed, as well as how the wide range of tile types fits into recent syntheses across the region and, perhaps, the wider Mediterranean (Mills 2013; Hamari 2017).

4 REMARKS ON BRICK AND TILE PRODUCTION AND CONSUMPTION IN BYZANTINE THESSALONICA

Raptis, Konstantinos (Ephorate of Antiquities of Thessaloniki)

The present paper examines the organization and the development of the brick and tile production in Late Antique and Medieval Thessalonica, from the Early Byzantine period until the first century after the Ottoman occupation (4th – 16th centuries CE).

It discusses the spatial distribution, the organization, and the establishments of the brick and/or tile production workshops that were functioning at the outskirts of the fortified city, and examines the brick and tile formats, the raw materials and the moulds used for their production, as well as various types of embossed brickstamps of the Thessalo-

nian state brick-production workshops, used probably as trademarks in order to ascertain the circulation, control the quantities and certify the quality of each workshop's output.

At the same time it considers the consumption pattern of ceramic building materials in a constantly active in terms of building activity Byzantine urban centre, attempting to propose alternative research directions regarding their, ignored so far, study.

5 ROOF TILES IN CAVES; AN ENIGMA

Koskinas, Aristotelis (Independent researcher)

In Oinoe, Marathon, Greece, there are two adjacent caves, designated Oinoe II and Oinoe IV; the former was discovered and briefly excavated in 1958 by Ioannis Papadimitriou. It was identified as the Cave of Pan, which had been described by Pausanias in his Description of Greece. In 2012 the Ephorate of Palaeoanthropology - Speleology began an excavation project to investigate both caves. In the Cave of Pan (Oinoe II), among finds dating from the Neolithic period to the 6th century CE, over 200 fragments of roof tiles and bricks were identified. A large number of roof tile fragments were also found in Oinoe IV. It is interesting that the caves of Marathon are not the only ones where roof tile fragments were deposited, since roof tiles have been found in other caves in Greece. This presentation will describe the general characteristics of the roof tiles found in Marathon, as well as their distribution in the two caves. It will also discuss the issues and questions raised by the presence of roof tiles in a speleological context.

6 ROOF TILES UNDER THE MEDITERRANEAN. THE MARITIME CIRCULATION OF CERAMIC ROOFING MATERIALS IN THE MID-WESTERN MEDITERRANEAN OF ROMAN PERIOD

Tomizza, Caterina (Department of Humanities, Ca' Foscari University of Venice) - Beltrame, Carlo (Department of Humanities, Ca' Foscari University of Venice)

Albeit being among the most important market segments in the Roman world, many questions still remain about the mechanisms that regulated the circulation of the ceramic roofing materials. It seems clear that, during the Roman period, most of these materials circulated by sea and probably through different forms of navigation, however, only a few of the cargoes so far detected in the Mediterranean basin have been studied with a complete approach. Here is proposed an analysis of the shipwrecks that includes an outlining of the stowing techniques and an attempt of reconstruction of the forms of navigation employed for the distribution of this sort of commodity. To reconstruct the stowage methods used for the ceramic roofing materials, there has been carried out an analysis on the sites' documentation to find out if there were some blueprints in the disposition of the roof tiles and cover tiles on board. The stowing patterns observed could be resumed in a general scheme whereby the roof tiles are arranged in parallel rows, positioned in the middle of the hull, with the cover tiles disposed in side stacks and inserted vertically in the gaps. The systematic study of the shipwrecks led to the hypothesis that the diffusion of the ceramic roofing materials took place on various scales and through different sailing modes, in contrast with the outdated theories that considered roof tiles and cover tiles as resalable ballast. It would be advisable a systematic study of this type of materials that starts from morphological and epigraphic analysis and necessarily passes through archaeometrical studies, considering both shipwrecks, production facilities, storage and redistribution sites.

7 A DIGITAL METHODOLOGY FOR THE MENSIOCHRONOLOGICAL ANALYSIS OF THE ROMAN BRICK-FACED MASONRY

Fornaciari, Lorenzo (École française de Rome)

This contribution aims to illustrate the development of a methodology for the mensiochronological analysis of the Roman brick-faced masonry that is developed through rigorous surveying, measurement and statistical data analysis in a GIS environment.

Mensiochronological analysis, even today, mostly uses traditional tools with enormous time and fieldwork costs and is consequently often conducted on restricted contexts only on specific occasions or for special needs.

The lack of quick and common procedures capable of increasing the possibilities of application and returning coherent data that can be truly compared, for a long time constrained these analyses to only attempting to date the individual structures, neglecting the broader meaning of mensiochronology in which data must be included in a global horizon dedicated to the brick-faced masonry that intersects with historical-geographical, socio-economic and technical aspects.

Digital survey techniques, the AI's image recognition and the spatial and statistical analysis GIS functions now offer the possibility of overcoming these limitations. It is a matter of developing a standardised and rigorous procedure that is not only accessible and quick, but that, once the rules have been established, allows data produced following a common procedure to be compared and statistically analysed even if they concern different structures and buildings.

This approach, of which some results will be presented for the Baths of Elagabalus and for the northern substructures of Vigna Barberini on the Palatine Hill, aims to deepen the study of one of the most common materials of Roman building by highlighting the use and reuse of bricks, the technical skills of the workers in preparing and setting up them, the supply of materials and the dynamics of the construction process.

Finally, it will be an opportunity to share with the scientific community the GIS analysis model available as a plug-in for the QGIS platform.

8 BETWEEN LAB AND FIELD: INNOVATIVE METHODOLOGIES FOR ANALYZING ANCIENT ARCHITECTURAL TERRACOTTAS

Wagner, Natalie (German Archaeological Institute, Rome)

The study of ancient Architectural Terracottas stands at the threshold of new scientific insights, driven by innovative methods ranging from archaeometric analyses to 3D reconstructions. This presentation sheds light on these methodological advancements through case studies from Capua and Rome, spanning from the 6th century BCE to the 1st century CE. The focus is not on the results of the archaeometric analyses themselves, but on the applied methods and their potential for archaeological research.

Provenance analyses, providing insights into the origin of the clays used, and pigment analyses, examining the coloration of the architectural terracottas, offer new perspectives on assessing ancient production and trade networks as well as aesthetic conventions. These are complemented by the use of 3D reconstruction techniques, which enable the virtual restoration of the original arrangement and appearance of the roof tiles to explore architectural contexts and construction details.

These methodological approaches revolutionize our understanding of material culture and the technological capabilities of ancient societies. They allow for a detailed and nuanced examination of roof tiles that goes beyond traditional typological classifications, providing insights into the complex production, trade, and application practices of antiquity.

9 ROOF-TILES IN GREEK SICILY FROM THEIR APPEARANCE TO THE ROMAN CONQUEST

Giuliano, Dario (Università degli Studi di Palermo; Université Bordeaux-Montaigne)

This contribution stems from the study conducted within the doctoral project focusing on the study of roof tiles in Sicily from their appearance to the Roman conquest. A class of materials, the one under examination, notoriously undervalued. The study focused on the colonies of Himera and Agrigento, but the results obtained were also found in other contexts on the island. The choice fell on these cities because Himera provides the oldest evidence of a terracotta roof from the island, while Agrigento, thanks to its uninterrupted habitation from its foundation to the present day, would have allowed highlighting any changes in roofing systems or roof-tiles used in them. For this purpose, different contexts were analyzed: residential, sacred, necropolises, in order to understand if there were types used in specific contexts. All fragments were examined and studied, allowing for a complete reconstruction of the different phases of the production chain.

The significant quantity of materials analyzed has allowed a clear definition of the morphological characteristics of the roof-tiles belonging to different systems: Corinthian, hybrid, and Laconian, proposing a better definition of them; furthermore, a chrono-typological seriation of the roof-tiles for the period under examination is proposed.

10 SERIAL PRODUCTION, WORKSHOPS AND THE CREATION OF TYPOLOGIES FOR UNDECORATED ROOF TILES

Rheeder, Annalize (German Archaeological Institute)

The high level of standardization found in undecorated roof tiles is an obstacle to the creation of typologies based on size and profile alone. Recent studies indicate that assemblages can be further differentiated by adding production techniques to the analysis. Ethnographic documentation of traditional tile works show tiles produced in series where the same material, tools and steps are repeated with minimal variation. The specific combination of material and techniques depend on the craftsmen or workshops. Even within regions with a very homogenous production tradition, differences in production techniques can still be observed between workshops. Observations made on tiles from Pergamon, Pompeii, Olympia and the Kerameikos as part of work in the DAI's Digital Roofs project correspond to the ethnographic results. Based on traces left on the objects it is possible to reconstruct not only the production sequence, but also specific techniques used within each production phase. The addition of production to the investigation of objects aid not only in the classification of objects by type, but also have the potential of identifying individual production series within each type. A diachronic view of assemblages furthermore aid in the investigation of regional or period specific tile production through the identification of production traditions.

11 MAPPING THE DIFFERENCES, UNDERSTANDING EVOLUTION: THE GROUNDS FOR SUGGESTING REGIONAL TYPOLOGIES FOR ROMAN-PERIOD ROOF TILES IN THE EAST

Hamari, Pirjo (University of Helsinki)

In 2019, I finalised my PhD dissertation on the Roman-period roof tiles in the Eastern Mediterranean (Hamari 2019). One of its aims was to get an overview of the types of ceramic roof tiles in use in the Roman period in the eastern part of the Mediterranean, as they clearly differed from those in the western provinces. My own primary material comes from Greece and Jordan, providing a starting point for a wide geographical overview.

In my presentation, I will present the source material used in summarised format, consisting of my primary material as well as a relatively extensive search for other published examples, with the aim of continuing discussion on the typology proposed and potentially enlarging the source material providing the foundation for such a typology. Finally, a question is posed on the possibility to build an accessible reference database in support of a developing typology of the eastern roof tiles.

1030 SURVEYING IN ARCHAEOLOGY IN THE DIGITAL ERA: RETHINKING OLD PROCEDURES AND IMAGINING NEW STANDARDS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Cavalazzi, Marco (Università di Bologna; University of Michigan) - Johnson, Tyler (Kelsey Museum of Archaeology - University of Michigan) - Putzolu, Cristiano (Università di Bologna)

Session format: Regular session

Field data-collection has greatly evolved due to ever-advancing Information and Communication Technology (ICT), which has found an increasing place in archaeology. Particularly, archaeologists are faced with the problem to document the three dimensions of archaeological contexts (width, length, and depth), and their evolution in time (the so-called 4D), as well as to document the continuum of archaeological landscape, considering the single archaeological feature (e.g. a site or a stratigraphic unit) as part of a more complex geographical palimpsest.

In this session we would like to present and discuss the impact of digital technologies on the every-day practices of the topographical survey, within the different sectors of in-field archaeology, as well as to highlight the limits and the implicit and explicit theoretical and methodological consequences of these practices.

Recent digital survey workflow are mostly focused on three main approaches: a Processual style analysis (collection and analysis of large datasets), a Phenomenological style analysis (often focused on using reconstructions to study the perception and feeling of ancient environments), and the development of applications for Heritage management and valorisation (such as tourism/educational application or conservation). However, hardly anyone is focused on methodologies for field surveying, even if the characteristics of the digital data themselves - in particular their level of resolution and their informative value/limits - are, almost spontaneously, generating a new momentum in the debate about epistemological processes in archaeology.

We seek papers presenting case-studies and considering aspects of self-criticism and self-awareness of topographical data-collection and management workflows, as well as related to the analysis of the level-of-detail and level-of-information-need of the archaeological data acquired with digital technologies.

ABSTRACTS

1 SURVEY IN 2024, BETWEEN LEGACIES AND FUTURE

Pintucci, Alessandro (Confederazione Italiana Archeologi)

Over the last 20 years, 3D survey techniques have made great strides and have rapidly become available to a growing number of professionals and public and private archaeological organisations. The traditional techniques of archaeological survey and structural analysis of ancient complexes have been supported by innovative and promising representation techniques, which, although not without contradictions, have quickly ended up replacing the old systems, opening up new research perspectives.

While this evolution was taking place, the world of archaeology, from the academy to the Ministry of Culture, up to the professionals engaged in the so-called commercial archaeology, despite largely mastering the new tools, did not have the ability, or the time, to rethink the discipline, taking into account the new possibilities, what was gained and what there was a risk of losing; in this intervention we will try to address some issues raised by the use of these systems: the risks connected to the progressive detachment from archaeological materiality, the rapid technological changes and the obsolescence of the tools, the lack of interoperability and the risk of obsolescence of the formats, the need to

adapt the forms of scientific publications to new media, overcoming the graphic standards born in a purely analogue era of representation.

2 THINKING OUTSIDE THE SQUARE: A CASE STUDY ON THE VALIDITY OF THE ARCHAEOLOGICAL SURVEY

Valsecchi Gillmeister, Margherita (Freie Universität Berlin)

Surface archaeological data are often the most accessible and readily available source of information about past cultural landscapes. In particular, survey is a well-established method for research in Northern Anatolian archaeology, where extensive regional surveys are more common than excavation. Considering this situation, the question about the reliability of modern historiography and archaeological interpretations based on the surface results for this region or other areas with a similar state of research comes to mind.

A possible approach to assess the reliability of surface collections is their cross-checking against the subsurface data. The multiperiod site of Oymaağaç Höyük (Samsun, Türkiye), with its long-term multidisciplinary research, is suitable as a case study for this kind of analysis. The large dataset collected at the site in the last two decades is available in the OpenSource MySQL server-based excavation database, offering a broad range for comparison against geophysical prospections, excavation results and artefacts data.

Starting from the cross-check of the surface pottery assemblages at Oymaağaç Höyük against the available subsurface evidence, this paper aims to discuss the validity of archaeological survey while discussing the methodological challenges arising when comparing records documented in different periods by different specialists, the importance of a coherent approach to data collection through time and space, and the possibilities and shortcomings of processing data collected by a multidisciplinary and international team.

3 AN APPROACH TO PERIOD-BASED ARCHAEOLOGICAL SURVEYS: THE LATE IRON AGE IN OMAN AS A CASE STUDY

Mauro, Fausto (Heidelberg Center for Cultural Heritage)

In the Arabian Peninsula, communities have consistently demonstrated remarkable resilience and adaptability when facing environmental constraints and societal transformations. This project aims to explore the narrative of such resilience among ancient communities in south-eastern Arabia, with a specific focus on the underexplored Jebel Madar area (Sultanate of Oman) during the Late Iron Age (LIA, ca. 300 BCE – 300 CE). Therefore, this research intends to reveal the density of LIA sites around the Jebel Madar and the relations with the surrounding areas.

Starting from geospatial analysis and robust data gathered across the country, Archaeological Predictive Modelling (APM) and remote sensing are going to guide the field survey in the area of interest. However, it is crucial to acknowledge the inherent limitations of these methods, especially when applied to specific centuries. For instance, the nature of LIA architecture makes it challenging to effectively detect sites through remote sensing. Simultaneously, the APM, while a valuable tool, has often remained untested on the ground. Thus, the field survey is intended not only to validate the efficacy of these methods in Arabian contexts but also to highlight further limits and seek to overcome them, particularly when targeting single chronological periods.

The paper presents the results and reflections of the first survey.

4 REFRAMING DIGITAL FIELD SURVEY STRATEGIES: SELF-CRITICAL EVALUATION OF THE DATA COLLECTION WORKFLOW IN THE WEMALP PROJECT (GREECE)

Bottoni, Margherita (Università degli Studi Roma Tre) - Rossi, Matteo (Università degli Studi di Roma "Tor Vergata") - Fasson, Federico (Università degli Studi di Bari Aldo Moro) - Scoz, Jacopo (Sapienza Università di Roma)

The Western Megaris Archaeological Landscape Project (WeMALP) is led by Roma Tre University, the Italian Archaeological School at Athens and the Archaeological Service of Western Attica. The project started in 2019 and aims to investigate the diachronic relations between the city and the countryside, as well as the rural use of the area in the *longue durée*. The *équipe* involves international researchers, undergraduate and graduate students.

In this paper, we aim to reflect on the workflow which allows the project to collect high-resolution and multi-scaled data during the field activity. Our workflow is not static, but it needs to be constantly self-rethought and reframed, taking into account our logistical, economic and training issues, in order to obtain the highest possible quality of the data. The reflection involves the whole *équipe* through a call for multivocality and self-awareness.

This theoretical approach is applied in the whole range of our field activities, that include artifact surface survey, enhanced by mobile GIS applications, architectural features survey with DGNSS devices and UAVs 3D photogrammetry, and sporadic shovel tests. The daily routine of data acquisition and processing allows us to reframe our use of these technologies on the field, depending on the ease of their application and the quality of the data obtained. Widening

the frame, the time gap between the different campaigns allows us to hypothesize major changes to the management of our workflow, in terms of the methodologies and the target of our research.

By describing our self-aware approach to the application of digital technologies and the evaluation of the collected data, this paper aims to develop self-criticism on the WeMalp's workflow, fostering a collective discussion during the Session.

5 USING KOBOTOOLBOX FOR FIELD DOCUMENTATION OF AFRICA'S HERITAGE SITES: EXPERIENCES ON THE DEPLOYMENT OF A MOBILE FIELD RECORDING APPLICATION

van der Merwe, Renier (Origins Centre, University of the Witwatersrand) - Kiala, Serge (Origins Centre, University of the Witwatersrand) - Merlo, Stefania (McDonald Institute for Archaeological Research, University of Cambridge) - Ochungo, Pamela (British Institute in Eastern Africa) - Lander, Faye (Origins Centre, University of the Witwatersrand)

Today, digital ground surveys are characterised by the deployment of a vast array of advanced ICT-based instruments that capture quantitative data at different scales, using heterogeneous methods and storing them in different formats. Notably, the capturing of qualitative information, including that on methodological decisions that characterise the design of the survey itself, has often continued to be carried out in paper format (or digital replications of a notebook). Field-based applications such as Open Data Kit (ODK) and KoboToolbox (koBo), which capture field data using mobile data collection methods, offer an opportunity to optimise the workflow of data collection. These applications are highly popular because of cost-effectiveness, efficiency, and user-friendliness. They can also operate in remote areas with limited or no internet connectivity, ideal for many types of fieldwork missions.

In the Mapping Africa's Endangered Archaeological Sites and Monuments project, KoboToolbox is used for the ground verification and survey of heritage sites identified through legacy records and remote sensing. Several iterations of a customized digital field recording form have been developed and deployed since the project began in four African countries (Kenya, Tanzania, Zimbabwe, and Senegal). The digital form is partly structured on the original paper-based site recording forms used by in-country national heritage authorities and museums. At the same time it serves as a locus for the aggregation of both quantitative and qualitative data on the sites and the capturing of information on survey methods used for the recording. Although chosen for its user-friendliness and efficiency, several challenges have emerged with its application, not least the integration of a new and unfamiliar digital technology with the more familiar traditional field recording methods. Drawing on case studies, we reflect on the challenges and opportunities of mobile field data recording methods in the context of a multi-stakeholder collaborative project.

6 SYSTEMATIC SURVEYS AND CONTEXTUAL ANALYSIS OF EVIDENCE IN THE SIBARITIDE AREA (NORTHERN CALABRIA)

Valentini, Giuseppe (Sapienza University of Rome, Rome, Italy) - Vanzetti, Alessandro (Sapienza University of Rome, Rome, Italy)

The Sibaritide, located in the northwestern part of Calabria, is renowned for its rich archaeological density, which attests to the existence of ancient civilizations and significant settlements, thus emphasizing the historical and cultural significance of the region in antiquity, along with the preciousness of its archaeological heritage.

This study proposes a detailed analysis of settlement dynamics in the Sibaritide through field surveys and contextual analysis of archaeological evidence, supported by geographic information systems and digital tools.

While in the 1980s field research was predominantly manual, today advanced digital technologies enhance efficiency. Traditional sampling strategies remain valid and integrate well with new technologies, proving advantageous even in contexts with limited digital resources. In particular, the use of GIS for digital procedures proves invaluable in geomorphological evaluation, enabling a more thorough and comprehensive analysis of the territory.

The focus was on the area surrounding Cerchiara di Calabria (CS), using a systematic-random sampling methodology of 10%. The main objective was to identify and map archaeological evidence, to compare settlement variations over time and consider the surrounding environment.

For data analysis, the QGIS software was used, while LiDAR data were employed to examine natural morphologies and traces of terracing in the identified areas. Overall, the study identified and mapped 43 areas of archaeological dispersion, spanning from the protohistoric period to the post-classical era. These results are of considerable importance as they provide valuable insights into settlement dynamics and human presence in the studied region.

In conclusion, the study adopts a combination of research methodologies and analytical tools to obtain meaningful information about the population and occupation of the territory in a part of the Sibaritide, thus contributing to the understanding of the history and archaeology of the region.

7 AN INTERDISCIPLINARY AND NON-INVASIVE APPROACH TO INVESTIGATE THE ARCHAEOLOGICAL LANDSCAPE OF BRIATICO (CALABRIA, ITALY) IN THE LONGUE DURÉE

Coleschi, Alessandra (Università di Siena) - Dalle Vedove, Letizia (Università di Siena)

Since 2021, the University of Siena carried out research campaigns to study the territory of Briatico (Calabria, Italy) with the aim of providing a diachronic reconstruction of the historical landscape, particularly the agricultural one. The project focused on the analysis of scattered settlements, especially to identify the ancient dwellings and farmhouses, which are linked to the exploitation of the rural territory. The research was developed through a multidisciplinary approach, considering both remotely and on-site surveys. The interpolation of data and the support of GIS based technologies, revealed a continuity of land-use attested from the Middle Ages onwards. The GIS platform was useful to create geoprocesses and to study the sites and their correlation with the surrounding territory, encompassing morphological, agricultural and settlement aspects. Other tools, including centimetric GPS, the Qfield android app and a multi-rotor drone, have been used to carry out an accurate documentation and a photogrammetric survey of the ancient center of San Leo Vecchio, which was abandoned after the earthquake of 1783. Accordingly, the site has a great archaeological potential and represents the ideal context to study settlement dynamics and the relationship with the surrounding landscape.

The three-dimensional model has facilitated a more effective study of the site in its current state, thereby preserving its memory and promoting local policies conservation efforts to avoid its total destruction, prioritizing preservation and enhancement is highlighted.

The research conducted only through the digital survey has returned a partial view of the archaeological content and the limits have been emerged already in the first phase of exploration and knowledge of the territory, for which it became necessary a field verification for each site identified, for a greater and closer analysis of the data already acquired, including systematic surveys and collection of oral sources.

8 THE UNINETTUNO ARCHAEOLOGICAL PROJECT AT ROSSOMANNO (SICILY): METHODS, APPROACHES AND TOOLS FOR SURVEY AND DATA COLLECTION

Brienza, Emanuele (Università Telematica Internazionale Uninettuno) - Girella, Luca (Università Telematica Internazionale Uninettuno) - Draìà, Eleonora (Università Telematica Internazionale Uninettuno) - Anzalone, Marco (Università Telematica Internazionale Uninettuno)

TRossomanno is an archaeological site in inner Sicily, occupied since the Bronze Age and almost uninterruptedly to the Medieval time. Emergency excavations have been carried out in the past, although poorly edited. A new project between the Soprintendenza ai Beni Culturali ed Ambientali di Enna and the Uninettuno University started in 2022 to investigate the urban and archaeological vicissitudes of the site, identifying the characters of coexistence, integration, and development of ancient different "cultural" communities, framed in the historical events of the largest territory of Sicily. The survey has been carried out following non-systematic, systematic, and intensive archaeological survey. Specific formats for archaeological written data recording have been used: file-cards for Topographic-Unit (UT), for Structural Context Unit (USM) but also for the Squares (SQ) into which the systematically surveyed areas have been divided. The graphic and topographic documentation has been implemented by using new smart GNSS centimetric positioning tools (Trimble DA2 Catalyst) and digital SFM photogrammetry, close range and aerial (by UAV-UAS): horizontal and vertical orthophoto-maps have been elaborated for archaeological evidence, together with DSMs and DEMs and vectorial drawings have been done using them as a basis. All data are managed by GIS software inside a wider geodatabase dedicated to all the archaeological sites of the Erei.

In our intention scientific results should become the source for an evaluation of site enhancement and relative impact on the current economic and social context: our activity is focused on the impact on the territory, proposing a development model based on propitious relationship between inhabitants, landscape, and cultural assets. From this perspective diffusion and participation are the main target: workshops, public meetings and open days on the site have been organized to refer to the ongoing activity and to discuss with all the stakeholders about future development perspectives.

9 DOCUMENTING THE ARCHAEOLOGICAL RECORD: REFLECTIONS ON THE RELATIONSHIP BETWEEN DIGITAL ARCHAEOLOGY AND THE CONCEPT OF STRATIGRAPHIC UNIT

Putzolu, Cristiano (Dipartimento di Storia Culture Civiltà, Università di Bologna) - Cavalazzi, Marco (Dipartimento di Storia Culture Civiltà, Università di Bologna; Department of Classical Studies, University of Michigan)

The digital revolution in archaeology has profoundly transformed data collection procedures and the nature of archaeological information itself. On one hand, the positive consequences of this revolution are evident: field workflows are quicker, surveys are more accurate, data are more easily reusable and shareable, and new digital approaches frequently revitalise the theoretical debate in the discipline.

However, on the other hand, digital workflows have also had negative impacts on research. For example, they are often applied uncritically, they create a digital barrier between the archaeologist and the archaeological evidence, and lead to the production of vast archives of digital outputs that are difficult to manage.

However, far from being an over-exploitation of new technologies, digital archaeology can update the paradigms of archaeological research, as has already occurred since the introduction of radiocarbon dating.

Building upon these considerations, this paper aims to examine how archaeologists are currently dealing with the challenge of defining archaeological information; specifically, it will examine how archaeologists express their data through digital outputs, whether written or illustrated, and how they archive fieldwork information. The focus of the discussion will be on a key concept: the stratigraphic unit, the smallest unit of archaeological deposit documentation. We will analyse how this feature is defined and documented in different research traditions, exploring how digital advancements are reshaping this type of data and our understanding of them.

To accomplish these objectives, we will delve into various case studies, such as the excavations of Gabii in Rome, Cervia in Ravenna, and Colombare di Negrar near Verona, among others, discussing the ongoing research conducted by the authors.

We believe a deeper exploration of the implications of digital approaches in archaeology can catalyse advancements in the theoretical debates within archaeology, facilitating novel approaches to the relationship between epistemology and ontology in this research domain.

10 STRATEGIES AND METHODS IN DOCUMENTING AND NARRATING TANGIBLE CULTURAL HERITAGE. THE CASE OF S. LORENZO IN MIRANDA (ROME)

De Stefano, Francesco (Sapienza Università di Roma) - Cecconi, Niccolò (Sapienza Università di Roma) - Griffo, Marika (Sapienza Università di Roma) - Porfiri, Francesca (Sapienza Università di Roma) - Ippoliti, Mattia (Sapienza Università di Roma) - Pavia, Davide (Sapienza Università di Roma) - Moricca, Claudia (Sapienza Università di Roma) - Perrone, Francesca (Sapienza Università di Roma)

Many cultural heritage assets and contexts are still not adequately documented and known. This increases the risk that this potential wealth of knowledge will be lost forever due to the threats of urban sprawl and the natural and anthropogenic erosion to which it is exposed. Furthermore, it prevents adequate cultural communication. These heritage contexts must therefore be transformed into documents and systems of knowledge through epistemological and hermeneutic procedures, so that they can be turned into images and narratives that illustrate the flow of large and small stories. These premises are the basis of the PNRR Project CHANGES - Spoke 8. The main objectives of the Project are the integration of technologies and sciences for Tangible Cultural Heritage (TCH); the creation and development of digital infrastructures for TCH inventories/catalogues capable of supporting different knowledge pathways and maximising accessibility. Within this framework, a relevant topic concerns strategies and methods for documenting and analyzing built spaces and reconstructing parts of ancient landscapes. One of the main challenges of the Project is to verify how different data sources can coexist in the same 3D digital environment. Due to this, Heritage Building Information Modelling (HBIM) provides a wide range of tools in terms of data representation and information extraction. The possibility of relating data sources to visible structure and reconstruction hypothesis will be illustrated through a specific case study: the church of S. Lorenzo in Miranda along the Via Sacra route, near the Roman Forum. Originating as a temple dedicated to the emperors Antoninus and Faustina, and later becoming a church, this context is particularly significant for the overlapping and diachronic relationship between open spaces and built contexts within a place of special historical and architectural significance.

11 SURVEY AND ELABORATION OF DIGITAL DATA FOR A STRATIGRAPHIC ANALYSIS OF PLURISTRATIFIED CONTEXTS: THE S.C. DOMUS DEGLI AMERICANI (PALATINE, ROME)

Bossi, Sara (Sapienza University) - Squartini, Nicolò (Sapienza University) - Mele, Samira (Sapienza University)

With this contribution, we would propose and discuss the digital technologies methods, strategies and procedures about acquiring and elaborating data, focusing on the case-study of the s.c. Domus degli Americani (Palatine, Rome).

The monument is a late-antique domus along the eastern slope of the Palatine Hill. Today, it lies within the limits of the Parco Archeologico del Colosseo in the area investigated by Sapienza University (Prof. M.T. D'Alessio). It dates from the third to the fourth century AD, constructed in place of earlier structures, varying in functions and erected since the fourth century BC. The building was excavated between 1989 and 1993 using a stratigraphic method by an international team led by Hostetter and Howe (AAR). Latest documentation has been produced by Parco Archeologico del Colosseo.

The context is of primary topographical, historical, and architectural significance, requiring a thorough analysis of the published, sometimes incomplete, documentation and visible stratigraphy. It is of the utmost importance to gain a

deeper understanding of a monument which to-date has been only partially read from a diachronic perspective and in its proper context.

Field and laboratory analyses are still ongoing. The aim is manifold: acquiring new data, verifying, and integrating information already published by AAR and in historical cartography. Our work is divided into an initial survey phase, in plan and elevation, of each evidence, utilizing GNSS antennas (Leica GS15), total stations (Leica TS15), laser scanners (Leica RTC360), photogrammetry. The new graphic documentation makes up the base for an autoptic stratigraphic analysis of the visible evidence. This approach allows diachronic interpretation of the monument and its narrative over time.

All data is acquired and processed digitally. Our goal is to apply a methodology that is as precise and effective as possible, crucial for the required level of detail, involving interoperability between tools and operators.

12 REASSESSING THE LEGACY SURVEY DATA FROM KARANIS (EGYPT) IN THREE DIMENSIONS

Johnson, Tyler (University of Michigan)

The site of Karanis, a Greco-Roman farming village in the Fayum (Egypt), was extensively excavated by the University of Michigan between 1924 and 1935. Although a far cry from modern standards, the Michigan excavators utilized advanced survey techniques for their time. Documenting the evolution of the site through a system of "levels" running from the early Imperial Period to Late Antiquity, the team left behind a dense archival record now housed at the Kelsey Museum of Archaeology (Ann Arbor, Michigan), including detailed section drawings, plans, and dozens of notebooks recording the survey readings used to produce these graphic representations. The majority of these records have yet to be systematically analyzed and published.

This paper presents the preliminary results of a project aimed at utilizing the Karanis survey records to confront ongoing uncertainties about the site's overall phasing. To address this, a methodology was devised for developing schematic 3D representations of buildings at Karanis on the basis of the legacy survey records. Then, an interface developed using the game engine Unity is allowing these models to serve as a framework for a broader contextual reappraisal of the graphic, photographic, and written documentation for the site. Ultimately, this approach supports the division of Karanis contexts into "stratigraphic containers" (groups of deposits), enabling a quasi-stratigraphic reassessment at the most granular level of detail possible given the nature of the original recording techniques. This work raises essential epistemological issues about the relationship between the level of detail in surveying records and the possibilities for subsequent inquiry. While Karanis is thus a case study in addressing legacy data using modern methods, it is also a useful thought experiment for considering the limitations and gaps imposed by current survey methods in constructing the archaeological record.

13 THE ROLE OF DIGITAL TECHNOLOGY IN THE DOCUMENTATION OF EGYPTIAN ROCK ART. EXPERIENCES FROM YALE EGYPTOLOGY EXPEDITIONS

Urcia, Alberto (Yale University)

The use of digital technologies in archaeology has reached, over the past few years, a predominant role within the discipline. Recording techniques such Structure from Motion and laser scanning, largely enhanced the amount of surveying data that archaeologists must manage to produce results and achieve their research goals. Software and devices for 3D imaging and measurements have been significantly improved, increasing the chances to gather good, or at least acceptable data, also by non-experts in technology. This is certainly positive but is it bringing only benefits? The data is indeed increased but how much do we know about its quality and how much can we rely on it? Digitizing material culture produces virtual copies of real objects on which we can work at any time. This may help their preservation, speed up field work procedures and reduce the distortion of our subjectivity while recording. But are all these just advantages? Do we know how to properly handle the relationship and interaction between virtual and reality? Is it clear how much this new technological influence is contributing to produce new archaeological knowledge?

Egypt has many rock art and inscriptions sites, mostly carved and spread all over the country, differentiating in typology, chronology, size, importance and preservation status (often precarious). Working with all the above questions in mind since over a decade, Yale Egyptology, together with other affiliated projects, was able to build a reliable Digital Epigraphic methodology based on the interaction between 3D imaging, topography, archaeology and philology. The recording workflow was designed to fulfill two main requirements: keeping the petroglyphs connected to their geo-environment and producing data on time to be collated in front of the original artifacts. These conditions imposed to adopt a multi-resolution and multi-scale approach, functional enough to generate faithful graphic materials and reliable research tools.

UNVEILING PRECISION: THE CASE FOR SMALL ARCHAEOLOGICAL FINDS IN 3D PHOTOGRAMMETRY

Lauro, Vittorio (Università di Torino) - Lombardo, Vincenzo (Università di Torino)

Photogrammetry has emerged as a pivotal tool in archaeological research, yet its application encounters unique challenges when dealing with small-scale objects.

Shadows, occlusions, variable lighting conditions, and the scarcity of distinctive feature points are hard obstacles. Moreover, objects with intricate geometries, challenging textures, and materials that feature complex optical properties increase these difficulties.

Researchers have innovated tailored solutions for photogrammetric scanning challenges on small objects. It can be deduced that to share these experiences and develop some common knowledge about the task of scanning small objects, it is paramount to share and compare the experiences. This can be done through some acknowledged metadata-tion. In the literature, there have been some attempts at interoperability, that address the critical need for traceability and comprehensiveness of metadata recording in photogrammetric processes. To foster the exchange of experiences and cultivate collective knowledge on scanning small objects, sharing and comparing experiences through established metadata protocols is imperative. Several endeavors in the literature aim to enhance interoperability, addressing the crucial need for traceability and comprehensive metadata recording in photogrammetric processes.

Our research focuses on standardizing metadata introduction for acquisition methods, considering various factors such as object shape, characteristics of the acquisition set, material properties, and adjustments made in response to light properties. It also accounts for the number of photographs taken, reconstructive algorithms based on prior acquisition methodology choices, and the scanning process across acquisition phases: Acquisition, Processing, Modeling, Export, and Indexing. Ensuring coherence between the structure of RAW data archives and collected metadata is crucial. This standardization effort aligns with CIDOC-CRM, achieved by integrating processes with standard classes and properties, facilitating interoperability and data consistency. We are currently testing the protocol to produce a preliminary evaluation of the method used for the analysis of glass beads from the archaeological site Tobitsuka Kofun in Okayama, Japan.

1033 CHOOSING THE RIGHT CUP FOR THE JOB: FUNCTIONAL AND NON-FUNCTIONAL CONSUMPTION HABITS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Meens, Anna (University of Amsterdam) - Crudo, Maurizio (Independent Researcher) - Stissi, Vladimir (University of Amsterdam) - Witcher, Robert (Durham University)

Session format: Regular session

Think about it: your kitchen cupboards are likely full of vessels of different shapes, sizes, and materials. What are the functional, cultural, and technological reasons for this? Why do we drink wine from one type of glass and water from another? Why are tea and coffee cups different? Why do we prefer ceramic and glass to metal and plastic? How does a soup bowl really differ from a breakfast bowl? Why do we buy another mug with a funny slogan that we'll never use? And do we sometimes use the 'wrong' vessel when no-one's watching?

Parts of the ancient Mediterranean world also demonstrate large and varied vessel repertoires. In some sixth/fifth-century BCE Athenian contexts we find a vast range of vessels related just to wine drinking; in other contemporaneous contexts, however, a few basic types of vessel were sufficient. Archaeologists have traditionally considered the variety of material cultural forms from a practical perspective (e.g. the suitability of shape and material for specific tasks), as well as cost, aesthetics, status and durability. More recently, concepts such as tradition and innovation, the agency of craftspeople and consumers, fashion, and identity formation have also been considered. Whilst there has been research on standardization, however, the proliferation of vessel forms has received less attention. Why are some periods, places, and social groups characterized by a desire for many vessel types, while others have fewer and perhaps more traditional forms?

We invite contributions that reflect on both the uses and meanings of vessels from archaeological contexts, looking beyond the practical and specific explanations, and focusing on consumers' choices and their cultural contexts. Our aim is to compare case studies from different periods and regions, and to explore future directions in research on some of the most common objects of the ancient – and modern – material record.

ABSTRACTS

1 CUPS, SKYPHOI, KANTHAROI, KYLIKES, KOTYLAI, POTIRIA AND THE REST: THE DIVERSITY OF GREEK DRINKING VESSELS (6TH-4TH CENTURY BCE)

Stissi, Vladimir (University of Amsterdam)

As is well known, the diversity of drinking vessels in 6th-4th century BCE Greece is staggering. Even if exact definitions may be problematic, at least a dozen clearly recognizable types can be distinguished, often coming in many variants and in various fabrics and finishes, creating very different looks. Some of the types remained fairly uniform during long periods and over large areas, but others were quite short-lived, or remained confined to limited regions, or particular functional contexts. Yet, while some vessel types may have had more diverse uses, and others very specific roles, the general functional association of (almost) all the types seems to have been wine drinking.

However, even though wine drinking had a very prominent place in Greek society, and may explain the large numbers of drinking vessels (which often form more than half of assemblages) this does not explain their diversity. Perhaps we have to look for more symbolic or contextual explanations. On the other hand, the inconsistent ancient Greek use of terminology using the same word for different types of vessels, but also labelling single types with different names, may indicate indifference and interchangeability. Where can we find solutions?

Scholars have tried to explain diversity in Greek pottery assemblages in various ways, looking both at function and at meaning, but I think a fresh look can be useful, and hope to be able to offer some new more systematic and general reflections, by combining case studies and more overall views. I also want to explore to what extent modern typology and classification may or may not overlap with ancient perceptions, to see whether perhaps some of the issues we look at reflect present rather than past concerns. Finally, I hope to find some inspiration through links with other papers in the session.

2 CULT, CRAFT OR CULTURAL? ON SHAPE VARIETY IN AN ARCHAIC-CLASSICAL SANCTUARY AT PHENEOS, ARCADIA

Klöckl-Zoric, Regina (University of Graz) - Testolini, Veronica (University of Graz)

Living in Pheneos meant being remote from the urban centres of ancient Greece, but not isolated. Surveys have proven Pheneos' position along a road network through the mountains, and external relationships are apparent in the range of finds excavated on the settlement hill of Pheneos. In addition to many locally produced items, there are ceramic vessels and other objects imported from various places in the Peloponnese, Attica and the wider Mediterranean.

In this context, the gift assemblage from a sanctuary on the hill dating from the sixth and fifth centuries reflects consumers' choices. Many visitors decided to bring pottery, and particularly favoured Athenian style drinking vessels. Similar choices were made in other parts of the Greek world in this period and the demand for black-gloss tableware stands out, not only in cultic contexts. Drinking from a black-slipped cup was fashionable, as demonstrated by the incredible diffusion of this technological innovation. Combining stylistic studies and archaeological science, we examine the reasons for this. Why was the Athenian-style black slip so popular among craftspeople and consumers at Pheneos? Was it just practical or is this a case of cultural assimilation?

Other visitors to the sanctuary decided to bring Corinthian pyxides, another large group of offerings. While wine consumption is traditionally associated with the male sphere, the pyxis is regarded a typically female item. We are interested in this apparent contrast, too: is it due to a standardisation of activities in the sanctuary or does it express the identity of the donors?

Our case study investigates aspects of production technology and shape variety to reflect on the agency of craftspeople and consumers, the cultural context and concepts of gender division, and demonstrates how interdisciplinary research can address these questions efficiently.

3 SAME SHAPE DIFFERENT CLASSES. PUBLIC AND PRIVATE CONSUMPTION IN A COMMON REPERTOIRE

Crudo, Maurizio (independent researcher)

In today's globalized society, the same tablewares can be found around the world making it difficult to identify the distinct cultural and social characteristics that were, until the last century, so evident. The archaeological record provides evidence for the choices made by people in the past about the different forms of ceramic and glass vessels needed for specific practices. But can these typologies also lead us astray? Does the presence of the same shape always indicate the same method of use? Conversely, were the diverse vessel shapes produced by different traditions intended for use in common rituals – most obviously, wine drinking? This paper will explore these questions by examining patterns in individual and group choices about vessel types, using the Sibaritide region and the Timpone della Motta excavations

in southern Italy as case studies. I will argue that each vessel embodies the social, cultural, economic, and craft context in which it was produced and used.

4 LARGER THAN LIFE: USE AND FUNCTION OF SUPER-SIZED KANTHAROI IN BOEOTIA

Meens, Anna (University of Amsterdam)

In ancient times in Greece the kantharos was a drinking vessel which was used in symposia, as depictions show us, however kantharoi were also common in everyday life, as their frequent occurrence in household contexts demonstrates. The two-handled cups, usually black glazed, also occur in sacred and funerary environments. As the shape leaves the profane realm sometimes it undergoes a profound change in size: it becomes much taller and larger. One starts to wonder if such vessels were still intended to be used or if they have become symbolic attributes.

Kantharoi were especially popular drinking vessels in the region of Boeotia (Central Greece). This paper will focus on the functions of kantharoi in various (use?) contexts in Boeotia, and explore if the shape changes according to context and reflect on possible meanings. Who were using kantharoi as drinking vessels and for what reasons? Were some kantharoi even intended as drinking vessels?

5 ANALYZING ATTIC BLACK-GLAZED POTTERY FROM OLBIA PONTICA: A COMPARATIVE CHARACTERIZATION BASED ON DIFFERENT CITY AREAS

Chechulina, Iryna (The Institute of Archaeology National Academy of Science of Ukraine; Taras Shevchenko National University of Kyiv)

Pottery was an essential commodity in the ancient Mediterranean world, serving both practical and symbolic purposes, and traded over long distances. Attic black-glazed pottery, one of the most common materials in Olbia Pontica, was a highly standardized Greek ceramic product and undoubtedly one of the most important groups of pottery transported to the region. Its black gloss coating, a complex system of stamp ornamentation, and morphological features allow us to distinguish the type and subtype of vessels and to determine the dating, which in some cases may be narrowed down to a timespan of 10–25 years.

Based on mass archaeological findings and previous studies of Attic black-glazed pottery in Olbia, a comparative characterization can be drawn depending on different areas of the city. First and foremost, the following areas have been studied: the central residential quarters of the city, the northern sector in the Lower City, the eastern and western temenoi, and the Classical and Late Archaic necropolis of Olbia.

The entire spectrum of the pottery has been analyzed in terms of the popularity of different vessels, both open and closed shapes, and the type inside each group. This paper will focus on the distribution of the various drinking shapes. The (drinking) pottery distribution may be associated with various factors, such as socioeconomic conditions, cultural preferences, or functional requirements in different parts of the city. This comparative analysis provides insights into the patterns of usage, popularity, and distribution of Attic drinking vessels within the urban landscape of Olbia.

6 INNOVATION AND TRADITION IN THE CERAMIC SET OF THE ROMAN VILLA OF PATTI

Morganti, Mariano (Università degli Studi di Messina) - Giglio, Donata (Università degli Studi di Messina)

The selection of ceramic vases in antiquity often transcends mere functionality, embedding itself within a complex matrix of elements that encompasses tradition, aesthetic preference, and social dynamics. This study delves into the impact of social openness and market interactions on the diversity and spread of ceramic types within a society, underscoring the importance of introducing new ceramic forms alongside the persistence of traditional ones. Through the examination of evidence from the context of the Roman Villa of Patti, located on the north-eastern coast of Sicily, this work seeks to delineate the interplay between innovation and tradition in shaping the ceramic repertoire of a late antique domestic setting. The case study provides an exceptional view into the practices of adopting new ceramic types while concurrently maintaining traditional aspects, thereby offering profound insights into the dynamics of cultural transmission and the character of daily activities in light of the socio-economic and cultural backdrop of the period.

1040 TRACKING THE URBAN DNA. UNRAVELLING THE RISE AND FALL OF TOWNS AND CITIES

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Bouwmeester, Jeroen (Cultural Heritage Agency of the Netherlands) - Seppänen, Liisa (University of Turku) - Haase, Kirstine (Museum Odense) - Belford, Paul (Heritage Innovation) - Rieger, Dirk (Hansestadt Lübeck)

Session format: Regular session

Urban places are dynamic. They are hubs of networks, influences, economies, cultures and religions. Rome is an appealing example of positive urban dynamism: it originated as a small settlement and steadily grew into a world power, overshadowing other cities, territories, countries and even continents. Of course, not all cities went through such a development. Some declined quickly because of environmental, political or economic changes (or a combination of all of those). Each urban place developed and evolved in its own way, determined by an interplay of factors: the natural landscape, connectivity between the settlement and its region and beyond, political and economic support for the settlement, the right people in the right place who could allow urbanism to develop further, and the economic base of the settlement itself. Traces of this can be found in the city's DNA.

In this formal session of the EAA Urban Archaeology Community, we want to challenge contributors to track down this urban DNA.

- How did the different elements express themselves that are so decisive for the development of the settlement?
- What can we still find here, above ground and below ground?
- How did this determine the city's spatial structure over time and is it still recognisable?
- Can we recognise external elements that at some point started to leave their mark on the city?
- What are the challenges of recognising and exploring this DNA and what are the challenges of preserving these remains for the future?
- What happens to the DNA of failed settlements?

We welcome contributions from Europe and beyond that illuminate this theme, independent of specific periods and cultures, to highlight the topic from as many different perspectives as possible.

ABSTRACTS

1 SOBA - MEDIEVAL METROPOLIS AND A MEETING PLACE OF AFRICAN URBAN TRADITIONS

Drzewiecki, Mariusz (University of Warsaw)

Soba was the capital of one of the medieval kingdoms of Sahelian Africa. The remains are located on the right bank of the Blue Nile, approximately 20 km from the centre of Khartoum. It was the metropolis for Nubian rulers of the Kingdom of Alwa (approx. 6th–16th century CE). The ruins of Soba are currently considered one of the largest archaeological sites in Sudan.

Results of research conducted in 2019–2022 suggest that the spatial organisation of the medieval city has been changing throughout the millennium of its existence. In the first centuries, Soba might have been a polycentric city. Its urban development seems dispersed, with no single, clearly accentuated centre. There were, however, several localities with permanent settlement. Such urban organisation in western and southern Africa is interpreted as a result of development of communities where power was not in the hands of an authoritarian leader or lineage but was exercised by a larger group of individuals or families.

At the beginning of the 9th century CE, the city's structure started to change. New ecclesiastical and royal complexes were built reflecting patterns of centrally organised cities existing at that time in northern Africa. Communities inhabiting Soba might have undergone a significant transformation. At the same time, written sources suggest that around the 10th century, the kingdom of Alwa had close political ties with its northern neighbour, Makuria.

2 REGULAR URBAN LAYOUTS IN THE MIDDLE AGES: BETWEEN IDEAL CONCEPT OF FOUNDER AND ECONOMICAL REALITY OF URBANLIFE

Legut-Pintal, Maria (University of Wrocław) - Kubicka-Sowińska, Anna (Wrocław University of Technology) - Ćmielewski, Bartłomiej (Wrocław University of Technology)

The layout of a town is a puzzle that allows us to read its origins, development, and transformations. It is one of the core components of the city's DNA. In the Middle Ages, regular urban plans were typical for newly founded cities. The original planned scheme has undergone significant transformations and only partially has survived to the present.

In our project, we analysed spatial layouts of selected regular medieval towns in Central Europe, Tuscany and Occitania. The aim of the research was to reconstruct the original plan and answer the questions: To what extent does a city plan influence its development potential? Are social inequalities reflected in the city plan, land divisions, and size of plots? We used the cosine quantogram method, which allows identification of a basic module in a set of measurements. The method was used to analyse the width of plots, streets, and building blocks. Measurements were taken based on cadastral plans of cities and archival maps. Additionally, field survey were carried out using a mobile lidar system, which allowed us to obtain an accurate model of architectural objects. Where possible, we tried to combine the results with archaeological data.

The results form the basis for discussion on the transformations of the spatial structure of cities with a regular plan. They show that urban layouts were not only an expression of the ideological assumptions of the founders of cities, but also a reflection of the practical needs of the inhabitants. The changes that regular urban centres underwent were a consequence of adaptation to changing economic, political, and environmental conditions. The differentiation of urban space was a product of socio-cultural transformations.

3 URBAN LANDSCAPING – UNDERSTANDING STRATIGRAPHY AS MORE THAN WASTE MANAGEMENT

Haase, Kirstine (Museum Odense)

This paper will argue that the landscape is a fundamental part of the urban DNA. It is not just the natural environment and the settings shaped by ice and water, but the landscape modelled and altered by the people living in the city. Many European medieval cities have been shaped by removing and adding soil over centuries, resulting in what we now recognize as archaeological stratigraphy. This stratigraphy is often looked upon as the result of bad waste management and a more or less random accumulation of production waste, debris from demolished buildings or similar activities. This presentation suggests looking at the build-up as a conscious action caused by either the necessity to include formerly uninhabitable areas in the city as the population grew or to adapt the landscape to suit the citizens' or its lords' ever-changing demands and needs.

To further understand the process of urban landscaping, the paper will present a case from Odense in Denmark, where the urban landscape has been reconstructed at different points in time. This has enabled us to understand the reasons and motivations for the changes being made in the city's landscape and the physical development as more than changes in attitudes towards waste management.

4 TOWNS WHICH NEVER MADE IT: SOME EXAMPLES FROM WALES

Belford, Paul (Heritage Innovation)

The creation of new urban places was one of the defining aspects of the Anglo-Norman conquest of medieval Wales in the eleventh and twelfth centuries CE. Some Welsh historians have characterised towns as purely 'colonial' entities; however towns were also established by Welsh princes on the same model as their English counterparts. They had the same intentions: to create nodes for trade and economic growth, and to provide functions to support the administration of wider territories. Some of these towns were successful very quickly – but not all of these were resilient enough to survive the challenges of war, famine and climate change in the fourteenth and fifteenth centuries. Other towns grew slowly until the post-medieval period, and some never flourished at all.

Using data from thirty years of developer-funded excavations in towns across Wales, this paper will explore the 'urban DNA' of places that are on the margins of the urban experience. A town may have a legal charter – and a castle, market, mill and church – but how urban is it really when there are only a handful of permanent residents? What was the impact of these new urban places on the surrounding landscape? What was the balance between their symbolic role and their pragmatic role as centres of trade and social interaction? The paper will consider whether we need to re-think how we define 'urban' in order to answer these and other questions – not just in Wales, but in marginal landscapes across Europe.

5 BEYOND THE WALLS. EXPLORING THE URBAN LANDSCAPE AROUND THE CITY

Bouwmeester, Jeroen (Cultural Heritage Agency of the Netherlands)

The city and the countryside seem like two opposites. However, they are not. The urban landscape does not end at the walls of the city, but extends much further. Many functions in the surrounding countryside are inextricably linked to the city.

Agricultural functions also have a direct relationship with the urban settlement. Think of providing raw materials for various crafts and, of course, producing food. But there is much more happening, for example gallows, monasteries and mills stood there.

It is interesting to see what kind of functions these actually are. And can patterns be discovered in this and is there an explanation for the specific location? In recent years, based on 16th century maps by Jacob van Deventer of nine cities, an inventory has been made of which complexes can be expected around cities and where they are located. Subsequently, the research will investigate whether a useful model can be made from these.

The results will be presented in this lecture and it will be explained how they can also play a role within the archaeological heritage management of cities.

1043 OUT OF NEGLECT, INTO THE SPOTLIGHT. STRATEGIES AND GOOD PRACTICES FOR REDISCOVERING SITES WITH TROUBLED HISTORIES

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Pizzuti, Elisa (Sapienza-University of Rome) - Palazzini, Flavia (Sapienza-University of Rome; Royal Netherlands Institute in Rome - KNIR) - Bossolino, Isabella (CReA-Patrimoine, Université Libre de Bruxelles) - Monti, Dario (Université catholique de Louvain) - Casarotto, Anita (University of Groningen; Royal Netherlands Institute in Rome - KNIR)

Session format: Regular session

Countless archaeological sites worldwide suffer from neglect or a lack of study, yet the reasons behind this oversight are rarely related to their significance or informative potential. The urgency to rediscover these contexts is heightened by the possibility that they may have already experienced, or are at risk of:

- damage (e.g. complete or partial obliteration caused by factors such as increasing urbanization and construction projects; limited access and possible loss of integrity due to conflicts and political instability);
- data loss (e.g. absence of thorough research owing to academic biases or a lack of stakeholder commitment; artifacts and documentation dispersal in the post-investigation phases).

Frequently, the chance of conducting new fieldwork in these contexts is hindered by a shortage of funds or inaccessibility, and the opportunity to get fresh information lies solely in the analysis of data from past research. However, scholars engaged in this recovery may face several challenges. Issues like the scarcity of up-to-date or complete documentation and the difficulty of working with data frequently not collected by modern standards add a layer of complexity to the work. Nevertheless, the result is worth the effort. The retrieval aids in gaining a better insight into the sites and often starts a virtuous cycle, fostering awareness, creating a shared narrative for community identity, and leading to collaboration among institutions and local entities to ensure preservation. For instance, digital online portals for data sharing and citizen science could be a powerful tool in changing the current situation, improving territorial monitoring and safeguarding of cultural resources.

We welcome papers that share first-hand experiences in addressing "neglected sites" with troubled histories, without specific geographic or chronological constraints. The session aims to discuss best practices for managing recovery challenges and preserving these sites for the benefit of future society.

ABSTRACTS

1 NEW DATES FOR OLD: RE-DATING THE PICTISH BURIAL MONUMENTS OF SCOTLAND

Mitchell, Juliette (University of St Andrews) - Noble, Gordon (University of Aberdeen) - Hamilton, Derek (University of Glasgow)

Past excavations and analysis have been key to building a picture of early medieval burial monuments in Scotland, that suggested the practice took place over an extended period. However the material culture and radiocarbon dates that underpin this picture may have been faulty or erroneous, and these results make their way into the archives, the archaeological record, and form the basis for subsequent interpretations.

A targeted project obtained a suite of new radiocarbon dates on old material from the archives, reviewed the reliability of other dating methods, and traced the development of interpretations. Going back to first principles and using the archive data to generate new scientific data with new scientific analyses, including Bayesian analysis, allows us to challenge the interpretations and assumptions that figure so prominently in how we have understood early medieval burial monuments in the past. Combining archives with new scientific techniques allows a fresh look at the data and new interpretations to be made.

2 BIOMOLECULAR ARCHAEOLOGY AS A TOOL FOR REDISCOVERING THE CHIOMONTE-LA MADDALENA NEOLITHIC SITE (ITALY, WESTERN ALPS)

Monticone, Alessia (University of Turin) - Mazzola, Marlisa (University of Bologna) - Curci, Antonio (University of Bologna) - Panero, Elisa (Musei Reali Torino) - Spiteri, Cynthianne (University of Turin) - Cilli, Elisabetta (University of Bologna) - Luiselli, Donata (University of Bologna) - Demarchi, Beatrice (University of Turin)

An ongoing multidisciplinary project has the objective of rediscovering and rediscussing the finds from the Chiomonte-La Maddalena, a multi-period site in the Western Alps, near Turin (Italy). The archaeological materials were totally removed at the end of the excavations and are now part of a museum collection. The site was excavated in the 1980s as a rescue excavation and the abundant anthropological, faunal and ceramic material has never been fully studied. Chiomonte-La Maddalena is the only Neolithic site which has been found in the Piedmontese Alps to date, and therefore represents a unique opportunity to investigate human-environment relationships in a marginal upland area as well as the cultural exchanges that may have occurred.

An effort was done to rescue the scant and scattered excavation documentation, and to reconstruct the complex stratigraphy. In the 2000s, a pilot morphological study was carried out on the more diagnostic macrofauna, lithics and ceramics. We are complementing this with Zooarchaeology by Mass Spectrometry on the more fragmented faunal remains in the assemblage to identify resources utilised for subsistence. Results indicate that both wild and domesticated herbivores were being consumed and that fragmentary human remains were also present in the sample. The latter have been selected for radiocarbon dating. Targeted aDNA analyses has been carried out to clarify the phylogeny of some animal taxa. In parallel, lipid residues from Neolithic ceramic vessels have been extracted and characterised to identify subsistence patterns. Overall this study showcases the potential of biomolecular archaeology for reconstructing the biography of complex sites on the basis of data-poor legacy collections, but also testifies to the positive feedback loop which started with a major engagement of local partners and the Musei Reali of Torino.

3 DEALING WITH THE ARCHIVES ON ANTHROPOMORPHIC STELAE SITES IN SOUTHERN ETHIOPIA: A TURNING POINT IN SITES' CONSERVATION

Anne-Lise, Goujon (CFEE, Addis abeba; TEMPS, Paris Nanterre) - Vincent, Ard (CNRS, TRACES, Toulouse) - Antoine, Laurent (Toulouse University) - Aurélien, Pierre (Musée Fenaille, Rodez) - Sophie, Corson (Historial de Vendée, Lucs-sur-Boulogne) - Philippe, Gouézin (CReAAH, Rennes University) - Anne-Charlotte, Philippe-Lelong (Meganéo Association) - Sophie-Jeanne, Vidal (Atelier du Rouge-Gorge, Naucelle) - Ermias, Yeshitla (Woloytta Soddo University)

Ethiopia has one of the richest megalithic heritages in East Africa. Its origin and chronology have challenged researchers for almost a century. This presentation proposes to discuss the evolution of these sites through the rare archives available dating from the 1930' and 2000'. Methodological questions will be addressed, as well as ethical ones: is archaeology at the root of the dismantling of these sacred sites?

The site of Tuto Fela is today emblematic of the anthropomorphic stelae sites dating from the medieval period, located in the eastern foothills of the Rift Valley, and at the heart of what is the largest complex of phallic stelae sites. These megaliths were first described to the academic public in 1931, when F. Azais and R. Chambard published a book on their three exploration missions to southern Ethiopia between 1926 and 1929. Pursuing the work of these pioneers, a team led by A.D. Jensen documented the Tuto Fela stelae for the first time in 1934, providing a partial state of the site with 245 photographs, 38 drawings, and a report mentioning other sites.

In 2023, the implementation of a spatialized database of these stelae sites is undertaken by the Abaya archaeological mission. It is based on the inventories drawn up during the excavation campaigns led by R. Joussaume at Tuto Fela in the 2000s, while seeking to integrate ancient archives.

In addition to the difficulties involved in processing this archival corpus, with its gaps in data and its overlapping inventory of sites and stelae at Tuto Fela, we'll be looking at what extent GIS can be used to recreate the ancient distribution of stelae sites. In this way, we will attempt to write the history and measure the extensive dismantling that the region's archaeological heritage has undergone, at the same time as its enhancement.

4 IN FAVOUR OF AN ARCHAEO-HISTORICAL APPROACH TO STUDY OLD COLLECTIONS: THE EXAMPLE OF RAOUL DANIEL'S WORK ON THE TOURTOIRAC ROCKSHELTER

Vignoles, Anaïs (University of Liege) - Doyon, Luc (Université de Bordeaux)

Since the development of computational approaches and digital open data in archaeology, it became possible to gather huge amounts of data and analyse them via large scale statistical approaches. However, a critical posture must be adopted towards the quality of data that are being re-used, since they are produced in a specific historical and scientific context. A historiographic approach to archaeological data is therefore crucial to specify the terms of its reusability in our current paradigms. Here, we present an archaeological and historiographic study of Raoul Daniel

(1891-1978)'s finds at the Tourtoirac rockshelter, that he explored together with his father Jean in the early 1910s. The material comprises ca. 80 lithic and a dozen osseous artefacts, their associated markings and curation boxes, Raoul Daniel's archival fund (2 boxes) and his article published in 1932. Our analysis shows that pragmatically cross-examining these different sources is crucial to qualify and interpret the archaeological information for this collection, as they complement each other to contextualize the artefacts spatially and chrono-culturally.

5 THE POTENTIAL OF THE GRAZIOSI ARCHIVE FOR THE STUDY OF THE LATER STONE AGE OF THE HORN OF AFRICA

Mutri, Giuseppina (Unità di Archeologia preistorica, Dipartimento SAGAS, Università di Firenze, Firenze (Italy); University of Connecticut, Department of Anthropology; ISMEO) - Lo Vetro, Domenico (Unità di Archeologia preistorica, Dipartimento SAGAS, Università di Firenze, Firenze (Italy); Museo e Istituto Fiorentino di Preistoria, Firenze (Italy)) - Martin, Lavinia (Museo e Istituto Fiorentino di Preistoria, Firenze (Italy))

During the 1950s, the Italian archaeologist Paolo Graziosi conducted extensive research in Africa, with a particular focus on East Africa and the Libyan Sahara. Ethiopia, Eritrea and Somalia were the subject of surveys and excavations, which led to the identification of a rich sequence of prehistoric settlements dating from the Middle Stone Age to the Pastoral Neolithic. An important part of Graziosi's research in the Horn of Africa was dedicated to the Later Stone Age, period for which several surface stations and stratified sites have been identified, mainly rock-shelters. The excavations returned a large amount of lithic artifacts, animal and human remains and are preserved in the Museo e Istituto Fiorentino di Preistoria (MIFIP). They have been the subject, over the years, of investigations by several specialists and recently the Marie Curie Global Fellowship project, led by G. Mutri at the University of Florence and University of Connecticut, included archive materials in a study that is reconstructing environmental adaptation and livelihood strategies of LSA hunter-gatherers in the Horn of Africa.

The extensive documentation stored in the Graziosi Archive at the MIFIP, including excavation and survey reports, maps, pictures and geological descriptions represents the base-ground for this research, by offering the necessary details to understand the context in which the artefacts were found.

Going through the data of some stratified Somali sites (Bur Eibi, Eil, Darrod, Kuf-Kuf, Iadadale, Monai and Moga-discio), our aim is to provide an updated interpretation of the precious information collected by Graziosi.

6 BETWEEN NEGLECT AND COLONIALISM. DIGGING INTO THE ARCHIVES TO RECONSTRUCT THE HISTORY OF KAMIROS (RHODES)

Bossolino, Isabella (Université Libre de Bruxelles)

From 1912, the island of Rhodes was the focus of archaeological activities first by the Kingdom of Italy and then by Fascist Italy, when Italian troops took advantage of the distraction of the Ottoman army, busy on the Libyan front, and militarily occupied the Dodecanese islands within a few days. The site of Kamiros – located on the NW coast of Rhodes and rich in ancient monuments – immediately became a favourite among Italian archaeologists.

However, this was not the first time the area had been investigated: Several more or less institutional archaeological missions had already taken turns at the site in the second half of the 19th century, mainly excavating the cemeteries. However, the lack of serious documentation of the excavations and the disinterest of the excavators in those who had preceded them on site led to an accumulation of various interventions scattered over the area and uncoordinated: a fact that naturally hampered the global study of the research on the site from a modern and scientifically valid perspective.

This paper aims to illustrate, through a case study, some of the methods and tools used to try to shed light on the troubled history of one of the most interesting sites in the Aegean, which is greatly misunderstood by both scholars and the public, partly due to its complicated research history. The available materials and some of the strategies used to try to bring the site of Kamiros back into the scholarly discussion will be presented.

7 DUSTING OFF THE ARCHIVES: RECONSTRUCTING THE LEGACY OF THE LATE BRONZE AGE CREMATION CEMETERY OF TIMMARI (MATERA, ITALY)

Pizzuti, Elisa (Sapienza University of Rome)

In the early 1900s, D. Ridola and Q. Quagliati uncovered an urnfield on the slopes of Mount Timbro near Matera (MT, Basilicata). This discovery highlighted what was, at the time, and still is, one of the largest urnfields in Southern Italy. The excavation revealed 248 graves, now housed and displayed in the Ridola National Archaeological Museum in Matera and in the Superintendence Office in Taranto.

Numerous scholars have studied this site throughout the years, with further excavations in the 2000s uncovering another 32 burials. However, a comprehensive analysis of this context has never been conducted, and the necropolis has remained mostly unknown despite its importance in Southern Italy's Late Bronze Age evidence.

By revisiting past documentation, we have managed to reconstruct the research history of Timmari and restore access to information that was once lost. Indeed, the transition from a physical to a digital archive was a significant aim in information retrieval, primarily to reduce the risk of additional damage and loss. In fact, the recovery process revealed that the most significant loss of information did not occur during the excavation or documentation phases but rather during the conservation stage.

This paper aims to illustrate the methodological solutions we have applied to tackle problems associated with artefacts and documentation manipulation during the post-excavation phase (e.g. errors in the artefact inventory or unreadable labels) and also demonstrate how the information collected through the recovery of legacy data has enabled a detailed picture of the occupation history of the Timmari cemetery, thereby extending our knowledge in the funerary customs of Late Bronze Age societies.

8 REDISCOVERING THE PROTO-URBAN SITE OF COMO SPINA-VERDE (N. ITALY): CHALLENGES AND POTENTIAL IN ARCHAEOLOGICAL RESEARCH

Di Maria, Francesca (Sapienza - Università di Roma)

Many are the challenges faced by researchers to be able to rediscover a neglected site. This contribution will focus on the case study of the protohistoric site of Como-Spina Verde (Lombardy, Northern Italy): it is one of the large-scale settlements of the Early Iron Age Golasecca Culture (150 ha -proto-urban size- in the 5th cent. BC). Despite its importance, the site has faced numerous challenges, including neglect and unregulated urban expansion. From its initial discovery in 1875 to recent preventive archaeology efforts, the Como Spina-Verde site has been recognized for its enormous potential, underlined by the complexity of the infrastructural elements, and for the possibility of studying the relationship between the settlement and its cemeteries. Indeed, scholars have mainly focused on the study of the necropolis, leaving the settlement only sketchily studied. This lack of studies, aggravated by the urban expansion that damaged the site, hindered a comprehensive analysis and understanding of the proto-urban centre, somehow subject to a generic historical approach. To fully understand the dynamics, challenges and potential of the Como-Spina Verde site, it is essential to apply a well-defined archaeological methodological approach through a multi-scalar approach. This requires the examination of modern administrative changes and the review of 150 years of studies, which have produced an extremely heterogeneous documentation of settlement archaeological evidence, both quantitatively and qualitatively. The Author is tackling the evidence from the Como Spina-Verde settlement through an integration of specifically targeted OA databases, with the primary objective of standardizing data, as a crucial point for comprehensive analysis of a mass of bibliographic, excavation and remote-sensing data, generally lacking precise chronological attribution. Only interoperable and interconnected data can allow the management and reconstruction of the settlement evidence from such different sources, carefully averting possible loss of information.

9 THE ARCHAEOLOGY OF PRE-CLASSICAL ATTICA: METHODOLOGICAL OVERVIEW FOR THE CASE OF SOUNION AND LAURION

Silva Porto, Mariana (Humboldt Universität zu Berlin; Paris 1 Panthéon-Sorbonne)

For this paper I propose to outline the methodology of my project using as an example the preliminary results of the first of four regional case studies covered by my PhD. My project focuses on a re-examination of the known archaeological data for four peripheral territories of Attic peninsula in the period between the fall of the Mycenaean Palaces and the Cleisthenic reforms (1200 to 500 BC). It uses a 1:1 scale GIS and connected database to facilitate an archaeological, landscape-based reading of the territory at different scales (individual structures, sites, areas, and Attica as a whole). Through these, it seeks to place the archaeological material from all known published sources in as precise a topographical and stratigraphic context as possible. For this presentation I would therefore like to focus on the challenges and opportunities of using this type of data which varies from 19th century excavation reports, to recent reports from rescue archaeology and includes both incomplete data and data that has already been subject to more recent revisions. More specifically, I would like to focus on the area of Laurion, which contains two major Attic sites, the sanctuaries on cape Sounion and the long-lived habitation site at Thorikos. Although much has been written about these two important sites, studies of the wider landscape beyond them have tended to focus on the changes the area underwent from the late archaic period onwards. By assembling data from different periods for the wider Laurion area, I propose to consider its development in the preceding centuries, including its role in the growth and repopulation of the peninsula and its position within the growing Athenian sphere of influence.

10 THE THEATER AT AMITERNUM REDISCOVERED. NEW DATA AND FUTURE PERSPECTIVES

Trafficante, Ilaria (Scuola Superiore Meridionale)

The archaeological remains of the city of Amiternum (S. Vittorino, AQ) comprise two monumental poles, separated by the Aterno river. In both areas, the building typologies are for entertainment: the theater, on the left bank of the river, and the amphitheater on the right. The structures of the theatre, the subject of this paper, although brought to light at the end of the 19th century, were never studied nor was its architectural and sculptural decoration, today dispersed in various museums in Italy and the U.S.

Other problems made the study of this context particularly complex. First, we have completely lost stratigraphical data: the excavations of the 19th century were not carried out according to modern methodologies. Secondly, only general documentation of the architectural features and the materials brought to light is dispersed in several Italian archives. Furthermore, two "heavy" restoration interventions were carried out in the 1960s and the 1980s, without compiling further documentation.

For these reasons, I recovered all the graphic and photographic documentation that testifies to the state of the structure before the 19th-century excavation and previous to the renovations of the 20th century. Thanks to these documents, I first examined the architectural features of the building, chose some significant samples of its masonry, and followed this with the study of the architectural and sculptural decoration. A general plan of the building, based on new drone photomosaics, was finally vectorized. In conclusion, the building phases have been identified and dated according to the documentation recovered, and some hypotheses for the reconstruction of the decorative characteristics were proposed.

The lack of stakeholders and a complex institutional framework present us with a new challenge: how is it possible to publish the new data gathered and promote a new plan for conservation, valorization, and sustainable development?

11 THE INSCRIBED BLOCKS OF THE OLD TOWN OF ALULA : A MEANS OF STUDYING URBAN DEVELOPMENT

Louman, Laura (Archaios; PLACES; MSHST-CREAP) - Jacquemet, Jules (CIHAM; Université Lyon 2) - Vernet, Apolline (Archaios; Laboratoire Orient & Méditerranée - UMR 8167)

AlUla Valley, or wadi al-Qurra, lies in the northwest of Saudi Arabia and has been the cradle of early civilisations and famous kingdoms, such as the Lihyanite, Dadanitic, Minean and Nabateans. The most recent heritage asset of the valley is the Old Town, which has been under investigation by a multidisciplinary project, MuDUD, since 2021. Abandoned in the 1980s, the vast majority of the buildings composing this town are still standing. Their earth-and-stone masonries, dated back up to the 13th c., are partly composed of reused blocks, and most notably inscribed ones from the pre-Islamic and Islamic periods.

Almost 40 of these inscribed stones had already been recorded by explorers, sparsely allowed to enter the town during the late 19th-early 20th. They brought back an exclusive documentary fund made of squeezes, location maps, drawings, pictures and transcriptions. The systematic investigation of the Old Town by the MuDUD project allows the addition of more than 200 inscribed blocks to this epigraphic corpus, carefully recorded by means of photogrammetry, descriptions and transcriptions.

The recurring presence of these blocks and their spatial distribution within the urban fabric raises questions regarding stone economy, while their location in and outside the houses forces us to examine their uses as aesthetical elements. Finally, the variety of languages identified leads us to enquire about their provenance in and around the valley.

Through an in-depth epigraphic study and GIS analysis, these inscribed blocks unveil new evidence of urban transformation. This paper will present how merging archives documentation and current 3D modelling allows one to better apprehend the urban history of AlUla Old Town, and how, thanks to the implementation of a digital ecosystem, one is able to analyze the documentary resources linked to the project's latest acquisitions.

12 THE ARCHIVES OF ARCHAEOLOGISTS OF YESTERDAY. A HISTORY TO PASS ON! A SCIENTIFIC HERITAGE CHALLENGE FOR FUTURE GENERATIONS.

Faupin, Géraldine (Service régional de l'archéologie, DRAC Hauts-de-France, Ministère de la Culture; UMR HAL-MA 8164)

The history of French archaeology is a rich one, marked as much by different generations of archaeologists, as well as by important legislative developments. The archives associated with all the archaeological operations carried out on French territory (surveys, excavations...) are numerous, varied and stored in multiple places and with different statuses. Regional archaeology departments (DRAC, French Ministry of Culture) are responsible for collecting and managing these archives (paper and electronic).

Given the age pyramid, we are currently experiencing a key moment in terms of generational transition and the transmission of knowledge and know-how as several generations of archaeologists (“amateur” archaeologists and the first generation of professional archaeologists) are either in the process of retiring, sadly deceased, or the structures in which they worked are closing down (associations, municipal archaeological services, etc.). There is an urgent need to collect their archives before they are lost. The preservation of the scientific data they represent is crucial for the future, since archaeology destroys the object of its study and because archaeological research is built on the accumulation of data. Before even considering making these ancient archives available and their subsequent reuse, we must first ensure that they are collected, processed and curated for the long term. Today, more than ever, we are faced with these crucial scientific and heritage issues.

In order to achieve this objective, the Hauts-de-France Regional Archaeology Service has been leading an active work since 2020. This presentation will draw on experience of this mission, with concrete examples to back it up (collection of historical archives from various stakeholders, oral archives campaign, implementation of a backlog reduction plan, classification, research tools, curation, availability and promotion of collections).

13 **INTEGRATING AND SHARING OLD AND NEW: HATCH: HOUSE AT ÇATALHÖYÜK – A NEW DIGITAL REPOSITORY FOR THE WORLD HERITAGE SITE**

Filipowicz, Patrycja (Faculty of Archaeology, Adam Mickiewicz University)

Çatalhöyük is a World Heritage site in Türkiye that has been intensively excavated for more than a quarter of a century: first in the 1960s, and then after a 30-year gap in the framework of the large international Çatalhöyük Research Project until 2017. The excavation is ongoing, although on a smaller scale, and the field data is accumulating. Over the years, the project produced a wide variety of data of different characters. This poses many challenges for storing, maintaining, and sharing the data.

The members of the project team and IT specialists from Adam Mickiewicz University in Poznań have designed an open-access repository devoted to presenting major findings from this world-renowned site: HATCH – House at Çatalhöyük. It has the form of MIODEC—Multidimensional Interactive Open Digital Educational Collection, which is innovative software for creating and maintaining digital assets. HATCH presents systematically all buildings excavated to date (both Neolithic and post-Neolithic), along with burials and different finds found at them. It was designed as a didactic tool for the professional and lay public, presenting information in a systematic manner, both from old and recent research. In my paper, I intend to provide an overview of HATCH, in particular in relation to the use of archival information, presenting it to academics and laypeople, and integrating it with the ongoing scientific work at the site.

14 **DUTCH PIONEERING FIELD SURVEY IN ITALY: CAREL VAN ESSEN AND HIS “PASSEGGIATE ARCHEOLOGICHE” IN ROMAN LANDSCAPES (1947 - 1963)**

Casarotto, Anita (University of Groningen / Royal Netherlands Institute in Rome - KNIR) - Mente, Janet (Royal Netherlands Institute in Rome - KNIR) - Giofrè, Diana (Royal Netherlands Institute in Rome - KNIR)

The Van Essen Archive at the Royal Netherlands Institute in Rome (KNIR) forms a precious source of information to retrace the steps of Dutch field survey in Italy. Carel Claudius van Essen, vice-director and archaeologist of the Dutch Institute in Rome from 1947 until 1963, adopted the pioneering topographic survey method developed by the archaeologist-topographer Thomas Ashby (British School at Rome) to record important archaeological data in several Roman landscapes of Italy, which were soon after drastically transformed by modern urbanization, intensive agriculture or land use changes. These legacy survey data are important for two main reasons: because they allow for the reconstruction of the origins and historical influences of Dutch field survey methodology in Italy, and because they represent a unique cultural heritage to reconstruct archaeological sites and rural places that existed in the 1950s and 1960s, but then were damaged or completely destroyed by land transformations. In this paper a proposal for a future project in digital humanities based on geospatial mapping, territorial monitoring and modelling is presented that will rediscover archaeological contexts of the Roman and Italian countryside through the retrieval and promotion of the van Essen’s legacy archive (documents, book notes, postcards, negatives and photographs of his field surveys), thus breathing new life into “old” data. The aims will be to 1. study the origins, history and evolution of Dutch field survey methodology in Italy, 2. provide an heritage management instrument useful for landscape archaeology, local spatial planning and architecture, and 3. preserve the memory of forgotten rural places, traditional ecological knowledge and past agropastoral practices, thus reinforcing shared narratives for community identity of present and future society.

15 **“REDISCOVERING MUGILLAE ARCHAEOLOGICAL SITE”: A COMPREHENSIVE APPROACH TO URBAN PLANNING AND COMMUNITY IDENTITY**

Lollino, Walter (Università degli studi di Bari) - Fiano, Francesca Romana (Università degli studi di Ferrara)

Nestled into the Archaeological Park of the Appian Way, the settlement of Santa Maria delle Mole is a ‘dormitory town’ on the south outskirts of Rome. The urban fabric has developed under an uncontrolled speculation, ignoring its relationship with the surrounding landscape, one of the main cultural palimpsests of Rome. Its environmental and archaeological qualities have been the driving force in curbing overbuilding since the 1970s. Only in 2020 the annexation of the area to the Park territories put a halt to cementification, opening a new perspective for archaeological enhancement. Here the local community’s struggles in contrasting overbuilding claimed for the protection of archaeological heritage as the opportunity to gain more public spaces, while a sense of community, feeling of belonging and collective identity increased, linked to the hypothesis that the ancient city of Mugillae once existed here, developing during such conflictual years an imaginary historical identity. Where over two centuries ago was hypothetically located Mugillae, is now an urban void spared by overbuilding on which insist a roman cisterna, in between urban space and the archaeological and agricultural landscape. No archaeological traces of the ancient city are recorded here but a mapping of the several non-monumental evidences found in the area before and during the building expansion have played a decisive role in bringing “out of neglect” the archaeological heritage of the area. Exploring their typology, chronology and functional qualities, it defined a reference and the starting point for a design proposal. The paper aim to discuss the methodological approach that integrates archaeological analysis with landscape and urban quality assessment, while dealing with the imaginary Mugillae’s historical identity, and how the process led to design strategies and narratives for the site’s enhancement and a program to reinvigorate and foster community engagement through an holistic and sustainable approach.

16 **PIANO AND POGGIO DELLE GRANATE (POPULONIA, LI - ITALY): THINKING A VALORIZATION PROJECT FOR A RISK AREA**

De Pieri, Francesca (Sapienza University of Rome)

Populonia was a reference center for the territory of northern Etruria. The site presented a complex structure: the Acropolis on two hills, and a lower city in the Gulf of Baratti, including the production districts, the ports, and necropolises.

Following the numerous archaeological investigations, in 1998 the Archaeological Park of Baratti and Populonia was inaugurated, which currently includes the necropolar area of Podere San Cerbone and Casone, in the Gulf of Baratti, and the Acropolis area.

From this virtuous example of valorization, the nearby archaeological area of Piano and Poggio delle Granate remains completely excluded. It is an extensive necropolis in use from the early Iron Age until the beginning of the 3rd century BC. However, its existence has been put at risk since its rediscovery: in 1927 an invasive building renovation project was proposed in the area, and at present it is in a total state of decay and abandonment, which endangers the existence and conservation of the few archaeological remains still in situ, inconceivable if you consider that the reality of the Archaeological Park is just a few steps away.

Now more than ever it seems necessary to think of a valorization project that also includes this area, both to be able to safeguard it, and to be able to return this piece of history to the local community. After some preliminary survey to verify the state of the site, the first protection actions made use of modern technologies, in particular GIS, to carry out a census of the ancient evidences and that which are still present. The analysis of previous participatory archeology projects has instead made it possible to ascertain the needs and desires of the local community to arrive at a preliminary proposal for some possible interventions to enhance the site.

17 **DIGITAL HERITAGE AT THE DISAPPEARING ISLAND: A HOLISTIC APPROACH TO ENDANGERED COASTAL HERITAGE**

Harrison, Laura (University of South Florida) - Hansen, Kimberly (University of South Florida) - Fernandez, Steven (University of South Florida)

In 2019, the Florida Trust for Historic Preservation listed Egmont Key as one of the state’s 11 most endangered heritage sites. The 2 km² barrier island has lost nearly half of its landmass in the last 150 years, submerging several heritage sites, and endangering numerous others. Few of the island’s 200,000 visitors per year are aware of the island’s rich history or the threats it faces, due to inadequate tourist interpretation and visitor infrastructure. This presentation discusses the process behind creating high-resolution simulations of the projected impacts of rising sea levels on coastal heritage, with a novel combination of terrestrial lidar, aerial lidar, and GIS. These analyses help advance communication between academic researchers and local land managers, who must decide if, when, and how to address the problem of beach erosion and historic preservation, despite limited resources. These simulations inform recom-

mentations about the implementation of living shorelines, green infrastructure, and targeted beach renourishment. The goal is to promote sustainable tourism and protect the island's natural and cultural heritage in accordance with the UN Sustainable Development Goals (Targets 8.9 and 11.4).

Digital tools such as augmented and virtual reality enhance community engagement with these goals. Outreach programs include: (1) a virtual reality experience that reveals how overlapping natural and anthropogenic factors threaten to wash away history; (2) a Heritage Monitoring Scouts citizen science program; (3) a Guardians of the Gulf augmented reality app for children that uses animated trackers to gamify cultural heritage preservation, and (3) a Step into History place-based augmented reality app that brings the island's "ghost town" to life with digital reconstructions and first-person historical narratives. Together, these public heritage tools weave together geoinformatics with broader digital storytelling projects that will live on, even if the island itself disappears.

18 "DISAPPEARING INTO THE FOREST" - ATTITUDES TOWARDS WW II PLACES USED BY FINNISH MILITARY DESERTERS

Kauhanen, Riku (University of Turku, Finland)

During Finnish Continuation War (1941–1944) thousands of Finnish men refused to go to fight in frontlines, and many fled to wilderness where they stayed hidden from officials in improvised campsites. After the war most of the sites that survived the war without being located and destroyed by officials were mostly forgotten in public memory, but some gained later interest of locals because of their dramatic history which included firefights, accusations of atrocities and strong, continuing political differences. Even though these sites could be considered as "difficult heritage" some sites were and are used to discuss the actions and treatment of members of Finnish resistance movements during Second World War.

Many sites have already disappeared through forestry or natural decay, without any realistic possibility to locate and study them any longer. Their "young age" also means that they are not automatically protected by laws, so raising interest and sharing knowledge is key to try to further study and preserve them. Interest towards these sites is not always a blessing or guarantee that they are protected in sustainable way or in a way that stores the "spirit" of the place. When some site gains more interest through publications or media, there is possibility that locals and officials start seeing the place as tourist attraction and alter the site to meet the expected needs of travellers.

In this paper I will highlight two places that gained strong local interest in 1980s, how that changed the places and what this means for archaeological research. I also discuss the research possibilities of these campsites, when the places are "forgotten", known only to surviving family members of deserters and local historians.

19 THE ERASURE OF THE SLAVIC MATERIAL PAST OF GREEK MACEDONIA

Stavridopoulos, Ioannis (Independent researcher)

Greek Macedonia became part of the Greek state in 1912-13 as an outcome of the Balkan Wars. In this period, Muslims, Greeks, Slavic speakers, Jews, Vlachs and Gypsies composed the populational mosaic of the area. During the 20th century, most of the non-Greek populations fled. The Slavic speakers, in the beginning of the 20th century, constituted a great part of the population of the area. After the absorption of the area and for many years, the Greek state regarded the Slavic speakers as a potential enemy, a group of people that they had to be either integrated or expelled. Throughout the 20th century, the Greek government inflicted different measures for their assimilation. Many were tortured, imprisoned, exiled, and expelled from the country. They lived for decades under constant surveillance and suppression by the authorities. A central issue in the state assimilation efforts was their language which was banned. Slavic inscriptions were erased, painted over and destroyed. Most of them were in churches, on icons, murals, religious books, tombstones and bells. In a few cases, even whole churches were demolished condemned as Slavic. The destruction of the Slavic material traces was used in the forced Hellenization of the area.

In my paper, I will focus on this group of monuments still a taboo for Greek academia and the state services. By using different examples of destructions collected through systematic field research, I will attempt to shed light on the erased material memory of the Slavic speakers of Greek Macedonia. I will also try to document the history of the monuments lost and to record the surviving ones. My aim is to make these monuments visible, a first step towards their acceptance, preservation, and protection by the local communities and the state authorities as part of the area's cultural heritage.

20 DOCUMENTING THE REMNANTS OF ITALIAN RULE IN NORTHERN DALMATIA, CROATIA: A HISTORICAL, CULTURAL, AND POLITICAL CHALLENGE

Iglic, Sara (University of Zadar)

Remnants of modern conflicts are frequently found in Croatia, but they have not been extensively researched archaeologically, except for a few exceptions. The purpose of this paper is to explore the difficulties of documenting

the remnants of Italian rule in northern Dalmatia in the first half of the 20th century. These remnants, which include military bunkers, barracks, defence lines and camps, can often be a source of ideological controversy, especially if neglected after recent conflicts and occupations. As a result, documenting these sites requires a careful examination of their historical, cultural, and political importance. Due to urbanization and construction, the traces of Italian rule in the region are being destroyed without proper archaeological documentation. Therefore, historical photographs and documents together with amateur research are relied upon to properly document and research these sites before they are more severely neglected and destroyed. Only a small part of these remnants were documented archaeologically, and the rest is now being irreversibly damaged by increasing human pressures. To ensure that the next generations can learn from history and appreciate the significance of past events, it is crucial that we take necessary measures to document and research sites that hold contested pasts. By documenting and, if possible, preserving these sites, we can gain a deeper understanding and appreciation of our shared history, and ensure that the lessons of the past are not lost to time.

1044 WHAT A WASTE! ? THE EPISTEMOLOGICAL VALUE OF REFUSE AND DISCARDED MATERIALS IN THE CURRENT ARCHAEOLOGICAL RESEARCH

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Cereda, Susanna (University of Innsbruck, Institute of Archaeologies) - Zambaldi, Maurizio (University of Coimbra, Centre of Studies in Geography and Spatial Planning (CEGOT), FLUC, Department of Geography and Tourism) - Jakobitsch, Thorsten (Austrian Archaeological Institute/Austrian Academy of Sciences, Environment and Human Impact in Historical Societies)

Session format: Regular session

Understanding the past through the material remains of human activity has always been a prime pursuit of archaeology. More than architecture, artistic productions, grave goods, caches, or offerings, societies have left behind throughout history a trail of waste: unwanted artefacts and materials that were intentionally (or unintentionally) disposed of. Despite their ontological status of neglected things—or perhaps also because of it—they bear even higher potential as rich repositories of the past.

This session seeks to explore the epistemological value and research insights that waste, in all its forms, can offer to our understanding of human history. Reconstructing the hidden narratives behind refuse, middens, and dumps can redefine our approach to archaeological inquiry and specific aspects, such as: resource consumption, economic practices, social structures, value and identity construction, ecological interactions and more. We encourage papers that promote discussions on theoretical frameworks, case studies and cutting-edge methodologies, which can highlight the significance of the practice of discarding materials and their role in comprehending the complex and meaningful dynamics of human actions. History teaches us that waste generation and accumulation know no bounds, and that its impact on our planet has steadily increased over time. Consequently, we welcome contributions from all geographical regions and periods ranging from early prehistoric societies to ancient and modern urbanizations and the industrial world. The aim is to promote an interdisciplinary discussion among archaeological sciences (e.g., geoarchaeology, zooarchaeology, archaeobotany), ethno- and experimental archaeology, and material culture approaches.

Purpose of this session is to explore the untapped potential concealed within to refuse as we delve into its historical significance and reassess the criteria that determine what qualifies as "valuable" archaeological data.

Do not waste this opportunity!

ABSTRACTS

1 REFUSE/RESIST: REASSESSING THREE MESOLITHIC "MIDDEN" SITES ON THE EAST COAST OF IRELAND

Moucheron, Martin (School of Archaeology, University College Dublin; Irish Research Council Government of Ireland Postgraduate Awardee) - Gilhooly, Bernard (National Museum of Ireland, Irish Antiquities Division) - Onfray, Marylise (Institut National de Recherches Archéologiques Préventives - Bretagne, UMR6554 LETG) - Trafford, Andrew (iCrag - Research Centre in Applied Geosciences, University College Dublin) - Warren, Graeme (School of Archaeology, University College Dublin)

This paper presents the results of a PhD research dedicated to reassessing three Late Mesolithic sites on the east coast of Ireland – Sutton and Dalkey Island, Co. Dublin; Rockmarshall, Co. Louth. These sites, excavated between 1946 and 1970 and often grouped under the shorthand "Mesolithic shell middens", were formative in establishing the contours and identity of the Late Mesolithic in Ireland and are still considered part of the canon for the period (e.g.

Woodman 2015). However, this legacy obfuscates a dearth of reliable data about the sites which betrays the archaeological thinking, standards, and practices of their time.

The research project aimed to establish a state of contemporary knowledge about these three sites, and to explore their remaining archaeological potential. This double objective was carried out by looking at the existing archives, and by implementing a strategy combining multiple, non- or minimally-invasive geophysical and (geo)archaeological methods. The results reveal a contrasted state of preservation across the three sites, and highlight the strengths and limitations of the selected methods applied to a particular context.

More broadly, they underscore the formative effects of language and scale on the perception and construction of the Mesolithic in Ireland in the archaeological discourse - with “midden” a prime example that positions cultural layers in the semantic field of waste. This interpretive framework affects archaeological research practices; ideologically, it chimes with colonial, neoliberal constructions of hunter-gatherer groups, past and present, as non-productive non-agents representing an earlier and less achieved state in human evolution. By refusing “refuse”, we can resist the dominant discourse, propose an alternative narrative, and contribute to shift archaeological perception and practices about these cultural traces left behind by past people.

Reference:

Woodman, P.C. 2015, Ireland's first settlers: time and the Mesolithic, Oxbow Books, Oxford.

2 WASTE AND BEHAVIOR: LBK SETTLEMENT IN FOCUS

Pilar, Daniel (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic; Charles University, Prague) - Kvetina, Petr (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic) - Denis, Solene (French National Centre for Scientific Research)

The settlements of the Linear Pottery Culture (LBK) have been a major topic of research on the Early Neolithic (5500-4900 BC) in Central Europe for almost a century. However, despite many years of research, we are still unable to fully answer the fundamental questions of how these settlements were formed, which limits any research focused on, for example, chronology or socio-economics. Therefore, the study of taphonomy and waste management is in this context crucial. This paper presents a case study focusing on waste management at the LBK settlement in Hlízov (Czech Republic). The study analysed the fragmentation, refitting, and concentration of artifacts in the pits surrounding house-ground plans. The results indicate that waste management was much more complex than previously thought. It was found that each type of waste (pottery, chipped stone, ground stone) seems to be treated differently by Neolithic people. The case study shows that without waste management and taphonomy research, our understanding of everyday life at the settlements could be misleading and over-optimistic. The examined finds provide authentic testimony of human behavior in relation to waste management in the settlement space that constitutes a prerequisite before dealing with more complex issues like socio-economics, households or identity of the Neolithic communities.

3 WATERLOGGED MIDDENS INVESTIGATED THROUGH ARCHAEOBOTANY AND ARCHAEOENTOMOLOGY - THE CASE STUDY OF THE NEOLITHIC PILE DWELLING MOOSWINKEL IN AUSTRIA

Jakobitsch, Thorsten (Austrian Academy of Sciences)

Stable manure preserves well in waterlogged archaeological sediments. The organic refuse provides a wealth of information about the site's economy, forest resources, and impact on the environment. However, the recognition of middens and manure in sediment layers is not always straightforward. In the case study of the Late Neolithic pile dwelling Mooswinkel at the lake Mondsee in Austria, dung, botanical macro- and microremains, as well as invertebrates identified the sediment as stable manure from goat, sheep and cattle farming. Furthermore, the season of the layer formation could be recognized. Materials investigated included pollen, bryophytes, plant fruits and seeds, leaves, branches and bud scales of woody plants, as well as insect remains. In addition, plant microremains in dung were analysed. The results of this multi-material study show that leaf hay and grass hay were used as fodder during the winter season. The impact of fodder acquisition and pasturing on the forest could be reconstructed, showing the formation of a mosaic landscape of natural and semi-natural habitats.

4 WASTING TIME EXAMINING THE WASTE? THE EARLY BRONZE AGE WASTE FROM THE HOSTY SETTLEMENT (CZECH REPUBLIC)

Hlásek, Daniel (Institute of Archaeology of the Czech Academy of Sciences, Prague) - Kovárník, Jaromír (University of South Bohemia in České Budějovice, Faculty of Fisheries and Protection of Waters, South Bohemian Research Center of Aquaculture and Biodiversity of Hydrocenoses) - Ernée, Michal (Institute of Archaeology of the Czech Academy of Sciences, Prague)

The primary focus of settlement archaeology often revolves around the examination of refuse. This comprises qualitatively and quantitatively transformed material remnants of past activities within a given settlement. Hosty settlement represents a typical prehistoric Central European dry site, notable for its exceptional preservation of cultural layers. The prevailing finds predominantly consist of fragmented pottery. A thorough investigation of this significant Early Bronze Age site, which evidences long-distance trade, metallurgy, and warfare, necessitates an exploration of non-typological aspects of the pottery. We have designed a method employing scanning and image analysis within the ImageJ Fiji environment, which efficiently measures various parameters of individual pottery fragments, such as area, maximum length, and shape regularity. Given the substantial volume of finds (approximately 200,000 sherds), operational efficiency is paramount. We contend that these data will facilitate a comprehensive examination of the transformational history of each find assemblage, crucial for elucidating their chronology and depositional context. Simultaneously, these data allow scrutinizing the waste area itself as a distinct archaeological source. Are we acquiring adequate information through this approach?

5 SECONDARY REFUSE OR REUSED OBJECTS? THE PRESENCE OF WASTE-LIKE MATERIALS IN THE FINNISH IRON AGE CAIRNS

Salomaa, Sanni (University of Turku)

Waste-like materials such as pieces of broken pottery, animal bones, stone flakes, burnt clay and slag are an essential part of many Iron Age cairns (c. 500 BCE -1200 CE) in Finland. Traditionally, the cairns have been interpreted first and foremost as grave monuments, and the curious occurrence of these fragmented materials has not yet been fully considered.

These kind of materials in the cairns can be found both with or without human bones or metal artifacts, concentrated in certain places or scattered around, and their presence is not easy to explain. Grave goods, votive gifts, or just plain waste – the interpretations of the materials have either highlighted the cairn as a grave or rejected it as ritual space altogether, in a very dichotomous way.

Through case-studies from Western Finland, this paper discusses the waste-like materials in the cairns on their own right. By examining the finds from previous excavations and their placement in the cairns with the help of geoinformation techniques, results from osteological analyses, and radiocarbon dating, the formation processes and meanings of the materials are reconsidered. The cairns are seen as places of possible multifaceted and long-term use, where presence of a burial does not exclude other kinds of actions. More detailed analysis of fragmented, seemingly valueless materials present in the purposefully laden constructions helps to understand the way Iron Age societies in Finland valued, reused and discarded materials cumulated by everyday life.

6 ROMAN LANDFILLS AS TWOFOLD ECONOMIC INDICATORS: PRESENCE AND ABSENCE OF ARTIFACTS IN AQUILEIA AND POMPEII

Furlan, Guido (UniPd)

Roman dumps are precious proxies of urban activities over potentially long periods. Their full potential, however, cannot be fully exploited without careful consideration of local formation processes, discard strategies, and possible biases.

When all these factors are modelled, waste assemblages can be profitably employed to investigate ancient economic dynamics. In this sense, hermeneutically, they have a twofold value. On the one side, the finds recovered can provide a reliable picture of economic fluctuations, particularly in terms of consumption and imports of ceramic vessels and related products. On the other side, just as significantly, proper consideration of what is missing reveals recycling strategies and circular economies on an urban scale.

These two aspects are investigated through two case studies. The first one is the infill of a suburban canal in Aquileia, employed as a dumping site between the late republican age and the mid/late imperial period. A re-evaluation of formation processes combined with the statistical analysis of the assemblage enabled to date the infrastructure and to investigate consumption and trade patterns through time.

The second case study is a peri-urban dump from Pompeii, which was still in use before the 79 CE eruption. In this case, a comparative approach highlighted the effectiveness of the local system of glass and metal recycling, shedding light on practices of circular economy. Archaeometric analyses have recently confirmed this picture.

7 HOLY WASTE: A MULTI-ANALYTICAL APPROACH TO THE STUDY OF CULTIC DEPOSITS IN THE COPPER MINE OF KROPFSBERG (NORTH TYROL, AUSTRIA)

Cereda, Susanna (Institute of Archaeologies, University of Innsbruck) - Staudt, Markus (Institute of Archaeologies, University of Innsbruck) - Goldenberg, Gert (Institute of Archaeologies, University of Innsbruck) - Tropper, Peter (Institute of Mineralogy and Petrography, University of Innsbruck) - Degenhart, Gerald (Department of Radiology, Medical University Innsbruck)

Kropfsberg, located by Reith im Alpbachtal (North Tyrol, Austria), is a dolomite mound that has been exploited for its copper ores since at least the Early Iron Age. Excavations conducted in 2020 by the University of Innsbruck exposed in detail the stratigraphic sequence of the mine, leading to a surprising discovery: what was thought to be merely a site for mineral extraction revealed a phase of use during the late Roman period with strong ritual connotations. The identified layers are characterised by abundant charcoals, animal bones and hundreds of votive coins, suggesting that the mine may have been used as a Mithraeum for some time.

Through micromorphology, μ XRF and CT analyses of the archaeological sediments, coupled with the precise spatial positioning of the recovered coins, we were able to accurately reconstruct the processes that led to the deposition of these layers and piece together the history of the cultic cave. While some of these remains indicate activities related to ritual burning ceremonies, others suggest the intentional obliteration of the cultic practices by later visitors of the mine. These findings prompt a reflection on how the label “waste” is attributed to materials in various chronological and cultural contexts. What defines waste—what is unwanted, dangerous, or tainted—and for whom?

Moreover, this study highlights the key role of microarchaeological and archaeometric analyses in uncovering variations in significance and value. These methods allow to reconstruct in greater detail the “context”, that is the sedimentary environment in which archaeological artifacts are embedded and ultimately found. Only through the careful analysis of these contextual details can archaeologists seek to comprehend the cultural significance of objects and gain a glimpse into the values of the past.

8 WHERE IS THE WASTE? THE MULTIENVIRONMENTAL STUDY OF THE DISTRIBUTION OF KITCHEN WASTE IN CASTLE ROKŠTEJN, CZECH REPUBLIC

Lisá, Lenka (Institute of Geology, Academy of Sciences of the Czech Republic) - Fišáková Nývltová, Miriam (Masaryk University, Czech Republic) - Kočárová, Romana (Masaryk University, Czech Republic) - Kočár, Petr (West Bohemian University in Pilsen, Czech Republic; Institute of Archaeology, Academy of Sciences of the Czech Republic) - Mazáčková, Jana (Masaryk University, Czech Republic) - Žaža, Petr (Masaryk University, Czech Republic)

The term waste is usually used to unwanted material that is permanently and intentionally thrown away with no further plans for its use. The kitchen waste should consist of the organic and organo-mineral residues from the food preparation and the food consumption. Are we able to track the distribution of the kitchen waste inside the medieval castle? To find an answer for this question a long-term archaeological excavation was done in medieval castle Rokštejn, Czech Republic which lasted between 1289 – 1467 years AD. The excavation area covers the 80 % of the inner castle and includes the space in the surrounding of the castle’s kitchens or bakery. As the castle was constructed in many stages, there was possible to compare two different areas linked to the food production in time and space and compare them with the other types of the waste or occupational surfaces. The methods of osteology, archaeobotany and micromorphology were applied to study archaeological material.

The typical dumping areas were not documented in the inner castle in spite of the fact, that the castle lasted for in minimum 270 years, and we can expect, that in minimum of 15-20 people of the great margravian court lived there permanently. A part of reused kitchen waste was detected in small castle’s garden areas. The bones are always cut, chopped, and crushed into small pieces and usually the hardest parts of the animal body like teeth or horn appear in archaeological record. These sediments are also often rich of charcoal. The micromorphology revealed accumulations of charcoal and eggshells in floor layers. The rest of the kitchen waste was perhaps transported out of the castle, decayed in dump areas together with the animal excrements and later distributed as fertiliser to increase crop yields.

9 TRACING URBAN PRACTICES THROUGH LATRINE WASTE - AN URBAN-ECOLOGICAL PERSPECTIVE ON LIFE IN RENAISSANCE COPENHAGEN

Mayer, Simone (Museum of Copenhagen) - Rosenkvist, Zenon (Museum of Copenhagen) - Dahlström, Hanna (Sydsvensk Arkeologi)

Latrines are common structures found on urban excavations throughout Europe and beyond. Due to lack of economic resources in rescue archaeology, it is rare that their full information potential is met. With our case-study of latrines from Renaissance Copenhagen, Denmark, we wish to draw attention towards the knowledge of past life which may be gained through close contextual and interdisciplinary analyses of latrines and their waste.

Our case stems from a research project focusing on the material manifestations of depositional practices and spatial organization of a backyard in 16th-17th century Copenhagen. With a point of departure in post-humanism and social practice theory defining the city as bundles of practices connected by intentional and unintentional acts; the construction, placement, and filling of latrines reveal narratives of everyday life during the period.

The latrine fills were examined with a combination of archaeological, historical, and scientific analyses looking at animal bones, macrofossils, insects, parasites, and soil micromorphology, allowing the ecology of the local backyard with its plant growth, animal presence and household activities to be traced. The results indicate intention and knowledge behind the deposition of different kinds of waste. Likewise, the emptying of latrines and the recycling of materials was investigated. Waste was not a dead good but had a prolonged and meaningful lifespan being used as landfill, manure or to enhance chemical processes inside the cesspits: The insertion of small amounts of kitchen waste to the latrine fill was intentional and based on knowledge about decomposition processes and sanitation. These examples indicate deliberate strategies adapting to a changing urban environment.

Our studies show that latrines, when investigated in a high-definition manner, hold significant information of urban people’s intentions, strategies, and values in an environment where lack of space and increasing economic interdependence demanded adaptation and resilience on a household level.

10 WASTE MANAGEMENT IN AN EARLY MODERN NORDIC TOWN THROUGH POTTERY RESEARCH

Helamaa, Maija (Muuritutkimus Ltd.; University of Turku)

This paper studies the waste treatment in an early modern (c. 17th–19th C.) urban environment through contextual pottery analysis of a recent large-scale excavation in Turku. When excavating postmedieval urban sites in Finland, pottery sherds can be found almost everywhere. Some ceramics is collected from distinct waste deposits, but majority of the material comes from different types of contexts. Fragments are found in fills and levelling layers, construction, and deconstruction layers, as well as scattered in the courtyards, and so on. Apart from the clear destruction layers and deposits of ritual purpose, for example, urban archaeological pottery is usually discarded although a single sherd may have gone through a complex process to its final resting place.

To understand how all the pottery is found where it is, the waste management of an early modern town needs to be addressed. Waste pits are rare in Finnish postmedieval archaeology and there is both archaeological and written evidence of the waste being transported and soil being moved around. In addition to scarce primary waste deposits, the scattered finds need to be taken account to discover the variety of the material, and to better understand the overall pottery consumption. However, the nature of these different types of discarded ceramics must be considered, for example how representative these secondary or tertiary deposits are, and what levels of information different groups of ceramic waste may provide.

This study is a part of ongoing doctoral research. Pottery in early modern (c. 1650-1830) Turku is studied to understand the everyday life of the people and their relation to the use of ceramics in different occasions and for various purposes. In addition, their attitudes towards broken objects as well as waste in their own area of living is considered.

11 THE CURIOUS CASE OF COLD WAR GARBAGE PITS AT ABANDONED SOVIET TACTICAL NUCLEAR BASES IN POLAND

Kiarszys, Grzegorz (The University of Szczecin)

In February 1967, the construction of three Soviet tactical nuclear bases commenced in North-Western Poland, sanctioned under the clandestine codename Wisła. Construction concluded in December 1969, and facilities were handed over to Soviet troops. Afterwards, the historical record in the Polish archives fell silent for the subsequent 22 years, until October 1990, when withdrawing Soviet troops abandoned the bases.

Throughout the conducted research, diverse non-invasive methods were employed to document remnants of the deserted Soviet nuclear bases. The primary objectives were to create comprehensive plans of the scrutinized facilities and decipher their spatial arrangements. The wealth of collected evidence significantly bridged gaps in archival records, unveiling insights inaccessible through historical documents. However, while the narrative derived from applied remote sensing techniques appeared comprehensive, it was also completely superficial as it lacked an essential

component – the daily lives and experiences of the soldiers and officers inhabiting these secretive compounds, the main ‘actors’ of this ‘drama’.

Throughout subsequent field surveys, numerous small garbage dumps were discovered within all three bases. Their contents posed a puzzle, as some elements seemed incongruous within the broader context. Alongside rugged fragments of Soviet uniforms bearing missile and artillery unit insignias, golden buttons featuring the hammer and sickle, military berets, gas masks, cans, and bottles, peculiar items surfaced: children’s boots, plastic toy remnants, women’s shoes, and other civilian female garments. The origin of these items raised questions – how did they come to be there? Declassified documents from the Wisla files bluntly recommended that all wives and children should reside preferably in larger Soviet garrisons distanced from the nuclear facilities, due to counterintelligence cover and a scarcity of living quarters.

The proposed presentation will discuss how discovering even small and seemingly meaningless artefacts can profoundly alter our interpretation of the entire subject of study.

12 DON'T THROW IT AWAY! MODERN WASTE, DISPOSAL PRACTICES AND A LOT OF PLASTIC

Waldhart, Elisabeth (University of Innsbruck)

There is almost no place where modern rubbish is not part of the upper soil layers. Respectively modern waste is part of many archaeological excavations and investigations, but it is rarely considered a valuable resource for scientific research. On the contrary, it is seen as an environmental problem! Furthermore, the things that are considered rubbish were thrown away for various reasons by the people who owned them at some point and therefore also subject to certain disposal practices. Looking at objects from the last 100 years that are deemed to be garbage raises a problem: Considering these items as “archaeological finds” is limited to the last few decades and mostly to archaeologists of the contemporary era. Accordingly, they are ladled as trash on site and often thrown away a second time instead being taken to the finds-lab.

What all these statements have in common is that the category of waste is imposed on things in social contexts, it is based on rules and practices that relate to the objects. Labelling something as rubbish is a means of establishing and maintaining (social) order. By looking at various case studies from Austria, I would like to sketch out some lines of what waste – as a social category, but also as matter that is entangled with its environment – can tell us about the society that left it behind.

1046 EVOLUTIONARY APPROACHES TO ARCHAEOLOGICAL QUESTIONS: HUMAN BEHAVIORAL ECOLOGY AND CULTURAL TRANSMISSION THEORY

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Yaworsky, Peter (Aarhus University) - Miu, Elena (Aarhus University) - McCool, Weston (University of Utah)

Session format: Regular session

Archaeology is the study of human behavior through its enduring material record. As such, it is important that we develop general understandings of human behavior and how people respond to changes in both the natural and social environments. Advances in archaeological methods and analytical tools have greatly enhanced our ability to describe the archaeological record. However, big data approaches and cutting-edge modeling tools may yield little explanatory power unless coupled with general theory, as atheoretical approaches generally struggle with framing questions, deriving predictions, overcoming issues of equifinality, and making inferences beyond direct analogy. A general theory of human behavior is needed to overcome these persistent issues. Two promising evolutionary approaches to understanding variation in human behavior and the material record are Behavioral Ecology (BE) and Cultural Transmission Theory/Dual Inheritance Theory (CTT/DIT). Both draw on evolutionary concepts to derive and test hypotheses using archaeological data to understand past human behavior, with important implications for the present and future. BE generally explains behavioral variation as adaptive responses to variations in the environment and is agnostic about the mechanisms involved (i.e., genetic, cultural). BE concludes that the behavioral diversity observed in humans is a direct result of the diversity in contemporary socioecological environments. CTT/DIT holds that both genetics, culture, and the natural environment influences human behavior, and that culturally and genetically inherited information are acted upon by evolutionary forces and structure human behavior. BE and CTT/DIT are often juxtaposed, but there is an opportunity to synthesize the two into a pluralistic discipline focused on the evolutionary study of human behavior to overcome the domain specific limitations of both. In this session, we highlight BE and CTT/DIT archaeology research to demonstrate their utility, facilitate discussion, and advance archaeological theory by pursuing their synthezation.

ABSTRACTS

1 EVOLUTIONARY APPROACHES TO ARCHAEOLOGICAL QUESTIONS AND THE IMPORTANCE OF THEORY-DRIVEN RESEARCH

Yaworsky, Peter (Aarhus University; University of Copenhagen) - Miu, Elena (Aarhus University) - McCool, Weston (University of Utah)

While anthropologists study human behavior through direct observation, archaeologists are limited to observations of the material consequences of behaviors, thus creating a disconnect between archaeological data and the goal of archaeological research - understanding variation in human behavior. To overcome this limitation, archaeologists use proxies to estimate the types of circumstances people lived in and correlate these proxies with variation in the archaeological record. Strict correlation studies in archaeology are plagued by two significant issues. With the advancement of analytical methods and refinement of data, archaeology has become a big data scientific pursuit, however, without a general theory of human behavior, archaeologists are ill-equipped for discerning causes from correlation and equifinality. Both of these issues can be mitigated with the use of theories, like Cultural Transmission Theory (CTT) and Behavioral Ecology (BE). However, alone, the domain-specific interests of these theories limit their application to a narrow band of explanation. CTT holds that genetics, culture, and the natural environment influence human behavior, and that both culturally and genetically inherited information is acted upon by evolutionary forces and structures human behavior. BE generally explains behavioral variation as adaptive responses to variation in the environment and is agnostic about the mechanisms involved (i.e., genetic, cultural). BE concludes that the behavioral diversity observed in humans is a direct result of the diversity in contemporary socioecological environments. BE and CTT are often juxtaposed, but there is an opportunity to synthesize the two into a pluralistic discipline focused on the evolutionary study of human behavior. Here, we discuss our vision of the complementarity between CTT and BE to facilitate discussion and advance archaeological theory by pursuing their synthezation.

2 USING EVOLUTIONARY THEORY TO UNDERSTAND DIETARY CHANGES IN THE MIDDLE AND UPPER PALEOLITHIC AT HOHLE FELS (SWABIAN JURA, GERMANY)

Starkovich, Britt (SHEP Tübingen) - Münzel, Susanne (University of Tübingen) - Blanco-Lapaz, Angel (SHEP Tübingen) - Conard, Nicholas (University of Tübingen)

Hohle Fels, in the Swabian Jura of Southern Germany, preserves an unparalleled record of Middle and Upper Paleolithic behavior. In over a century of excavations, archaeologists have uncovered large numbers of faunal and lithic remains, as well as some of the oldest Paleolithic figurines, musical instruments, and personal ornaments that date to the Aurignacian. Detailed excavations have also yielded ample microfaunal remains, which have allowed analysts to reconstruct environmental conditions when the site was occupied by Neanderthal and modern human populations. In this paper, we examine hominin subsistence strategies at Hohle Fels diachronically, from the Middle Paleolithic through Magdalenian, drawing on models from human behavioral ecology to do so. We will examine changes in prey choice; animals available in the ecosystem included megafauna (woolly mammoth and rhinoceros), ungulates (reindeer, wild horse, ibex, chamois, red deer, roe deer, and wild pig), small game (hares, birds, and fish), and occasional carnivores (cave bear, cave lion, cave hyena, fox, lynx, and wild cat). We will interpret the data within the context of local paleoenvironmental records, in order to determine if prey choice was more closely linked with environmental conditions, hominin demography, or changing technological solutions. Given the extensive evidence for symbolic expression in the Upper Paleolithic layers of the site, we will also address the explanatory power of Cultural Transmission Theory to help us interpret the faunal record at Hohle Fels.

3 STATISTICAL SIGNALS OF COPYING ARE ROBUST TO TIME- AND SPACE-AVERAGING

Youngblood, Mason (Institute for Advanced Computational Science, Stony Brook University) - Miton, Helena (Stanford University) - Morin, Olivier (Institut Jean Nicod)

Cattle brands (ownership marks left on animals) are subject to forces influencing other graphic codes: the copying of constituent parts, pressure for distinctiveness and pressure for complexity. The historical record of cattle brands in some US states is complete owing to legal registration, providing a unique opportunity to assess how sampling processes leading to time- and space-averaging influence our ability to make inferences from limited datasets in fields like archaeology. In this preregistered study, we used a dataset of ~81,000 Kansas cattle brands (1990–2016) to explore two aspects: (1) the relative influence of copying, pressure for distinctiveness and pressure for complexity on the creation and diffusion of brand components; and (2) the effects of time- and space-averaging on statistical signals. By conducting generative inference with an agent-based model, we found that the patterns in our data are consistent with copying and pressure for intermediate complexity. In addition, by comparing mixed and structured datasets, we found that these statistical signals of copying are robust to, and possibly boosted by, time- and space-averaging.

4 LEVERAGING GENE-CULTURE COPHYLOGENETICS AND THE COMPARATIVE METHOD TO ARTICULATE CULTURAL TRANSMISSION THEORY AND BEHAVIOURAL ECOLOGY

Riede, Felix (Department of Archaeology and Heritage Studies Aarhus University)

I assert that the foundational premises of both Cultural Transmission Theory (CET) and Behavioural Ecology (BE) are correct per se yet each is challenged, in different ways, by the low granularity and large temporal scales of the archaeological record. By usually not accounting explicitly for the historical relatedness of the units under study nor the genetic outcomes of the behaviours in question, BE studies run the risk of statistical invalidity and of telling just-so-stories that assume rather than demonstrate adaptation. In contrast, studies that focus exclusively on cultural transmission dynamics often fail to convincingly explain why the inferred behaviours change over time, ultimately offering similarly unsatisfying accounts. Noting that phylogenetics appears to have waned somewhat in popularity among archaeologists, I here suggest that an expanded and ambitious three-step phylogenetic methodology may in fact offer a rejoinder of CET and BE. In this approach, artefacts, their shapes, and traits are used to infer explicit quantitative hypotheses of historical relatedness among the units in questions. The objects targeted must be sampled in close contextual association (e.g. same grave, same site) with palaeogenetic data such that cophylogenies tracking cultural and biological transmission in parallel may be constructed. Once these are in place, data reflecting the behaviours of the sampled individuals can be added and their statistical association across spatial, climatic, or environmental variables be tested. In doing so, the underlying phylogenetic structure can be used to account for historical relatedness and hence for infamous Galton's Problem. The approach sketched out here is empirically and analytically demanding but is, thanks to recent developments across relevant fields, within reach.

5 MODELING ADVERSITY AND INNOVATION IN THE ARCHAEOLOGICAL RECORD

Herzog, Nicole (University of Denver) - Demps, Kathryn (Boise State University)

Thinking is costly. Nonetheless, humans develop novel solutions to problems and share that knowledge prosocially. We propose that adversity, not prosperity, created a dependence on innovation in our ancestors who were forced through a fitness valley to develop new behaviors and life history characteristics. Using predictions derived from optimal foraging theory, we outline an evolutionary scenario in which a species pushed to the edge is required to develop a new skill-set to survive. We suggest that a fulcrum point in human history hinged on our response to an increasingly variable climate and the spread of open, arid habitats in the Pleistocene. Unable to reduce search costs, our ancestors would have resorted to reducing handling costs to increase foraging returns. At this time individuals must have adopted a new diet, perhaps dominated by underground storage organs. We hypothesize that this shift to higher quality, extractive, and variable food sources led to additional challenges and changes for our lineage, requiring a dependence on exchange, learning, and cooperation.

6 THE NETWORK ECOLOGY OF SETTLEMENT PERSISTENCE

Vernon, Kenneth (University of Colorado) - Ortman, Scott (University of Colorado)

Recent studies of persistence in ancient populations are concerned with the persistence of states and paradigmatic urban concentrations like towns and cities. This ignores settlement persistence at scales that preceded those larger concentrations and, importantly, lacked the highly centralized institutions that could impose meaningful constraints on individual behavior. To fill this lacuna, we draw on ideas and methods from the growing field of network ecology – basically, network science plus population ecology – to evaluate the degree to which social and environmental factors contribute to the persistence of human settlements. Specifically, we focus on dispersed settlements within small-scale agricultural systems that evolved over several hundred years in three regions of the US Southwest: the central Mesa Verde region of southwest Colorado, the northern Rio Grande in New Mexico, and the Zuni or Cibola region on the border between Arizona and New Mexico. Social interaction is measured using weighted network centrality scores derived from commute time estimates between settlements. Environmental data are provided by the Synthesizing Knowledge of Past Environments (SKOPE) project and include climate variables relevant to maize farming, notably temperature and precipitation. To model longevity, we use a Bayesian discrete time proportional hazards model fit with Integrated Nested Laplace Approximation (INLA). By integrating a spatio-temporal covariance structure into this model, we should be able to investigate the contribution made by information exchange – broadly construed – to settlement longevity, all while controlling for the socio-ecological context.

7 'CONCEPTS' IN DYNAMIC ASSEMBLAGES: AN INTEGRATIVE EVOLUTIONARY FRAMEWORK AND ITS APPLICATION TO ARCHAEOLOGICAL QUESTIONS

French, Jennifer (University of Liverpool) - Kissel, Marc (Appalachian State University) - Khaksar, Somaye (Appalachian State University) - Fuentes, Agustín (Princeton University)

Humans are biocultural beings (Fuentes 2023). Both the cultural and biological are central to understanding human behaviour, and crucially, should not be separated within theoretical evolutionary frameworks. In this presentation, we outline a developing body of theory for an integrative approach to cultural evolution deriving from a multi-national interdisciplinary working group of anthropologists, archaeologists and philosophers. This theory is centered on the role of 'concepts' (defined as a suite of articulated and co-ordinated thoughts, ideas, and symbols that structure relationships between individuals and between individuals and their environment) in processes of cultural transmission and change; a role driven by the engagement between 'concepts' and a 'dynamic assemblage' of multiple forces (biology, material objects, environmental and social factors) that afford and constrain biocultural evolutionary trajectories. We consider how this framework relates to, and complements, the evolutionary theories dominant within archaeological research (Behavioural Ecology and Dual Inheritance Theory) and highlight some of the ongoing challenges in identifying both the relevant cultural 'concepts' and the associated 'dynamic assemblage' in archaeological contexts.

References:

Fuentes, A. (2023). Humans are biocultural, science should be too. *Science*, 382(6672), ead11517.

8 SOCIO-ENVIRONMENTAL DRIVERS OF PEACE OVER 7,000 YEARS OF ANDEAN DEEP HISTORY: IMPLICATIONS FOR BEHAVIORAL ECOLOGY AND CULTURAL TRANSMISSION THEORIES

McCool, Weston (Department of Anthropology, University of Utah; Society, Water, and Climate Research Group, University of Utah) - Wilson, Kurt (Department of Geography, University of Utah) - Codding, Brian (Department of Anthropology, University of Utah)

As modern anthropogenic climate change threatens to destabilize global societies and ecosystems, studies are needed to anticipate likely human responses. A key global initiative and United Nations Sustainable Development Goal (SDG) is the promotion of peaceful interactions and institutions within an ever changing climate. Archaeology can aid in this pursuit by evaluating dynamic relationships between long-term socio-environmental conditions and peaceful interactions. Nonetheless, studies that theorize what conditions should promote peace and systematically quantify and evaluate driving forces are limited, and research focuses on the last few centuries when climatic conditions were relatively stable. Here, we couple behavioral ecological theory and machine learning models with a cross-regional dataset tracking levels of peace and violence over 7,000 years of Central Andes history to investigate the relative effects of changing climatological, demographic, and socio-political conditions on the degree and duration of peace. We present modeled results and discuss their implications for debates on behavioral ecological and cultural transmission theories of human peace and violence.

9 CONVERGENCE: A LINK BETWEEN BEHAVIOURAL ECOLOGY AND CULTURAL TRANSMISSION THEORY

Rivers, Ray (Imperial College London) - Diachenko, Aleksandr (National Academy of Sciences of Ukraine, Institute of Archaeology, Kyiv) - Sobkowiak-Tabaka, Iwona (Adam Mickiewicz University in Poznań, Faculty of Archaeology,)

The evolution of similar cultural traits can proceed in alternative ways: "homology" and "convergence. Homology presumes a common "ancestor" in traits. Convergence allows for the evolving of artefacts that are similar in form and/or function, but not related to a common "ancestor". While convergence and cultural or demic diffusion alone are rare, growing empirical evidence for convergent evolution permits new theoretical and methodological applications to its analysis which provide important lessons for understanding human behavioural patterns.

As a step towards the synthesis of behavioural ecology and cultural transmission theory, our paper discusses convergence as providing a link between these two theories. We propose quantitative measures that help to understand connectivity and selection reducing variability to variation in long-term cultural trajectories. We begin with a simple example of artificially created and developed technologies, and then extend our approach [1] to a wider set of socio-cultural behavioural patterns evolving at different spatial and chronological scales.

[1] Diachenko A, Rivers RJ, Sobkowiak-Tabaka I, 2023, Convergent evolution of prehistoric technologies: the entropy and diversity of limited solutions, *Journal of Archaeological Method and Theory*, Vol:30, ISSN:1072-5369, Pages:1168-1199 <https://doi.org/10.1007/s10816-023-09623-8> <https://doi.org/10.1007/s10816-023-09623-8>

10 ECOLOGICAL AND CULTURAL TRANSMISSION PROCESSES IN LITHIC TECHNOLOGICAL EVOLUTION

Prentiss, Anna (University of Montana) - Walsh, Matthew (National Museum of Denmark) - Denis, Megan (University of Montana) - Foor, Thomas (University of Montana)

Models derived from Behavioral Ecology provide insight into the economic logic behind a wide range of human behaviors. Technological decisions are of interest to archaeologists where investment in lithic reduction and use strategies has received substantial attention. While simple cost-benefit models explain immediate economic contingencies, many scholars point to the likely impact of more complex cultural transmission scenarios. Boyd and Richerson argue that Nomic groups of the North American Great Basin had advantage against neighboring groups given their unique technological repertoire but also their gendered labor and reproduction strategies. Rosenberg is even more explicit suggesting that any form of cultural evolution will be the result of a complex system of hierarchical interrelationships between evolving genealogical and ecological entities. In this paper, we ask if technological evolution is driven singularly by behavioral flexibility associated with ecological conditions or if more complex cultural transmission processes played a more significant role. To accomplish this, we engage in phylogenetic modeling using a data set of 159 lithic assemblages deriving from archaeological sites spanning the Middle Upper Paleolithic of Siberia to the Late Holocene of Northwestern North America. Outcomes of the study provides insights into interaction between economic decision-making and the cultural transmission process.

11 FROM MIND TO MATTER: PATTERNS OF INNOVATION IN THE ARCHAEOLOGICAL RECORD AND THE ECOLOGY OF SOCIAL LEARNING

Demps, Kathryn (Boise State University) - Herzog, Nicole (Denver University) - Clark, Matt (Imperial College London)

We use the case study of the adoption of the bow and arrow in the Great Basin to infer how patterns of cultural variation, invention, and innovation affect investment in new technologies over time and the conditions under which we could predict cultural innovation to occur. Using an agent-based simulation to investigate the conditions that manifest in the innovation of technology, we find the following: (1) increasing ecological variation results in a greater reliance on individual learning, even when this decreases average fitness due to the costs of learning; (2) decreasing population size increases variability in the types of learning strategies that individuals use; among smaller populations drift-like processes may contribute to randomization in interpopulation cultural diffusion; (3) increasing the mutation rate affects the variability in learning patterns at different rates of environmental variation; and (4) increasing selection pressure increases the reliance on social learning. We encourage others to use our open-source R code to test their own hypotheses and discuss with us: <https://github.com/matthewclark1223/MindToMatter>

12 TESTING HYPOTHESES OF CULTURAL HITCH-HIKING IN PREHISTORY

Shennan, Stephen (University College London) - Kolar, Jan (University College London) - Lee, Victor Yan Kin (University of Copenhagen) - Racimo, Fernando (University of Copenhagen) - Staniuk, Robert (University College London) - Thomas, Mark G. (University College London) - Timpson, Adrian (University College London)

Many if not most of the cultural traits that archaeologists describe and record have no obvious biological selective value but may simply be neutral, in that their changing frequencies are governed by random sampling processes in cultural transmission together with occasional innovations. Testing hypotheses of neutrality versus alternatives, such as copying the locally most common, most prestigious, or most functionally successful variants of any given cultural feature may be relatively straightforward in cases where the underlying population is in equilibrium. However, as we now know, local populations fluctuated in size and often received inputs from neighbouring regions. In this paper we will use available data from Western Eurasia on demographic patterns and ancient gene flow to evaluate the extent to which cultural trait frequencies simply hitch-hiked on underlying demographic processes. To do so we will use data being collected by the ERC-funded COREX project, linked together in the BIAD archaeological database and connected to ancient DNA data.

13 COMPETING OR COMPLEMENTARY? THE ROLE OF EVOLUTIONARY ECOLOGY AND CULTURAL TRANSMISSION THEORY IN EXPLAINING TECHNOLOGICAL COMPLEXITY

Codding, Brian (University of Utah) - Brewer, Simon (University of Utah)

Evolutionary ecology and cultural transmission theory offer different perspectives to assess patterning in material culture complexity. Sometimes these theories offer competing hypotheses, such as the causal pathways linking demography and technological innovation. Other times they operate at different levels of explanation that may be complementary, such as examining the adaptive function vs cultural phylogeny of specific technologies. Here we examine both the competing and complementary roles of evolutionary ecology and cultural transmission theory in

accounting for variation in technological complexity. First we assess model expectations from each framework using cross-cultural data on forager and farmer societies across western North America. We then leverage these results to help evaluate the possible drivers of technological change in the archaeological record across foraging and farming populations in western North America and western Europe. The results help explain patterning in material culture complexity across past human societies and provide an opportunity to advance a comprehensive framework for understanding technological change.

1048 ANTIQUES, HEIRLOOMS, AND MEMORABILIA: THE RELATIONSHIP BETWEEN PORTABLE OBJECTS AND MEMORY IN THE ANCIENT WORLD

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Ward, Courtney (independent scholar) - Barrero Martin, Nova (National Museum of Roman Art, Mérida)

Session format: Regular session

Portable objects and small finds constitute a large and important body of evidence from the ancient world. While portable personal possessions could be retained over significant periods for economic reasons, this explanation does not address all instances. By their nature, these smaller objects could easily change hands (e.g., sold to new owners or passed down from one family member to another). The focus of this session is on the meeting of material and memory. In particular, it will look at the identification and interpretation of valued personal possessions (e.g., adornment, tableware, souvenirs) – that is objects that were worn, used, and above all, retained due to their connection with specific individuals or events.

Antiques, heirlooms, and memorabilia were all tied to memories – of earlier periods, past owners, or particular events. They were valued, respectively, for their age or the fame of their maker, for the connection to the people from whom they were received, and for their association with specific places or events. The session seeks papers focused on how these objects can be identified in the archaeological record (wear patterns, signs of repair, anachronistic styles, specific motifs, etc.), what this can tell us about their role in linking different generations or specific communities, and the value that material culture held beyond economics.

Potential topics include:

What do we know about the market for memorabilia and souvenirs in the ancient world and how it relates to ideas of memory?

What do literary and epigraphic sources reveal about the passing of objects between individuals and the importance of personal connections?

While some objects were made explicitly for the purpose (e.g., the fourth/fifth-century AD Sevso plate), how did other objects become heirlooms?

How can we address the changing meaning of objects as they changed hands?

ABSTRACTS

1 PORTABLE MONUMENTA: OBJECT BIOGRAPHIES AND COLLECTING PRACTICES IN ROMAN IMPERIAL TIMES

Colzani, Giovanni (Università degli Studi di Milano)

Greek and Roman authors offer several anecdotes about heirlooms and revered artifacts, eagerly pursued by collectors and highly valued in the marketplace for their association with prominent figures from ancient history: from Philip II's silver service (Iuv. 12, 46-47) to the diamond gifted by Agrippa II to the princess Berenice (Iuv. 6, 156-158), including seemingly humbler objects such as Epictetus's terracotta lamp and Peregrinus Proteus' staff (Luc. Adv. Ind., 13). Caracalla boasted of possessing the weapons of Alexander the Great (Cass. Dio. 77, 7), while Zenobia, in a similar form of imitatio, displayed at her banquets the golden vessels once belonging to Cleopatra (Hist. Aug., Treb., 24, 30, 19). Caligula put up for sale several jewels from the imperial treasury, insisting that they be valued higher due to their previous ownership by Germanicus, Agrippina, Mark Antony, and Augustus (Suet. Cal. 39), while the connoisseur Novius Vindex proudly showcased in his collection a bronze statuette that had passed into the hands of Alexander the Great, Hannibal and Sulla (Stat. Silv. 4, 6, 45; Mart. 9, 43-44). Regardless of the merits of such claims, the insistence on this 'associative value' underscores the cultural role attributed to these objects, imbued with symbolic significance and the capacity to serve as 'portable monuments' (monumenta) of a particular era, its major personalities, and its ideology. Their status is not related simply (or at all!) to the artistic excellence or the skill of their makers, but rather to the fame of their former owners and patrons, capable of bestowing upon them an enhanced dignitas. The

construction of elaborate biographies and distinguished pedigrees thus becomes a recurring theme in the description of these memorabilia, sometimes attracting the irony of the most disenchanting observers (Mart. 8, 6).

2 MIRROR MIRROR: REFLECTING ELITE LEGACY IN ANCIENT POMPEIAN HOUSES

Murphy, Mamie (John Cabot University)

This study analyzes the four precious mirror-like obsidian panels embedded into the peristyle and atrium walls of the House of the Golden Cupids, the House of the Fruit Orchard, and the House of the Ephebe in ancient Roman Pompeii (1st century CE). While these obsidian mirrors were undoubtedly prized for their rarity and economic value, this study proposes a greater purpose behind their purchase and retention: the obsidian mirrors were intended to leave lasting impressions on guests during the *cena*—a ritual deeply intertwined with bolstering the host's social status. The obsidian mirrors achieve this through obsidian's ability to foster a liminal environment that directly inserts viewers into the decorative programs of their houses to entertain and impress their owners' guests.

Therefore, this paper examines the obsidian mirrors as treasured heirlooms intimately linked to the personal identities of the mirrors' owners and their families, as well as to the event of the *cena*. This will be realized through an investigation of the obsidian mirrors' production and importation process, potential post-earthquake refurbishment (62 CE), and their integral role as active agents within their owners' highly individualized domestic decorative programs.

Given the obsidian mirrors' physical connection to their respective houses and key role in facilitating their residences' immersive entertainment system—both of which were inextricably intertwined with the family who owned the house—this paper suggests the obsidian mirrors' owners likely treasured the mirrors as prized belongings to be cared for by the generations of family members occupying these houses. Ergo, the obsidian mirrors embody the convergence of materiality and memory, serving not merely as symbols of luxury but also as enduring emblems of personal legacy.

3 PORTABLE SHRINES IN THE ANCIENT WORLD: BETWEEN MEMORABILIA AND PRIVATE CULT. THE CASE OF THE VALLE PONTI MINIATURE LEAD TEMPLES

Regueiro Salcedo, Ian (University of Ferrara)

The six lead miniature temples found inside the shipwreck of Valle Ponti, located at Comacchio (province of Ferrara, Italy) and dated to the last quarter of the first century BC, have often been interpreted as a unicum in the Roman world. Some authors have seen in them an archaeological evocation of the Ephesian silver shrines mentioned in the Act of the Apostles: A silversmith called Demetrius and other artisans were engaged in crafting miniature silver versions of the Ephesian temple to Artemis for sale to visitors. The temples from Comacchio, indeed, have until now been interpreted as simulacra of real standing temples, and their presence in the shipwreck limited to economic reasons, being considered part of the selling cargo. The main objective of this study is the contextualization of these miniature portable shrines within the ancient world. Through the written sources and the iconographic and archaeological comparisons with similar miniatures new interpretative perspectives have been opened on the reasons behind the production of the lead temples, their use and the scope for which they may have been crafted. Some symbolic elements and the deities represented in the Valle Ponti temples seem to provide important clues about the ritual and religiosity on the wreck. At the same time, other portable lead shrines with similar functional elements found along the Roman provinces could talk about a class of dynamic objects within the private sphere, related to mobility and used for multiple purposes. From funerary to military contexts, the so-called Portable Shrines could offer new perspectives on the relation between individuals and miniature objects.

4 TRADITION MEETS CONVENIENCE: CULT INSTRUMENTS AS MEMORABILIA

Zepernick, Marte (Philipps-Universität Marburg)

Cult instruments played an active part in ancient cult practice. However, their role as significant objects per se — intertwined in traditions marked by religious habits as well as various people interacting with such objects across generations — has rarely been explored. Concerning ancient Greek cult instruments, literary sources reveal that such objects could be of personal value. For instance, Achilles' libation before Patroclus rejoins the battle against the Trojans in the Iliad is framed by highlighting the libation cup's divine origin, as a precious, well-stored present given by Achilles' mother. Also, deposition practices underline that cult instruments were embedded in Greek memory culture, as dedicated testimonies of former cult practice. But, in how far did this relationship between religious objects and different members of the cult community vary and relate to the past? The paper explores ancient Greek cult instruments as memorabilia with a focus on literary and epigraphic evidence. It analyses the connotation attached to cult instruments as agents in Greek cult bridging generations, by addressing their double role as necessary tools for rituals and relicts. Thus, it contributes to connecting the materiality of religion and memory culture.

5 THE MEMORY OBJECT CONNECTIONS AND TRANSMISSIBILITY OF IMAGINES MAIORUM

McCahill, Mark (Independent scholar)

This paper will provide a rationale for considering more substantial sculptural veristic images as *imagines maiorum* (embodied ancestors), rather than the limiting ancient variant of an ancestor mask rendered in wax: it is not extant as a primary source, except second-hand through ancient writers attesting to existence and their significance as memory objects.

This extension of scope supports a switch away from the limited nature of the frangible contemporaneous objects missing from the archaeological record, whilst providing suitable provenance through that extant written primary source material that also utilises *ἐνάργεια* (an ancient Greek term meaning vividness) to help pictorialize sculptural ancestral images and their transmissibility as historical exemplars.

Memorialisation and ancestral legacy imagery in, for example, the frieze depictions from the Ara Pacis Augustae (Altar of Augustan Peace), challenge the privileging of the wax mask variant and emphasise more substantive forms — like reliefs and marble busts — as better narrators of family inheritance and memory, confirming an enduring legacy across a longer timeframe than frangible ancestor masks.

As a specific monument, the Ara Pacis would then allow the expanding imperial family to exploit the built environment narrative using this monument and others — like the Forum Augustae and its aetiological layout of prominent ancestors and their exemplary *romanitas* (Roman-ness) and *virtus* (virtue) — as they used these enduring sculptural objects to link generations via emulation, memory generation, and exemplary Roman representation.

6 A LITERARY PERSPECTIVE ON PORTABLE OBJECTS: THE CULTURAL CACHET OF SPOILS, SOUVENIRS, AND HEIRLOOMS IN LATE REPUBLICAN ROME

Baarda, Tom (University of Cambridge)

The 'value' of objects in late republican Rome went far beyond simple economics, and instead was a central part of the 'economics of status' (Jehne 2016) contested as much in the dining room as in the senate house. Portable objects were tangible expressions of the cultural capital derived from the different networks that bestowed power: aristocratic dynasties (heirlooms) and the expanding empire (spoils and imports). Catullus, who wrote poetry in Rome in the mid-50s BC, has long been seen as an important source for the 'language of social performance' (Krostenko 2001) by which elite behaviour was evaluated. He was also a junior officer in the retinue of a provincial governor, and his poems are full of objects passed between him and his friends. In Poems 12 and 25, the theft of a napkin reveals the different sources of the object's value: explicitly not its economic worth (*aestimatio*), but its role in facilitating the social exchange of the elite dinner party (*convivium*). In particular, this 'memento' embodies Catullus' relationship with the absent friend who sent it: we see an explicit thematization of the role of the 'souvenir' (*mnemosynum*) in creating memory. The napkin's association with its origin in Saetabis, Spain (a centre of textile manufacture) reveals the cultural cachet that Romans attached to imperial provenance ('cargo chic'). We also see the changing meaning of the napkin in the hands of its owner (Catullus) and the thieves with different social status, through an interaction with another category of object with a particular social capital: heirlooms (*avita*). The interaction of two distinct categories of portable object currently provoking scholarly interest — souvenirs (Cassibry 2021; Popkin 2022) and spoils (Helm and Roselaar 2023; de Jong and Versluys 2024) — are revealed through this literary perspective from the particular 'imperial moment' of late republican Rome.

7 REPAIR PRACTICES AS A MEMORY STRATEGY IN ANCIENT GREECE?

Lindenlauf, Astrid (Bryn Mawr College)

Objects fall apart and break at different rates, but they tend to reach their use life eventually. When this happens, they get thrown away, moved into special storage spaces, or repaired. This paper focuses on repair jobs carried out in ancient Greece to determine under which circumstances artifacts were considered worth repairing. It also investigates changes in affordances, functionalities, and uses of repaired artifacts. Greek repair practices tend to be explained in terms of economic necessities, but this functionalist approach disregards the personal experiences that tie people to their artifacts. I suggest that the willingness to spend time, material or money on extensive repair jobs that do not restore an item's full working condition may be indicative of an emotional attachment to the restored object, transforming it to a memento. To gain a better understanding of this phenomenon in ancient Greece, sympotic pottery associated with the prestigious social institution of the symposium is compared and contrasted with cooking ware with respect to the frequencies of repair, the scale and execution of repair, and the change in function and meaning of vessels.

HOARDING HEIRLOOMS

Davis, Mary (National Museums Scotland) - Goldberg, Martin (National Museums Scotland)

The 'Viking-age' Galloway Hoard from south-west Scotland contains Hiberno-Scandinavian material which in many ways epitomises the bullion nature of such hoards in the Irish Sea zone around AD 900. However, buried alongside silver arm rings and ingots was an elaborate silver gilt lidded vessel packed full of objects of a very different character. Many of these were several hundred years old, made of glass, stone and even dirt. Some were wrapped in textiles and placed together with other personal valuables such as contemporary brooches, gold mounts, silk braids and an unusual rock crystal jar – with the name of a Northumbrian bishop inscribed in gold on its base. A number of these objects were probably of religious value and significance, while others might have represented objects passed down through family lines. Several items are most closely paralleled in Merovingian and pagan Anglo Saxon female graves, introducing aspects relevant to the female guardianship and inheritance of material culture in the early Medieval period.

This collection of jewellery, amulets, relics and heirlooms presents a unique opportunity to look at different 'values' through distant connections in terms of both time and place and consider the juxtaposition of culturally distinct materials connected through burial together in a complex hoard.

1049 TIL DEATH DO US PART. REVISITING THE QUESTION OF DOUBLE BURIALS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Büster, Lindsey (University of York; Canterbury Christ Church University) - Knüsel, Christopher (UMR 5199, PACEA, Université de Bordeaux)

Session format: Regular session

Double burials (co-buried individuals in the same grave feature) are well attested in the archaeological record and have been interpreted in numerous ways: the 'mother and child' from Mesolithic Vedbæk (Denmark), the 'murdered' Mesolithic 'Ladies of Téviec' (Brittany, France), or the inferred social acceptance of the early medieval 'same-sex couple' buried in Grave 96, at Buckland (Dover, Kent, UK). While archaeologists have recognised the inherent ethno-centric and androcentric biases they bring to interpretations of the burial record and have embraced new theoretical frameworks for understanding personhood and identity, this seems not to have been extended frequently or uniformly to co-burials.

Recent methodological advances, such as genome-wide analysis of ancient DNA and the increased application of archaeoethanatomical principles, are beginning to shed light on the diverse composition of such burials, even in cases where mortuary tableaux superficially suggest rapid and 'conventional' deposition. Examination by the COMMIOS Project (<https://commiosarchaeology.com/>) of the co-burial of a 24-year-old man and his >45-year-old daughter at the Iron Age site of Wattle Syke (West Yorkshire, UK) highlights the complex and protracted nature of engagements with the dead which might have been otherwise overlooked. Even in the absence of aDNA analysis, a combined historical and bioarchaeological study of the 'St. Bees Lady', a female buried next to the exceptionally well-preserved late medieval 'Saint Bees Man', suggests a brother and his sister.

This session invites papers which apply new and current techniques, methodologies and frameworks to co-buried individuals, to shed light on complex kinship systems, protracted death rituals and, at times, simultaneous deaths. Papers considering burials of more than two individuals, including internal relationships in mass and collective graves, are also encouraged.

ABSTRACTS

1 ANCIENT GENOMES OF ÇATALHÖYÜK REVEAL DIACHRONIC CHANGES IN FUNERARY PRACTICES AND HOUSE USE

Yüncü, Eren (Middle East Technical University) - Küçükakdağ Doğu, Ayça (Middle East Technical University) - Kaptan, Damla (Middle East Technical University) - Mazzucato, Camilla (University of Copenhagen) - Pearson, Jessica (University of Liverpool) - Güler, Merve Nur (Middle East Technical University) - Eker, Elifnaz (Middle East Technical University) - 2014-2017, Çatalhöyük Human Remains Team (University of Bordeaux) - 2014-2017, Çatalhöyük Excavation Team (University of Stanford) - Ancient DNA Team, METU/Hacettepe (Middle East Technical University)

This investigation documents and interprets population structure and the long-standing question of intramural biological relatedness at Neolithic Çatalhöyük, Turkey (7100-5950 BCE) using an archaeogenomic dataset of 132 individuals spanning the Early (7100-6700 BCE), Middle (6700-6500 BCE) and Late (6500-6300 BCE) periods. Our results reveal that through its occupation the village gene pool did not change significantly. We also do not detect the presence of any individuals with significantly different genetic backgrounds, suggesting limited, if any, immigration

into the site from distant regions (e.g. the Levant, Zagros, or the Aegean). We next investigated genetic kinship among intramural burials in 23 buildings on an archaeogenomic sample 3/4 comprised of subadults. During the Early-level occupation, we find that individuals were often buried in the same building with at least one close relative, a pattern similar to that previously reported for Pre-Pottery Neolithic sites in Anatolia. The frequency of close genetic kinship among such co-burials declined in Middle-level buildings, with children from multiple biological families being buried in the same house. The frequency of co-burial genetic kinship decreased even further in the Late period-level buildings. A Monte Carlo simulation test shows that these temporal changes cannot be attributed to differences in sample sizes or bias in genetic sampling. We discuss possible explanations for the apparent change in the frequencies of close genetic relatedness among individuals across the occupation of Çatalhöyük.

2 CO-BURIAL IN NEOLITHIC ANATOLIA: AN EXPLORATION OF MEANING AND PURPOSE

Pilloud, Marin (University of Nevada, Reno)

The Neolithic archaeological sites of Central Anatolia are well-known for their intramural burials. In the case of Çatalhöyük, individuals were buried at the same time, whereas, in other instances, the same burial location was visited multiple times to inter additional individuals. The meaning of this co-burial has been variably interpreted to be indicative of co-habitating biological kin or as collectives of 'practical kin'; however, no clear patterns have emerged to definitively answer why individuals were interred together and others were not. Similar practices of intramural burial are found in other Anatolian Neolithic sites. This paper serves to re-evaluate the meaning of this mortuary practice through emerging methods exploring biological distance analysis.

Dental morphometric data were explored from several Neolithic Anatolian sites that span the early aceramic to the later Pottery Neolithic (Boncuklu, Aşıklı Höyük, Çatalhöyük, and Barcın Höyük). To understand social structure, biological relationships within interments were explored. The data reveal that biological relationships were more frequent between individuals buried within the same building early in the Neolithic, but, over time, such relationships appear to become less important, as the number of biologically related co-burials decreases. Variation in phenotypic data between sites and males and females was explored to understand migration patterns. This research highlights the role of emerging technologies in understanding complex mortuary behavior and the varied ways in which co-burials can be interpreted.

3 ANCIENT DNA IN CO-BURIED REMAINS FROM THE NEOLITHIC AND ENEOLITHIC NORTH PONTIC REGION SHEDS LIGHT ON ANCIENT BURIAL PRACTICES

Svyryd, Sofiia (Grand Valley State University) - Nikitin, Alexey (Grand Valley State University)

Ancient DNA studies have revealed a complex pattern of relationships among individuals interred in the same grave across ancient Europe. This presentation will discuss burial connections in the prehistoric steppe and forest-steppe north of the Black Sea (the North Pontic Region). In the Neolithic period (6200-5000 BCE) in the North Pontic steppe, we observe first- and second-degree relatives variously distributed within collective graves and in single burials at Mariupol type cemeteries of the Neolithic hunter-fishers in southeast Ukraine situated along the Dnipro Valley. Conversely, at a collective burial site of Trypillia archaeological culture complex in the North Pontic forest-steppe dating to the Eneolithic period (5000-3300 BCE), no detectable kinship is observed among the remains. In the Eneolithic steppe, relationships vary from no detectable relatedness to first-degree kinship among co-buried individuals of various steppe archaeological groups. At the same time, second-degree kinship has been identified in contemporaneous steppe burials situated two thousand kilometers apart.

4 MIXED FUNERARY PRACTICES AND CREATIVE RELATIONS WITH THE DEAD: BELL-BEAKER CO-BURIALS FROM NOGAROLE ROCCA (VERONA), ITALY

Thompson, Jess (University of Cambridge) - Salzani, Paola (Soprintendenza Archeologia, Belle Arti e Paesaggio di Verona, Rovigo e Vicenza) - Panella, Sofia (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAREA) Centre, Sapienza University of Rome) - Soncin, Silvia (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAREA) Centre, Sapienza University of Rome) - Saupe, Tina (Uppsala University) - Dori, Irene (University of Florence) - Tafuri, Mary Anne (Department of Environmental Biology and Mediterranean bioArchaeological Research Advances (MAREA) Centre, Sapienza University of Rome) - Robb, John (University of Cambridge)

Co-burials and double burials have typically been assumed to hold close kin or partners, (re)united in death. Such ideas are now testable and genetic estimation of relatedness is revealing local differences in the kinds of kin that were drawn together in death. But how do we assess burials containing multiple individuals when the funerary practices were also multiple and mixed?

We address this problem through a close analysis of bell beaker period burials from the Nogarole Rocca necropolis, Verona. Dating between 2540-2305 cal BCE (95.4%), 8 graves attested to the concurrent practices of inhumation

tion, cremation and secondary deposition. Three out of 8 of these graves contained multiple individuals in different forms: one grave held the cremated remains of 3 people of different ages, another contained a cremation with part of an unburnt cranium and mandible deposited alongside, and the last held an inhumation which had been disturbed to inter a cremation.

Given the difficulties with aligning the same sets of analyses on burnt and unburnt remains, and the singular and idiosyncratic nature of each of these graves, how do we interpret the relations within and between them? Genomic sequencing of the unburnt cranium and the inhumation in these co-burials shows these two individuals were related to a nonadult who was buried alone, and may also have been related to one another. We discuss different interpretations of these creative funerary practices from the available osteological and biomolecular data, suggesting that diverse modes of kinship and ancestral relations structured the mixed depositions at Nogarole Rocca.

5 A CLOSE EMBRACE: A UNIQUE DOUBLE BURIAL FROM THE EARLY MYCENAEAN AYIOS VASILEIOS NORTH CEMETERY, LACONIA, GREECE

Moutafi, Ioanna (Ludwig-Maximilians-Universität München) - Voutsaki, Sofia (University of Groningen)

Late Bronze Age (1700 – 1100 BCE) funerary practices in the southern Greek mainland include a diverse range of burial disposals, from primary and intact single burials to collective assemblages of multiple interments, whether primary or secondary, intact or disarticulated, simultaneous or successive, few or many. Funerary choices raise questions about personhood, or the construction of social identities and relationships, and are therefore essential for a better understanding of social dynamics. The Early Mycenaean (ca. 1700-1450 BCE) Ayios Vasileios North Cemetery (AVNC) in Laconia, Greece, is of special interest in these enquiries, as it comes into use when novel and diverse funerary practices emerge, including a shift from single to collective burials. Excavated recently and currently undergoing a multi-disciplinary study of all field data, the AVNC provides an ideal opportunity for an accurate reconstruction of the variable mortuary treatment and its underlying meanings.

Notwithstanding the mortuary diversity in the prehistoric Aegean, double burials remain unusual. This is also the case for the AVNC, which includes very few such cases despite large variability in modes of disposal and Minimum Numbers of Individuals (MNI). In this paper, we focus on a most striking double burial, i.e. two skeletons placed contracted in a close embrace position inside a large pit (tomb 17). In terms of grave structure, MNI and body placement, Tomb 17 is a special, unique case in AVNC. Employing a multi-dimensional methodology that integrates archaeoanthatology, taphonomy, osteobiographies, biomolecular analyses and the contextual analysis of the mortuary practices, we try to shed light on the identity of these people, the particular circumstances of their deaths, the motivation and emotions behind their shared burial. Going a step further, we would also like to take into consideration our own response to this unexpected burial and the ethical questions it raises.

6 FAMILY TIES: KINSHIP AND COMPLEXITY IN THE 'DOUBLE BURIALS' OF IRON AGE BRITAIN

Büster, Lindsey (University of York; Canterbury Christ Church University)

Advances in ancient DNA analysis have revolutionised our ability to study the relationship between biological relatedness and socially constructed kin. Using data from the COMMIOS Project and comparanda from the published literature, this paper explores the potential of aDNA evidence to shed light on the phenomenon of co-buried individuals in Iron Age Britain and highlights some of the ways in which ethnocentrism has influenced past interpretations of the social identity of these individuals.

Coupled with osteology, archaeoanthatology and isotopic analysis, not only are these data revealing complex sub-structures of kin identity among the living, but dynamic and often protracted interactions between the living and the dead. Data on biological relatedness and age-at-death has, for example, highlighted the very different mortuary treatments that certain co-buried individuals received, including above-ground curation, exhumation and grave reopening. Such extended mortuary processes suggest that the Iron Age dead (whether physically present or not) would have been an important and enduring part of daily life, tying families (and communities) together across the generations. Recognition of these complex interactions also provides important context for the variety of mortuary treatments across Iron Age Britain, including increasing recognition of curated remains, and the blurring of lines between the sacred and the profane at this time.

Drawing on multiple lines of evidence to lift the lid on these so-called 'closed contexts', this paper invites us to abandon notions that the prehistoric dead were necessarily intended to 'rest in peace', to re-examine the rhythm and tempo of mortuary processes, and to embrace the 'messiness' of Iron Age life and death.

7 ANCIENT GENOMES OF ÇATALHÖYÜK REVEAL NOVEL AGE- AND SEX-SPECIFIC BURIAL TREATMENT PRACTICES

Küçükakdag Dogu, Ayça (Middle East Technical University) - Yüncü, Eren (Middle East Technical University) - Kaptan, Damla (Middle East Technical University) - Haddow, Scott (University of Copenhagen) - Kılıç, Muhammed (Middle East Technical University) - Vasic, Milena (Freie Universität Berlin) - Vural, Kıvılcım (Middle East Technical University) - 2014-2017, Çatalhöyük Human Remains Team (University of Bordeaux) - 2014-2017, Çatalhöyük Excavation Team (Stanford University) - Ancient DNA Team, METU/Hacettepe (Middle East Technical University)

Çatalhöyük East Mound in the Anatolian Konya Plain was settled between 7100 BC and 5950 BC, with continuous occupation for c.50 generations. Although decades of analysis have revealed numerous details of daily life at Çatalhöyük, ancient genome data is providing novel insights into social practices. Here we present results based on shotgun DNA sequencing of skeletal remains from 414 Neolithic-period intramural burials. The data revealed highly variable DNA preservation among individuals, measured as the proportion of endogenous (i.e., human) DNA molecules among all sequenced DNA molecules. Interestingly, we found significantly higher DNA preservation among subadults compared to adults. The absence of similar patterns in published archaeogenomic datasets from other prehistoric sites suggests that this is unlikely to be related to age-biased taphonomic processes. Instead, it likely represents differential burial practices for adults and subadults in Çatalhöyük. These practices may reflect age-specific funerary treatments including the possible effect of different spatial placement of burials within houses, as previously described for this site. Second, we present results on sex differences -in the type and amount of burial-associated objects among subadults. Shells, beads, baskets, bone objects, and blades were found in association with a minority of burials at Çatalhöyük, with a higher association of these items with adults, especially with adult females than with adult males. When zooming in on subadults, our new data highlight a similar pattern between sexes, with females showing a significantly higher frequency of burial-associated objects than males. We also find that female subadult skeletons have a degree of DNA preservation than male subadults; suggesting that female subadults were treated more similar to adults when compared with male subadults. Our results suggest previously unknown differences in funerary treatment at Çatalhöyük between adults and nonadults, and, for the latter, sex-specific burial practices.

8 THE GRAVE'S EMBRACE: BIOLOGICAL AND SOCIAL RELATIONS IN BEAKER PERIOD ADULT-CHILD GRAVES REVEALED BY ANCIENT DNA

Zedda, Nicoletta (Department of Environmental and Prevention Sciences, University of Ferrara, Ferrara, Italy) - Meheux, Katie (Institute of Archaeology Library, LCCOS, University College London, London, UK) - Brami, Maxime (Palaeogenetics Group, Institute of Organismic and Molecular Evolution (iomE), Johannes Gutenberg University Mainz, Mainz, Germany)

In this presentation, we take a closer look at a particular type of double burial known in German literature as 'mother-child burials'. Shared burials of adults and children are remarkably common throughout Europe in the third and second millennia BC, despite a widespread shift from collective to single inhumation. To find out more about the relationships between the co-buried individuals, we sampled two double graves from the Bell Beaker culture in Northwest Europe, Altwies in Luxembourg, and Dunstable Downs in Britain (Zedda, Meheux et al. 2023). The two graves, located over 500 kilometres apart, were strikingly similar, consisting of an adult woman and a small child facing each other in death, accompanied by fossils and remains of a Beaker vessel. Ancient DNA analyses conducted at the Palaeogenetics Laboratory of Johannes Gutenberg University Mainz, with the support of the Institut National de Recherches Archéologiques, Luxembourg, have now provided more information about the co-buried individuals, who were related in both cases. These analyses reveal that children were sometimes buried with their biological parents and other close kins, such as a paternal aunt at Dunstable Downs. A comparative analysis of over 100 published adult-child graves dating to the third and second millennia BC highlights the complexity of this practice, which has often aroused suspicion of violence and/or epidemic diseases. We suggest that the body of a woman, lying as though sleeping, clasping a child in her arms, had a specific meaning to early Bronze Age communities. This aesthetically consistent configuration was potentially more important than the cause of death and even the biological relation between the adult and child.

Zedda, N., Meheux, K., Blöcher, J. et al. Biological and substitute parents in Beaker period adult-child graves. *Sci Rep* 13, 18765 (2023). <https://doi.org/10.1038/s41598-023-45612-3>.

9 REINTERPRETING MULTIPLE BURIALS WITH NON-ADULT INDIVIDUALS: CHILDREN'S AGENCY AND SOCIAL BONDS IN COPPER AND BRONZE AGE IBERIA

Herrero-Corral, Ana (Austrian Archaeological Institute, Austrian Academy of Sciences) - Garrido Pena, Rafael (Universidad Autónoma de Madrid, Spain) - Paulos Bravo, Rodrigo (Universidad Complutense de Madrid, Spain) - Flores Fernández, Raúl (Independent scholar, Madrid, Spain) - Rebay-Salisbury, Katharina (University of Vienna, Austria; Austrian Archaeological Institute, Austrian Academy of Sciences) - Kanz, Fabian (Medical University of Vienna, Austria)

Double or multiple burials of children and adults are often interpreted in two different ways: either as the intentional act of burying a deceased child alongside another close family member (usually a biological parent), or as a practical act of burying a child in any structure of another person who has died close in time. In either of these two interpretations, neither the importance of children is recognized, nor their ability to create social bonds with other group members. The aim of this study is to provide alternative interpretations of multiple burials with children through the case study of the site of Humanejos (Madrid, Spain). In this necropolis, spanning the entire Copper Age and a significant part of the Bronze Age (c. 3000-1500 BCE), a total of 61 non-adult individuals have been analyzed, with over 70% from double or multiple burials. The types of accompanying individuals, the primary or secondary nature of the deposits, the ages at death, and the identification of biological sex through peptide analysis allow for a more comprehensive understanding of the various scenarios these burials may represent. Pending genetic results on biological relatedness, the study of these burials has already yielded new findings on kinship construction, such as the intentional selection of certain children from a specific age and sex group in secondary deposits.

10 POTENT PERFORMANCES: NEW APPROACHES TO INFANT-ADULT DOUBLE BURIALS IN ROMAN BRITAIN

Phillips, Reanna (University of Chester)

While approaches to infant burial in Roman Britain have been greatly updated in recent years, key questions have yet to be addressed. Moving past notions of unceremonious disposal and presumed unimportance in life or in death, infant burial practices in Roman Britain have been shown to be dynamic and varied, with evidence of emotion evoked through selected rites conducted in domestic contexts as well as cemetery landscapes. When infants have been found 'accompanying' burials of adult individuals in urban cemeteries, these burials have often been understudied by investigations of double burial in Roman Britain, seemingly treated as opportunistic 'additions' to the adult burial and not considered 'agents' in these funeral performances.

However, the diversity of evidence and the underrepresentation of infants in the burial record suggests the memorable nature of these infant-adult burial practices and their potent effects on the social memory of living communities. This paper reconsiders a range of infant-adult double burials in Roman Britain, examining evidence of performances and participation throughout the burial process. Double inhumation and cremation grave contexts will be investigated, highlighting the motives and variations in choices made by the living participants across the stages of these burials. The paper will ultimately provide new interpretations and suggest future approaches to these burial rites which can mediate the complex social role of infants, the relationships between the buried dead and between the living participants in funerary performances.

11 CHILDREN IN MULTIPLE BURIALS AS A SOURCE FOR SOCIAL STUDIES (ON EXAMPLES FROM OLD RUS' PERIOD BARROW CEMETERIES IN BELARUS)

Makouskaya, Viktoryia (University of Warsaw)

Children's burials are the illustration of how children were viewed by adult members of the community. Among them, multiple burials stand out - including the graves of several individuals from different age groups, who may have had different social status. The aim of the research undertaken here was to identify various features of children's burials in common barrows from three regions of Belarus: from the Polack land (associated with the area of the historical Polack principality) and from the basin of the Niemen and Bug rivers. A total of 39 barrows with children's burials were analysed, resulting in an attempt to organise this material on the basis of age and the relationship between the buried individuals (various forms of multiple burials of adults and children and only children; cases indicating special treatment of children in the context of the sphere of the sacrum, in which a child's burial appears as a "grave good" of an adult, has a marginal position in the space of the barrow or is a trace of a secondary, i.e. later burial, were also recorded).

The investigated cemeteries are located in the vicinity of Old Russian towns or local administrative centers, and the children's burials recorded in them can be dated to the 11th-12th centuries, i.e. to the period of the rooting and unification of the Christian burial rite in the area. Although barrows with mass graves were not the most common practice there, they accounted for a significant proportion, up to one-third, of the children's burials discovered in the Polack land. Differences in the treatment of children in multiple burials are particularly evident in relation to the graves of

the youngest children (infans I), which can be interpreted as a trace of a certain stage of their adolescence, which was related to their social status.

12 WHY BURY TOGETHER? FUNERARY EXPRESSIONS OF DEATH DURING GESTATION AND CHILDBIRTH IN CATHOLIC AND PROTESTANT POPULATIONS IN 18TH-CENTURY LA ROCHELLE

Souquet, Isabelle (INRAP) - Guillon, Mark (INRAP) - Rousseau, Elisabeth (INRAP)

Burials associating a very young child with an adult are not uncommon in French cemeteries during the modern period. In some cases, these were pregnant women, with the fetus located in the pelvic cavity. In other cases, the mother and child most likely died during childbirth. The fetus, having emerged from the mother's womb, was buried with her in the same grave, often in the same container.

The number of archaeological finds of these burials does not reflect the reality of these simultaneous deaths, and it is difficult to quantify them because maternal and infant mortalities are always studied independently. At the same time, the funeral treatments observed for these deceased reveal a distinction that raises questions about the perception of death appearing during gestation and childbirth. To what extent is the burial of a pregnant woman considered as a double burial? How does modern society view these deaths? And when the birth leads to a double death, what criteria are used to allow a double burial of mother and child?

In eighteenth-century La Rochelle, these two types of double burial were present in both Catholic and Protestant cemeteries, discovered in recent excavations (between 2010 and 2023). Although they did not function in accordance with the same requirements and restrictions linked to different conceptions of Death, the presence of these burials could reveal a particular and irregular treatment chosen according to criteria specific to the biological identity of the deceased and/or the time elapsed between the death of mother and child.

Compared with other French examples, these burials provide an opportunity to discuss mother-child mortality and the different burial practices that arise from it.

13 DOUBLE BURIAL CASES. LOOKING FOR APPROPRIATE RESEARCH QUESTION(S)

Morintz, Alexandru (Institute of Archaeology, Bucharest) - Kogalniceanu, Raluca (1 Decembrie 1918 University, Alba Iulia, Romania) - Stirbu, Francesca (Institute of Archaeology, Bucharest, Romania) - Vasile, Gabriel (Institute of Archaeology, Bucharest, Romania) - Vacalie, Radu (Valahia University, Targoviste, Romania) - Coman, Marian (University of Bucharest, Romania)

Double burial is a non-representative funerary practice but significantly present almost anywhere and anytime in the world. What could be the meaning of a specific type of double burial or, turning the things around, what could be the question to which the answer is a specific type of double burial? Obviously, the variety of double burials involves a variety of questions and answers to match. Finding the right answer fit to a specific case could be a real challenge. But finding more and more pairs of matching questions and answers can give us some explanations about this non-normative funerary practice.

Our case study relies on ten double burials found in a medieval burial ground from Wallachia, dating between the end of the 14th century and the beginning of the 17th century. All ten graves were grouped in a small area. Five of them could be dated (with coins) in the first quarter of the 15th century. Except three of them, wealthy burial goods were found in all the graves, including coins, rings, buttons and other clothing accessories. The age and sex of the individuals buried together in the same grave included a wide variety of combinations: children, adolescents and adults, males and females. No unhealed mechanical trauma has been found on the bones.

Why this non-normative ritual practice was applied once and never again in this burial ground? Are all ten double burials related to the same event? Do all these people belong to a minority of the community? In our paper we will try to put more questions in order to find those who fit our material context. As the famous virologist Jonas Salk said, „What people think of as the moment of discovery is really the discovery of the question”.

14 THE MULTIPLE BURIAL BENEATH THE HUSABY MONUMENT - AN EXAMPLE OF A 13TH-CENTURY SOCIO-POLITICAL STRATEGY

Nyqvist Thorsson, Anna (Västsvensk arkeologi)

In Husaby in the western part of Sweden, an exclusive sandstone grave monument from the 13th century turned out to cover a complex burial context. Beneath the slim cover slab the remains of five buried individuals, two men and three women, were found. Multiple burials from the medieval period in Scandinavia is not an unknown phenomenon, but in general they are interpreted from the common hypothesis that burials of more than one individual in a single feature happen because of either biological relatedness, or contemporaneous or near-contemporaneous death.

At the moment, we can't be certain that the individuals from the Husaby burials are not biologically related, but it is obvious that the different funerals are separated in time. The first grave was re-opened for later interments more than a hundred years after the first burial.

Drawing upon the Husaby burials as an example, I will argue that a multiple burial can be interpreted as something more than creating a family grave in a prominent place within the cemetery. Instead, I argue that the re-use of an older grave can be perceived as a deliberate and conscious choice to establish a link to the past and to a person with a prominent position in society. The funeral was a social act and a performance that had an important role in creating or reinforcing social structures. Through this act, the burial of the dead in close physical relation to the older grave/graves were witnessed by the community. In the presence of an audience, both the dead and the surviving family were drawn into past relationships and processes connected with social influence and position.

15 LINEAGE LANDSCAPES OF THE DEPARTED: EXPLORING PORTUGAL'S DIVERSE FAMILY, POWER AND SOCIAL RELATIONS

Casimiro, Tania (FCSH-UNL) - Santos, Joel (University of Leicester)

In 1835, a new law in Portugal forced every city and village to build cemeteries with well-defined characteristics: a walled place had to be able to have large tombs, permanent graves, and temporary graves. This legislative decree marked a pivotal shift, as it became compulsory nine years later to bury the deceased in a cemetery, and church burials became forbidden. Thus, many cemeteries were built in the mid-19th century, either in large urban centres or small rural areas. These spaces necessarily reflected the size, social fabric, and cultural aspects of the places where they were created.

Most of the tombs found in these burial grounds are collective family tombs, and most of the time, they reveal the family relationships between the people buried inside these tombs or even with other tombs. Husband, wife, mother, father, son, daughter, cousins, and grandparents reflect how families engage in personal and social relationships. Considering regional differences, this paper aims to analyse several cemeteries in different areas of Portugal, some with a strong cultural identity, and how family bonds, and the power they represent, were maintained after death. In this sense, we analysed urban and rural, but also coastal and inland areas across the country comparing more than 50 cemeteries. We evaluated large and small burial grounds, discussing if social representation and cultural behaviours, towards age and gender reflected family connections. This will permit us to comprehend if different locations and the social and cultural behaviours of those places, associated with major superstructures such as religion, would influence such family behaviours towards death.

16 VIKING AGE MASS GRAVES C.1000: COMPARATIVE ANALYSIS OF THE TRELLEBORG, RIDGEWAY HILL, AND OXFORD CASES

Baillie, Britt (Roskilde Viking Ship Museum; McDonald Institute for Archaeological Research, University of Cambridge)

There are three known Viking Age sites containing 'mass graves' dating to c. 1000. The two 'collective graves' at Trelleborg were excavated in the late 1930s. Located in a cemetery that predates the establishment of the fort, the deceased were initially interpreted as thralls and subsequently as fallen warriors. The other two mass graves are located in southern England and were discovered in 2008 and 2009. The St. John's, Oxford case has been interpreted as being the result of the St. Brice's Day Massacre. Here, at least 35 individuals bearing multiple wounds from a 'frenzied attack' were unceremoniously deposited in a Neolithic henge ditch. Interpretations of the Ridgeway Hill, Dorset case, containing around 50 individuals placed in a reused Roman quarry pit, have ranged from the execution of mercenaries/warriors/hostages to a different permutation of the St. Brice's Day Massacre. This paper will explore what a comparative analysis of the aDNA, isotope data, contexts, trauma and antemortem data reveal about the identities of the deceased and the phenomenon of 'mass graves' around the shift in the millennium.

17 BURIED WITH A STRANGER BUT A BATTLE-MATE: A CASE STUDY FROM SARDIS

Özer, Füsün (Human-G Laboratory, Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey; Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey) - Altınışık, Nefize (Human-G Laboratory, Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey; Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey) - Kazancı, Duygu (Department of Biological Sciences, Middle East Technical University, 06800 Ankara, Turkey) - Cahill, Nicholas (Department of Art History, The University of Wisconsin, Madison, WI, USA) - Somel, Mehmet (Department of Biological Sciences, Middle East Technical University, 06800 Ankara, Turkey) - Erdal, Yılmaz (Human-G Laboratory, Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey; Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey; Husbio-L Laboratory, Department of Anthropology, Hacettepe University, 06800 Beytepe, Ankara, Turkey)

Multiple burials have been a subject of long debate in anthropological literature. The coexistence of more than one person in an interment is mostly evaluated within the framework of social and/or biological kinship and cultural spheres. Two adult individuals with multiple perimortem wounds were interred simultaneously in the same simple pit grave in Field 49 of the ancient city of Sardis in Manisa province of Turkey. These individuals, buried according to Islamic tradition, were found next to a Christian cemetery. Radiocarbon dating confirmed that individuals buried following Islamic and Christian traditions were contemporaneous (1030-1150 cal. AD and 1016-1158 cal. AD, respectively).

Here, we explored the story of these individuals by using a multidisciplinary approach. We obtained genome-wide data for the two individuals, which showed that both were genetically male. We then performed Principal Component Analysis to study their populations of origin. We found that both genomes cluster with Medieval Anatolian genomes and carry some degree of Central Asian affinity. We also formally tested their genetic ties with surrounding populations.

Next, we explored the genetic kinship between two individuals. We found that they did not share the same mitochondrial DNA and Y-chromosome haplogroups. Autosomal DNA data also did not support genetic kinship between these two males. Our results imply that genetically unrelated two males were buried together probably as they were the victims of an act of violence and died at the same time. The violent deaths of the Turkish invaders in western Anatolia, encountered by the local Christian group could be one of the explanations why these individuals were buried together in the same pit. In summary, apart from social or biological kin relations, social phenomena such as martyrdom or violent death might also be a reason for co-burial.

18 LINKED BY DEATH: DOUBLE BURIALS IN AN EPIDEMIC CONTEXT

Castex, Dominique (CNRS) - Kacki, Sacha (CNRS)

For the medieval and post-medieval periods, double burials are divergent from the regular funerary practices, but they are nevertheless quite often identified in the archaeological record. With a few rare exceptions, this type of burial indicates the simultaneous death of two individuals who were subsequently buried together in the same structure. The circumstances leading to concomitant deaths can be relatively common, and may differ depending on the geographical or chronological context considered. They may be occasional events (e.g. maternal-foetal death during pregnancy or childbirth, hierarchical deaths, small collective accidents) or, on a larger scale, mortality crises, whatever their causes. In this presentation, we will address the question of the use of double burials in epidemic contexts, by reviewing the archaeological evidence we have accumulated over the last few decades of the presence of such graves in burial sites from the early Middle Ages to the early modern period. We will examine the factors that, depending on the site or region, led to the creation of double burials rather than mass graves in this context of mortality (chronological context, rural versus urban environment, beginning and/or end of the epidemic).

1050 REDEFINING ABANDONMENT: GEOARCHAEOLOGICAL AND ETHNOGRAPHICAL APPROACHES TO UNVEILING HIDDEN NARRATIVES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Banerjee, Rowena (University of Reading) - Morandi, Lionello (University of Pisa) - Sciuto, Claudia (University of Pisa)

Session format: Regular session

Abandonment is synonymous with processes and acts such as desertion, neglect, disuse, and evacuation. Historical and ethnographic evidence shows that periods of abandonment encapsulate pivotal social and economic changes in the biographies of human settlements. Abandonment processes arise from cultural, economic and environmental transitions in human history and the temporality of these processes can vary, but they are often only described as a 'book-end' to an archaeological narrative and rarely a topic considered worthy of discussion. This gap in understanding is perhaps due to an initial focus in processual archaeology on it being a process by which something becomes

archaeology, implying cessation and “end of life”, rather than the agency of those processes. Far from just creating “empty” settlements, abandonment processes also generate a novel view of seeing and perceiving the landscape in the local population. Shifting the focus in the examination of abandonment involves a move away from seeking centralized causes and instead emphasizes the observation of how the interactions between humans and non-humans evolve over time and space (Pétursdóttir, 2014).

The aim of this session is to examine, through geoarchaeological and ethnographical approaches, how archaeological sites, monuments, and landscapes can be in flux, their states of periodic abandonment and re-use, but also the processes and events resulting in (and from) complete abandonment.

We welcome papers focusing on:

- Theoretical and methodological viewpoints attributing new meanings to abandoned areas, also from a non-anthropocentric perspective.
- Geoarchaeological investigations bringing new data for the understanding of both agencies and formation processes in abandonment, also with the contribution of a comparative perspective from ethnoarchaeological data.
- Ethnographical and community archaeology aimed at the disentangling of identities and memories linked to the abandoned spaces.

ABSTRACTS

1 ECHOES OF THE PAST: EXPLORING THE LEGACIES OF THREE ABANDONED SETTLEMENTS IN THE FAROE ISLANDS

Villumsen, Melissa (University of Aberdeen; Museum Thy)

This paper delves into the legacies of three abandoned settlements in the Faroe Islands; Korndalur (late 17th or early 18th century), Blankskáli (early 19th century), and Skarð (early 20th century). Through engagement with descendants, the relationship between these settlements and local communities and descendants is examined. The enduring collective memories of the abandoned settlements persist in both tangible and intangible forms, indicating the significance of maintaining a connection to this part of their shared heritage.

Physical traces of the abandoned settlements persist not only in their original locations as ruins, but also within the walls of inhabited buildings in the communities to which they were relocated. Despite having been abandoned over 300 years ago, artefacts and remnants from Korndalur are integrated into daily life by locals in the neighbouring community. The houses of Blankskáli were relocated in their entirety after an avalanche, and the ruined settlement continues to shape the identity of the new settlement. Skarð stands out as the settlement whose memory has been most actively preserved. In 2013, over 500 people gathered there to erect a monument commemorating the boat accident that led to Skarð's demise 100 years prior.

This paper not only highlights the lasting legacies of the settlements but also examines the environmental, societal and economic changes that led to their abandonment. Moreover, it emphasizes the importance of understanding how past cultural landscapes are perceived and interpreted in the present Faroese society.

2 DIGITAL DOCUMENTATION AND GEOARCHAEOLOGICAL ANALYSIS OF THREATENED HISTORICAL VERNACULAR ARCHITECTURE IN CYPRUS

Elliott, Sarah (Bournemouth University) - Manley, Harry (Bournemouth University) - Hadjisterkotis, Eleftherios (Agricultural Research Institute, Cyprus)

This research project started with the concept of using modern abandoned villages as an analogy for Neolithic villages in the Middle East. However, what soon became apparent was that due to their episodic abandonment, there was a fundamental need to record these historical abandoned villages, and their associated liminal landscape, in their own right.

While UNESCO recognises the art of building dry stone walls in Cyprus, it overlooks the precursor to this form of construction: mudbrick architecture. This material was common in traditional villages throughout the Middle East and represents a threatened form of vernacular architecture, with substantial portions of now-abandoned villages being constructed from mudbrick. Utilising digital methodologies such as 3D laser scanning, drone-based photogrammetry, and GNSS surveying, this study has recorded the threatened traditional vernacular architecture in Cyprus, as well as carrying out sampling of construction materials and activity areas for geoarchaeological analyses (geochemistry, phytoliths, animal dung).

A successful pilot study across four abandoned villages has validated our digital recording and mapping approach. By combining the results of the digital survey with data from historic aerial photographs and cadastral plans, the investi-

gation examined the temporality of abandonment. It has identified the continuation of religious practices in structures within the uninhabited villages, highlighting ongoing cultural affinity with these seemingly abandoned places.

In addition to the scientific analyses and digital recording, this research also aimed to raise awareness of the islands' historical architecture which is susceptible to loss through natural and anthropogenic destruction, such as disuse/neglect, and currently that is not protected by antiquity laws. Therefore, this research collated a broad archive of material, which included the intangible ethnographic histories relating to construction, use and abandonment: the full life cycle of a Cypriot village.

3 ABANDONED POTTERY WORKSHOPS: A GEO-ETHNOARCHAEOLOGICAL STUDY OF A CONTEMPORARY POTTERY-MAKING VILLAGE IN THE WESTERN LOESS PLATEAU, CHINA

Lin, Siyu (Durham University) - Milek, Karen (Durham University)

Soil micromorphology analysis is invaluable for studying ancient human activities, yet there has long been a lack of micromorphological research on the remnants of pottery production in archaeological sediments. Using field surveys and soil micromorphological studies in Yaotou, Gansu, China, this research is identifying diagnostic characteristics of pottery production and is enhancing our understanding of pottery production from an ecological perspective. The abandoned pottery production area is in and around traditional loess house dwellings (Yaodong). With its ability to maintain a consistent temperature and humidity, it is well-suited for pottery manufacturing. Different pottery-making facilities, including places for raw material piling, pottery building, drying, and storing, interacted with each other, creating a complex workflow. Thin sections sampled from the waste area exhibit various features from the entire chaîne opératoire of pottery making. Red clay, rich in high kaolinite and smectite, was deliberately selected and mixed with loess to obtain the appropriate pottery paste, while mineral grains were intentionally added as tempers to achieve the desired paste consistency. The heterogeneous distribution of quartz and feldspar shows mixing and manufacturing in the sample are still at the primary stage. Vitriified ash indicates the high temperature necessary for pottery firing, which reached over 800°C. The presence of charcoal and wood ash provides insights into the types of fuels employed, following the principle of cost-effectiveness. By integrating macro and micro scales, this study reconstructs a narrative of abandoned pottery manufacturing, holding significant implications for identifying and interpreting this craft in archaeological contexts, especially in on China's Loess Plateau.

4 NOT QUITE-ABANDONED: NATURAL DISASTERS AS AGENTS OF USE AND RE-USE OF SPACES

Angelo, Dante (Universidad de Tarapacá) - Rojas, Néstor (Universidad de Tarapacá)

Our paper analyzes an archaeological and historical site in northern Chile, which has been hit by violent natural disasters. Throughout their history, human settlements on the coast of the Atacama Desert have been subject to frequent transformations caused by natural disasters. However, this dynamic condition has seldom been considered from a perspective of constant change and reuse of meaningful spaces. Here, through a multi-scalar analysis that considers: 1) processes of site formation of a historic site, derived from tsunami, flood and earthquake events, and, 2) ethnographic documentation that recounts its transformations as a historic cemetery, an emergency refugee camp and a baseball field, among others, we aim to shed some light about the role of disasters as active agents engaging in processes of occupation, abandonment, transformation, and replacement of inhabited spaces. By proposing a roughly defined charting of these interactions (human-nonhuman) we hope to contribute to the theoretical discussion on the biography of (re)used spaces.

5 “LEAVING TO OCCUPY AND OCCUPYING WITHOUT INHABITING”, THE EXAMPLE OF THE EXPLOITATION OF A VALLEY IN THE AUVERGNE MOUNTAINS (PUY-DE-DÔME)

Cocoual, Antoine (University of RENNES 2)

“Settlement, occupation and abandonment” - three states that characterize a site's period of activity from an archaeological point of view. This technical and abstract perception reflects a materialistic and dehumanized vision of reality. Indeed, the end of a settlement does not necessarily mean the death of the human community that occupied it, or the cessation of activity at a regional level.

Beyond these few observations, abandonment is sometimes the sign of a societal transformation and a precious indicator in the understanding of the evolution of human settlement on a global scale.

In Auvergne's Sancy massif, the succession of human occupations in the Couzes valley reflects the evolution of land management strategies from protohistory to the present day. In the Middle Ages, the relocation of settlements to the slopes did not mark the abandonment of the valley and the plateaux, but rather reflected a new mode of territorial administration, responding to the emergence of new political powers and changing agrarian practices.

Recent research highlights the gradual transition from fragmented management to integrated management of the entire mountain territory.

6 AFTER THE INDUSTRY: REINTERPRETING ABANDONED INDUSTRIAL LANDSCAPES IN POOLE HARBOUR

Manley, Harry (Bournemouth University) - Elliott, Sarah (Bournemouth University) - Pitman, Derek (Bournemouth University)

What happens to industrial sites after they go out of use? In the UK, areas related to abandoned industrial activity are often referred to as “Brownfield sites” and are negatively perceived as areas with high contamination and little post-abandonment value. Furthermore, archaeological surveys of historic industrial sites frequently use language laden with negative connotations such as “waste tips”, “spoil dumps” and “slag heaps”, with little consideration given to the inherent value of the by-products of the industrial processes.

Should we, then, begin to rethink “abandonment” at these archaeological sites and consider a longer, post-industry biography at them? What happens to the structures and surrounding landscape after the industrial processes end? Do they afford resources that enable the landscape to evolve into something new and different, and, if so, are we able to detect this archaeologically?

Recent archaeological evidence from excavations on the edge of Poole Harbour (Dorset, UK) suggest that the “waste tips” from medieval salt production were utilised as a resource to create agricultural fields for cereal production and pasture. A programme of deposit modelling using topographic data, sedimentology and geochemistry explored the wider landscape around the salt production site, revealing that, far from becoming a post-industrial abandoned waste ground, the landscape was heavily anthropogenically modified to create the rural idyll that it now is. The natural character of the Poole Harbour catchment, as visible today, is therefore the result of a complex relationship between past coastal communities, natural resources and the by-products of historic industrial processes. This study shows that the extent of the impact of human activity is often greater than the focal points of activities themselves and highlights the need to reconsider how we perceive “waste” in the archaeological record.

7 SIGNATURES OF ABANDONMENT IN THE MICROARCHAEOLOGICAL RECORD

Banerjee, Rowena (University of Reading) - Morandi, Lionello (University of Pisa)

The portrayal of abandoned spaces was reconsidered by Hudson (2014), who uses the term ‘informal spaces’ to refer to derelict spaces and ruined sites collectively, which fulfil several roles for different people. Our data show that identification of signatures in the microarchaeological record can provide localised, micro-contextual spatial and stratigraphic information on depositional and taphonomic processes to examine terms such as “informal spaces”. These processes can be indicated by soils formed on substrates of anthropogenic layers, fluctuations in the abundances of microscopic activity residues within deposits that may indicate “sterile” wind and waterlaid deposits, and the gradual dilapidation of structures. This microarchaeological information helps us to understand the processes by which something becomes archaeology following cessation or “end-of-life” of structures and occupation, and the agency behind those processes, and, in particular, identifying localised abandonment within settlements, timescales of widespread abandonment across the settlement (and landscape), hiatuses in the use of structures or temporary abandonment, and the nature of any “post-abandonment” (see LaMotta & Schiffer 1999) activities within structures.

Starting with examples of abandonment, partial abandonment and “end-of-life” processes from ethnoarchaeological sites from the Alpine and Apennine regions, Italy, this paper then presents examples of soil micromorphological and microfossil data from experimental archaeological sites, urban archaeological sites and peri-urban historic landscapes, which may represent these stages in the archaeological record. The experimental sites include Lejre Historical and Archaeological Research Centre, Denmark, and Butser Ancient Farm, UK, and the archaeological case studies include data from Silchester Roman town, UK, and the “Land of Aynadamar”, Granada, Spain. The results from our data help to redefine areas termed as abandoned spaces, as well as to understand both agencies and formation processes in abandonment.

8 ABANDONMENT AND ARCHAEOLOGICAL ASSUMPTION: ETHNOARCHAEOLOGICAL EXPLORATION OF SETTLEMENT ABANDONMENT IN WEST KARBI ANGLONG, NORTHEAST INDIA

Sabnis, Shikharani (Christian-Albrecht University)

Humans respond to new circumstances, such as climate change, environmental degradation caused by human activity, or social challenges by relocating and abandoning their current settlements. Abandonment can occur at various scales, from individual activity areas to entire regions. While all archaeological sites have experienced abandonment, the manner in which structures or settlements are left behind varies significantly.

Northeast India stands out as one such region where our understanding of the origins and migrations of prehistoric communities remains incomplete. The rugged terrain and the considerable time needed to identify potential locations of prehistoric settlement sites present significant challenges. Ethnoarchaeology has re-emerged as a key methodo-

logical tool in recent years for comprehending the past cultures of a particular area. Drawing upon data gathered during recent fieldwork in the hilly district of Assam, Northeast India, focusing on the diverse uses of material culture for consumption, social interaction, and political purposes, this paper aims to explore the reasons and processes behind the abandonment of structures, activity areas, and settlements. Among the ethnic groups inhabiting the region, the motivations for these abandonments may extend beyond environmental or resource-related factors to encompass economic, social-political, and belief-system considerations.

Through this contribution, we seek to understand not only the settlement patterns of the early settlers of the region but also potential pathways for future research and deepen our understanding of this complex and intriguing region.

9 BEYOND ABANDONMENT: A MULTIVOCAL EXPLORATION IN THE APUAN ALPS

Sciuto, Claudia (University of Pisa) - Anichini, Francesca (University of Pisa) - Basile, Salvatore (University of Pisa) - Gattiglia, Gabriele (University of Pisa) - Giovannetti, Chiara (University of Roma, La Sapienza)

Redefining abandonment demands a comprehensive strategy that encompasses various perspectives within the archaeological palimpsest. The decentralisation of human exceptionalism is necessary for a paradigm shift in considering abandonment as a context in which humans, non-humans, memories and materialities intertwine to create new assemblages.

While archaeological theory has dealt extensively with the importance of a holistic approach to analysing the archaeological record, it often remains unclear how archaeological practice can adapt to these instances of horizontality. From our point of view, a multivocal and transdisciplinary approach can be used to narrate the complexity of interactions that unfold in the context of abandonment. Archaeological surveys and environmental archaeology can dialogue and interrelate with the experiences of the communities that, in various ways, traverse abandoned territories.

The presentation will focus on the example of research conducted on the Versilian slopes of the Apuan Alps, in north-western Tuscany. Different strategies involving various focus groups led to descriptive approaches, creating a multivocal picture. A series of interviews were conducted with members of the local communities, which provided insight into details of production and livelihood practices, such as forest management techniques, terracing cultivation, and charcoal production. Collective mapping with adults and children, on the other hand, was carried out during specific walking events, providing participants (mostly from lowland towns) with maps on which they could record experiential notes and associations with personal memories related to the walk. Lastly, the project conducted with the Martiri di Sant’Anna school, located in the village of Sant’Anna di Stazzema, involved primary and secondary school children in a two-year course that resulted in an exhibition set up by the children on places, objects and memories of the abandoned mountain.

10 PASTORAL UPLAND LANDSCAPES: LAND USE, (OVER)GRAZING AND ABANDONMENT FROM ETHNOARCHAEOLOGY AND COMPUTATIONAL ARCHAEOLOGY. A CASE STUDY IN THE ASPROMONTE (ITALY)

Domingo Ribas, Guillem (Newcastle University) - Carrer, Francesco (Newcastle University) - Romanowska, Iza (Center for Humanities Computing (CHC), University of Aarhus)

Pastoralism is regarded as one of the most extensive forms of land use on Earth, and millions of livelihoods worldwide depend on it. Particularly relevant in upland spaces, where agricultural practices are less likely to succeed, mobile pastoralism permits the exploitation of remote areas generally during the summer season, triggering landscape change, influencing local ecologies, and shaping landscape character for centuries in remote mountain spaces. Mountain landscapes in the northern Mediterranean are representative of these dynamics, and agropastoralism is still the main human activity despite the severe depopulation and the socioeconomic issues faced over the last decades.

Our contribution will explore one of such agropastoral systems: an abandoned village in the Aspromonte Massif (Calabria, Italy). Africo Vecchio was a village whose main economic activities were focused on pastoralism and transhumance mobility, and whose population lived under conditions of extreme poverty, isolation, and severe weather until a landslide triggered the abandonment and relocation of the entire village in 1954. Through the combination of ethnoarchaeological fieldwork, participatory events, and computational modelling, it has been possible to understand the functioning of this pastoral system and the social reality of these mountains during the 20th century. An agent-based model to simulate pastoral mobility and grazing strategies has been developed to simulate different scenarios, assess the sustainability of the pastoral system and unravel the underlying socioeconomic dynamics that led to its collapse and the abandonment of the area, which will be the focus of the contribution. At the same time, our paper will also cover how close work with the local communities has ensured the preservation of threatened local knowledge, informed policymakers, and, above all, revived the local community’s interest in its pastoral past and its abandoned village.

THE END IS NOT THE END: BUILDING ABANDONMENT PROCESSES DURING THE NEAR EASTERN NEOLITHIC

Garcia-Suarez, Aroa (ArchaeologyHub.CSIC)

The onset of sedentism at the beginning of the Holocene is best manifested in the mudbrick architecture that characterises the Near Eastern Neolithic. Understanding the processes that led to the construction, use and abandonment of domestic built environments in the first villages are critical to the reconstruction and interpretation of their spatial organisation. However, while building construction and use has attracted significant scholarly attention, abandonment phases are often overlooked, excavated in large arbitrary units and rarely sampled.

This paper focuses on the geoarchaeological examination of building abandonment sequences from Neolithic sites in Jordan and Türkiye spanning ca. 9000–6000 cal BC. This study has found that building abandonment phases are frequently demarcated by symbolic deposits, partial destruction of the external walls and features, often with the purpose of reclaiming and re-utilising specific construction elements, and deliberate infilling. Micro-stratigraphic analyses have revealed that, while some abandoned buildings are filled with compact, single-event packing deposits, others function as both activity areas and/or locations for the dumping and accumulation of domestic waste.

This research shows that the reasons for the abandonment and demolishing of domestic built environments are often unclear, and could have been related to ritual re-building beliefs and processes, where a new house is erected on the remnants of an earlier house. Thus, in the Near Eastern Neolithic, abandonment does not simply represent the end of a particular building's life-history, but the beginning of a new one.

1052 REVIEWING THE 2020 MERC MANIFESTO ? CHECKING IN ON THE FUTURE DIRECTION OF MEDIEVAL ARCHAEOLOGY IN EUROPE

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Crabtree, Pam (New York University) - Lewis, Carenza (University of Lincoln)

Session format: Round table (without formal abstracts)

Astonishingly, the Manifesto of the Medieval Europe Research Community (MERC) (Medieval Europe Research Community (mercmanifesto.org)) will be five years old in 2025. The 2020 Manifesto aimed to nurture medieval archaeology (defined in broad chronological and geographical terms), in light of its particular visibility, ubiquity, familiarity and resonance, reflecting the priorities of the EU's 2005 Faro Convention (The Value of Cultural Heritage for Society) and EAA's 2019 Bern Statement (Archaeology and the Future of Democracy). Hence the 2020 Manifesto's purpose was to foster a medieval archaeology that transcends borders, collaborates across sectors, engages publicly and contributes sustainable benefits to wider society. The Manifesto's guiding principles were that this could be achieved through a virtuous cycle in which advancing knowledge of medieval archaeology increases appreciation of its value, which encourages its care and protection, which increases public engagement and enjoyment, which completes the cycle by building capacity for further advancing knowledge. The Manifesto ended with six priority recommendations: 1.Challenge the political misappropriation of medieval archaeology; 2.Promote STEM archaeological careers; 3.Increase capacity in planning and museums; 4.Invest in human resources; 5.Make research openly accessible and collaboratively co-created; and 6.Increase public engagement.

Any manifesto should be periodically reviewed to ensure it remains relevant. The 2020 MERC Manifesto was mostly drafted in what now seems like another era, before COVID19, war in Ukraine, the cost-of-living economic crisis and a myriad of other political, social and economic difficulties the 2020s has already experienced.

Accordingly, EAA2024 seems an appropriate time to review the progress made towards advancing or meeting the 2020 Manifesto priorities, aims and recommendations, review their continued relevance and whether new priorities have arisen, and consider whether any changes to the 2020 manifesto are needed to ensure it can nurture medieval archaeology and wider society into the second half of the 2020s.

All welcome.

1054 LANDSCAPE ARCHAEOLOGY AND PLACE NAMES IN MULTIFOCUS INTERPRETATIONS

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Klir, Tomas (Charles University, Faculty of Arts, Department of Archaeology) - Janovská, Viktorie (Charles University, Faculty of Arts, Department of Archaeology) - Wawrzeniuk, Joanna (Institute of Archaeology, Cardinal Stefan Wyszyński University in Warsaw, Poland) - Vieira, Alexandra (CITCEM.FLUP and Instituto Politécnico de Bragança, Portugal)

Session format: Regular session

The session aims to bring together scholars dealing with archaeology, onomastics, ethnography, oral tradition and other related fields from all parts of Europe to provide a space for discussion and sharing ideas concerning the study of the landscape. Changes or persistence of the settlement patterns influenced by migrations, population resettlement and other social and economic aspects can be studied on the basis of geographical names in various regions. The interdisciplinarity reveals new approaches to study populations which passed through Europe within prehistoric and historic periods. Overlapping layers in the landscape are explored in their material and immaterial dimension by different approaches in every country, the richness of which will be presented by researchers of various fields.

Different contributions will address the following questions:

- What interdisciplinary methods can be used to reconstruct the past cultural landscape? What is the current state of cooperation between landscape archaeology and onomastics in the humanities?
- How can onomastic and archaeological records be used to trace changes or persistence of settlement in the landscape?
- What contact zones, as regions in which the transmission of diverse material culture and multilingualism took place, bring new knowledge?
- Does oral tradition help in the interpretation of the archaeological sites and features? How can we create a biography of a place?
- What kinds of archaeological monuments can be discovered by the study of geographical names? What is the meaning of the etymology and etiological legends related to the place names?

ABSTRACTS

1 GIVING MEANING TO A NAME: HOW THE STUDY OF PLACE NAMES CAN CONTRIBUTE TO THE ARCHAEOLOGICAL READING OF LANDSCAPE

Matteazzi, Michele (University of Trento)

This paper intends to highlight the important contribution that research on place names can bring to the archaeological studies on landscape, by analyzing some examples we can nowadays find within the province of Trento (Italy). Toponymy, thanks to a comparative analysis of ancient and modern place names, can bring to: identifying a series of features or functionalities (both anthropic and environmental) today no longer recognizable and referable to past landscape structuring, dating from Protohistory to the Modern Age; finding settlements and artifacts whose traces have been lost over the centuries; recognizing a continuity or a change in settlement patterns. From a methodological point of view, we can distinguish two types of approach, different but complementary to each other, which we can define as "areal" and "stratigraphic". The former considers an investigation extended over a large area, thanks to which it could be possible to establish the spread of one or more place names that belong to the same linguistic group. Instead, the second one analyses the different names of a same place considering their linguistic layer of belonging, their chronological succession, and their degree of resistance to the influence of more recent linguistic groups. The final aim is to give (or to give back) a meaning to the place names that define the current landscape, analyzing their genesis and development. The name of a place was always born with a particular meaning, given to highlight some physical feature of the area, the presence and/or function of anthropic artifacts (buildings, roads, channels...), or the ownership of the land. However, very often this original meaning has been lost over time due to its archaicity because it belongs to linguistic layers that are no longer existing and therefore now incomprehensible, moving away from a phase of meaning to that of indicating or identifying.

2 THE ROYAL INAUGURATION SITE AT MORA, SWEDEN: LANDSCAPE STUDY THROUGH ARCHAEOLOGY AND PLACE NAMES

Bäck, Mathias (The Archaeologists, National Historical Museums) - Sanmark, Alexandra (Institute for Northern Studies, University of the Highlands and Islands) - Lindeberg, Marta (Swedish National Heritage Board) - Jonsson, Kristina (Jamtli, Museum of Jämtland)

This paper will discuss the methodology and early results of the ongoing research project focusing on Mora, the inauguration site for kings of medieval Sweden referred to in documents from the late 13th century to the 15th century, as well as on carved stones found around the site. Mora is situated a few kilometres southeast of Uppsala Cathedral where the coronations were held after the inauguration rituals. Mora has drawn much attention from scholars and ecclesiastical dignitaries of varying disciplines, from the 15th century until the modern day, but despite these efforts the exact location of the inauguration site has not been identified with any certainty. This is indeed a difficult task, due to a general lack of clearly identifiable archaeological remains and the vague nature of the written sources. In order to establish how the site was used for the medieval inaugurations, this project takes a wide-ranging approach via a full landscape analysis, using a combination of methods, such as geophysical survey, excavations, and detailed place name analysis. It is shown that the toponymy can provide much information about older water levels at site, which is used to aid the landscape reconstruction. Further placenames also provide insight into nearby key locations and communication routes used for reaching the inauguration rituals.

3 SACRED WATER IN PODLASIE (EASTERN POLAND) - PHENOMENA FROM THE PRE-CHRISTIAN PERIOD?

Wawrzeńnik, Joanna (Cardinal Stefan Wyszyński University in Warsaw) - Józefów-Czerwińska, Bożena (Academy of Aleksander Gieysztor in Pułtusk - Branch AFiBV)

In the sources of Podlasie folklore relating to the codes of belief culture, a particular attitude to nature was marked. Life was even seen in such elements as water. However, specific categories of water were distinguished and related to the relationship with the sacred, which could have a varied structure. For example, water that came into contact with the body of the deceased was marked by the order of death. Such kind of water for the living was dangerous. Water from springs or wells located within the boundaries of sacred sites - was connoted as a positive kind of sacrum. This was evidenced by the belief of the oldest respondents and in the oral tradition of this region that it could free people from disease or other misfortunes. There was, however, a condition. When washing in the miraculous water, according to the oldest inhabitants of Podlasie, one had to say or think of a request, an intention addressed not only to God, but directly to the water. It can be assumed that this attitude towards water dates back to pre-Christian beliefs, where water as an element of nature as a well was an important component of the cult landscape. We will also illustrate these phenomena during our presentation.

4 TRACING THE ROYAL DOMAIN WITHIN MEDIEVAL COUNTY OF ZAGREB

Antonic, Nikolina (Department of Archaeology, Faculty of Arts, Charles University) - Simon, Suzana (Institute of Historical and Social Sciences, Croatian Academy of Sciences and Arts)

At the end of 11th century medieval Slavonia became a unit within composite Kingdom of Hungary. The (rare) first extant written sources concerning the area date from the second half of the 12th century/first half of the 13th century. Their number starts to increase after 1242. Newly joined territory was divided into counties and smaller units, castle districts centered around certain castles. At the same time, kings were giving significant portions of land to the church, high nobility, religious orders etc. However, in both Croatian and Hungarian scholarship, the origin of these territorial organizations was much debated.

This presentation aims to approach the topic from a different angle, using medieval Zagreb County as a study case. Instead of theoretical discussions, county of Zagreb will be looked through detailed spatial analysis. This includes, on one side mapping of toponyms and boundaries recorded in medieval charters, and on the second, mapping castles around which castle districts were formed. First it will be shown to what extent is possible to establish the exact borders of the county and particular castle districts based on the sources. Second, it will be discussed if analysis of spatial positions of castles enables new insights into the process of forming of castle districts. Third, it will be shown what parts of the land within the County remained directly in royal domain in the later centuries. Finally, it will be questioned if there is any spatial "logic" explaining why kings kept some parts of land directly under their rule and how this fact influenced development of areas in the modern period.

5 NAMES OF POWER: THE STUDY ON PLACE NAMES OF SLAVIC STRONGHOLDS IN THE CONTEXT OF MEDIEVAL LANDSCAPE

Janovská, Viktorie (Charles University, Faculty of Arts, Department of Archaeology)

The toponyms of medieval central places and strongholds form the oldest layer of Czech words that we know from the written Latin sources. The focus of this paper is especially on names from *Chronica Boemorum* by Cosmas of Prague and other sources from the 12th century. There is presented a critical classification of place names related to power and administrative centres in medieval Bohemia. This topic is directly connected to the questions of the territorial development and raising centrality of the early Czech state. Some strongholds of the medieval administrative network still fulfil the role of regional centres today, while others have found themselves on the edge of settlement activity. This contrast in settlement changes on the one hand and the persistence of some centres on the other shows us the dynamics of the development of medieval settlement network. What mechanisms led to these different fates of power centres and what do their names tell us about these changes? Moreover, can the linguistic analysis of geographical names help us to recognize the names of strongholds that are not mentioned in written sources, but we know their archaeological remains? The distribution of centrality will be examined in relation to the chronological and topographical aspects, land and river routes, development of settlement processes and landscape transformation.

6 LANGUAGE AND BURIAL RITUALS ON THE CAROLINGIAN-OTTONIAN EMPIRE BORDERS

Klir, Tomas (Charles University, Faculty of Arts, Department of Archaeology)

The aim of this paper is to advance our understanding of the relationship between material culture, language and ethnicity using the example of the eastern frontier of the Carolingian-Ottonian Empire (8th-10th centuries), specifically what is today north-eastern Bavaria. On the basis of settlement names and hydronyms, it appears that this area was linguistically heterogeneous, where Slavic-Germanic language contact took place. Written sources mentioned ethnic 'Slavs', who were, however, not defined by language. Surprisingly, it seems that this language and ethnic heterogeneity was not expressed in the burial ritual of the time. Dozens of row skeleton burials are known from northeastern Bavaria (mostly also 8th-10th century), but at first impression they appear homogeneous across the whole area. The question is whether this view is correct. The paper presents the results of a new analysis of the archaeological sources and, particularly, a new interpretation using the testimony of written and linguistic evidence.

1056 TELLING THE STORIES OF OTHERS? ETHICS, EPISTEMOLOGY, AND PRACTICES IN ARCHAEOLOGICAL DISCOURSES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Moucheron, Martin (University College Dublin) - Nyland, Astrid (Museum of Archaeology - University of Stavanger)

Session format: Regular session

Reflecting on an appropriate use of analogy and ethnography is at the core of research practice for many archaeologists: we are fundamentally 'telling the stories of others', i.e. telling stories about Others - in their stead. Embedded in our stories are decisions to tell one in many possible ways of being human. This is always theoretically and politically situated and needs to be considered.

Ethical, epistemological, and practical implications of telling the stories of Others can be deployed around four questions:

Who: who speaks? In whose name? Who is talked about? Which stories are ours to tell? Which voices are present in archaeological texts? Is it possible to represent without misrepresenting? Is storytelling a way of voicing the not-yet-heard?

What: what link(s) are there between descriptions, narratives, stories, representations, and interpretations? Can one describe without interpreting? What do we choose to say about our fragmentary data? What is the effect of time and taphonomy on our interpretations?

Why: is anyone unsettled by the idea that archaeologists are storytellers? Why/why not? Is there a distinction between archaeological discourse and (other types of) storytelling? With the constructed separation between the scientific/objective/real/neutral world and that of imaginaries, stories and narratives, are we telling stories that would be (in)comprehensible to past populations?

How: How should we implement anthropological/ethnographic knowledge? To what extent can storytelling as knowledge transmission become a part of our research practice? Is there a difference between analogy from ethnographic/anthropological sources and appropriation of indigenous knowledge in our attempts to create sense from our data?

For this session, although research on hunter-gatherers is our point of departure, we welcome papers reflecting on how to represent all past people in ways that support ethical and respectful practices, and diverse narratives.

ABSTRACTS

1 STORYTELLING WITH OTHERS

Warren, Graeme (University College Dublin) - Moucheron, Martin (University College Dublin) - Nyland, Astrid (Universitetet i Stavanger)

Archaeologists are fundamentally 'telling the stories of others'. We are also always culturally, socially, and historically situated, which means that storytelling is always political. This makes it imperative to keep focus on how to secure ethical and respectful practices of telling other peoples' stories. That is, we need to pay attention to who speaks and in whose name? Who is talked about and how? Which voices are represented – or misrepresented – in archaeological texts?

Considering how we disseminate and present our data, storytelling as knowledge transmission is entangled in our research practice. Choices are made every day as to what to include or not empirically, but also how we choose to disseminate our work and the ways in which we practise it. Indeed, in many senses, the most important part is the process of storying, rather than the story. This is because Storytelling is key in the building or re-building of knowledge and relationships, and how we do it can thus challenge and shift established truths and categories of the world. There is power in this. Considering archaeologists as contributing to building worlds demonstrates that archaeological knowledge can contribute to knowledge production in current society, not only provide curiosa.

As a first experimental step, this introduction is a commitment to a process as well as to a result: we, as authors, have engaged in a continuous discussion on the topic based on a deliberate "respectful dissent" – i.e. we actively listen to each other's perspective, and do our best to integrate AND challenge it to move the discussion further; we can also count on the others to help us identify our respective biases. Our paper thus exemplifies our argument that storytelling with others builds knowledge and relationships, and creates categories of the world.

2 BEYOND SILENCE: EMPOWERING PORTUGUESE WOMEN IN INDUSTRIAL ARCHAEOLOGY

Pacheco, Susana (CFE-HTC Nova University of Lisbon) - Casimiro, Tânia (CFE-HTC Nova University of Lisbon)

The study of subaltern communities and groups is something that archaeology has been doing for a few decades trying to give a voice to those who were silenced for generations. But is it ethical to speak for them and assume we know what they want to say, and what they would want us to know? We are aware that for earlier periods we usually do not have much of a choice but to speak for them, interpreting anything we can find. It is either that or leaving them in complete silence forever. But what if we had the opportunity to let them tell their own stories? In contemporary archaeology, we often deal with historical subjects that are still alive, or at least were able to record their testimonies before dying. Besides, how will our interpretation of their lives change by letting them speak?

With this communication, we intend to do an exercise. By exploring first-person testimonies of women in the Portuguese industrial sector, we hope to clarify and debunk some myths related to their role as workers. At the same time, we intend to explore how memory and narratives about these subjects can be affected, and what is the practical political result of that. Usually, archaeologists are storytellers. In this case, they do it themselves.

3 INTEGRATING ARCHAEOLOGICAL AND LOCAL EPISTEMOLOGIES. A CASE STUDY OF THE LINAPACAN ISLAND (PALAWAN, PHILIPPINES)

Kowalczyk, Zuzanna (Adam Mickiewicz University, Poznan, Poland)

This paper aims to critically examine the disparities between Eurocentric ontologies and epistemologies, and local knowledge, specifically within the context of Linapacan Island in Palawan, Philippines. The research seeks to address the question of whose voice prevails in shaping narratives about the past and the mechanisms through which such narratives are constructed. By focusing on the interplay between Eurocentric and local epistemologies, the paper investigates the extent to which archaeological practices contribute to the dominance of certain voices and perspectives in historical discourse.

The Linapacan case study involves an archaeological survey and ethnographic research aimed at documenting the island's heritage. The research design intentionally incorporates both archaeological methods and local insights (recognized through anthropological investigations), and encourages a shift towards a more equitable and pluralistic approach in constructing narratives about the past, challenging traditional power dynamics in archaeological discourse. Moreover, this research prompts crucial questions and stimulates critical thinking about the role and responsibilities of archaeologists and ethnographers in actively shaping and influencing the discourse surrounding the past, emphasizing the need for a more reflexive and ethical engagement with diverse epistemologies.

4 HUNTING TALES: AN ETHNO-ARCHAEOLOGICAL STUDY OF BAYAKA SPEAR HUNTING

Milks, Annemieke (University of Reading, Department of Archaeology) - Lew-Levy, Sheina (Durham University, Department of Psychology) - Kiyabiya Ntamboudila, Francly (Faculté des Lettres, Arts, et Sciences Humaines, Marien Ngouabi University, Brazzaville, Republic of the Congo)

Ethnographic analogy remains a way to understand chronologically distant lifeways, including of Neanderthals who have always been more or less 'othered' in our narratives. The practice of connecting recent and contemporary foragers with Pleistocene humans also remains strong, including in related disciplines concerned with human evolutionary processes. It may be unrealistic to think we can fully uncouple archaeology from ethnographic analogies as doing so removes a key strategy for interpreting the material record. Meanwhile the theoretical foundations – including core assumptions about material culture and behaviours – would remain. When we engage with small-scale societies we connect with people who have skills and knowledge that we lack. Can it work to consider alternative ways of being to explore potential variability of past behaviours, avoiding cherry-picking examples to support a particular theory? What ethical concerns remain if we 'reframe' in this way?

In this talk, we use a case study of our research with BaYaka foragers (Republic of Congo), designed to better understand the interconnected processes of spear hunting and learning to hunt. We explore the benefits of working with people with requisite skills and experience to understand material culture (in this instance, spears) and behavioural processes (learning). Our research was designed to work with BaYaka adolescents and children, as well as adults, hoping to capture the voices and experiences of youngsters. We will discuss to what extent the research helps us understand the deep past, as well as the limits of inference.

5 OTHER[S]TORIES: DIGITAL ARCHAEOLOGICAL STORYTELLING AND ETHICAL CONSIDERATIONS

Sampatakou, Despoina (University of York)

Why do archaeologists tell stories? What stories do they tell, and why do they tell them? How ethical archaeological storytelling is? These and more are questions that I addressed in my recent PhD thesis research while exploring digital media for communicating archaeological research to the public. This paper aims to further explore and discuss some of the key findings of my research on interactive digital narratives and immersive technologies, as well as the ethics behind archaeological storytelling especially regarding issues such as the handling of human remains and decolonisation of crytpocolonised heritage.

The case study which is the foundation of the stories is Grave Circle A, a Bronze Age cemetery in Greece. Through archaeological storytelling based on osteobiography and archaeology of personhood, I created stories about the life and death of the individual MYCIV buried at the cemetery, as well as about Stamatakis, the archaeologist who excavated the cemetery in the 19th century along with Schliemann, and the reexamination of the skeletal remains in 21st century by Dr Nafplioti and her team. Through those stories, I also developed a methodology for evaluating similar DIY archaeological projects, aimed to put the researcher at the centre of the analysis and the storytelling, considering ethics around telling the stories of others who lived millennia ago.

6 ONLY A DISASTER NARRATIVE? HOW MEMORIES OF ENCOUNTERS WITH THE STOREGGA TSUNAMI MAY HAVE AFFECTED MESOLITHIC SOCIETIES

Nyland, Astrid (Museum of Archaeology, University of Stavanger)

It was initially natural scientists who recognised the Storegga tsunami which had wrecked the coastline of western Norway, Northern Britain, and Scotland, 8200 years ago. Based on the severity of assumed impact, researchers have suggested that this must have represented a disaster for the Stone Age population. Archaeologically, its impact is primarily studied via modelled C14 dates (inferring demographic impact), site location patterns (looking for changes or disturbances in settlement patterns), lithic technology, or trying to identify tsunami deposited layers directly on top of settlement sites. The story of the Storegga tsunami is hence mainly read from the top – down, from curves, graphs and hypothesis of major change – and the grand narrative is one of disaster, devastation, demographic collapse, and societal down turns. But are these stories the only one available? Are there stories about the day the sea turned Monster not yet told?

The material record from the event is indeed fragmented and non-conclusive. However, instead of seeing this as inhibiting, by considering storytelling and worlding of disaster and crisis as also part of a Mesolithic everyday life, other types of data and interpretation of these data, become relevant. Broadening knowledge of what represents a tsunami encounter, tsunami impact, or memories of crisis, gives new scientific knowledge. But where should those stories be told, should we keep to scientific journals, or is a children's book also a valid output from a large research project?

7 WHAT STORIES ARE (OR CAN BE) TOLD WITH ARCHAEOLOGICAL DATA?: EXPERIMENTS IN SITE PHOTO REUSE WITH DIFFERENT AUDIENCES

Perry, Sara (Museum of London Archaeology (MOLA)) - Simandiraki-Grimshaw, Anna (Museum of London Archaeology (MOLA))

Archaeologists create vast amounts of specialised data, yet these are often difficult to access and reuse, even for practitioners themselves. Reuse, in particular, is hindered by the fact that archaeological data progressively lose their complexity and nuance as they are gathered and structured in different recording and storage systems. Such systems regularly force us to strip our data of the meaning and dynamism needed to convey rich and complicated narratives about the past. This denuded data landscape severely disservices archaeologists. It excludes other professionals and policy makers from engaging with and being inspired by our work. Most problematically, it alienates local communities from the cultural heritage they may care about and from which they may wish to benefit.

Transforming Data Reuse in Archaeology (TETRARCHS: www.tetrarchs.org) is an international project dedicated to enriching archaeological data at all points in their life for more wide-ranging and expressive reuse. In this talk, we present the results of TETRARCHS' storytelling experiments with archaeological photographs from a long-excavated site in central London, England, conducted with nearly 100 people from distinct communities: archaeologists (representing a range of sub-specialities), creative practitioners, school children and others working or living near to the site. We demonstrate how these communities 'optimise' archaeological photos for storytelling; we discuss the commonalities and divergences between approaches taken by specialists and non-specialists in exerting imagination and creativity onto the data; and we reflect on the tropes and biases seemingly inherent in even the most mundane archaeological photographic records and picture-taking habits. Drawing on photographic and narrative theory, critical data studies, and participatory design, we argue for revising our basic approaches to data recording and data deposition with storytelling in mind, in order to realise more fertile, democratic and just interpretations of the past.

1057 THE MEDITERRANEAN IN SCANDINAVIA ? IMPORTS AND TRADE DURING THE MIDDLE AGES AND EARLY MODERN PERIOD, C. 1000-1800

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Haggren, Georg (University of Turku; University of Helsinki) - Kjellberg, Joakim (County museum of Uppland, Uppsala; The medieval museum, Stockholm) - Wennberg, Tom (Museum of Gothenburg)

Session format: Discussion session (with formal abstracts)

How were Scandinavian countries and the Baltic market connected with Mediterranean and Southern European regions over the previous thousand years? What are the material traces of these connections? Can these connections be viewed from archaeological remains, and what do these finds tell us of activity between the two regions?

Material culture will be the focus of this topic. This session seeks to investigate imported goods, trade and connections from the Mediterranean and Southern European region into the Scandinavian societies and the Baltic market. It endeavours to examine what was desired and what was used at Courts, churches and households in the North. We also seek to address the issue of status and discuss whether there are any differences between imports found in common and wealthy households? Are there changes in fashion or function that can be evidenced and used as explanations, can patterns be identified and did these patterns change over time?

Examples of Mediterranean goods found in Scandinavian contexts usually include pottery from Italian, Portuguese and Spanish kiln sites, glass from Venice, shoes made from cork from the Iberian Peninsula and olive, fig and grape seeds from soil deposits. What do these finds represent; do they imply status, diet, migration or new ways of living? Did these goods arrive directly, or did they come via secondary contacts (and from where, and when)? Lastly, what goods are missing from these contexts and how does this affect knowledge of these Mediterranean and Scandinavian connections?

ABSTRACTS

1 THE METROPOLE AND THE MEDITERRANEAN

Whatley, Stuart (Museum of Copenhagen) - Keenan, Samuel (Museum of Copenhagen)

From ca. 1000-1250 Copenhagen developed from a village or set of villages into a walled town, which by the mid 15th century became the capital of Denmark and seat of the Crown. By the 1600s, it had grown into the largest city in Denmark and Scandinavia, undertaking global trade as a Metropole. Through this process, many foreigners in the form of merchants, sailors, architects and the clergy moved to Copenhagen, creating a multi-cultural population centred on the town square and the harbourside.

Although recent research has focused on the role of the city's Dutch and German inhabitants and their material culture, little has been studied on the Mediterranean connections and their part in transforming the city. From the 15th to the 17th century, artefacts in new ceramic and glass forms from Spain and Italy are found in Copenhagen, indicating a transformation in the preparation and cooking of food, and new dining styles, a process viewed over Northwestern Europe. These were found alongside Mediterranean foodstuffs and liquids that over time would become a common site on Danish tables and part of the everyday diet. New ceramic forms were also utilised (olive jars) alongside older types such as amphorae in the transport of liquids.

This talk will focus on what was transported, what was used and by whom, and where the artefacts were retrieved from, to understand the effect of the Mediterranean trade on Copenhagen lifestyles.

2 GOTHENBURG AND THE MEDITERRANEAN - TRACES OF TRADE ROUTES

Wennberg, Tom (Museum of Gothenburg)

Gothenburg was the main Swedish port to the west during the Early Modern times. The city where founded 1621 by king Gustavus Adolphus of Sweden with the specific purpose to be a part of the global trade of the time. Gothenburg played a peripheral role in this system of trade routes during the 17th century though. There are, however, both written and archaeological evidence of the world trade strongly influencing the inhabitants of Gothenburg. Tobacco, exotic spices, and ceramics are typical finds that give evidence for this long-distance trade.

One of the centers of trade with connection to the Mediterranean was Lisbon. The importance of this specific connection has recently become apparent in the archaeological source material. The evidence for trade routes into the Mediterranean Sea is scarcer. Though we know of these connections, the archaeological finds with a Mediterranean provenance are very few. This presentation will the archaeological evidence and discuss possible reasons for this skewed picture.

3 MEDITERRANEAN GLASS IN THE NORTH - ANALYZING A LONG TRADITION SPANNING CENTURIES

Haggren, Georg (University of Turku; University of Helsinki)

Small numbers of Mediterranean vessel glass was imported to Scandinavia already during the Roman, the Merovingian and the Carolingian Era. Vikings are known of their raids but they were also tradesmen uniting European markets. Vikings were no uncommon visitors in Constantinople, and these connections continued through the era of crusades. As a result, for example some enameled Byzantine glass beakers were introduced to early Scandinavian towns.

In the early second millennium there were three alternative routes from Scandinavia to the Mediterranean and back. The first one was the hazardous western route along the Atlantic coast, the second possibility was based on land routes through the European continent and over the Alps, while the third one followed eastern river routes from the Baltic to the Black Sea. This route was closed for good in the 1240s when the Mongols conquered vast Eastern European areas.

Glass researchers noticed already in the early 20th an exclusive 13th to 14th century group of enameled beakers. C. L. Lamm identified them first Eastern Mediterranean calling them Syro-Frankish but later on they have been shown to be products of Venetian workshops. These beakers were distributed literally over whole of Europe, including Scandinavia.

During the 15th century glass exports from the Mediterranean ceased temporarily. The demand of the exclusive products of Italian workshops increased again in the 16th century. This time several skilled workers migrated closer to their markets too. Glass houses producing vessels à la façon de Venise were founded in several cities north of the Alps. In the end, a couple of such factories were located in Denmark and Sweden too.

How should we interpret the trade of Mediterranean vessel glass that continued over centuries? Why were the skills and the production transported to north at the end? How did this process take place?

4 WHO USED VENETIAN ENAMELLED GLASS BEAKERS IN CENTRAL SWEDEN? - RECENT FINDS AND NEW UNDERSTANDINGS

Kjellberg, Joakim (Medeltidsmuseet/Upplandsmuseet)

Finds of venetian enamelled glass drinking vessels – often referred to as Aldrevandin beakers after its most famous example in the British museum – have appeared among the artefact assemblages from several recent excavations in Sweden. The finds that will be discussed in this paper comes from Stockholm as well as Uppsala, Old Uppsala and Enköping in the province of Uppland in central and eastern Sweden.

The shards from Stockholm, Uppsala and Enköping come from 13th and 14th century urban household deposits. The sherd from Old Uppsala comes from a building in a more rural setting, interpreted as part of the archbishops manor in the 13th century. The new finds thus complete and partly challenge the previously interpreted narrative of a very

exclusive category of glass only present in the most high-status places, such as the previous finds from the royal castle in Stockholm. The paper will focus on the geographical, chronological and social contexts of the finds.

1058 DRYLAND AGRICULTURE AND LAND USE; PAST, PRESENT AND FUTURE RESILIENCE

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Whitehouse, Nicki (University of Glasgow) - Fiorentino, Girolamo (University of Salento)

Session format: Discussion session (with formal abstracts)

Drylands provide a vital but sometimes overlooked land resource, ranging from forests and other wooded lands through to grasslands and deserts. They have been inhabited for thousands of years and are home to societies that display a range of adaptive behaviours. The current climate crisis is putting livelihood in drylands at risk, as climate and environmental changes are having a magnified impact on these ecosystems and the societies that inhabit them. Up to now, traditional and long-term agricultural and ecological knowledge has been largely under-explored in these regions, despite the challenges facing these areas today and the richness of information to be gained.

At the same time, we believe the rest of the world can learn from drylands: agricultural systems have typically developed in areas of more limited natural resources (e.g., rainfall, soil fertility), demanding and changing climatic contexts, and sometimes challenging socio-political systems, but are also based on crops that can be grown in a wide range of ecological niches. Communities have often transformed soils and adapted land use to maximise opportunities for crop growing in the face of aridity (e.g., cultivation terraces) and scarce resources. Similarly, the integration of farming with livestock and wild resources is often key to achieve food security in drylands. The resilience of dryland systems may therefore offer important lessons for more northern latitudes whilst knowledge of traditional and ancient land and farming adaptations also offer important understanding and solutions for drylands themselves.

In this session we would like to focus on the archaeology of dryland agriculture and land use (broadly defined), with a particular emphasis on case studies from the Mediterranean, South-west Asia, South and Central Asia and dryland Africa. This session draws its inspiration from a recently funded Marie Curie Doctoral Training Network [AGRI-DRY] with a focus on this topic.

ABSTRACTS

1 AGRI-DRY: DRYLAND AGRICULTURE AND LAND USE; PAST, PRESENT AND FUTURE RESILIENCE

Whitehouse, Nicki (Archaeology, University of Glasgow, UK) - Madella, Marco (Complexity and Socio-Ecological Dynamics (CaSEs), Research Group, Universitat Pompeu Fabra, Barcelona, Spain) - Fiorentino, Girolamo (Department of Cultural Heritage, Università del Salento, Italy) - Mothulatsipi, Sarah (Archaeology Unit, Dept History, University of Botswana, Botswana) - Ordonez, Alejandro (Department of Biology: Centre for Biodiversity Dynamics in a Changing World, University of Aarhus, Denmark) - Schoeman, Alex (School of Geography, Archaeology & Environmental Studies, University of Witwatersrand, Johannesburg, South Africa)

Drylands have been inhabited for thousands of years and are home to societies that display a range of adaptive behaviours; these practices are underpinned by Traditional Ecological Knowledge. Drylands are especially vulnerable to climate change, shifts in precipitation patterns, increasing desertification, and extreme events, whilst inappropriate soil management practices have led to major land use changes and soil degradation. These factors hinder the ability of communities to produce food, and negatively influence their ways of life and well-being. Future climate change will continue to severely impact these ecosystems and communities and there is a critical need to understand how to produce food more sustainably.

Long-term perspectives on how and why agricultural systems have emerged and developed in the light of evolving needs and changing environmental conditions offer a way of understanding how people developed and interacted sustainably with their environment. Combined traditional and ancient agricultural practices provide more than a historical perspective: they offer solutions to the challenges posed by the need to grow food within a warming world. At the same time, the rest of the world can learn from drylands: agricultural systems have typically developed in areas of more limited natural resources (e.g., rainfall, soil fertility), demanding and changing climatic contexts, but also have used novel and diverse crops that can be grown in a wide range of ecological niches.

We focus on a recently funded EU Marie Curie DN and UKRI project, AGRI-DRY, which uses the Mediterranean Basin, North Africa & Sahara, and Southern Africa as the main geographic foci and outline case studies that highlight key crops, farming and land use strategies that we believe were critical to a resilient system.

2 LONG-TERM TRENDS IN ECOSYSTEM AND AGRICULTURAL BIODIVERSITY IN NEOLITHIC WEST ASIA

Roe, Joe (University of Bern)

We now understand that biodiversity is critical to maintaining life-supporting ecological processes. Agriculture is typically associated with significant loss of biodiversity: globally, as has become all too evident in the last few centuries; but also in drylands specifically, which are frequently considered under threat from rangeland degradation and 'desertification'. It is perhaps surprising, then, that the world's earliest agricultural systems—which can be traced to West Asia at the beginning of the Holocene (c. 11,500 BP)—emerged within dryland ecologies characterised by relatively low biodiversity and high ecological instability. These are ecosystems that are thought to be particularly susceptible to climatic and anthropogenic disturbance, yet they are also where we see our species' first experiments in large-scale ecological intervention. Though several potential solutions to this paradox have been presented, far less attention has been paid to verifying the premise: was early agriculture actually associated with a loss in biodiversity?

This paper represents a first attempt to trace the long-term evolution of biodiversity in early agricultural systems in West Asia using computational methods. Potential biodiversity of the plant community is modelled using stacked species distribution models and palaeoclimatic reconstructions. Observed biodiversity of the agricultural system is measured in the taxonomic composition of a large dataset of 240 distinct archaeobotanical assemblages from 135 Neolithic sites across the region. Contrasting these two independent signatures of biodiversity reveals a complex association between ecosystem and agricultural biodiversity in the first farming societies. It also questions the assumption that agriculture necessarily leads to a loss of biodiversity, or that it has always done so.

3 THE BOOM AND BUST OF DESERT AGRICULTURE: ARABLE TRANSFORMATION OF THE COUDE DE DRAA, MOROCCO UNDER MUSLIM RULE

Pelling, Ruth (UCL (University College London); Historic England) - Fenwick, Corisande (UCL) - Bokbot, Youssef (INSAP) - Mattingly, David (University of Leicester)

Long term sustainability of arable agriculture in deserts is by necessity reliant on water, manure and appropriate crop choice, while economic expansion beyond subsistence requires significant investment. Such landscapes are vulnerable, reliant on both politics and economic markets as well as the fragility of non-renewable resources. The emergence of Saharan trading networks associated with new Islamic states in North Africa (8th-10th centuries) and the great medieval empires of the Almoravids and Almohads (11th-13th centuries) is associated with the development of successful specialist farming landscapes across Morocco. Until recently the archaeological focus has tended to be on the urban and trading centres and the crops produced rather than the farming communities. A number of recent projects are attempting to re-focus on the arable practice as well as the lives of farmers. The Moroccan-British Oas-Civ project (INSAP, Uni of Leicester and UCL; Fenwick et al. 2021; Mattingly et al 2017), has been surveying and excavating sites within a well-preserved farming landscape with hundreds of settlements and extensive networks of irrigated cultivation plots in the desert of the Coude de Draa, south eastern Morocco. The earliest traces of occupation and associated cereal cultivation date from the centuries immediately prior to Muslim rule, apparently extending and flourishing during the medieval period, before ultimately failing by the 19th century. As part of the associated EVERYDAYISLAM Project (UCL) this paper will trace the changing character, timing and impact of arable farming in the Coude de Draa following the arrival and expansion of Muslim rule. While the presentation will focus on the survey results, and provisional archaeobotanical evidence from the first three seasons of excavation, it will also consider the potential of other analytical techniques for understanding arable change in this environment.

Fenwick et al (2021) <https://doi.org/10.1558/jia.20440>

Mattingly et al (2017). <https://doi.org/10.1163/21915784-12340009>.

1060 FEMINIST PERSPECTIVES ON SOCIAL ARCHAEOLOGY. AGE SESSION IN MEMORIAM LIV HELGA DOMMASNES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Monton-Subias, Sandra (ICREA; Pompeu Fabra University) - Fries, Jana Esther (Lower Saxony State Institute for Cultural Heritage) - Palıncaş, Nona (Vasile Pârvan Institute of Archaeology, Romanian Academy) - Wicker, Nancy (The University of Mississippi, Department of Art & Art History) - Doris Gutmiedl-Schumann, Doris (University of the Bundeswehr Munich, Historical Institute)

Session format: Regular session

Archaeology provides important tools to study past societies. Past people from all parts of societies left behind material remains. Archaeology can therefore shed light on the living conditions of marginalized groups. This has been one of the main topics in feminist archaeology from the very beginning. But feminist archaeology does not only explore

the past; it also considers present-day societies regarding the relationship between archaeological discourse and contemporary cultural logics, the role of archaeology for the general public, or the rationale and working conditions within archaeological institutions.

This session, sponsored by the Archaeology and Gender in Europe (AGE) network, will acknowledge and celebrate the pioneering and fundamental investigations that Professor Liv Helga Dommasnes (1949-2023) contributed to feminist archaeology and archaeology in general through discussion of: a) feminist perspectives on social archaeology, and b) feminist archaeology for an equitable future.

Contributions dealing with current concerns in feminist archaeology will be welcome, encompassing, but not limited to, the following topics:

Feminist analytical frameworks, concepts and interpretations of social dynamics

The development of feminist analyses of archaeological discourse

Re-conceptualization of the past and its communication to the general public

Decolonial/de-patriarchal perspectives

Feminism and archaeological institutions

Networking and collaborative work in feminist archaeology

Feminist archaeology and queer archaeology: marriage or divorce?

Feminist archaeology for a non-patriarchal present and future

Non-Western feminist perspectives and their relevance for archaeology

The future of feminist archaeology: where are we going now?

ABSTRACTS

1 RECALLING LIV HELGA'S INITIAL WORKS ON WOMEN AND FEMINISM

Hjorungdal, Tove (Department of archaeology and ancient culture)

Liv Helga Dommasnes (1949-2023) was the very first Norwegian archaeologist to situate archaeology and interpretations of the past in a feminist position. As her first works are written in Norwegian, and thus less known, it is of importance to be aware of their early appearance and their importance to further development of gender and feminism in Scandinavian archaeology. Her first work, her master artium thesis (1976) dealt with Viking Age burials in western Norway. Tools of analysis were inspired by social anthropology, Peggy Sanday's method of division of work by gender, together with Binford's social persona with reference in quality and quantity of burial equipment. Important results were the visibility of women in Viking age Western Norway, by their rich dress outfit, together with textile equipment, a variety of tools, and west European imports. Conclusion: women were in charge of the farms when male partners were out trading and raiding.

Still more important is that Liv Helga, who earned a degree in philosophy, initiated an analysis of archaeology as a part of western patriarchal traditions in society and academia. This was first published in Norwegian journal KAN (Women in Archaeology in Norway), of which she was one of the editors, from 1985 on. Liv Helga published a program for women's studies in archaeology. Feminist analyses were made as well of the heritage discourse in Norway.

Later, she published a popular book in Norwegian on West Norwegian archaeology. The background of the book was her decades of curatorial and academic work in the regions around the Historical Museum in Bergen. The book had an intersectional and multispecies approach to prehistory.

2 WHO CARES? MOVING BEYOND NARRATIVES OF WAR OR ECONOMY IN LATER MEDIEVAL ARCHAEOLOGY

Dempsey, Karen (Cardiff University)

Decades of gender and feminist archaeologies have highlighted that caring activities are not foregrounded in archaeological narratives despite their pivotal roles in maintaining society. Yet, the practices of care are articulated in particular ways that leave material traces. For the later medieval period in Britain and Ireland, much indirect evidence survives as evidenced through spatial arrangement of buildings, mortuary contexts, placed deposits and living plants preservation. The work of early gender archaeologists, their feminist perspectives and social approaches have enabled researchers to address new questions outside of the traditional narratives of power, economy or status. What can we now say about gendered aspects of the material practices of medieval care? In this paper, we will explore daily life in medieval castles through the lens of 'care', upending traditional narratives that elevate militaristic function at the expense of understanding lived and gendered experiences. These alternative stories embrace archaeological ambiguity

and highlight the full sensorium of daily life as well as the entangled emotional experiences of medieval people. In doing so, it shows the power - theoretically and methodologically - of centring care in our archaeological narratives.

3 A FEMINIST ARCHAEOLOGY FOR EARLY COLONIAL GLOBALIZATION (AND FOR OUR PRESENT)

Monton-Subias, Sandra (Universitat Pompeu Fabra)

In this paper, I will discuss the latest theoretical foundations that define the feminist approach of maintenance activities. The analytical approach of maintenance activities was collectively born within a group of Spanish feminist archaeologists to highlight the structural role of a set of routine tasks of everyday living indispensable to create and sustain life, and the values, attitudes, capacities, behaviours, and social dynamics required and promoted by them. Human beings cannot survive in a healthy fashion in their absence because they make human life possible. By foregrounding cooperation, interdependence, social bonding, cultural continuity, affective capacity, empathy and care as fundamental to social life, this approach offers different interpretations of the past because dynamics that usually remain unseen are "reinserted" into history as central.

I will use the example of early colonial globalization to illustrate how maintenance activities, and their material culture, were both important in shaping and resisting this phenomenon. This example will also serve to discuss how new paradigms to interpret the past emerge when focus shifts away from the patriarchal cultural logic that dominates this interpretation.

4 EXPLORING ARCHAEOLOGICAL INTERPRETATIONS: REINFORCING STEREOTYPES OR DECONSTRUCTING SOCIAL CONSTRUCTS? INSIGHTS FROM HUNTER-GATHERER SOCIETIES AT CZECH PALEOLITHIC SITES

Lecbychová, Olga (Institute of Archaeology of the Czech Academy of Sciences, Brno) - Matulová, Klára (Institute of Archaeology of the Czech Academy of Sciences, Brno)

In recent decades, Western society has faced the redefinition of gender roles, with some fearing that the deconstruction of traditional social norms would lead to the loss of the 'good old (patriarchal) world' based on a binary concept of biological sexes merging with gender and their rigid social roles.

Challenging stereotypes is part of a reflexive approach applied in various social science disciplines today, emphasising not the replacement of one stereotype with another, but rather a focus on constant openness to different perspectives and understanding their contextuality. Gender archaeology has shown that, despite the use of the precise methods of the natural sciences in archaeology, our reconstructions of past societies have been unconsciously shaped by the social patterns of contemporary society.

This contribution deals with mapping interpretations of the social structures of hunter-gatherer cultures and their visual presentations, with particular reference to archaeological research in the Czech Republic, and explores the social impact and responsibility of archaeology in shaping current social norms. Archaeology demonstrates that it is possible to reconstruct gender arrangements more freely and that patriarchy is a product of historical evolution rather than grounded in biology.

5 ASEXUAL FIGURINES OR NEOLITHIC DEITIES? THE CASE OF CUCCURRU S'ARRIU (SARDINIA)

Carta, Arianna (University of Primorska)

Archaeological narratives about gender have concerned not only "flesh-and-blood" bodies but also their most direct representations: figurines. In this contribution I will attempt to show how archaeological theories and interpretations have shaped women's prehistory by mystifying or erasing female gender, both in processual and post-processual archaeological theories. On the one hand, until the 90s, the deceased in graves with significant finds have often been assigned male gender, and figurines have been often considered Mother Goddesses without any serious inquiry. With post-processual theories the main trend has been to define the figurines as "asexual", thus erasing female gender and excluding women from the main narrative. In the attempt to show the consequences of these (mis)interpretations, I will discuss the case of a Sardinian Neolithic's statuette, with such iconographic features that it was used as the cover of *The Oxford Handbook of Neolithic Europe* (2019). This figurine has been found in the Cuccurru S'Arriu's Neolithic burial (tomb #386) and it is dated ca. the first half of V millennia BC, located in Cabras (Sardinia).

Through an interdisciplinary iconographic and comparative analysis, I will try to show how this figurine could have been a goddess. In addition, I will argue that the female body narrative, within archaeological theories, has apparently changed in order not to change (i.e. add gender and stir), as Tomasi di Lampedusa's words featured in EAA's motto 2024: "If we want that everything remains the same, it is necessary that everything changes." G. Tomasi di Lampedusa (1896-1957) - *The Leopard*..

6 TOWARD AN INTERSECTIONAL ARCHAEOLOGY: CHALLENGING NEOLITHIC FUNERARY CONTEXTS

Morell-Rovira, Berta (ArchaeologyHub.CSIC; IMF-CSIC) - Díaz-Zorita Bonilla, Marta (Archaeometry Research Group, Institute for Pre- and Protohistory and Medieval Archaeology, Eberhard Karls Universität Tübingen) - Gibaja Bao, Juan F. (IMF-CSIC) - Masclans, Alba (Independent researcher)

This communication presents a series of case studies delving into diverse Neolithic funerary contexts across Central Europe and the Western Mediterranean. Employing a multi-proxy approach, the research integrates diverse bioarchaeological analyses, including mobility and dietary isotopes, ¹⁴C dating, grave good and use-wear analysis of lithic tools. These case studies challenge the conventional biological-sex dichotomy, revealing a nuanced variability in the archaeological record and emphasising the necessity for a more refined theoretical framework to address this complexity.

The research actively promotes an intersectional perspective, exploring how multiple social categories intersect to shape past funerary practices. In this context, intersectionality recognizes the interconnected nature of social categories, emphasizing the interweaving of various aspects of identity. These include, but are not limited to, gender, age, ethnicity, social class, sexuality, individual abilities, among others

Participation in this session is envisioned as an opportunity for exchanging ideas and methodologies, addressing doubts, and collectively developing a more robust and inclusive approach to interpreting archaeological records. Through this presentation, we would like to contribute to the significance of intersectional perspective in archaeological research, emphasising its relevance for achieving a more accurate and comprehensive understanding of the social dynamics within past communities.

7 SCIENCE AND THE INTERPRETATION OF PREHISTORIC SOCIAL DYNAMICS: THE MEMORIES PROJECT AS A CONTRIBUTION TO FEMINIST ARCHAEOLOGY

Cintas Peña, Marta (University of Seville) - Lucíañez Triviño, Miriam (University of Seville) - Herrero-Corral, Ana (Austrian Archaeological Institute, Austrian Academy of Sciences) - Rebay-Salisbury, Katharina (University of Vienna; Austrian Archaeological Institute, Austrian Academy of Sciences) - Fuentes Porto, Alba (University of La Laguna) - Kanz, Fabian (Medical University of Vienna) - Montero Artús, Raquel (University of Seville)

Thanks to the impetus of the feminist movement, research has undergone a profound transformation in recent decades. The change is particularly visible in the field of archaeology, where many researchers, including Liv Helga Domasnes, have shed light on the invisible, normative as well as exceptional women. This has contributed to the creation of a collective memory in which not only men, but also women and children are represented.

Cutting-edge techniques have opened up new possibilities for reconstructing the biographies of prehistoric women in the absence of written records. Their application has allowed us to bring to light some unique women (such as the "Ivory Lady" of the Chalcolithic site of Valencina) who had previously been identified as men. This in turn requires us to rethink traditional models of social complexity on the one hand, and the relationship between gender and power on the other.

This contribution outlines the MEMORIES project (Memoria de Mujeres. Recuperando Identidades Singulares en la Prehistoria) and presents its first results. The main objective of the project is to deepen this line of research through the study of exceptional funerary contexts, such as the artificial cave of La Molina (Seville). At this site, the remains of an adult female were found, together with an exceptional set of grave goods, which remind us of the burial of the 'Ivory Lady'.

We will discuss how building a new science-based analytical and conceptual framework to interpret social dynamics in prehistory will contribute to the future of feminist archaeology.

8 LEARNING FROM NON-EUROPEAN PERSPECTIVES ON GENDER TO BETTER UNDERSTAND WOMEN IN EUROPEAN PREHISTORY

Palincas, Nona (Vasile Pârvan Institute of Archaeology, Romanian Academy)

It is widely recognized that European feminist archaeology - as well as European gender archaeology more broadly -, at least when it focuses on past societies from the regions that are presently part of the Western countries, continues to be dominated by what we generally call Western perspectives on gender - i.e. perspectives rooted primarily in Western sociology and contemporary Western social experiences, legal and political debates. At the same time, European studies on gender in archaeology have also recognized the value of non-European perspectives, particularly those based on critical social theory and ethnographic and anthropological fieldwork as important sources of inspiration for new ways of thinking about gender. Considering that there is still plenty of room for learning from non-European/non-Western perspectives, this paper will look at sociological, anthropological and archaeological work made

in Africa, the Americas and parts of Asia in search for new ideas and then revisit a few case studies from the Eastern European Bronze and Early Iron Ages to see how they could be interpreted differently. The focus will be on women's statuses and roles in prehistoric societies.

9 GENDERED SPACES AT WAH-SUT: THE FICTIONAL TALE OF PRINCESS RENISENEB THROUGH AN ARCHAEOLOGICAL LENS

Crawford, Courtney (American University in Cairo)

Gender archaeology has created new ideas and concepts for interpreting archaeological material. In Egyptology, the topic of women and gender studies has become more popular in recent years but the attempt to gender spaces through fictional storytelling has yet to take off in the field. One site in particular, Wah-Sut, contained many artifacts that pertain to women that can illuminate their role and their spaces in ancient Egypt. Additionally, most archaeology work is only analyzed by an academic audience, which does not allow the general public to learn more about the past. Feminist archaeologist, Janet Spector, wrote a fictional story based on archaeological material and historical texts of an artifact only used by women to allow both academics and non-academics to understand the past better. Although her research focuses on North American Archaeology, it highlights the importance of archaeological storytelling and how it can help a larger audience understand the ancient world. This author creates a fictional story about Princess Reniseneb by using archaeological evidence that was found in a palace at the site of Wah-Sut to contextualize the artifacts found as well as create a story that can attract a larger audience to the study of women in ancient Egypt.

10 LOOKING AT ARCHAEOLOGICAL EVIDENCE OF CHILDHOOD: A DIACHRONIC REVIEW OF OBJECTS, SOCIALIZATION PRACTICES AND ENVIRONMENTS IN PAST SOCIETIES

Romagnoli, Francesca (Universidad Autónoma de Madrid) - Comino Comino, Alba (Universidade Nova de Lisboa) - García-Basanta, Andrea (Universidad Autónoma de Madrid) - Prados Torreira, Lourdes (Universidad Autónoma de Madrid)

The Archaeology of Childhood is focused on the study of the youngest individuals, their needs, activities, and living and playing spaces. The study of childhood is also strongly interested in understanding the relationships that children maintain within their social group, both within their age group and with adults, and look at childhood as a key period not only in the personal development of an individual but also because it is the period in which individuals are acquiring skills and knowledge and are being integrated into the community. The discipline developed in the last few years influenced by Feminist Archaeology that drew attention to the social aspects in the past and stressed the invisibility of several social and age groups, including childhood, both in archaeological research and the socialisation of knowledge. Furthermore, the feminist perspective highlighted as age categories and roles are culturally defined. Thus, they are not always and everywhere the same and are not directly linked to biological features: childhood is a social and cultural phenomenon since prehistoric times. In this paper the authors present the current approaches in the Archaeology of Childhood, discuss the biases and constraints that still limit the development of this discipline, and provide an overview of the archaeological knowledge on childhood in different periods and cultural contexts in the past.

11 COFFEE WITH ELAGABALUS: TRANSGENDER ARCHAEOLOGY FOR A BETTER FUTURE

Jaffe, Gali (Freelance Lecturer/Researcher)

In the past few years, we are witnessing an escalation in transphobic attacks across all types of communication forms, from books, to written journalism, to websites, internet news outlets, and especially social media.

These attacks are based on misinformation, as well as a fear of change and alternative lifestyles. The main accusation of recent times is that the whole idea of transgender people is new, and as I will lay out in my talk, this notion is absurd beyond all measure.

In depth current archaeological research proves the existence of transgender and queer people for at least the last five thousand years. This is manifested in many various archaeological finds. There is evidence of priests changing their gender to serve a specific goddess, there are graves which show male skeletons with female grave goods, or female skeletons with male grave goods (including weapons), contemporary written sources attesting to the existence of transgender monks and much more.

As a trans woman and archaeologist, I believe that by using this knowledge and spreading this information widely, we can affect a change in the way transgender people today are being treated, and maybe even change and eradicate the myth that "Transgender people are a new idea".

In my lecture I will show how we can use these archaeological finds of the past together with modern new media tools, such as social media sites, to inform a wide audience about the existence of transgender people in the ancient past. By combining the finds and the internet to inform the people of the present and the future, we can change the narra-

tive which is being utilised now against transgender people, and maybe in this way, help make the lives of transgender people, and future society in general, better ones.

12 FEMINIST ARCHAEOLOGY AND QUEER ARCHAEOLOGY: DIVORCE OR FAMILY COUNSELING?

Eklund, Anna (Department of Archeology and Ancient History, Uppsala university)

There is no shortage of theoretical perspectives introduced within archaeology, and the same applies within gender archaeology, in which queer and intersectionality are two of the latest newcomers. Archaeology's enthusiasm for embracing new – often not so new – theoretical approaches from other scientific disciplines are well known and debated. Once in every decade another revolutionary theory is introduced and embraced, a period of infatuation occurs and all is well for a while. However, soon the feeling of novelty passes and the limitations and incompatible elements become visible, and this is where it goes wrong. Instead of putting in the effort of improving and developing the theory further, another, supposedly better fitted theoretical approach is adopted, and so it continues. The previous theoretical approach is now considered out of fashion and not to be discussed further. Maybe now is the time to refrain from the usual divorce procedure and instead engage in family counseling? I suggest that gender archaeology abandon this adopt-and-discard attitude towards theoretical frameworks and start to engage more deeply in the development of theoretical approaches, both old and new. In this way, we can create theoretical frameworks that contribute to new archaeological knowledge, and, ideally, perhaps even contribute to knowledge development in other disciplines.

1061 APPRECIATING THE ARCHAEOLOGICAL VALUE OF PRESERVED FAECES USING MULTIFACETED METHODS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Green, Eleanor (BioArCh, University of York) - Fuks, Daniel (Ben-Gurion University of the Negev; McDonald Institute for Archaeological Research, University of Cambridge) - Dunseth, Zachary (Archaeology Program, Boston University)

Session format: Regular session

Ancient feces are a valuable type of archaeological material and intact dung, or coprolites, provide a micro-context which serves as time capsules of past ecologies and economies. Preserved dung is being increasingly investigated through an expanding range of archaeological science techniques. Among them, geoarchaeological (micromorphological, mineralogical), archaeobotanical (palynological, carpological, phytolith), parasitological, spectroscopic (Raman, NIR, FTIR) and biomolecular (genomic, proteomic, lipidomic, isotopic (^{14}C , $\delta^{13}\text{C}$, $\delta^{15}\text{N}$)) methods are being employed to reconstruct archaeo-faunal diets and microbiomes. The relative rarity of coprolites and the multidisciplinary nature of their study means there is little opportunity for like-minded researchers to connect formally. So, building on the community success of the coprolite session at the EAA 2023 Belfast, this session will provide a space to bring together dispersed researchers working on, and interested in, this special archaeological material. All archaeological fecal-related research will be considered, and we are particularly interested in multiproxy studies or those which advance the application of archaeological science techniques to intact coprolites.

ABSTRACTS

1 FODDERING STRATEGIES AND VEGETATION EXPLOITATION THROUGH THE MULTIPROXY STUDY OF HERBIVORE DUNG FROM MIDDLE BRONZE AGE N-ITALIAN SETTLEMENTS

Dal Corso, Marta (Department of Geosciences, University of Padova) - D'Aquino, Silvia (Dipartimento dei Beni Culturali, Università di Padova) - Piazzalunga, Giorgio (Dipartimento dei Beni Culturali, Università di Padova) - Baldan, Maela (Department of Geosciences, University of Padova) - Bortolini, Mara (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice) - Battistel, Dario (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice) - Manfrin, Maria Sofia (PrEcLab – Laboratorio di Preistoria, Protostoria ed Ecologia Preistorica del Dipartimento di Beni Culturali e Ambientali, Università degli Studi di Milano) - Gillis, Rosalind (Deutsches Archaeologisches Institut, Referat Naturwissenschaften, Berlin) - Polisca, Federico (Department of Geosciences, University of Padova) - Nicosia, Cristiano (Department of Geosciences, University of Padova)

During recent excavations at two Middle Bronze Age (MBA, ca. 1650-1350 BCE) settlements in northern Italy, particular attention has been given to the extrapolation of data from archaeological stratigraphy to understand past lifeways. Usually, cultural layers in sites inhabited by early farming societies are enriched in organic material that largely derives from dejections of humans and animals, besides other routine activities. Rarely, however, in-situ stabling layers have been identified as such in the stratigraphy and thoroughly analysed. In this presentation we will discuss

the investigation of MBA stabling layers at two sites south of Verona, with radically different preservation conditions: the waterlogged settlement of Oppeano and the site of La Muraiola di Povegliano, located in a well-drained area. In both contexts stabling layers composed of herbivore dung and litter have been exposed. At Oppeano, these deposits are found as finely laminated accretions, alternated to ash, inside perfectly preserved wooden “byre-houses”. At La Muraiola, instead, remains of similar stabling areas occur as calcium phosphate crusts. In the framework of the ERC CoG project GEODAP (Geoarchaeology of Daily Practices), we applied a multidisciplinary approach that includes soil micromorphology, botanical micro- and macro-remains and organic geochemistry to the study of stabling layers. Here we will focus on the palynological, carpological, anthraco-/xylo-logical and parasitological records to reconstruct foddering practices and environmental exploitation related to herding. Results are compared with other available datasets, which include GC-MS analysis and the faunal assemblage of livestock from the sites. A variety of different natural environments, partly disappeared, will emerge and seasonality of foddering practices will be discussed, leading ultimately to a better understanding of the lifeways of MBA communities in the Po Plain.

2 UNPICKING THE CONTENTS OF VIKING-AGE LATRINES PRIMARILY USING ANCIENT DNA METHODOLOGIES

Green, Eleanor (University of York)

Faecal concretions are amorphous masses of cemented material which, under favourable conditions, form via phosphatization in cesspits. Their potential biomolecular content is most similar to archaeological sediment. In this project, faecal concretions from Coppergate, York, UK, were analysed using a range of bioarchaeological techniques, including archaeogenetics, palaeoproteomics, lipidomics and microscopy. Results from ancient metagenomic analysis demonstrate that these samples contain a plethora of ancient DNA relating to the human diet, human waste and the local environment. Unlike coprolites (distinct faecal samples), the concretions give a mixed host DNA signature. Nevertheless, we hypothesised that these samples were likely to be human-derived given that they were found in formal waste pits. The human contribution to the cess was confirmed using CoproID and a hybridization capture of 1240k SNPs was performed, resulting in six of the ten concretions covering over 10,000 ancestrally informative SNP positions. Using a tool developed for forensic crime scene investigations, a minimum number of human contributors to the concretion's genetic profile was established. With further development, the analysis of concreted masses could present a new bioarchaeological opportunity to assess health, subsistence and environment at a community level.

Note, this work was completed with collaborators who will be acknowledged throughout.

3 DETECTION OF FAECAL MATTER IN A NEOLITHIC COMBUSTION FEATURE AT ABRIC DEL XICOTÓ (SPAIN) THROUGH A MULTIPROXY GEOARCHAEOLOGICAL ANALYSIS

Fernández-Palacios, Enrique (Archaeological Micromorphology and Biomarkers Laboratory (AMBI Lab), Instituto Universitario de Bio-Orgánica “Antonio González”, Universidad de La Laguna, 38206, Tenerife, Spain; Departamento de Geografía e Historia, UDI Prehistoria, Arqueología e Historia Antigua, Facultad de Humanidades, Universidad de La Laguna, 38206, Tenerife, Spain) - Égüez, Natalia (Archaeological Micromorphology and Biomarkers Laboratory (AMBI Lab), Instituto Universitario de Bio-Orgánica “Antonio González”, Universidad de La Laguna, 38206, Tenerife, Spain; Departamento de Geografía e Historia, UDI Prehistoria, Arqueología e Historia Antigua, Facultad de Humanidades, Universidad de La Laguna, 38206, Tenerife, Spain) - González-Olivares, Cynthia (SERP (Seminari d'Estudis i Recerques Prehistòriques), Universitat de Barcelona, 08001, Barcelona, Spain; Institut d'Arqueologia de la Universitat de Barcelona), Universitat de Barcelona, 08001, Barcelona, Spain) - Herrera-Herrera, Antonio (Archaeological Micromorphology and Biomarkers Laboratory (AMBI Lab), Instituto Universitario de Bio-Orgánica “Antonio González”, Universidad de La Laguna, 38206, Tenerife, Spain; Departamento de Química, Facultad de Ciencias, Universidad de La Laguna, 38206, Tenerife, Spain) - Mallol, Carolina (Archaeological Micromorphology and Biomarkers Laboratory (AMBI Lab), Instituto Universitario de Bio-Orgánica “Antonio González”, Universidad de La Laguna, 38206, Tenerife, Spain; Departamento de Geografía e Historia, UDI Prehistoria, Arqueología e Historia Antigua, Facultad de Humanidades, Universidad de La Laguna, 38206, Tenerife, Spain) - Mangado, Xavier (SERP (Seminari d'Estudis i Recerques Prehistòriques), Universitat de Barcelona, 08001, Barcelona, Spain; Institut d'Arqueologia de la Universitat de Barcelona), Universitat de Barcelona, 08001, Barcelona, Spain) - Sánchez de la Torre, Marta (SERP (Seminari d'Estudis i Recerques Prehistòriques), Universitat de Barcelona, 08001, Barcelona, Spain; Institut d'Arqueologia de la Universitat de Barcelona), Universitat de Barcelona, 08001, Barcelona, Spain)

The use of caves as livestock shelters during the recent prehistory is widely known. The geoarchaeological term *fumier* refers to human-related biogenic input of herbivore (generally ruminant) dung inside of caves and rockshelters. Most of the documented *fumier* deposits show meters of stratified sequences of burned and unburned dung, which are easily recognizable in the field. However, sporadic penning within rockshelters might not leave such a stratigraphic imprint. Here, we present combined microcontextual and biomolecular data of a Neolithic combustion feature at Abric del Xicotó (Alòs de Balaguer, Lleida, Spain). We aim to characterize the functionality of the combustion feature, and

approach animal husbandry strategies by providing information on fuel use and livestock composition. Micromorphological, microremains (faecal spherulites, ash pseudomorphs, and phytoliths), and organic biomarker data (n-alkanes and their $\delta^{13}\text{C}$ stable isotope composition, faecal sterols and bile acids) have been obtained. Preliminary data shed light on the use of the combustion feature, the presence of husbandry activity at the rockshelter, and the nature of the animals and their diet.

4 THE FAECAL MATTER AT HAND – THE UTILISATION OF FAECAL BIOMARKER ANALYSIS IN PALAEOENVIRONMENTAL RECONSTRUCTIONS

Bertheussen, Anastasia (University of Oslo)

This paper will explore the use of faecal biomarker analysis to investigate human-environment dynamics. Prehistoric landscape utilisation of the interior regions of the Scandinavian peninsula is still debated. However, evidence of significant landscape modification in these regions do exist in the form of e.g., the creation of mosaic forest structures. Arguably, considerable effort was made to create spaces or niches in these transitory spaces. Faecal biomarker analysis is increasingly used in archaeological research. However, on the Scandinavian peninsula, few studies have been conducted using this method. Through my research, I aim to utilise faecal biomarker analysis as a supportive tool in multi-proxy paleoenvironmental reconstructions. In this presentation, I aim to discuss the potentials and difficulties of using faecal biomarker analysis for this purpose.

A set of analysis results obtained from Mesna Lake will serve as a starting point for my discussion where faecal biomarkers proved to be highly valuable in supporting the argument of anthropogenic influence. I will then continue by presenting my future research on Aursjøen in the Dovre mountains. Despite being quite early in the research process, Aursjøen has already indicated to be a good research area due to its biodiversity and rich history. More specifically, I am interested in investigating human-faunal relationships as e.g., multiple trapping pits for reindeer have been identified. Faecal biomarker analysis might prove to be a beneficial tool in identifying different faunal markers and overall be used as supportive evidence of the changing human-faunal dynamics.

5 SMELL THE DIFFERENCE: VOLATILE ORGANIC COMPOUNDS (VOCs) AS A RAPID MEANS FOR ASSESSING THE SOURCE OF COPROLITES

Whelton, Helen (University of Bristol) - Zhao, Wanyue (University of Bristol) - Shillito, Lisa-Marie (Newcastle University) - Bull, Ian (University of Bristol)

Coprolites comprise complex mixtures of lipids derived from diet and biochemical processes of the producer. Analysis of lipids preserved within coprolites is well established and a range of faecal biomarkers are routinely used as a means of identification and an indicator of dietary inputs. Faecal lipid biomarker analysis requires extraction and separation of organic compounds before analysis by gas chromatography-mass spectrometry (GC-MS). One of the main drawbacks of this technique is the large sample size required and the laboratory and analytical resource required to separate lipid fractions prior to analysis and identification.

An alternative technique, proposed as a means of fast screening coprolites, is the characterisation of headspace volatile organic compounds (VOCs). The odour of rehydrated coprolites can be used as an informal means of faecal identification. Using this principle, VOCs from coprolites previously analysed and identified by their lipid profiles, were analysed using solid phase micro extraction (SPME) and GC-MS. A number of discriminatory compounds were identified and shown to differentiate between human, herbivore, and carnivore coprolites. Coprolites and their associated sediments could not be differentiated between using this method, suggesting leaching of VOCs into the burial matrix. The analysis of VOCs provides an alternative, more rapid way to characterise coprolite origin.

6 DATING DUNG: RADIOCARBON DATING OVICAPRID FECAL PELLETS

Dunseth, Zachary (Boston University) - Fuks, Daniel (Ben Gurion University of the Negev; University of Cambridge)

Ancient dung is a scarce but important archaeological resource, encapsulating information on past economies and ecologies. At the 2023 EAA meeting in Belfast, we presented a multi-proxy workflow proposal for maximizing non-destructive, semi-destructive and destructive analyses of individual dung pellets. This included using radiocarbon dating on shavings of the outer surface of dung pellets, based on results indicating their efficacy for this purpose. This result is significant for maximal multi-proxy workflows because the outer surface may act as a trap for biomolecular and microbotanical contaminants and is often discarded in coprolite analysis. Building on these results, we conducted a series of follow-up experiments designed to confirm or qualify the efficacy of the pellet exterior for reliable radiocarbon dating. These involve tests for consistency, homogeneity, pretreatment effects, and reliability of radiocarbon dates obtained from dung pellet exteriors. This paper presents the latest findings and highlights additional directions for improving the dating of ancient dung. The apparent utility of fecal pellet exteriors for radiocarbon dating will facil-

itate the application of multiple destructive analyses to single coprolites, particularly for species with medium to small fecal pellets, such as sheep and goat, among others.

7 THE DOG OR ITS MASTER? FURTHER INTERDISCIPLINARY RESEARCH ON COPROLITES FROM STARE GMAJNE ENEOLITHIC PILE-DWELLING SITE IN SLOVENIA

Tolar, Tjaša (ZRC SAZU, Institute of Archaeology) - Caf, Nina (ZRC SAZU, Institute of Archaeology, Ljubljana, Slovenia) - Galik, Alfred (Austrian Academy of Sciences, Austrian Archaeological Institute, Vienna, Austria) - Le Bailly, Matthieu (University of Bourgogne Franche-Comte, Faculty of Sciences and Techniques, Besançon, France)

The initial results on the seven waterlogged preserved Eneolithic dog coprolites from Slovenia discovered in 2007 and 2014 and published in 2019 (Tolar and Galik) and 2021 (Tolar et al.) are now complemented by the analyses of seven newly discovered, waterlogged preserved dog-human coprolites found during the 2021 excavations at the Stare gmajne pile-dwelling site. The preserved pollen, plant and animal macro-remains and parasites indicate that we are probably dealing with two different origins, both that of the dog and that of its master. The differences between the individual coprolites and between the contents of the coprolites and the sediments surrounding them are presented.

TOLAR, Tjaša, GALIK, Alfred (2019) A study of dog coprolite from Late Neolithic pile-dwelling site in Slovenia. *Archaeological discovery*. 2019, vol. 7, no. 1: 20-29.

TOLAR, Tjaša, GALIK, Alfred, LE BAILLY, Matthieu, DUFOUR, Benjamin, CAF, Nina, TOŠKAN, Borut, BUŽAN, Elena, ZVER, Lars, JANŽEKovič, Franc, VELUŠČEK, Anton (2021) Multi-proxy analysis of waterlogged preserved Late Neolithic canine excrements. *Vegetation history and archaeobotany*, vol. 30, no. 3: 107-118.

8 UTILIZING CT SCAN AND LIPID ANALYSIS IN COPROLITE STUDIES: A CASE STUDY OF JOMON SITES IN JAPAN

Shiroishi, Tetsuya (Yamagata University) - Nishida, Yasutami (Niigata Prefectural Museum of History) - Sakiko, Namigata (Archaeological Research Institution of Yokohama, Yokohama Historical Foundation) - Fukui, Junichi (Hokkaido Archaeological Operations Center) - Miyata, Yoshiki (The University Museum, The University of Tokyo)

In this presentation, we introduce a case study of coprolites excavated from shell middens dating back to the Jomon Period (equivalent to the Neolithic Period) in the Japanese archipelago. Previous year, We conducted artifact observation, CT scanning, and lipid analysis on coprolites excavated from two shell middens (Shomyoji and Motomachi shell middens).

A total of 48 specimens were examined, with 25 undergoing CT scanning and 5 subjected to lipid analysis. The non-destructive nature of CT scanning allowed for a larger quantity of specimens to be analyzed, while the destructive nature of lipid analysis limited it to 5 specimens. Indeed, coprolites are highly valuable artifacts in the Japanese archipelago, and it is necessary to analyze them non-destructively whenever possible.

As a result of the analysis, CT scanning revealed numerous fish bones, while lipid analysis also indicated the possibility of marine fish and shellfish. Additionally, gross observation uncovered fish bones bearing dog tooth marks and other “sandy” materials. These “sandy” materials may have contained sand ingested during the meal of a canine, suggesting that the coprolites may be of canine origin rather than human.

In addition, we will report on sites currently under analysis (e.g., Torihama shell mounds) when we present our findings at the EAA 2024 Annual Meeting.

9 UNVEILING INDIVIDUAL DIETARY PROFILES AND CULINARY PRACTICES OF THE PAST: A MULTIDISCIPLINARY ANALYSIS OF PALEOFECES

Maixner, Frank (Eurac Research Institute for Mummy Studies, Bolzano, Italy) - Sarhan, Mohamed (Department CIBIO, University of Trento, Italy; Eurac Research Institute for Mummy Studies, Bolzano, Italy) - Oegg, Klaus (Institute of Botany, University of Innsbruck, Innsbruck, Austria) - Rattei, Thomas (CUBE - Division of Computational Systems Biology, Centre for Microbiology and Environmental Systems Science, University of Vienna, Vienna, Austria) - Reschreiter, Hans (NN) - Moritz, Robert (Institute for Systems Biology, Seattle, USA) - Segata, Nicola (Department CIBIO, University of Trento, Italy) - Zink, Albert (Eurac Research Institute for Mummy Studies, Bolzano, Italy) - Kowarik, Kerstin (Austrian Archaeological Institute, Austrian Academy of Sciences, Vienna, Austria; Prehistoric Department, Museum of Natural History Vienna, Vienna, Austria)

Paleofeces act like a miniature time capsule, providing highly resolved snapshots into individual dietary habits. Various information sources are present in naturally desiccated ancient feces, including plant and animal macro- and micro-fossils, parasite eggs, and biomolecules (DNA, proteins, lipids, and metabolites). Here we will present two multidisciplinary paleofeces studies that unlocked new insights into past cuisines and individual culinary practices through the reconstruction of in-depth dietary fingerprints.

By undertaking a complementary -omics approach, including high throughput sequence analysis of ancient biomolecules and microscopy, we analyzed the stomach content of the 5,300-year-old Iceman mummy, commonly known as Ötzi. Our analysis showed that the Iceman seemed to have had a remarkably high proportion of fat in his diet, supplemented with dried wild meat, cereals, and traces of bracken. Microscopic examination provided in addition first evidence of food preparation methods showing that the Iceman either consumed fresh or dried meat. In our second study we subjected four human paleofeces from the Hallstatt salt mines dated from the Bronze Age to early Modern Times to an in-depth microscopic, metagenomic and proteomic analysis. Our dietary survey identified bran and glumes of different cereals as one of the most prevalent plant fragments. This highly fibrous, carbohydrate-rich diet was supplemented with proteins from broad beans and occasionally with fruits, nuts, or animal food. The miner's diet was complex and included also fermented food. Specifically, fungal analysis of one of the Iron Age samples showed significant levels of *Penicillium roqueforti* and *Saccharomyces cerevisiae* DNA, fungi that ferment blue cheese and beer, respectively.

By integrating findings from multiple disciplines, we could reconstruct holistic portraits of past individual foodways and culinary practices. Importantly, the application of cutting-edge analytical techniques to paleofecal studies continues to push the boundaries of archaeological research, offering new avenues for investigating the past.

1065 ADVANCES IN THE STUDY OF ANCIENT POTTERY: BRINGING SOCIAL ARCHAEOLOGY AND DIGITAL ARCHAEOLOGY TOGETHER

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Oikonomou, Artemios (Science and Technology in Archaeology and Culture Research Center (STARC), The Cyprus Institute; Institute of Nuclear and Particle Physics, NCSR Demokritos) - Kathariou, Kleopatra (Department of History and Archaeology, University of Ioannina, Greece) - Valamoti, Soultana (Aristotle University of Thessaloniki)

Session format: Regular session

Pottery analysis is a means of great importance in archaeological research, as the information it offers helps to better approach and interpret not only the objects themselves but also the archaeological settings they belong to (including domestic, administrative, religious, and funerary contexts) as well as the various activities of the ancient societies they are linked to.

Studying pottery is a demanding task, since it is found in huge amounts at almost all excavation sites around the world and usually in fragments. The application of ICT tools over the recent decades fulfilled the need to record, manage, retrieve and analyze these data. Analytical techniques based on heterogeneous sources (such as drawings, photographs, 3D scans etc.) have been brought together, whereas the creation of pottery databases and digital repositories facilitates the ceramologists' work to manage the plethora of information they deal with as well as to proceed to their pottery-based interpretations.

Furthermore, archaeometric approaches have become over the years a powerful set of analytical tools that allow a deep understanding of the processes of manufacture, the provenance and the use of pottery. Chemical, structural, petrographic analysis and the study of organic residues from ceramic objects have revealed a hidden world allowing us to understand their biography.

Our session aims to move forward through a fruitful dialogue between the different research paths that Digital Archaeology and Archaeometry have developed for the study of ancient ceramics on one hand and major archaeological questions about past human societies on the other. This session will try to put emphasis on the synergistic effects of ICT tools, scientific approaches, and Archaeology to enhance our knowledge about ancient pottery and shed light into daily life, special events and contact networks in Greece and adjacent areas (Italy, Balkans, Eastern-Mediterranean) from Prehistory until the end of Late Antiquity.

ABSTRACTS

1 INTEGRATING CERAMIC PETROGRAPHY AND DIGITAL IMAGE ANALYSIS. INVESTIGATION OF PASTE PREPARATION METHODS AND RESOURCES PROCUREMENT AT OGLIASTRETTO (CS)

Serino, Donatella (Sapienza University of Rome) - Vanzetti, Alessandro (Sapienza University of Rome) - Marino, Sara (Sapienza University of Rome) - Cannavò, Valentina (University of Modena and Reggio Emilia)

The Neolithic (6th millennium BCE) and Copper Age (3rd millennium BCE) settlement of Ogliastritto is located in the southern hilly edge of the Plain of Sybaris (Calabria, Italy). Macroscopic characterization of two pottery assemblages and thin section petrography of n=42 vessels and daub fragments were conducted for the compositional and the technological classification of the ceramic pastes. As a result, the main paste recipe was identified as the IM3

fabric, locally produced and heterogeneous in granulometry, suggesting that different processes were applied to the raw clay materials, like tempering and sieving/fractioning. A minor portion of the pottery assemblage is grouped into macroscopic impasto classes and petrographic fabrics which show a certain compositional variability. While such diversity is representative of the local intrusive-metamorphic lithology, it also allows to infer that various deposits were exploited by local producers, who selected the resources offered by the surrounding environment and landscape. Therefore, to interpret the variability in texture and composition found in the ceramics in terms of paste preparation methods and resources procurement, n=12 samples of clays, silts, sands and soils were further collected within 7 km from the site to characterize locally available raw materials. Petrographic analysis usually involves qualitative descriptions of ceramic fabrics. Here a quantitative approach was adopted by performing digital point-counting on 2D images, in order to achieve an accurate modal and textural analysis and a reliable comparison between raw materials and ceramics. Specifically, the JMicroVision Software was used as a virtual point-counter which generates a grid of random points to be classified and measured. The combination of archaeometry and digital image analysis has represented therefore a valuable tool for the in-depth investigation of deposits exploitation strategies at the local scale, and to better define the local crafting tradition and the social implications involved.

2 BRONZE AGE COOKING CERAMIC FABRICS FROM NORTHERN GREECE AND BULGARIA: TECHNOLOGICAL VARIABILITY AND USES

Dimoula, Anastasia (Eidikos Logariasmos Kondilion Erevnas A.P.TH, Aristotle Univ. of Thessaloniki) - Tsirtsoni, Zoi (UMR 7041-Archéologies et Sciences de l'Antiquité CNRS) - Valamoti, Soultana Maria (Eidikos Logariasmos Kondilion Erevnas A.P.TH, Aristotle Univ. of Thessaloniki)

The clay recipes used in the production of cooking pots and/or cooking ceramic fabrics, commonly share functional characteristics, associated with their intended use over fire. However, their technological features, from the selection and processing of raw materials to firing, differ considerably between settlements and regions, as well as over time. As for evidence of their use, research in this field is rather limited. This presentation integrates macroscopic, analytical, and experimental data obtained within the framework of ERC project PlantCult, in order to explore this technological variability, as well as to establish those properties related to culinary function. Our ultimate goal is to identify specific traces, petrographic and macroscopic, indicative of the use of cooking pots.

Our methodological approach comprises integrated contextual, macroscopic, and petrographic analysis, along with digital data processing and documentation, of a range of cooking pots sampled from eight sites in northern Greece and Bulgaria, dating from the Early to the Late Bronze Age (3rd-2nd mill BC). The study is complemented by the analysis of experimentally manufactured cooking pots, used in a series of cooking experiments. The research results demonstrate that while cooking fabrics in our study area exhibit strikingly consistent functional properties, they are characterised by respective technological variability due to diverse environmental, socioeconomic, or other factors. Additionally, the identification of use traces on ceramic cooking fabrics is facilitated by the comparison between analytical archaeological data and experimental data.

3 INVESTIGATING THE COARSE POTTERY FROM THE SANCTUARY OF KALAPODI. AN ARCHAOMETRIC APPROACH

Christodoulou, Kelly (National and Kapodistrian University of Athens; N.C.S.R Demokritos) - Hein, Anno (N.C.S.R Demokritos)

The present study focuses on the archaeological and archaeometric investigation of the coarse pottery assemblage discovered in the South Temple Sequence of the sanctuary of Kalapodi in ancient Phokis. Coarse pottery in general, is nowadays the main focus of the studies of 'New' Archaeology since they can provide answers to questions related to origin of production and, moreover, pottery exchange, the technological choices made by the ancient potters and the socioeconomic meanings evolving to these human actions. Although studies and publications of this specific ceramic category exist for several sites in Mainland Greece, this is the first study of pottery that derives from a cult place with successive layers of use from Late Mycenaean (LHIII) to Early Iron Age (Late Geometric Period).

The ultimate goal of this research is the examination of the typology and the range distribution of coarse pottery per chronological phase and the comparison of archaeological results with the context, as well as, the results of the analytical techniques (pEDXRF, petrography, SEM). The above combined results showed a remarkable variability and the formation of different coarse categories, based on their elemental composition and petrographic fabric. Analytical techniques presented a clearly selective use of local clay sources for the production of specific Mycenaean (cooking and pithos ware) and geometric coarse vessels (burnished ware). Of quite importance were also the macroscopic and archaeometric results of a very particular and much discussed coarse pottery, the so called Handmade Burnished Ware, which appeared to have a continuous use from Mycenaean to Early Iron Age and different places of origin (local and non-local).

4 MORTARIA FROM KARABOURNAKI, NORTHERN GREECE: TYPOLOGICAL AND PETROGRAPHIC ANALYSES

Manakidou, Eleni (Faculty of Philosophy, School of History and Archaeology; LIRA Laboratory, Department of Archaeology, School of History and Archaeology, University of Thessaloniki, 54124 Thessaloniki, Greece; Center for Interdisciplinary Research and Innovation (CIRI-AUTH), Balkan Center, Buildings A and B, 10th km Thessaloniki-Thermi Rd, P.O. Box 8318, 57001 Thessaloniki, Greece) - Dimoula, Anastasia (LIRA Laboratory, Department of Archaeology, School of History and Archaeology, University of Thessaloniki, 54124 Thessaloniki, Greece; Center for Interdisciplinary Research and Innovation (CIRI-AUTH), Balkan Center, Buildings A and B, 10th km Thessaloniki-Thermi Rd, P.O. Box 8318, 57001 Thessaloniki, Greece) - Valamoti, Soutana-Maria (LIRA Laboratory, Department of Archaeology, School of History and Archaeology, University of Thessaloniki, 54124 Thessaloniki, Greece.; Center for Interdisciplinary Research and Innovation (CIRI-AUTH), Balkan Center, Buildings A and B, 10th km Thessaloniki-Thermi Rd, P.O. Box 8318, 57001 Thessaloniki, Greece)

The coastal site at Karabournaki in Thessaloniki, northern Greece, was one of the most significant harbors of antiquity in the northern Aegean, especially flourishing during the Archaic period (7th-6th c. BC). The intense commercial activities of the site are evident through the ceramic wares present, mainly transport or tableware, deriving from various areas throughout the Aegean and the Eastern Mediterranean. The present interdisciplinary study focuses on a particular domestic ware, the so-called mortaria or ceramic grinding bowls, which are commonly not traded in large-scale, but at Karabournaki they exhibit remarkable quantity and variety.

In this context the aim of the study is twofold. Firstly, to establish the provenance of the mortaria, in order to interpret their role in this trading site. Secondly, to explore their technological attributes (clay composition, vessel building and firing, surface treatment), along with their use-wear traces, both directly linked to their intensive grinding function. To achieve this, the methodology applied included integrated macroscopic typological and petrographic analyses, complemented by digital data processing and documentation. Our study shows that the specific use of mortaria required specialized ceramic fabrics to withstand the mechanical stresses of grinding in food preparation or other workshop activities. Moreover, the results of our study demonstrate that mortaria, originating from various Aegean and Eastern Mediterranean production centers, reached the harbor of Karabournaki in order to be used in situ and also probably to be distributed to neighbouring settlements and the hinterland of Central Macedonia.

5 THE BIOGRAPHY OF THE POTTERY OF WESTERN ACHAEA (DYMAIA CHORA) IN THE CLASSICAL PERIOD. A PRELIMINARY ARCHAEOLOGICAL AND ARCHAEOMETRIC APPROACH

Argyropoulos, Vassilios (Ephorate of Antiquities of Achaia; University of Thessaly, Department of History, Archaeology and Anthropology) - Kougia, Nickoula (Department of Geology, University of Patras) - Iliopoulos, Ioannis (Department of Geology, University of Patras)

In recent years, alongside the discovery of new archaeological sites, the archaeological excavations that have been carried out in the NW Peloponnese and especially in the countryside of western Achaia (Dymaia Chora), have brought to light a significant number of pottery finds. Among them evoke interest grave goods, mainly vases dated to the 5th and 4th century B.C. These are considered to be imported products of Attic, Corinthian or Elean workshops, local productions influenced by western Greek workshops, or typologies encountered across Achaia and Elis. The group of red-figure vases are of particular interest, probably products of a new-appearing pottery workshop in Dymaia Chora, influenced by red-figure pottery of South Italian and especially Apulian workshops.

The research about the vases' biography is not only based on their morphological and stylistic characteristics, but is also complemented by archaeometric techniques. The study of the mineralogical and petrographic characteristics of the ceramic samples allowed us to infer about their provenance and pottery technology. A diverse and comprehensive framework of data collected provided all necessary elements for the documentation and interpretation, not only of the vases, but also of the wider social context to which they belong.

The aim of this synthetic study is to reveal the function of vessels in the context of the burial sphere, also the approach and interpretation of social structures and identities and finally the understanding of socio-economic processes and fermentations, in the 5th and 4th c. BC, in the region of western Achaia.

6 A NEW CENTER FOR CERAMIC PRODUCTION FROM THE ROMAN PROVINCE OF ACHAEA. ARCHAEOLOGICAL DATA AND ARCHAEOMETRIC ASPECTS

Kougia, Nickoula (Department of Geology, University of Patras; ERAAUB, Departament d'Història i Arqueologia, Facultat de Geografia i Història, Universitat de Barcelona) - Iliopoulos, Ioannis (Department of Geology, University of Patras; ERAAUB, Departament d'Història i Arqueologia, Facultat de Geografia i Història, Universitat de Barcelona)

The existence of ceramic kilns in the city of Patras offer concrete evidence of great development throughout the Imperial period, after its foundation as an Augustan colony. The city's role as a major ceramic production center is underlined, mainly due to its key location within regional and long distance trading networks. The rich corpus of ceramic kilns and workshops in Patras' territory, has expanded our understanding of the functional roles they played in urban and rural space. Representative ceramic fragments among the locally encountered typological repertoire of the workshops were studied in conjunction with analytical techniques, in order to determine the local compositional patterns. The archaeometric study and interpretation of pottery through thin-section analysis enabled the classification of different ceramic fabrics. The mineralogical analysis through X-Ray Powder Diffraction (XRPD) allowed us to estimate the equivalent firing temperatures that the pottery has sustained inside the kilns, providing important information about the ceramic technology. Furthermore, the geochemical analysis of the ceramic assemblage offered adequate data for developing a comprehensive geochemical database. The results obtained have helped us to reconstruct local and regional networks of exchange, to unveil practices of the past and understand technological choices.

7 CHEMICAL CHARACTERIZATION OF HELLENISTIC-ROMAN FINE WARES FROM TWO WORKSHOPS IN THE REGION OF ELIS, GREECE: A PRELIMINARY STUDY

Triantafyllidi, Elena (Department of History, Archaeology and Cultural Resources Management, University of the Peloponnese, Old Camp, 24133 Kalamata, Greece) - Tsampa, Kalliopi (X-ray Fluorescence Laboratory, Institute of Nuclear and Particle Physics, NCSR Demokritos 153 10 Aghia Paraskevi Attiki, Greece) - Karydas, Andreas-Germanos (X-ray Fluorescence Laboratory, Institute of Nuclear and Particle Physics, NCSR Demokritos, 153 10 Aghia Paraskevi Attiki, Greece)

The current study aims to outline the pottery tradition of north western Peloponnese by examining a group of Hellenistic-Roman fine wares from two important workshops: Ancient Elis and Ancient Olympia, Greece. Both sites had a flourishing pottery tradition, especially from the Classical period and onwards, something that can be verified from the remnants of pottery kilns. In the current study 40 samples (20 from Ancient Elis and 20 from Ancient Olympia) date in Hellenistic-Roman period, were examined both microscopically and chemically. In the case of Ancient Elis, the material comes from the South Stoa and consists mainly from utilitarian pottery fragments such as black glazed and terra sigillata table wares. In Ancient Olympia pottery comes from a well in Leonidaion and from a Hellenistic bath in a building complex, north of Prytaneion. Leonidaion pottery consists mainly from plain wares, like jugs while Prytaneion pottery represented mainly by utilitarian black glazed and terra sigillata wares. Samples were examined microscopically using LED for a preliminary grouping of the fabrics. XRF analysis using a handheld analyzer was used for the chemical characterization of the clay matrices. The analysis showed that both workshops using highly calcareous clays (CaO>10wt%) for the manufacture of high quality, durable vessels. The microscopic examination revealed that Ancient Elis pottery consists from 5 distinct fabrics while 4 chemical groups were determined based on the CaO content. In general, no microscopical (fabric) and chemical correlation was testified with the exception of the terra sigillata type that forms a distinct group, microscopically and chemically. In Ancient Olympia 7 fabrics were determined while chemically not a distinct chemical group was defined, based on the CaO content. This study provides important new data on western Peloponnesian fine wares by analyzing samples from two thriving workshops of Hellenistic-Roman period.

8 THE VASE, THE CONTENT, THE USE. ORGANIC RESIDUE ANALYSIS OF FIGURED POTTERY IN CONTEXT.

Pola, Angela (Università degli Studi di Pavia) - Bosi, Adele (CNR)

Traditionally, figured pottery has mainly been analysed with the attributive/chronological purposes of identifying painters and workshops and cataloguing its rich figurative repertoire, often underestimating the undeniable fact that beyond the rich mythological representations, a figured vase is also a functional object whose shape and decoration are closely connected to its practical use and function within society. To fill this gap, a new research project on figured pottery from central pre-Roman Italy (*) has developed an interdisciplinary approach to study the uses and functions of figured vases. This project allows the investigation of the relationship between shapes, uses, and contents, their consistency and possible variation in connection with different contexts (necropolis, sacred areas, inhabited areas), through a diachronic perspective including the study of imports and local production. With the application of organic residue analysis (ORA), the use of the vases is analysed by identifying the commodities they once contained. The

combination of archaeological methodology and archive research allow us to re-contextualise the vases, investigating their function in their archaeological discovery context and the broader socio-economic and cultural context of the society in which they were used. The paper briefly presents the project, focusing specifically on the problems derived from performing ORA to highly valuable decorated ceramics, the development of a new analytical methodology for the determination of molecular markers from ancient complex matrices, and a new extraction/clean-up protocol and HPLC-MS/MS analysis after derivatisation, providing an archaeological interpretation of some of the first results achieved.

9 CAPACITY OF SYMPOTIC VESSELS IN THE LATE CLASSICAL PERIOD: REFLECTIONS ON THE CHANGES OF DRINKING HABITS

Kathariou, Kleopatra (University of Ioannina, Greece)

The capacity of a vessel is related to its function since form follows function. It is true that there are not many studies of vessel capacities so far; the existing isolated ones focus on black-figured attic vases exported to Italy or red-figure and black-glazed ones found in the excavations of the Athenian Agora. In this presentation we will focus on drinking vessels made in specific workshops of the late 5th and the early 4th century BC, when production of well potted and decorated vases was gradually replaced by mass vase manufacture.

The dominance of cups was later followed by smaller, more practical shapes, e.g. stemless and cup-skyphoi. What do the changes over time in vase shapes and their capacities tell us? Does the significantly smaller volume suggest changes in drinking habits, the consumption of less wine or different drinking activities?

Serving and mixing vessels will be studied in parallel to drinking vases either when produced in the same workshop or when found in an assemblage, in order to examine whether there is a functional relationship between them. In the cases of workshops, where red-figure drinking vases are known to have been produced together with black-glazed ones we will examine the differences in their capacity.

With this study, by bringing capacity into discussion we will try to connect pottery to everyday life and to trace changes in consumers' behavior towards its use.

10 SIZE DOES MATTER - WHAT THE CAPACITY OF DRINKING VESSELS CAN TELL US ABOUT THE INSTRUMENTALISATION OF CONSUMPTION HABITS

Dauth, Thomas (University of Innsbruck)

By the 4th century BC at the latest, black-glazed pottery had advanced from a luxury item to a mass product. In ceramic production centres around the Mediterranean, new vessel forms were developed to meet local needs. An initial review from the most recent excavations on Monte Iato in inland of western Sicily revealed striking similarities but also discrepancies within the ceramic find material. In particular, black-glazed drinking vessels showed a high degree of variability, both in terms of shape and capacity. This diversity is not reflected in current research on Hellenistic pottery. Rather, a study of the relevant publications gives the impression that new types of drinking vessels replaced older types and became progressively smaller from the 4th to the 2nd century BC, which can be attributed to changes in consumption habits. As findings from Monte Iato show, the change in consumption habits was not abrupt. Rather old consumption patterns may have been instrumentalized for social and political purposes, at least in selected situations.

The simplest and most time-efficient method of calculating the capacity of vessels is to use CAD programs to convert profile drawings into 3D objects and read the volume directly from them. In this way it is possible to calculate the average capacity, as well as the ratio between diameter, height and volume, of the most common types of drinking vessels from a large number of published vessels. This allows an approximate capacity to be calculated even for vessels that are only preserved in fragments but whose type can be determined. Fragments from stratified contexts can then be compared with these average values, allowing conclusions to be drawn about different, sometimes coexisting, consumption habits. This, at least in the case of Monte Iato, allows interesting conclusions to be drawn about everyday life, traditions and consciously represented identities.

11 APPROACHES TO CERAMIC ILLUSTRATION IN A DIGITAL AGE. EVALUATING AND COMPARING DIFFERENT METHODOLOGIES

Bruderer, Oliver (University of Zurich, Department of Archaeology)

Archaeological illustrations are an important means for understanding and communicating pottery remains found on archaeological excavations – quite often in huge quantities. With the ongoing digitisation various digital technologies support the illustration of pottery and have the potential to replace the traditional measuring and drawing by hand. There are, for example, automated drawing tools like the “Laser Aided Profiler” (laseraidedprofiler.com), or one can apply 3D documentation, as for example ‘Structure from Motion’. Whereas in the traditional hand drawing every line gets measured and drawn intentionally (and controlled) by the illustrator, the digital methods draw shapes based on

optical-mathematical measurement. Thus, they are influenced – and sometimes limited – by various physical parameters.

Upon closer inspection many of the assumed advantages as for example “making the drawing more precise”, “making the process faster”, “making the method easier to use” need to be reconsidered. But which method serves which purpose? What are the benefits of digital methods, and where are their limits?

As many in the fields, the Monte Iato excavation project of the University of Zurich has been confronted with these questions. A systematic evaluation of the above mentioned methods (traditional drawing / «Laser Aided Profiler» / «Structure from Motion») was done with artefacts in the Archaeological Collection in Zurich as well as with excavation material in Sicily.

12 IMAGES ON GREEK POTTERY “SEEN” BY A COMPUTER

Reinhardt, Corinna (Universität Zürich, Institut für Archäologie, Fachbereich Klassische Archäologie)

Images on ancient Greek pottery as sources for the study of ancient societies and their thinking are a well known topic in the discipline of Classical Archaeology and look back on a detailed and elaborate methodology. New developments of Artificial Intelligence, for example in the field of comparing and identifying images (and texts) present the discipline with challenges and new opportunities. Distant viewing of a larger dataset or an image-based search of similar poses, gestures or objects within the images provide a fresh look at a familiar material. However, these are only the beginnings of a digital archaeology in the field of image studies.

The presentation, thus, seeks to explore some of the potential of using methods of (mainly) Computer Vision in the study of Greek vase paintings and at the same time identifies problems for further developments. It is based on the results of a project which began at Friedrich-Alexander-Universität Erlangen Nürnberg/ Germany with funding from the Emerging Fields Initiative of the University from 2019-2022. It called Iconographics: Computational Understanding of Iconography and Narration in Visual Cultural Heritage. There, colleagues from the disciplines of Art History, Christian Archaeology, Classical Archaeology and the team of the Pattern Recognition Lab worked together on the challenge of developing image recognition and else for the humanities.

13 FROM REALIA TO VIRTUAL REALITY. A PROJECT OF MEDITERRANEAN ARCHAEOLOGICAL HERITAGE VALORISATION OVERSEAS THROUGH DIGITAL ARCHAEOLOGY AND AI

Mandic, Josipa (Aix-Marseille Université) - Saltini Semerari, Giulia (University of Michigan) - Vita, Cesare (Université Rennes 2)

This paper presents a project for the valorisation of matt-painted pottery found in Southern Italy through the creation of a virtual 3D models database hosted by the Museum of Anthropological Archaeology (University of Michigan) for scientific and didactic purposes. Matt-painted ware is one of the most tangible expressions of indigenous cultural identity between the 9th and 6th centuries BCE and a valuable source for understanding local funerary, domestic and ritual contexts and interactions dynamics during the Greek colonization. This pottery has been subject, in the last 30 years, to chrono-typological, contextual and archaeometric analyses resulting in a well-defined chronological, stylistic and technological framework. This project aims to take a step forward in the study of this material culture by harnessing Digital Archaeology and AI technologies in order to (1) create a public database for the valorization, research and teaching of this ware and (2) provide a useful case study for similar future initiatives. The project will create virtual 3D restitutions of a comprehensive dataset of regional and chronological specimens, which will be searchable for identification and 3D printing. The scientific aim of this project is the creation of a virtual depository of data for the implementation of AI software for the recognition of shapes and decorations of matt-painted pottery. The didactic aim is to facilitate, also overseas, the fruition and knowledge of those less treasured Mediterranean cultures through their virtual exhibition and use of new technologies.

14 MAKING SENSE OF HELLENISTIC POTTERY: PAST, PRESENT, AND FUTURE

Laftsidis, Alexandros (CReA-Patrimoine (ULB))

Research interest on Hellenistic pottery presented a notable delay in relation to the study of ancient Greek ceramics from other historical periods. It was not until the late 1980s that the study of Hellenistic pottery gained considerable traction. Fast forward a few decades, and our understanding on workshops, local ceramic traditions, trade networks and particularly the chronological distribution of different vessel-types has dramatically improved. The advancements, though, in the employment of scientific analysis and the hitherto attempts towards synthetic works moving away from merely positioning the examined pottery in time and place leave much to be desired. This situation begs the question of what the preferable approach to the study of this ceramic evidence should look like moving forward.

The paper attempts to offer an answer to the above question, aspiring to simultaneously provide a tentative theoretical framework for handling ceramic assemblages of the period. First, the use of archaeometric analysis should become

more widespread, joining forces with traditional archaeological approaches to answer questions of production, use, and provenance of pottery. Also, the wider application of software solutions, such as pottery databases, can facilitate the 'taming' of the overwhelming amount of pottery and allow for patterns of similarities/differences to emerge on a local and/or supra-local level. All the above approaches, however, should be informed by theory, which could help navigate through different interpretations and avoid unnecessary steps in analyzing pottery. Further, the underused so far scientific area of psychology can offer promising theoretical support. Finally, one should never lose sight of the ultimate goal, namely the enhancement of our understanding of Hellenistic societies. Treating our ceramic evidence as the remains of social practices, after it has been placed in its correct socio-economic and political contexts, could bring us one step closer to the realization of this difficult task.

15 THE CRACKING THE CODE PROJECT; ANCIENT TALES FROM THE GRAVE. A QUANTITATIVE APPROACH TO AN UNKNOWN PROTOGEOMETRIC COMMUNITY FROM AETOLIA

Simoni, Eleni (University of Patras) - Christakopoulou, Olga (Hellenic Ministry of Culture and Sports)

The Protogeometric cemetery at Stamna in Aetolia, Greece consists of over 500 burials, most of which date back to a very short period between 900-800 BC. The way most of the cemetery has been unearthed (rescue excavation prior to the construction of a highway) points to a promising site, the full extent of which could not be revealed and will take a very long time until this happens. Therefore, the application of every available method to understand the short but flourishing life of the settlement in a period relatively unknown in Mediterranean archeology is welcome and highly sought after.

In this article we will focus on the 267 burial pithoi of the cemetery. From the material published to date, we can classify them into 11 categories based on their manufacture. Additional data concerns the typology, quantity and decoration of the abundant grave-goods that accompanied them. Even though the site is not visible anymore, a very important piece of information, the spatial identity of the pithoi has been recorded. We know that they were located inside 27 burial clusters and make up more than half of the total graves of the site.

After having georeferenced the clusters, we apply a series of available GIS tools (spatial analysis, spatial statistics, KDA) and attempt to answer questions concerning the social and economic character of the settlement, about which nothing else is known. Are there significant differences among the burials in the different clusters? Does the distribution of pithoi and their offerings reflect a stratified society? Are contacts with other areas occurring? In this way, we propose a multidimensional excavation data processing tool and we highlight the importance of very thorough spatial recording in rescue excavations.

16 A MASS OF FUSED LAMPS FROM LATE ANTIQUE ATHENS - DIGITAL RECONSTRUCTION AND INTERDISCIPLINARY ANALYSIS

Petrakis, Manolis (Directorate of the National Archive of Monuments; National Archaeological Museum, Athens)

This paper explores an intriguing mass of fused wasters at the National Archaeological Museum in Athens. Comprising approximately one hundred intact or partially preserved terracotta lamps dating to the 4th century CE, it represents the largest known failed batch of lamps from a pottery kiln in Greece. Acquired by the museum in 1865 from the antiquities dealer Dimitrios Giagias, according to whom it was discovered in Metaxourgeion (next to the Athenian Kerameikos), this lamp mass is exhibited in the Museum's Vase Collection. However, technical difficulties, such as the fragile nature of the object, have hindered its thorough examination, making even its observation from all angles extremely difficult.

This paper addresses these challenges by applying ICT tools, aiming to provide a comprehensive analysis of the lamps-mass. Using photogrammetry, a 3D model has been created to document and study the challenging object, replacing traditional macroscopic analysis. Through the examination of this model, the paper endeavors to contextualize the find, determine its date, attribute the lamps to specific pottery workshops, and enhance our understanding of the lamp manufacturing process and the utilization of pottery kilns in Late Antique Athens. Furthermore, comparisons with samples from the workshops of neighboring Kerameikos have been conducted to confirm the provenance of the failed batches.

In addition to digital analysis, the paper employs archaeometric techniques, including X-ray examinations, to gain sight into the interior of the lamp mass. By integrating these multidisciplinary approaches, this study seeks to contribute to our understanding of ancient ceramic production and trade networks in the region and to demonstrate the use of 3D models in archaeological studies.

1068 AGRARIAN CHANGE IN THE MEDIEVAL MEDITERRANEAN: TOWARDS HOLISTIC ARCHAEOLOGIES OF ENVIRONMENTAL CHANGE

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Pluskowski, Aleks (University of Reading) - Kirchner, Helena (Autonomous University of Barcelona) - García-Contreras, Guillermo (University of Granada) - Alexander, Michelle (University of York)

Session format: Round table (without formal abstracts)

As the Mediterranean rapidly enters a new era of changing climate, holistic archaeologies can offer vital perspectives on how societies responded to environmental challenges through innovation and adaptation during the formative 'long Middle Ages'. This aim of this roundtable is to discuss how we can best approach the varied and fragmented data to better understand the relationship between societal and environmental change in the medieval Mediterranean. The recently begun ERC synergy project "Re-thinking the "Green Revolution" in the Medieval Western Mediterranean (6th - 16th centuries)" (MEDGREENREV) provides a framework for exploring the opportunities and challenges of integrating different types of archaeological, historical and environmental data, as well as scales of analysis, relevant theoretical frameworks and comparative approaches.

During this roundtable, we would like to explore:

- 1) Key research questions for archaeologies of environmental change
- 2) The challenges of integrating different types of data
- 3) The challenges of dating and robust chronologies
- 4) Long-term versus short-term perspectives on environmental change
- 5) The role of climate
- 6) Accommodating different theoretical frameworks
- 7) Comparative approaches across the Mediterranean world
- 8) Lessons for the future

We invite everyone interested in the complex relationship between societal and environmental transformation in the medieval Mediterranean to contribute to this discussion.

1071 MACHINE LEARNING METHODS IN ARCHAEOLOGICAL RESEARCH: NEW APPROACHES, BARRIERS AND STANDARDIZATION

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Berganzo-Besga, Iban (Ramsey Laboratory for Environmental Archaeology (RLEA), University of Toronto Mississauga) - Jakubczak, Michał (Institute of Archaeology and Ethnology, Polish Academy of Science) - Bulawka, Nazarij (Catalan Institute of Classical Archaeology) - Troiano, Maurizio (Department of Information Engineering, Electronics and Telecommunications (DIET) - University of Rome "La Sapienza"; Research Unit of Molecular Genetics of Complex Phenotypes, Bambino Gesù Children's Hospital, IRCCS, Rome) - Nobile, Eugenio (The Sonia and Marco Nadler Institute of Archaeology, Tel Aviv University)

Session format: Regular session

During the last years we have entered a new phase in the application of artificial intelligence (AI) in archaeology. The main advances within machine learning (ML) and deep learning (DL) have been successfully implemented in multiple archaeological case studies. However, it is easy to see that the use of these new methods comes with its own set of problems, and lack of a common procedure and standardization.

The variety of applications includes sites detection and material culture analysis, showing that these methods are able to define a wide spectrum of socio-economic aspects of the societies, such as the individual preferences of craftsmen, the technological mindset of the communities, or their exchange of ideas beyond any geographical borders.

At this session, in order to integrate the archaeological ML research into general archaeological practice, we would like to welcome every researcher who struggles with the above problems and also:

- All case studies on the application of AI, especially with the use of new algorithms and approaches to different sources of archaeological information with a clear focus on improvements.
- Analyses of how ML and DL have been implemented in archaeological research with a clear focus on the issues that have arisen and those studies that have proposed solutions to these issues. Plans for the use of these methods and the barriers researchers are encountering.

- Best practices and procedures, which can include comparative analysis, of how to approach the most common issues in archaeological research, such as the small amount of training data available.
- Ethical issues in ML-based archaeological research with a particular focus on the growth that AI has had globally during the last year.

ABSTRACTS

1 A DEEP LEARNING BASED TAPHONOMIC STUDY OF DS (BED I, OLDUVAI GORGE) AND ITS IMPACT ON RECONSTRUCTING EARLY HOMININ-CARNIVORE INTERACTIONS

Jiménez-García, Blanca (Universidad de Alcalá; Instituto de Evolución en África) - Cifuentes-Alcobendas, Gabriel (Universidad de Alcalá; Instituto de Evolución en África) - Baquedano, Enrique (Museo Arqueológico y Paleontológico de la Comunidad de Madrid; Instituto de Evolución en África) - Domínguez-Rodrigo, Manuel (Universidad de Alcalá; Instituto de Evolución en África; Rice University)

The importance of accurately identifying bone surface modifications (BSMs) has sparked considerable discussions regarding suitable methodological and interpretive frameworks for discerning taphonomic agents and their patterns of bone modification within dynamic taphonomic processes, particularly those involving interactions between different agencies.

Although efforts have been made to devise various comprehensive and objective experimental criteria to aid in detecting specific taphonomic agency, these criteria have largely remained unchanged for several decades, making it difficult to reach a consensus on the application of appropriate objective standards. Here, machine learning and convolutional neural networks demonstrate significant potential in accurately identifying and characterizing bone surface modifications.

The results depicted here contribute significantly to the ongoing discourse on early hominin behavior, emphasizing the importance of integrating traditional and AI-driven methodologies in taphonomic research.

In this study, we provide a thorough examination of the faunal assemblage retrieved from level 22A of DS (David's Site) within Bed I of Olduvai Gorge combining traditional methods based on quantification and physical attributes of the assemblage and more novel approaches based on deep learning and computer vision tools. These findings make a substantial contribution to the still ongoing discussion on early hominin behavior, emphasizing the importance of integrating traditional and AI-driven methods in taphonomic research. This holistic approach enhances our ability to identify specific carnivore agencies, better understand carnivore-hominin interactions, and reconstruct their roles within any given taphocoenosis.

2 A NEURAL NETWORK ANALYSIS FOR METRICS PREDICTION OF PRE-POTTERY NEOLITHIC-B LAMINAR ARTEFACTS FROM SOUTHERN LEVANT

Nobile, Eugenio (The Sonia and Marco Nadler Institute of Archaeology, Tel Aviv University, Israel.) - Troiano, Maurizio (Department of Information Engineering, Electronics and Telecommunications (DIET) - University of Rome "La Sapienza", Italy.; Bambin Gesù Paediatric Hospital.) - Mangini, Fabio (Department of Information Engineering, Electronics and Telecommunications (DIET) - University of Rome "La Sapienza", Italy.) - Mastrogiuseppe, Marco (Department of Information Engineering, Electronics and Telecommunications (DIET) - University of Rome "La Sapienza", Italy.) - Vardi, Jacob (Israeli Antiquities Authority, Israel.) - Gopher, Avi (The Sonia and Marco Nadler Institute of Archaeology, Tel Aviv University, Israel.) - Frezza, Fabrizio (Department of Information Engineering, Electronics and Telecommunications (DIET) - University of Rome "La Sapienza", Italy.) - Conati Barbaro, Cecilia (Department of Sciences of Antiquities, University of Rome "La Sapienza", Italy.)

The Pre-Pottery Neolithic B phase (10,600-9,000 years Cal B.P) is highly characterised by laminar production all over the Levant (Syria, Lebanon, Jordan and Israel) and South-eastern Anatolia (Turkey). This specific chrono-cultural phase consists of a specific reduction process that is aimed to produce mainly blades and secondarily bladelets. The laminar production represents indeed the main technological blank for tools shaping (e.g. arrowheads, sickle elements, borer/awls etc...) and tool resizing/recycling (e.g. multiple or combined tools). However, the conservation of such artefacts is often highly affected by several anthropic and natural causes, such as rituals, recycling activities and/or post-depositional processes. We therefore developed a methodology that aims to solve the laminar artefacts' metrics lack using a machine learning approach, specifically a neural network analysis based on a Bayesian regularization training algorithm.

The neural network analysis was carried out on Middle PPNB sites from the Southern Levant such as Motza, Yiftahel, and Nahal Reuel (Israel).

3 CLASSIFICATION OF GLASS BEADS BY IMAGE CLUSTERING FROM EARLY MEDIEVAL AUSTRIAN SITES

Tobias, Bendeguz (Österreichische Akademie der Wissenschaften - Institut für Mittelalterforschung) - Seidl, Benedict (University of Vienna, Institut für Urgeschichte und Historische Archäologie) - Miklautz, Lukas (University of Vienna, Faculty of Computer Science Research Group, Data Mining and Machine Learning) - Plant, Claudia (University of Vienna, Faculty of Computer Science Research Group, Data Mining and Machine Learning)

Glass beads were among the most common grave goods in the Early Middle Ages, with an estimated number in the millions. The color, size, shape and decoration of the beads are diverse leading to many different archaeological classification systems that depend on the subjective decisions of individual

experts. The lack of an agreed upon expert categorization leads to a pressing problem in archaeology, as the categorization of archaeological artifacts, like glass beads, is important to learn about cultural trends, manufacturing processes or economic relationships (e.g., trade routes) of historical times. An automated, objective and reproducible classification system is therefore highly desirable. We present a high-quality data set of images of Early Medieval beads and propose a clustering pipeline to learn a classification system in a data-driven way.

The pipeline consists of a novel extension of deep embedded non-redundant clustering to identify multiple, meaningful clusterings of glass bead images. During the cluster analysis we address several challenges associated with the data and as a result identify high-quality clusterings that overlap with archaeological domain expertise. To the best of our knowledge this is the first application of non-redundant image clustering for archaeological data.

4 AI CLASSIFICATION OF CERAMIC SHERDS: NEW FRONTIERS FOR THE ARCHAIDE PROJECT

Saraceni, Quirino (Department of Computer Science, University of Pisa) - Gattiglia, Gabriele (Department of Civilisations and Forms of Knowledge, University of Pisa) - Dubbini, Nevio (Miningful SRLS)

In recent years, there has been a growing emphasis on incorporating Artificial Intelligence (AI) methodologies in Archaeology, aimed at automating data processing, leaving archaeologists more time and resources for non-automatable tasks. In this regard, the ArchAIDE project (H2020 RIA, GA 693548) provided an automatic classification tool for ceramic fragments' decoration through a photo. Such a system has been the base for further research projects, e.g. developing a robotic platform to manipulate the fragments, exploiting the potential of ArchAIDE. To reach the goal, the improvement of the initial deep learning (DL) system, developed in TensorFlow 1.x and based on ResNet101, has been necessary.

ArchAIDE framework has first been ported to PyTorch, which provides dynamic control over graphs and facilitates code updates. Then the original Convolutional Neural Network has been fine-tuned - e.g. trials on dropout and intermediate features, addition/deletion of final layers - and other DL models have been explored, such as ResNet50 and Google Inception_v3. Top-5 accuracy has been improved from the original ~75% to ~90% and the top-1 accuracy from ~40% to over 60%, with ResNet50.

Moreover, we introduced the implementation of Continual Learning (CL), which lets the network incrementally add new instances and classes without re-training from scratch, porting ArchAIDE onto a CL framework (Avalanche). Such an approach will make ArchAIDE improvable with new ceramic types and classes more easily. Both the introduction of new instances into the existing ones (domain-incremental scenario) and new classes into the network (class-incremental scenario) got a fair top-5 accuracy, i.e. ~60%, and a top-1 accuracy comparable to that of the first version by ArchAIDE, i.e. ~40%.

The update and the CL approach are able not only to enhance recognition but also to future-proof ArchAIDE and make it more sustainable, enabling ongoing alignment with evolving data and research priorities.

5 EMPLOYING MACHINE LEARNING TRANSFER KNOWLEDGE TECHNIQUES FOR IMPROVED FUNGAL RECOGNITION IN ARCHAEOLOGICAL MICROSCOPY IMAGERY

Mircea, Cristina (Department of Molecular Biology and Biotechnology, Faculty of Biology and Geology, Babes-Bolyai University, Cluj-Napoca, Romania) - Mircea, Ioan Gabriel (Department of Computer Science, Faculty of Mathematics and Informatics, Babes-Bolyai University, Cluj-Napoca, Romania)

The present research aims at tailoring current Computer Vision Machine Learning models to the particular task of classification and recognition of fungal communities in the context of ancient archaeological fabrics studied using Scanning Electron Microscopy (SEM).

As state-of-the-art approaches towards the classification and recognition of various entities in imagery have had exponential success growth rates for the past decade, it is only fair to suppose a custom-tailored deep learning model will perform properly given proper training on such tasks.

The research is conducted in a highly transdisciplinary fashion, the bioarchaeologists being the element to the success of the endeavor as they will provide both the qualitative input data for training as well as the feedback for assessing the performance of the proposed Computer Vision Deep Learning model for continuous improvement and validation purposes.

The training of the models will be conducted on a curated dataset obtained from the literature with an emphasis on the data harvesting and preprocessing stages. The attention will focus on highly qualitative SEM imagery depicting a comprehensive range of fungi associated with archaeological textiles. The validation will be performed on modern textiles reinoculated with species of fungi isolated from the original archaeological textiles.

6 TOWARDS A SHARED PRACTICE FOR DEEP LEARNING APPLICATIONS TO LIDAR-BASED ARCHAEOLOGICAL PROSPECTION

Poggi, Giulio (Istituto Italiano di Tecnologia) - Sech, Gregory (Istituto Italiano di Tecnologia) - Jaturapitpornchai, Raveerat (Istituto Italiano di Tecnologia) - Fiorucci, Marco (Istituto Italiano di Tecnologia) - Traviglia, Arianna (Istituto Italiano di Tecnologia)

Deep Learning (DL) applications in LiDAR-based archaeological prospection assist the manual screening of extensive territorial data with beneficial implications for studying and safeguarding archaeological landscapes. However, the implementation of DL is still far from identifying shared best practices widely applicable to a range of archaeological features differing in size and shape and located in diverse geographical and geomorphological contexts. In addition, the scarcity and restricted scale of archaeological datasets often impose constraints on experimental settings, impeding the pursuit of general trends in the definition of tools and methods.

This presentation presents the results of a comprehensive testing framework aimed at facilitating the selection of appropriate preprocessing methods for DEM-derived products (visualisations) and DL model configurations for enhancing semantic segmentation performance in archaeological applications. This study assesses the influence of diverse visualisations and model configurations in identifying five different archaeological classes on two geographically distinct datasets in the Netherlands and Mexico.

Results show that the selection of the appropriate visualisation influences the overall performance of DL models up to 8%, although it is not possible to identify one visualisation that outperforms the others in all archaeological classes. Performance varies up to 25% across different model configurations and visualisations, underlying the importance of selecting the right match between visualisations and configurations. Lastly, this presentation evaluates how the combined use of the two different datasets can improve semantic segmentation performance by using transfer learning techniques from archaeological datasets instead of general-purpose images (e.g. ImageNet). Preliminary results suggest that this method is a valuable solution to overcome some issues related to the limited size and scarce availability of archaeological datasets.

7 CHALLENGES AND SOLUTIONS IN AUTOMATED LARGE-SCALE ARCHAEOLOGICAL MAPPING WITH DEEP LEARNING: INSIGHTS FROM DTM ANALYSES IN POLAND

Jakubczak, Michal (Institute of Archaeology and Ethnology, Polish Academy of Science) - Tyszkiewicz, Michal (École Polytechnique Fédérale de Lausanne (EPFL)) - Leloch, Michal (Faculty of Archaeology, University of Warsaw)

Recent years have seen numerous projects leveraging machine learning across various fields of archaeology and beyond. Researchers are increasingly recognizing the vast potential of this technology. Yet, we are at the early stages of developing efficient, practical, and accessible machine learning tools for archaeology, necessitating the formulation of a comprehensive methodology.

Thanks to the ISOK project, which focuses on flood protection, we now have free access to a Digital Terrain Model (DTM) of Poland. This model, generated from LiDAR data with a measurement density of 4 to 12 points per square meter, enables the effective remote sensing of many archaeological sites. However, with forested areas alone spanning almost 100,000 km², conducting manual analyses across the entire region is an enormous challenge, likely unfeasible for a small team. Neural networks have emerged as a solution to this issue.

In our paper, we aim to present the outcomes of use of neural networks for the remote sensing of archaeological sites preserved in the land's relief. Our project focused on mounds, charcoal piles, and trenches. We will discuss not only our outcomes but also the significant challenges encountered in data preparation, processing, and result interpretation.

8 COMPUTER VISION BEST PRACTICES IN COMPUTATIONAL ARCHAEOLOGY

Berganzo-Besga, Iban (Ramsey Laboratory for Environmental Archaeology (RLEA), University of Toronto Mississauga (UTM)) - Orengo, Hèctor (Landscape Archaeology Research Group (GIAP), Catalan Institute of Classical Archaeology (ICAC); Catalan Institution for Research and Advanced Studies (ICREA)) - Lumbreras, Felipe (Computer Vision Center (CVC), Autonomous University of Barcelona (UAB))

Landscape Archaeology has progressed enormously in recent years thanks to the introduction of new computer vision (CV) technologies (Argyrou and Agapiou, 2022). In particular, Machine and Deep Learning (ML and DL)-based approaches have demonstrated a wide range of archaeological applications beyond site detection, such as geochemical analysis (Oonk and Spijker, 2015) phytolith detection and classification (Berganzo-Besga et al., 2022a), and the identification of ceramic fragments (Wright and Gattiglia, 2018) between others.

This presentation is intended to provide a guide for the application of ML in archaeological research through a list of best practices. Both training and validation approaches will be presented. The most common problems encountered by archaeologists will be considered, such as the low-density of archaeological features to be detected and the small amount of training data available (Berganzo-Besga et al., 2023). Likewise, a series of methods will be shown to deal with the high number of false positives usually present in the algorithms' results.

The main objective of this talk is to present a comprehensive guide on the design, application, and validation of CV methods, the most common technology within the field of computational archaeology, for the automated identification of archaeological features.

9 INVESTIGATING DOCUMENT AI FOR ARCHAEOLOGICAL REPORTS: A COMPARATIVE ANALYSIS

Santos, Ivo (CIDEHUS - Universidade de Évora; HPC-Chair - Universidade de Évora)

The recent surge in Machine Learning (ML) and Artificial Intelligence (AI) has catalyzed the growth of various fields, including archaeology, possibly pushing into a new era. Evidence of this growth is demonstrated by the constant evolution, expansion and publication of models, datasets, algorithms, and related resources. Some of these efforts are only accessible through a paywall, others push the user to use APIs, but many are freely accessible through platforms such as HuggingFace and GitHub.

This work focuses on an endeavor to extract information from Portuguese archaeological reports, primarily in PDF format, with tools generically identified as Document AI and integrated into the author's PhD project. The corpus is composed of almost, 11000 documents, some digitally born, mostly following different formal structures.

Despite the plethora of tools, algorithms, and datasets saturating the AI landscape, the study aimed to evaluate the efficacy of some of these approaches, with a particular emphasis on accessibility.

We must acknowledge that the revolutionizing nature of the moment implies that this work may soon be describing already overshadowed technologies, not including new cutting-edge approaches, but we believe that the documentation and dissemination of our conclusions could benefit other researchers in their current and future endeavors.

10 APPLICATION OF A DEEP CONVOLUTIONAL NEURAL NETWORK TO SATELLITE IMAGERY FOR THE DETECTION OF PREHISTORIC STRUCTURES IN THE SAHARA DESERT

Brucato, Alessia (University of Bari Aldo Moro (UNIBA); National Research Council of Italy, Institute of Heritage Science (CNR ISPC)) - Taggio, Nicolò (Planetek Italia, GEOAI) - Masini, Nicola (National Research Council of Italy, Institute of Heritage Science (CNR ISPC)) - Scardozzi, Giuseppe (National Research Council of Italy, Institute of Heritage Science (CNR ISPC)) - Lucarini, Giulio (National Research Council of Italy, Institute of Heritage Science (CNR ISPC))

This research introduces a DeepLearning-based approach on satellite imagery to detect and classify archaeological prehistoric structures related to the Holocene period and distinctive of two macro-regions of the Sahara Desert.

Given the challenges of ground-based surveys in these regions, this study aims to enrich our understanding of Saharan prehistoric groups' occupation models, mobility patterns, and their role in exchanging goods and knowledge. The first case study explores settlements and temporary encampments of hunter-gatherers and herders in the oases of the Egyptian Western Desert during the Early and Middle Holocene. The analysis will concentrate on distinctive features such as the slab structures, a type of stone hut foundation, and the Steinplatz-type hearth-mounds, both characteristic of this region. The second case study focuses on landmark monuments associated with Middle and Late Holocene pastoral groups. These monuments, including 'Keyhole,' 'Antenna,' 'Croissant,' and 'V' tumuli, are located in the central and western Sahara, and date between the 4th and the 2nd millennium BC.

This study utilizes a diverse set of satellite imagery, including very-high-resolution optical images (Bing Maps, Google Earth), satellite panchromatic photos from the Cold War era (Hexagon KH-9, Corona KH-4B), and multispectral and radar data (ESA's Copernicus Sentinel).

The satellite images are processed using both cloud platforms and local software (Google Earth Engine, SASPlanet, QGIS) to highlight potential archaeological sites through image-enhancing techniques such as Spectral Indices and PCA. The processed dataset, combined with information from the archaeological record, was prepared to train a Deep Convolutional Neural Network (Ultralytics YOLOv8) for the identification of similar archaeological features.

Preliminary results indicate that the algorithm effectively detected potential new archaeological features, subsequently validated through visual inspections and on-site verifications. This methodology showcases the capability of integrating satellite imagery and Artificial Intelligence to unveil previously undiscovered archaeological sites in desert environments.

11 DEVELOPING A MACHINE LEARNING TOOL FOR THE IDENTIFICATION OF ARCHAEOLOGICAL FEATURES IN LANDSCAPE DATA

Curran, Susan (The Discovery Programme) - Corns, Anthony (The Discovery Programme) - O'Keeffe, John (The Discovery Programme) - Kokalj, Žiga (ZRC SAZU) - Čož, Nejc (ZRC SAZU) - Kocev, Dragi (Bias Variance Labs) - Kostovska, Ana (Bias Variance Labs) - Dimitrovski, Ivica (Bias Variance Labs) - Davis, Stephen (University College Dublin)

The demand for utilising machine learning (ML) in archaeology is steadily rising due to the swift advancement of image analysis techniques and the increasing accessibility of high-quality airborne laser scanning data (ALS). The Automatic Detection of Archaeological Features (ADAF) tool has been developed to offer user-friendly software utilising ML models, particularly convolutional neural networks, for the automatic detection of archaeological features from ALS data. The ADAF tool has been funded by Transport Infrastructure Ireland (TII) in order to mitigate the potential of development-led excavation during the construction of major road schemes.

The software requires minimal interaction and no prior user knowledge of ML techniques, significantly enhancing its accessibility to the archaeological community. The underlying ML models have been trained on an extensive archive of ALS datasets in Ireland, expertly labelled with three types of archaeological features (enclosures, ringforts, barrows). The key components of the tool include the Relief Visualization Toolbox (RVT) and the Artificial Intelligence Toolbox for Earth Observation (AiTLAS), both actively used in aerial archaeology. RVT is essential for processing input data (for training and inference) by converting digital elevation models into ML-friendly visualisations, while AiTLAS provides access to the ML models. A series of experiments has been conducted with different visualisation methods and ML architectures for object detection and semantic segmentation to determine the optimal configurations for the software.

This paper concludes the project with the ADAF tool published under open access for reuse within the research community. An evaluation of the ADAF tool will be explored through comparative analysis compared to human-only identification of archaeological features. Identification issues, such as false positives, will be discussed along with their reduction using ADAF tool functions and GIS post-processing. Finally, the retraining of the ADAF ML model will be explored for use with new ALS datasets and monument types.

12 MACHINE LEARNING AND ARCHAEOLOGICAL PREDICTIVE MODELLING: FUTURE HORIZONS IN PREDICTING THE PAST

Magnini, Luigi (Ca' Foscari University of Venice (Italy)) - Pedersoli, Stefano (University of Sassari) - Bettineschi, Cinzia (University of Augsburg)

What happens when combining two controversial digital archaeology methodologies? Which unique contributions can arise in terms of research outputs? This presentation will focus on the theoretical and practical implications of employing artificial intelligence (AI) to implement predictive models for landscape organization, and site identification.

While AI, and particularly Machine Learning (ML), stands out as one of the trendiest methodologies in the current panorama of digital applications in archaeology, it is surprising that only a limited number of case studies have explored its potential for predictive modeling. The inexplicable (?) persistence in exclusively applying ML for micromorphology identification on DTMs (did someone mention mounds?) has asphyxiated even the numerous and, potentially, infinite neurons of the most sophisticated neural network, reducing the potential of AI in archaeology to two primary research lines: feature detection and artifact analysis.

This research aims to investigate the topographical and geographical factors influencing anthropic location choices in relation to the site type and available resources. The study focuses on two classes of sites: control places in mountainous areas and nuraghes (Sardinian megalithic structures of the Bronze and early Iron Age). In the first case study, the dataset was not sufficiently large or standardized for training a neural network model, leading us to opt for a theory-driven approach combined with symbolic AI. In the second case study, the abundance of known sites enabled the development of a dedicated protocol bringing together data-driven analysis and ML. Spatial statistics were used to extract significant topographical, geological, and geomorphological variables, while CNNs were employed to pinpointing regions with the highest archaeological potential in terms of probability of finding nuraghes. The presentation

will discuss both case studies and will underline the relevance of choosing the best approach according to the type and consistency of the available dataset, and the overarching archaeological question.

13 A PICTURE IS WORTH A THOUSAND WORDS - AUTOMATED WORKFLOW OF ARCHAEOLOGICAL ILLUSTRATIONS USING DEEP LEARNING

Klein, Kevin (Vor- und frühgeschichtliche Archäologie, Institut für Altertumswissenschaften, Johannes Gutenberg University Mainz, Mainz, Germany; Palaeogenetics Group, Institute of Organismic and Molecular Evolution (iomE), Johannes Gutenberg University Mainz, Mainz, Germany) - Brami, Maxime (Palaeogenetics Group, Institute of Organismic and Molecular Evolution (iomE), Johannes Gutenberg University Mainz, Mainz, Germany) - Gorelik, Alexander (Vor- und frühgeschichtliche Archäologie, Institut für Altertumswissenschaften, Johannes Gutenberg University Mainz, Mainz, Germany) - Lämmel, Ralf (Software Languages Team, University of Koblenz, Koblenz, Germany)

The transition from Neolithic to Bronze Age societies in Europe is characterized by an enormous amount of archaeological material, including tens of thousands of graves, published to different standards. The primary challenge in analyzing and classifying these assemblages lies in the lack of easily accessible, machine-readable data. There are two potential data sources in publications: written descriptions and illustrations. Working with content from numerous publications is difficult, due to differences in written descriptions and the absence of common recording systems. Manually processing large amounts of drawings to extract information such as size or orientation of graves is a time-consuming, repetitive and error-prone task.

To facilitate the processing of large amounts of data we developed a two step workflow which is implemented in a software called AutArch (Klein et al. 2023): the first step is completely automated and utilizes neural networks for object detection and classification, image processing algorithms and OCR. The second step consists of an interactive user interface allowing for manual adjustments but also offers a toolset for data analysis.

Using AutArch, we were able to quickly identify graves in archaeological PDFs and assemble a dataset of 613 Neolithic burials. Basic attributes such as the size, orientation and number of skeletons in the burial pit were automatically extracted. Crucially, the workflow can relate attributes on the page, such as the grave outline, the north arrow and the scale, to generate archaeologically-relevant data from drawings. It can also extract and analyze whole-outline shape data using EFA.

In sum, AutArch harnesses the power of AI to deliver fast, efficient and standardized data collection from archaeological illustrations. The old maxim, 'a picture is worth a thousand words', has never been truer.

Klein, K. et al. (2023), 'An AI-assisted workflow for object detection and automated recording in archaeological catalogues'. ArXiv: 2311.17978.

14 NAMED ENTITY RECOGNITION APPLIED TO XML-TEI-ENCODED FRENCH ARCHAEOLOGICAL REPORTS. FIRST RESULTS OF THE ARCHES PROJECT

Rego, Diane (Inrap) - Menu, Ariane (Inrap) - Bryas, Emmanuelle (Inrap)

Over 2,000 archaeological field reports are produced every year at the Inrap, encompassing the whole French territory and all chronological eras. In spite of a dedicated online catalog platform (Dolia) and a permanent archiving at the CINES (French National Computer Center for Higher Education), the reports lack open accessibility and reusability due to their PDF format and the sheer volume of data they represent. Facing this situation, this paper will present ARCHES (Archéologie & Édition Structurée), a project experimenting new approaches to the field reports' publishing chain in order to FAIRify our data.

Financed with the support of the French National Fund for Open Science (Fonds National pour la Science Ouverte), ARCHES aims to explore ways of improving the dissemination and exploitation of field reports using Machine Learning and the XML-TEI format. This presentation will display the first results of the project, showing the successes and pitfalls encountered during the creation of a dedicated Named Entity Recognition model, from the annotation campaign on INCEPTION and training with the spaCy Python library to its evaluation. Building on a previous experiment made within the ARIADNEplus project, this model aims to identify fifteen types of archaeological entities, from objects and features to materials and techniques, from people and organizations to places and chronological references, and more. Then, we will explain how this model can enrich the semantic mark-up in TEI to already XML-structured archaeological reports to enhance the online publication and consultation of FAIR archaeological data.

15 FINDING A MATCH: A DIGITAL COMPARISON OF ARCHAEOLOGICAL POTTERY DRAWINGS AND MORPHOLOGICAL DATA

Zampierin, Daniele (Freie Universität Berlin) - Zampierin, Luca (Independent researcher)

From the third century BCE onwards, the Indian Ocean, particularly its Western half, has been the stage for the development of a large trade network connecting three different continents and countless different cultures. Despite being the topic of ever-growing interest from the international archaeological and historical community, the image of the Indian Ocean trade network is still extremely fragmented, isolated, and far from a comprehensive understanding of its original dynamics. Among the multiple difficulties that a researcher faces when investigating such long-distance interactions, identifying the provenance of ceramic artefacts is one of the most significant and complex.

Within the provenance study of pottery, the most adopted approaches are two: raw material analysis and morphological comparison. Despite being sometimes used independently, ideally, the two approaches should be combined to have a complete picture and a better identification. However, the combination of the two methods requires an enormous amount of data extraction and comparison resulting in an enormous investment of time and effort.

This paper introduces a new methodology, based on machine learning, which has been developed specifically to speed up the provenance study of ceramic artifacts from Khor Rori (Oman). Such methodology, built combining gradient boosting and content based image retrieval, offers the possibility of searching for morphologically comparable artefacts from a large collection of archaeological materials. In particular, the program confronts the morphological data and the archaeological pottery drawings providing the researcher with a limited set of potential matches to choose from. Consequently, the researcher is left only with the duty of choosing the most similar ceramic classes simply by comparing the material description. The presentation aims to start a discussion on the advantages and disadvantages of the adoption of machine learning in pottery provenance studies.

16 THE SHADOWS OF DIFFERENCES: NEURAL NETWORKS AND PREPROCESSING STRATEGIES IN DIGITAL ARTEFACT ANALYSIS

Blochin, Jegor (independent researcher) - Lashmanov, Oleg (independent researcher) - Korolev, Alexander (independent researcher) - Silaeva, Nina (independent researcher) - Vasilyev, Stanislav (independent researcher)

This paper explores the application of neural networks in digital archaeology, specifically focusing on artefact analysis. Over the past decade, numerous implementations have emerged, targeting artefact classification, typology analysis, and pattern recognition. Stressing the importance of high-quality preprocessing in image recognition, our team has dedicated several years to developing an algorithm for searching analogies among archaeological artefacts in diverse databases from multiple institutions. We thoroughly explore the pros and cons of different preprocessing pipelines, evaluating approaches like image matting for effective artefact segmentation in photographs containing additional objects. The paper provides a comparative analysis of different neural network types, including convolutional neural networks and transformers, for similarity detection. While these networks are generally effective, our experience highlights the necessity of additional preprocessing steps for optimal performance in archaeological tasks. Finally, drawing on practical insights, we propose a comprehensive pipeline covering detection, classification, semantic segmentation, and similarity search. The proposed approach synthesizes our team's practical experience, offering a valuable contribution to the field of machine learning in digital archaeology.

1072 CROP HISTORY RESEARCH: AFTER PREHISTORY

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Ros, Jerome (Institut des Sciences de l'Évolution de Montpellier; CNRS) - Fuks, Daniel (Ben-Gurion University of the Negev) - Ryan, Philippa (Interdisciplinary Research, Royal Botanic Gardens Kew) - Alexander, Michelle (BioArCh, Department of Archaeology, University of York) - Peña-Chocarro, Leonor (Instituto de Historia, Consejo Superior de Investigaciones Científicas (CSIC))

Session format: Regular session

Reconstructing the pathways of agricultural crop diffusion and evolution is essential to research on the origins and development of agriculture through time, with long-recognized implications for modern crop improvement and understandings of human history. Yet, until recently, research has largely focused on initial domestication beginning with the southwest Asian Neolithic over 10,000 years ago, to the near exclusion of more recent crop histories directly affecting today's agricultural diversity. This session aims to bring together a diverse group of researchers working on agricultural developments over the last 3,000 years or so, from any region. This session will look at the notions of legacies, transitions, changes and evolutions from a socio-economic and/or environmental perspective. Papers (reviews or case studies) may include archaeobotanical, ethnoarchaeological, biomolecular, isotopic, historical or other

methods of inquiry. Interdisciplinary studies are encouraged and we are particularly interested in work focused on a particular crop plant or group of crops.

ABSTRACTS

1 WILL CORDIA MYXA STAND UP, PLEASE? UNTANGLING THE HISTORIES OF CORDIA SPECIES IN THE ANCIENT EASTERN MEDITERRANEAN

Muthukumar, Sureshkumar (National University of Singapore)

The fruit stones of the edible sebesten plum (*Cordia myxa*), whose native range extends from mainland Southeast Asia to Iran, are reported present in Egyptian archaeological sites from the early Bronze Age on. The exceptionally early presence of this Asian species in Egypt remains unexplained and perplexing. Some of these fruit stones may be misidentifications of the related grey-leaved saucer berry (*Cordia sinensis*), a native of Africa and Asia. Additionally, a few other Afro-Asian *Cordia* species (e.g. *Cordia dichotoma*, *Cordia africana*) present a long history of human consumption and use. Regardless, the sebesten plum is certainly present in later Egyptian samplings, particularly those of the Greco-Roman period. This paper aims to clarify the dispersal trajectory and uses of *Cordia* species in ancient eastern Mediterranean contexts through archaeological and textual records. Using relocated *Cordia* species as an index for human mobility, the paper will also shed light on linkages between societies in East Africa, Peninsular Arabia, India, and the eastern Mediterranean.

2 ARCHAEOBOTANY, GEOMETRIC MORPHOMETRICS AND GENOMICS OF WORLDWIDE OPIUM POPPY (*PAPAVER SOMNIFERUM* L.) ACCESSIONS REVEAL ITS ORIGINS AND SPREAD

Oliveira, Hugo (Interdisciplinary Center for the Archaeology and Evolution of Human Behaviour (ICArEHB), University of Algarve, Faro, Portugal.) - Machado, Rui (Interdisciplinary Center for the Archaeology and Evolution of Human Behaviour (ICArEHB), University of Algarve, Faro, Portugal.) - Salavert, Aurélie (Unité Mixte de Recherche (UMR) Archéozoologie, Archéobotanique: Sociétés, Pratiques et Environnements, Muséum National d'Histoire Naturelle (MNHN), Centre National de Recherche Scientifique (CNRS), Alliance Sorbonne Université, Paris, France.) - Bouby, Laurent (ISEM, University of Montpellier, CNRS, IRD, EPHE, Montpellier, France.) - Soteras, Raúl (Division of Natural Sciences, German Archaeological Institute (DAI), Berlin, Germany.) - Bonhomme, Vincent (ISEM, University of Montpellier, CNRS, IRD, EPHE, Montpellier, France) - Evin, Allowen (ISEM, University of Montpellier, CNRS, IRD, EPHE, Montpellier, France) - Antolín, Ferran (Division of Natural Sciences, German Archaeological Institute (DAI), Berlin, Germany.)

Studies on the origins and spread of agriculture in the Old-World focus almost exclusively on food crops domesticated in Southwest Asia, namely cereals and pulses. Crops with multiple uses (p.ex. for fibre, oil, medicines) or those cultivated after native species from outside SW Asia have received scarce attention. The opium poppy (*Papaver somniferum* L.) was probably the only major crop domesticated in Neolithic Europe and one of a few species cultivated for various purposes (i.e. narcotic properties, medicinal, seed oil and food).

The earliest poppy remains were recovered in early Neolithic contexts in sites such as La Marmotta (Italy) and La Draga (Spain), dated to 5610–5480 cal BCE and 5311 and 4717 cal BCE, respectively. Poppy seeds are also found in many Linear Pottery Culture (LBK) sites in Central/North-Western continental Europe (5200–5000 cal BCE), out of the area of its presumed wild distribution form. This temporal proximity between poppy presence from the LBK and Cardial is intriguing. One hypothesis is that poppy was initially exploited in the Cardial and moved into the LBK region, following existing networks. The following diffusion of poppy cultivation during late prehistory and classical antiquity remains unclear.

Here, we present a combination of genomic analysis and geometric morphometry of seeds of 160 modern opium poppy accessions from Eurasia. The results are contextualised with radiocarbon dates directly obtained from archaeological poppy seeds, iconographic attestations, and textual references. From these we propose a tentative history of opium poppy diffusion and its uses in prehistory and historical times.

3 ETHNOBOTANICAL PERSPECTIVES ON CROP HISTORIES IN WEST AFRICA

Ryan, Philippa (RBG Kew)

Ethnobotany has the potential to provide new perspectives on recent and longer-term crop histories, and to link up the archaeological and historical record to the present day. Some groups of crops have been little focused on within archaeobotany, because they leave limited or difficult to interpret archaeobotanical remains (such as vegetatively propagated crops). In other instances, ethnobotany can provide ethnoarchaeological insights about crop histories in countries where there has been virtually no archaeobotany. Ethnobotany can provide new information on landrace diversity and varietal groupings and about changes in the role of crops in living memory. Recent changes in the relative

importance and uses of crops are often little documented, but provide a historical baseline from which to consider the role of local crops prior to the great changes in agrobiodiversity patterns brought about by the increased role of commercial monocrops over the last century. This paper will focus on recent ethnobotanical fieldwork in Guinea, West Africa, on yams and fonio.

4 THE CHANGING FORTUNES OF PEA IN IRELAND OVER THE LAST TWO MILLENNIA

Collins, Adam (University College Dublin) - McClatchie, Meriel (University College Dublin) - Negrão, Sónia (University College Dublin) - Vargas Sielfeld, Sofia (University College Dublin)

Current pea production in Ireland for human consumption is clustered around a single, modern pea processing plant in the east of the country. Has pea always been grown in such a small region of the country or was it different in the past? Can we see from the archaeological record how pea was grown in Ireland's past and determine what socio-economic factors influenced its use across Ireland over the past 2000 years? Ireland has a rich history of farming stretching back to the Neolithic period. While ancient Irish farmers cultivated a wide array of crop species and varieties in all areas of the country, modern farming practices have restricted the growth of certain crops to certain areas. The CRO-PREVIVE project examines the extensive archaeological evidence for farming in ancient Ireland, focusing on the trajectories of three target crops - Emmer Wheat, Rye and Pea. This mixed-methods project seeks to examine the transitions, changes and evolutions of each crop from different perspectives to seek an explanation as to why these crops are underutilised in the modern context and by working with industry specialists how we might re-introduce the crops, encouraging more sustainable farming practices and encouraging a more diverse environment for all.

5 COMPARATIVE GENETIC VARIATION IN OLD OLIVE TREES IN THE SOUTH LEVANT - A WINDOW INTO THE HISTORY OF OLIVE CULTIVATION

Barazani, Oz (Agricultural Research Organization, Institute of Plant Sciences, Israel) - Ben Dor, Elad (Agricultural Research Organization, Institute of Plant Sciences, Israel; The Robert H. Smith Faculty of Agriculture, Food and Environment, the Hebrew University of Jerusalem, Israel) - Dag, Arnon (Agricultural Research Organization, Gilat Research Center, Israel)

The olive tree (*Olea europaea*) is the most important fruit tree of the Mediterranean Basin, possessing both economic and cultural significance. The earliest evidences of olive fruits usage (table olives and oil extraction) that had been found in the southern Levant (modern Israel) indicate on the focal role of this region in olive domestication and thus on the importance of local olive genetic resources. With that in mind we study the history of olive cultivation in the southern Levant. Using molecular tools in genetic analysis of old living olive trees we detected ancient landraces and suggest on a trend in cultivar usage along history. In addition, by using comparative analysis between samples collected from the canopies and roots we were able to trace back preferable propagation technique. Our analysis included iconic olives in the garden of Gethsemane and ancient living olive trees, relicts of Byzantine agricultural system in the Negev desert. The findings contributed to the understanding of the importance of the unique germplasm that still exist in the region and initiate ex-situ and in situ conservation programs.

6 SEARCHING THE ORIGIN OF CULTIVATED OLIVES: GENETIC, MORPHOMETRIC AND PHENOTYPIC ANALYSIS OF NATURALLY GROWING OLIVES IN THE ATLIT AREA, ISRAEL

Ben Dor, Elad (The Robert H. Smith Faculty of Agriculture, Food and Environment, the Hebrew University of Jerusalem, Israel; Agricultural Research Organization, Institute of Plant Sciences, Israel) - Barazani, Oz (Agricultural Research Organization, Institute of Plant Sciences, Israel) - Dag, Arnon (Agricultural Research Organization, Gilat Research Center, Israel) - Ben Dor, Yoav (Geological Survey of Israel)

It is known that the ancestor of cultivated olives (*Olea europaea*) is its wild relative - *O. europaea* subsp. *europaea* var. *sylvestris*, yet the original gene pool of var. *sylvestris* remains unknown and whether genuine populations of the wild ancestor still exist is the subject of debate among botanists.

In this research we focused on the most hypothetical southern distribution range of var. *sylvestris* in the East Mediterranean, in a region that is less subjected to gene flow from groves of cultivated olives. In a large scale botanical survey we mapped hundreds of naturally growing olives and integrated genetic, morphometric and phenotypic analyses to create passport data set for individual trees. The variation of size and shape of stones, fruit and oil characteristics and genetic ID was immense in comparison to cultivated varieties. All together the results showed that this special population may be the key to unlocking the origins of cultivated olive trees.

7 OLIVE CROPS IN LATE BRONZE AGE CRETE: BIODIVERSITY AND TEXTUAL SOURCES

Pierini, Rachele (University of Copenhagen)

This paper focuses on the olive crops *Olea europaea* in Late Bronze Age Crete and the distinction between wild and domesticated plants by analysing the textual sources attesting the presence of olive trees on the island, namely Linear A (1800-1450 BCE) and Linear B (1450-1100 BCE) tablets. In Linear A and Linear B, 'olive' is denoted by the sign AB 122 OLIV, which is used as a plain logogram and as a ligatured sign, namely a logogram incorporating a syllabic sign that aims to further specify the typology of the logogram. The Linear B ligatured signs of AB 122 OLIV allow to distinguish between wild and domesticated olive plants. By analysing the written sources from Late Bronze Age Hagia Triada, Zakros, Tylissos, Arkhanes, and Knossos this paper also sheds light on the relevance of the geographical and chronological contexts of these findings in connection to the open questions about the exploitation of olive cultivation in Bronze Age Crete. The study also delves into the broader archaeological context, incorporating data from pollen studies, crop-processing activities, and the identification of olive taxa.

8 VITICULTURE LANDSCAPES OF THE LATE ANTIQUE SOUTHERN LEVANT

Miller, Shulamit (University of Haifa; Hebrew University of Jerusalem) - Bar-Oz, Guy (University of Haifa) - Ben-Eliyahu, Eyal (University of Haifa) - Gambash, Gil (University of Haifa)

Viticulture in the ancient Mediterranean was one of the most prolific agricultural enterprises. If properly tended, vines could grow in diverse landscapes and climate regions, providing both large- and small-scale vintners and landowners with high financial gains at relatively low initial investment.

To date, studies of viticulture in the Roman and Late Antique Mediterranean have focused primarily on the western Mediterranean, with some attention placed on the regions of Greece, Asia Minor, and most recently also Egypt. Nevertheless, the region of the Levant, particularly the southern Levant, remains for the most part outside of scholarly debate, despite rich archaeological and textual evidence attesting to diverse sustainable strategies used in growing vines. This paper attempts to bridge this gap by presenting new evidence and insights into viticultural practices in the southern Levant, with emphasis on the configuration and architecture of vineyards. By examining the landscapes, layout, and planting practices, we are able to discuss sustainable strategies evident in the methods of natural resource exploitation in the context of vineyards. For example, we address viticultural practices in the arid micro-region of the Negev Highlands, which produced prized wines traded throughout the Late Antique Mediterranean. Also, rock-cut vineyards located in hilly landscapes exemplify strategies aimed at combating soil erosion on slopes and at maximizing cultivation potential. Ultimately, despite regional differences, we show that the evidence from the southern Levant corresponds to the broader framework of viticultural tradition common throughout the Mediterranean world.

9 OLIVE FINDING FROM MA'AGAN MIKHAEL B SHIPWRECK (7TH-8TH CENTURY CE)

Schmerler, Noam (School of Archaeology & Maritime Cultures, University of Haifa, Israel) - Ben Dor, Elad (Institute of Plant Sciences, Department of Vegetables and Field Crops, Volcani research Institute, Israel; The Robert H. Smith Faculty of Agriculture, Food and Environment, Israel) - Ben Dor, Yoav (Geological Survey of Israel, Jerusalem) - Barazani, Oz (Institute of Plant Sciences, Department of Vegetables and Field Crops, Volcani research Institute, Israel) - Cvikel, Deborah (School of Archaeology & Maritime Cultures, University of Haifa, Israel)

The Ma'agan Mikhael B shipwreck was found about 30 km south of Haifa, Israel. It is the remains of a 25-meter-long merchantman which plied the Mediterranean Sea at the early Islamic period (7th-8th century CE). The shipwreck was found in pristine condition and excavated in the course of eight seasons (2016-2022). The 250 amphorae found in the hull contained different foodstuff such as dates, nuts, fish and olive fruits. This research focused on 24 out of the 36 amphorae which contained preserved olives, apparently table olives. These amphorae are a unique finding that has no precedent in this time period. Using designed computerized morphometric tools, we aim deciphering the origin of these olives and accordingly the rout of the ship. Our results show that the olives belong to cultivars typical to the southern Levant, the region of modern Israel, Palestine, Syria, and Jordan. This discovery opens new understanding on the use and trading of olives as staple food (table olives), deeply rooted in the customs of the region.

10 FIRST ARCHAEOBOTANICAL EVIDENCE FOR *V. FABA* VAR. *EQUINA* AND *VICIA FABA* VAR. MAJOR CULTIVATION AND BREEDING FROM MEDIEVAL SOUTHERN ITALY

Grasso, Anna (Università del Salento) - Primavera, Milena (Università del Salento) - Fiorentino, Girolamo (Università del Salento)

The faba bean (*Vicia faba* L.) was one of the first plants to be domesticated. The cultivation of this legume made it possible for man to have readily available a high protein food, animal fodder and a natural fertilizer for the fields. These features, along with the ease with which it could be grown and the production cycle in alternative to grains, determined its widespread use for millennia.

The circulation of the small grain fava bean started in the earliest phases of domestication and its size remained essentially the same for thousands of years. However, beginning in the Late Antiquity, there was an increase in the size of the bean, witnessed by some remains identified in the Mediterranean and Central Asia, which led to the *Vicia faba* var. *equina* in Sicily (Italy). Subsequently, in the later Middle Ages, there was a new phase of varietal improvement of the bean in Apulia (Italy) that led to a new faba cultivar, the *Vicia faba* var. *major*.

The purpose of this study is to substantiate this picture, with reference to the morphometric analysis of charred remains of *Vicia faba* specimens collected from various archaeological sites located in south-east Italy, dated to a range of periods, comparing them to modern reference material.

11 THE ROMAN WAY(S). ARCHAEOBOTANICAL RECORDS DOCUMENT DIFFERENCES IN CROP CHOICES IN WESTERN IBERIA DURING ROMAN TIMES

Tereso, João (CIBIO-BIOPOLIS - Research Center In Biodiversity and Genetic Resources/University of Porto; Centre for Archaeology. UNIARQ. School of Arts and Humanities. University of Lisbon; Centre of Interdisciplinary Studies, University of Coimbra; MHNC - UP - Natural History and Science Museum of the University of Porto) - Seabra, Luís (CIBIO-BIOPOLIS - Research Center In Biodiversity and Genetic Resources/University of Porto; Faculty of Sciences, University of Porto) - Guerra, Amílcar (Centre for Archaeology. UNIARQ. School of Arts and Humanities. University of Lisbon) - Arruda, Ana (Centre for Archaeology. UNIARQ. School of Arts and Humanities. University of Lisbon) - Fabião, Carlos (Centre for Archaeology. UNIARQ. School of Arts and Humanities. University of Lisbon) - Viegas, Catarina (Centre for Archaeology. UNIARQ. School of Arts and Humanities. University of Lisbon) - Detry, Cleia (Centre for Archaeology. UNIARQ. School of Arts and Humanities. University of Lisbon) - Carvalho, Pedro (Centre of Interdisciplinary Studies, Faculty of Arts and Humanities. University of Coimbra) - Silva, Ricardo (Centre of Interdisciplinary Studies, Faculty of Arts and Humanities. University of Coimbra) - Correia, Virgílio (Museu Nacional de Conimbriga; Centro de Estudos Clássicos e Humanísticos, Universidade de Coimbra)

Until recently, most Roman carpological investigation conducted in Iberia has focused on the South, East and NW areas, namely in the Tarraconensis and Baetica provinces. B-Roman project aimed to tackle the lack of archaeobotanical studies in the Lusitania province by recovering and analysing a large number of samples from several archaeological sites in western Iberia. The aim of this paper is to present and discuss its main results.

Data obtained suggests a greater reliance on a variety of fruits absent or rare in the Iron Age and show a close affinity between Lusitania and Mediterranean Hispanic provinces, rather than with the NW. Despite some investigation and preservation biases affecting the archaeobotanical record, differences in the western fringe are probably driven by south-north environmental contrasts, although social-economic causes are likely also at play.

This interplay between crop choices, environmental constraints, and the introduction of social and economic models under the Romans in western Iberia will be explored using the carpological data as a starting point but integrating other components of the archaeological record in order to put the archaeobotanical information into perspective.

12 SOWING THE SEEDS OF EMPIRE: EARLY STATECRAFT AND THE EMERGENCE OF INDIGENOUS AGRICULTURE ON THE MONGOLIAN STEPPE (C.250 BC-150 AD)

Carolus, Christina (Yale University) - Cameron, Asa (Yale University) - Wright, Joshua (University of Aberdeen) - Honeychurch, William (Yale University) - Chunag, Amartuvshin (National University of Mongolia) - Szpak, Paul (Trent University)

The end of the first millennium BC (c.250 BC-150 AD) marks the genesis of the Xiongnu, eastern Eurasia's first nomadic state, which emerged from central Mongolia to successfully integrate one of the largest-scale political configurations in prehistory. This transformative period also marks the appearance of Mongolia's earliest direct agricultural evidence. Though long assumed to be a "purely pastoral" state, scholars have recently considered connections between these phenomena. Growing evidence suggests a political culture that may have deployed novel foodways in statecraft: namely, the development of flexible indigenous agropastoral systems that integrated or intensified production of foreign cereals. Evaluation of this perspective, however, has been hindered by a historical lack of systematic archaeobotanical analysis from sites of this period. Here we present an overview of current evidence for eastern steppe populations' relationships to agricultural practices and products during the first millennium BC. We then report results of the first and earliest formal macrobotanical and isotopic analyses ($\delta^{13}C$, $\delta^{15}N$, $87Sr/86Sr$) of a set of locally produced crop assemblages from Iron Age Mongolia, including the earliest direct evidence for the presence of wheat, barley, oats and broomcorn millet. These results are discussed in relation to previously published isotopic data from contemporaneous local human and herd animal populations as well as new GIS-based landscape analyses. Results are drawn together to situate agricultural trajectories in the Mongolian steppe within the broader prehistory of the trans-Eurasian crop exchange.

1076 THE LATE ANTIQUE TO EARLY MEDIEVAL TRANSITION IN EUROPE AND NORTH AFRICA: SOCIO-CULTURAL DYNAMICS OF MIGRATION, MOBILITY, AND IDENTITY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Morgan, Reed (Max Planck Institute for Evolutionary Anthropology, Department of Archaeogenetics; Harvard University, Department of History) - Gerling, Claudia (University of Basel) - Olalde, Iñigo (Universidad del País Vasco) - Villalba, Vanessa (Max Planck Institute for Evolutionary Anthropology, Department of Archaeogenetics Institute of Evolutionary Biology; CSIC-Universitat Pompeu Fabra)

Session format: Regular session

The period spanning the 4th to the 9th centuries AD in the former territories of the Roman Empire and its neighbouring regions witnessed intensified human mobility, social interactions, and cultural transformations. Until recently, archaeological research related to this period has been strongly dominated by migration (or invasion) narratives and ethnic- or religious-based explanatory models, in which the Roman-Barbarian, Latin-Byzantine, and Christian-Islamic dichotomies were the main drivers for exploring and interpreting the data. The recent expansion of bioarchaeological studies, encompassing physical anthropology, isotope analyses, genetics (etc.), has facilitated multidisciplinary research, offering insights into the intricate dynamics of mobility and identity. An increasing number of research projects integrate bioarchaeological analyses with archaeological datasets and illuminate the complexity of human mobility and networks at various scales, as well as varied dynamics of interactions between non-local settlers and indigenous populations, during the Late Antique-Early Medieval transition period. In order to get an overview of recent advances in the investigation of Late Antique-Early Medieval transition, this session aims to bring together experts who combine a variety of methodological approaches such as isotope and aDNA analyses, radiocarbon dating, climate modelling etc. We encourage presentations on archaeological contexts from the former territories of the Roman Empire and its bordering regions, and are interested in diachronic studies that particularly target the transition from the Late Antiquity to the Early Middle Ages. In this framework, special attention is paid to border regions and their hinterlands, which are particularly sensitive to changes in cultural, economic, and political settings due to their geopolitical situation. However, comparisons with core areas of Late Antique and Early Medieval administrative entities are also welcome. Additional session organisers are M. Depaermentier, Vilnius University, Lithuania, and Z. Hofmanová, Max Planck Institute for Evolutionary Anthropology, Germany.

ABSTRACTS

1 TRACING THE ORIGINS OF ALWA: ISOTOPIC INSIGHTS INTO THE FOUNDATION OF SOBA AND THE SOCIO-CULTURAL DYNAMICS OF EARLY MEDIEVAL NUBIA

Ciesielska, Joanna (Faculty of Oriental Studies / Institute for Advanced Studies, Faculty of Physics, University of Warsaw)

By the mid-sixth century AD the territory of modern Sudan was divided between three kingdoms of Nobadia, Makuria and Alwa. The emergence of the medieval city of Soba, the illustrious capital of the southernmost Kingdom of Alwa (6th-15th c. CE), as a major urban settlement in the late post-Meroitic period marked the beginning of a millennium-long history. Scientific explorations in the late 20th century revealed the city's exceptional status, with extensive ecclesiastical complexes, churches, and affluent material culture. Positioned strategically at the confluence of the White and Blue Niles, Soba became a melting pot of diverse populations and a key hub in regional trade networks. While some scholars propose that the initial settlers may have been remnants of the late Meroitic kingdom, others suggest shared ancestry with the founders of neighbouring states, Nobadia and Makuria, possibly originating from the Nuba people in the Kordofan region to the south and southwest of Soba. This presentation explores the application of isotopic research to uncover the social dynamics at the foundation of the medieval metropolis. We applied isotopic analyses to investigate the origins of the people buried at various locations within the city and their concomitant ways of life. Through stable isotope analysis of human skeletal remains, we investigated dietary practices, mobility patterns, and social stratification, while animal remains provide insights into urban economic structures, including subsistence strategies, livestock management and trade networks. Despite no evidence of occupation pre-dating the foundation of the city in 6th c., the obtained results speak not only to local roots of city's inhabitants, but also to the economic reliance on enduring agro-pastoral symbiosis. This presentation explores the application of isotopic research weaving together a rich tapestry of multidisciplinary approaches to unveil the social dynamics and economic intricacies that marked the inception of this medieval African metropolis.

2 ARCHAEOGENETICS AND THE SOCIAL DYNAMICS OF ANCESTRY AND IDENTITY IN VANDAL AND BYZANTINE CARTHAGE, TUNISIA

Morgan, Reed (Harvard University; Max Planck Institute for Evolutionary Anthropology) - Chalhouni, Najd (Institut National du Patrimoine, Tunisia) - ben Romdhane, Hamden (Institut National du Patrimoine, Tunisia) - Bockmann, Ralf (University of Hamburg) - Stevens, Susan (Randolph College) - Rossiter, Jeremy (University of Alberta) - Humphrey, John (Journal of Roman Archaeology) - Pennefather-O'Brien, Elizabeth (Medicine Hat College) - Ringbauer, Harald (Max Planck Institute for Evolutionary Anthropology) - Krause, Johannes (Max Planck Institute for Evolutionary Anthropology)

The early medieval history of Carthage saw the western Mediterranean's second largest city change hands numerous times, between Vandals, Byzantines, and ultimately Arabs. Up to the time of its destruction, it remained a vital port at the centre of Mediterranean trade routes, and historical sources portray it as a vivid hub of cosmopolitan activity. Carthage was a crucible of encounter for a wide array of cultural, linguistic, and religious groups: Romans, Vandals, Berbers, and Eastern Mediterranean populations; Latin speakers, Greek speakers, and speakers of indigenous North African languages; Orthodox, Donatist, and Arian Christians. Up until now, North Africa has remained a major lacuna on the map of ancient DNA research, and bioarchaeological research more generally. Here, a new collaboration between historians, archaeologists, and archaeogeneticists aims to examine biological ancestry and kinship patterns in light of our current understanding of social identities in the early medieval city. We present new archaeogenetic results from more than 200 fifth- to seventh-century burials, representing a wide range of social identities from around the city, including extramural cemeteries, intramural cemeteries, elaborate basilicas, and isolated burials. This paper will present a first attempt to integrate the new genetic insights into migration, ancestry, demography, and kinship in early medieval Carthage together with the longstanding historiography of identity formation in post-Roman North Africa.

3 BIRTH OF A MEDITERRANEAN CITY: EXPLORING THE METAMORPHOSIS OF VALENCIA THROUGH TIME USING ANCIENT DNA

Oteo Garcia, Gonzalo (Sapienza - Università di Roma; Stockholm University (CPG))

Of all places in the Mediterranean, Iberia was probably the New World of the Old World. Coastal areas harboured Greek and Punic colonies for trade but beyond, the hinterland was an ignotous territory and the peninsula known to the wider Mediterranean as a source of metals, this caught the attention of Greeks, Phoenicians, Carthage and Rome who fought for control over its resources. This was the context in which the Romans started founding colonies that in many cases replaced indigenous settlements and transformed the land into a Hispania completely integrated in the Mediterranean sphere. Some of these early Roman sites have survived to our times, such is the case of the city of Valencia (Spain), founded in 138 BCE at the mouth of river Turia on an islet surrounded by marshes.

A new CIVIS3i-funded project starting in 2024 will study the population dynamics behind the foundation of the city and the influences by the various subsequent cultures that shaped it. Over 200 burials have been successfully sampled. The collected dataset encompasses the Roman Republican, Imperial, Visigothic and Islamic medieval periods. The collection is currently undergoing analysis to recover ancient DNA from all the remains. The genomic information will be complemented by stable isotopes and sedimentary DNA recovered from the marshes around the city to try to link changes in diet and the environment with changes in the genetic profile of the population of the city at different times.

At EAA we will be presenting the first preliminary sequencing results from the ancient genomes that cover the early history of Valentia (2nd century BCE to 7th century CE) and various archaeological sites of the city, including the foundational republican-era necropolis, tombs from the imperial-era and a cemetery associated to the Visigothic elite and ruling families in the city.

4 THE DEMOGRAPHIC IMPACT OF THE ROMAN AND VISIGOTHIC PRESENCE IN THE IBERIAN PENINSULA

Carrion, Pablo (Institut de Biología Evolutiva (CSIC-UPF)) - Olalde, Iñigo (BIOMICs Research Group, Department of Zoology and Animal Cell Biology, University of the Basque Country UPV/EHU, Vitoria-Gasteiz, Spain) - Jiménez-Arenas, Juan Manuel (Departamento de Prehistoria y Arqueología, Universidad de Granada) - Vergès, Josep Maria (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain.) - Cuadrado, Miguel Angel (Museo de Guadalajara, Guadalajara, España) - Heras-Mora, Javier (Archaeological Museum of Badajoz, Junta de Extremadura, Badajoz, Spain) - García-Entero, Virginia (Departamento de Prehistoria y Arqueología, Universidad Nacional de Educación a Distancia) - Coromina, Neus (Universitat de Girona) - Lalueza-Fox, Carles (Natural Sciences Museum of Barcelona (MCNB), Barcelona, Spain) - Reich, David (Department of Human Evolutionary Biology, Harvard University, Cambridge, MA, USA.)

The transformation of the political landscape in West Eurasia can be attributed to the Roman Empire, the decline of its Western segment, and the consequential Great Migration era. The influence of these events on the demographic composition of various regions, such as the Iberian Peninsula, remains not fully elucidated. We have collected genome-wide data from 255 newly reported ancient individuals from Iberia spanning from the Roman era to the Great Migration period. The Roman presence in the peninsula dates back to the 3rd century BCE and was fully annexed by the 1st century BCE. It remained intricately connected with the broader Mediterranean through Roman roads and sea routes until its collapse in the 5th century. Our findings reveal that the populations in Roman-period Iberia were as diverse as those in other central and western Mediterranean regions, like central Italy (Antonio et al. 2019) and the Danubian frontier (Olalde & Carrion et al. 2023). Historical records indicate the impact of various groups on Iberia in the 5th century, including Germanic tribes (Buri, Suevi, Vandals & Visigoths) and Sarmatian people (Alans). While some, like the Suevi, established kingdoms, the Visigoths formed the most significant Germanic kingdom in the late 5th century, persisting until the Umayyad conquest in the 8th century. Despite the identification of individuals with Germanic ancestry at specific sites, overall, we observe a remarkable degree of population continuity in Roman-period Iberian populations. Thus, indicating limited demographic changes during this era. The close interconnections of these Germanic groups are evident in the discovery of close relatives at distant archaeological sites.

5 THE GENOMIC HISTORY OF THE BALEARIC ISLANDS

Villalba-Mouco, Vanessa (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany; Institute of Evolutionary Biology, CSIC-Universitat Pompeu Fabra, Barcelona, Spain; Max Planck Harvard Research Center for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany) - Sintés, Elena (Independent researcher) - Rohrlach, Adam (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany; School of Mathematical Sciences, University of Adelaide, Adelaide, South Australia, Australia) - Mas Florit, Catalina (Equip de Recerca Arqueològica i Arqueomètrica de la Universitat de Barcelona (ERAAUB); Institut d'Arqueologia de la Universitat de Barcelona (IAUB); Universitat de Barcelona (UB), c/ Montalegre 6-8, 08001 Barcelona, Spain) - Cau-Ontiveros, Miguel (ICREA, Pg. Lluís Companys 23, 08010 Barcelona, Spain; Equip de Recerca Arqueològica i Arqueomètrica de la Universitat de Barcelona (ERAAUB); Institut d'Arqueologia de la Universitat de Barcelona (IAUB); Universitat de Barcelona (UB), c/ Montalegre 6-8, 08001 Barcelona, Spain) - Skourtanioti, Eirini (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany; Max Planck Harvard Research Center for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany) - Stockhammer, Phillip (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany; Max Planck Harvard Research Center for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany; Institute for Pre- and Protohistoric Archaeology and Archaeology of the Roman Provinces, Ludwig Maximilian University, Munich, Germany) - Haak, Wolfgang (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany) - Risch, Roberto (Department of Prehistory, Universitat Autònoma de Barcelona, Barcelona, Spain) - Krause, Johannes (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Deutscher Platz 6, 04103 Leipzig, Germany; Max Planck Harvard Research Center for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany)

The Balearic Islands, located in the western part of the Mediterranean Sea, had a rich prehistory and history since the first colonization ~2500 BCE. Later, the islands underwent a distinct dynamic compared to that observed on the European mainland, especially during Late Antiquity, including periods of Vandal and Byzantine occupation. The Balearic Islands became part of Al-Andalus two centuries later than the Iberian Peninsula, and its Islamic rule lasted until the 13th century AD when the Kings Jaume I and Alfonso III of Aragón conquered the islands.

To study the population dynamics associated with the historical changes of this insular setting, we generated genome-wide data from 300 new individuals spanning 3,000 years of history. Our results show that the initial settlers of the Archipelago were genetically similar to the Beaker groups in Western Europe and Iberia. This genetic profile

persisted until the Iron Age. The introduction of central Mediterranean and North African-related ancestries to the Archipelago occurred during the Carthaginian/Punic dominance. However, the most significant genetic shift took place during Roman times, marked by the arrival of genetic ancestries from the Near East and North Africa. In Late Antiquity, we observe increased mobility, with outlier individuals displaying diverse ancestries from mainland North/Central Europe, Northeast Asia, and North Africa. The onset of Islamic domination in the Archipelago coincided with the introduction of West African ancestry in Menorca. Excess North African ancestry was found in individuals buried in Islamic, but not in Mozarab contexts. Finally, the “Christianization” of the Archipelago correlated with a decrease in North African and Near-Eastern ancestries, attributed to the arrival of contemporary groups from Northeastern Iberia.

Our comprehensive study intertwines archaeology, history, and genetics providing a holistic view of the interplay between human populations and historical transitions in the Balearic Archipelago over 3000 years.

6 FROM WINE EXPORT HUB TO PILGRIMAGE CORRIDOR: MITZPE SHIVTA AND SOCIO-ECONOMIC SHIFTS IN THE LATE ANTIQUE NEGEV DESERT

Lehnig, Sina (University of Haifa; Minerva Stiftung für die Forschung, Max-Planck-Gesellschaft)

At a first glance, Mitzpe Shivta in the northern Negev Desert is located in an arid, sparsely populated region. Yet satellite images reveal the remains of thousands of agricultural structures that bear witness to a period between the 4th and 6th centuries CE when the Negev experienced an unprecedented economic and demographic heyday. Mitzpe Shivta was embedded in this thriving agricultural landscape. Positioned on a hilltop and surrounding slopes, the site boasts a perimeter wall, towers, a church, a chapel, domestic units, a large cistern, and numerous rock-hewn rooms adorned with inscriptions and cross paintings.

Our research, encompassing inscriptions, radiocarbon dates, and pottery, indicates occupation of Mitzpe Shivta from the 6th to 8th centuries CE, spanning the Middle Byzantine to Early Islamic periods. The Middle Byzantine era (450-550 CE) witnessed regional prosperity fueled by the Mediterranean-wide export of locally produced wine, notably in Gaza Jars. However, the Justinian Plague around 541 CE precipitated a decline in wine exports. By 620 CE, Akaba Jars signalled Arab influence from the south, yet pilgrim inscriptions suggest a surge in Mitzpe Shivta's economy due to Christian tourism to St. Catherine Monastery at Mount Sinai.

Concurrently, Mitzpe Shivta's rise coincided with the gradual abandonment of the nearby Byzantine settlement of Shivta, evident in sealed doors and deserted buildings. Our project, placed at University of Haifa, aims to unravel the correlation between Mitzpe Shivta's ascendance and Shivta's decline, exploring shifts in settlement patterns from affluent villages to fortified hilltop settlements which become apparent Mediterranean wide during the 6th century. We will delve into the economic roles of monasticism and pilgrimage amid dwindling agriculture. Utilizing bioarchaeological methods, micro-geoarchaeology, epigraphy, and SfM, we seek to illuminate Mitzpe Shivta's occupation history and economic framework, offering insights into Negev settlement dynamics during periods of socio-economic upheaval and cultural change.

7 BASEL IN THE FIRST CENTURIES AD: INTERDISCIPLINARY INSIGHTS INTO MOBILITY AND SOCIO-CULTURAL STRUCTURES

Gerling, Claudia (University of Basel) - Depaermentier, Margaux (Vilnius University) - Alder, Cornelia (University of Basel) - Hajdas, Irka (ETH Zurich) - Kempf, Michael (University of Basel) - Hofmanová, Zuzana (Max Planck Institute for Evolutionary Anthropology) - Schwarz, Peter-Andrew (University of Basel)

Basel (Switzerland) played an important role in Late Antiquity and the Early Middle Ages due to its location at the margins of multiple socio-cultural entities and influences. It became a melting pot of political, cultural and economic interactions, integrating large-scale and local exchange networks. In the framework of a SNSF-funded project, we analyse various burial sites in Basel dating to the 4th-8th centuries AD using archaeological, anthropological, isotope and aDNA analysis, radiocarbon dating as well as environmental multicomponent modelling. Our aim is to provide new interpretations of human mobility, social structures and lifestyles at the periphery of the late West Roman administrative boundaries and to propose local mobility, subsistence strategies and communication networks beyond traditional migration narratives and ethnic categorisations. The project started with a pilot study on the Basel-Waisenhaus grave group, where we were able to revise the traditional idea of a strict separation between “Romans” and immigrated “Alamans” by the river Rhine.

8 COMMUNICATION AND CONNECTIVITY IN 6TH-CENTURY PANNONIA: SIGNS OF AN ETHNOGENESIS?

Koncz, István (Eötvös Loránd University) - Tian, Yijie (Department of Ecology and Evolution, Stony Brook University) - Knipper, Corina (Curt-Engelhorn-Zentrum Archäometrie) - Faragó, Norbert (Institute of Archaeological Sciences, Eötvös Loránd University) - Szeniczey, Tamás (Department of Biological Anthropology, Eötvös Loránd University) - Vyas, Deven (Department of Ecology and Evolution, Stony Brook University) - Vida, Tivadar (Institute of Archaeological Sciences, Eötvös Loránd University) - Veeramah, Krishna (Department of Ecology and Evolution, Stony Brook University) - Geary, Patrick (Institute for Advanced Study)

For long archaeological research, when describing early Medieval European societies, focused on trying to identify cultural/ethnic groups or various social classes. While this approach has come under intense criticism in the last decades, its results still form the basis of our understanding of the period and its communities. Recent developments in the archaeology of identity and the integration of bioarchaeological methods in fine-scale studies shifted the focus of archaeological research towards a series of new questions, but also gave us a chance to revisit old ones.

The comprehensive analysis of five cemeteries from the 6th-century Little Hungarian Plain (LHP), NW Hungary and SW Slovakia, provides a great opportunity to study not only the formation and development of individual communities, but also their connections and relationship in a well-defined region. LHP became one of the core territories of the Langobard polity in Pannonia as early as the beginning of the 6th century. Mortuary data indicate a stratified society with communities that integrated individuals of various cultural and social backgrounds. Isotopic evidence suggests that individual and group mobility played an important role in their formation. Paleogenomic analysis identified biologically related groups in all communities, and it also found genetic connections between sites.

In the middle of the 6th century, we witness the appearance of locally developed artefact types that spread rapidly in wider areas suggesting well-developed communication networks. This coincides with the appearance of precious metals, belt sets and second animal style in male burials suggesting the emergence of a warrior elite that will rise to its true importance later in Italy.

The combination of archaeological, paleogenomic and isotopic data suggests that LHP was part of intensive intra- and extraregional networks which could be interpreted both the cause and the consequence of the formation of a common identity in the region.

9 ON THE WAY FROM ITALY TO GOTLAND - THE FINDS OF OSTROGOTHIC SOLIDI FROM POLISH BARBARICUM

Zapolska, Anna (University of Warsaw) - Dymowski, Arkadiusz (Independent Scholar)

The Ostrogothic coins found in present-day Poland are sporadic, yet their undeniable presence is noted. Research on these coins is impeded by the fact that many artefacts, especially those from Pomerania and East Prussia, have found their way into collections of German museums and subsequently, due to World War II, have either gone missing or been dispersed. Consequently, information regarding these artefacts primarily derives from literature and only one comes from the latest discoveries.

Among the Roman solidi minted in Roman mints under Ostrogothic control found in the territory of present-day Poland, there are specimens originating from individual finds, such as the solidus from Darłowo in Pomerania, while others come from hoards. Some of these coins could have been produced in Ravenna during the reign of Theodoric I or could be imitations made on Gotland.

The analysis of these coins – die studies made with the use of AI, but also studying them in the context of other artefacts, settlement sites, and cemeteries will help answer questions regarding the reasons and circumstances of the influx of these coins into the areas of Pomerania, Kuyavia, and Greater Poland. Additionally, it will shed light on whether we are dealing with the migration of small groups of people from Scandinavia to the southern Baltic coast, the “transit” of Scandinavian mercenaries through Polish lands towards Italy (and back), or the existence of a network of trade and/or political connections among Germanic tribes in Late Antiquity in Europe.

EARLY MEDIEVAL POPULATION MOVEMENTS FROM THE STEPPE INTO EUROPE: INTEGRATING ARCHAEOLOGY, HISTORY AND ANCIENT GENOMICS

Gnecchi Ruscone, Guido Alberto (Max Planck Institute for Evolutionary Anthropology 04103, Leipzig, Germany; Department of Archaeology and Museology, Faculty of Arts, Masaryk University, 60200, Brno, Czechia) - Rácz, Zsófia (Institute of Archaeological Sciences, ELTE - Eötvös Loránd University, 1088, Budapest, Hungary) - Traverso, Luca (Max Planck Institute for Evolutionary Anthropology 04103, Leipzig, Germany) - Liccardo, Salvatore (Department of History, Universitätsring 1, 1010 Wien; Institute for Medieval Research, Austrian Academy of Sciences, Ignaz-Seipel-Platz 2, 1010 Wien) - Pohl, Walter (Department of History, Universitätsring 1, 1010 Wien; Institute for Medieval Research, Austrian Academy of Sciences, Ignaz-Seipel-Platz 2, 1010 Wien) - Vida, Tivadar (Institute of Archaeological Sciences, ELTE - Eötvös Loránd University, 1088, Budapest, Hungary; Institute of Archaeology, HUN-REN Research Centre for the Humanities, 1097, Budapest, Hungary) - Krause, Johannes (Max Planck Institute for Evolutionary Anthropology 04103, Leipzig, Germany) - Hofmanová, Zuzana (Max Planck Institute for Evolutionary Anthropology 04103, Leipzig, Germany; Department of Archaeology and Museology, Faculty of Arts, Masaryk University, 60200, Brno, Czechia)

Recent genomic studies showed that during the Migration Period and the Early Middle Ages, people carrying Central or East Asian ancestries appeared in Europe at different in multiple waves. The earliest genomic evidences involve only a handful of individuals from the 5th century CE. Chronologically, this corresponds to the Hunnic period when over only a few decades several raids into the former territory of the Roman Empire of the Hun group of steppe riders have been recorded. Nevertheless, only a limited archaeological record presenting eastern or central Asian Steppe connections have been found for this time period. The scarcity of the genomic and archaeological evidences leaves open the questions on what was the actual impact of large-scale migrations from the steppe, from where and what role migration had in shaping populations' cultural identity within the Hunnic empire. Around a century later, in the late 6th century CE, another, this time substantial, influx of people carrying East Asian or admixed ancestries appear in the Carpathian Basin. This coincides with the historical accounts of the arrival in 568 CE of the Avar people who settled in the Carpathian Basin within a large territory that included the former Roman province of Pannonia, establishing their "Qaganate" (i.e. empire) that lasted over 250 years. Alongside historical accounts, the Avar period left an abundant and culturally diverse archaeological record testifying trans-Eurasian connections.

Combining new and published genomic data with archaeological and historical contextualization, we: 1) investigate the impact of these movements from the steppe in Early Medieval Europe; 2) test possible geographic origins following the main historical and archaeological hypotheses discussed in modern scholarly debates, using comparative ancient genomic data available from preceding and coeval contexts across the Eurasian Steppe.

1077 RESEARCH DATA MANAGEMENT IN THE FIELD

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Riebschläger, Fabian (German Archaeological Institute; NFDI4Objects) - Novák, David (Institute of Archaeology of the Czech Academy of Science, Prague)

Session format: Regular session

Gathering, curating and storing research data during field work is not a trivial task. In fact, it can quickly get messy. Archaeologists often have to deal with less-than ideal working conditions and heterogeneous research methods and diverse documentation requirements. On top of that, projects often involve specialists from different disciplines, such as the natural sciences, who bring their own requirements and practices to the table.

This often leads to data silos that have to be subsequently integrated. At the same time, the demands on research data management and data quality have continuously risen in recent years. Institutions that fund research expect professional data management. Compliance with the FAIR principles is a mandatory requirement. This increases time and effort required by researchers and, in some cases, demands new technical skills that are not reflected in today's educational curricula.

Against this backdrop, many research projects have developed their own workflows and best practices to enable high-quality documentation with minimised effort. Initiatives such as the National Research Data Infrastructure for Objects (NFDI4O) in Germany are trying to bring the community together to transfer these project-specific specifications into commonly accepted standards and best practices.

In our session we aim to discuss these workflows and best practices developed in projects to improve our understanding of practical research data management in the context of field research. We invite contributions that deal with the entire documentation process or specific aspects. These include, but are not limited to:

- Workflows & Tools: from data collection in the field to FAIR data
- Best Practices: data formats and standards you use

- AI / Machine learning for data processing and/or quality management
- Working with silos: transformation and publication of data
- Reuse Open Data: from BigData to ML/AI Application
- Projekt specific excavation manuals and data models.

ABSTRACTS

1 FROM FIELD TO FAIR: DATA WORKFLOW AT THE AUSTRIAN ARCHAEOLOGICAL INSTITUTE (OEAI)

Schwaiger, Helmut (Austrian Archaeological Institute) - Burkhart, Karl (Austrian Archaeological Institute) - Danthine, Brigit (Austrian Archaeological Institute) - Welte, Micheline (Austrian Archaeological Institute) - Baudouin, Elise (Austrian Archaeological Institute) - Hye, Simon (Austrian Archaeological Institute)

As the largest archaeological research institute in Austria with a wide variety of projects and documentation types, it was essential for the OeAI to develop a common strategy for dealing with research data. Free and open-source software is used in the field wherever possible to enable interoperability. For example, field projects, such as the Ephesos excavation or the 'Crossing the Seas' survey project use QGIS with the Tachy2GIS or QField interface. To make data exchange with restoration or ceramic processing easier and less error-prone, the data is regularly compared with the Axiell Collections object database. Additionally, data from other infrastructure and research units is also integrated, such as photo documentation, using predefined forms.

Care is taken to ensure FAIR data, not only for long-term archiving but also for other projects and applications. For this it is important that both controlled vocabularies and structured data models are used that can build on one another. Special core services have been set up at the OeAI for this purpose, such as OeAI.DAM, the central contact point for images and other digital assets. Specific interfaces have been programmed into other projects so that data can be available and exchanged without redundancy.

2 DEVELOPING SOFTWARE FOR THE DOCUMENTATION OF ARCHAEOLOGICAL FIELDWORK IN NFDI4OBJECTS

Riebschläger, Fabian (German Archaeological Institute; NFDI4Objects) - Kleinke, Thomas (Verbundzentrale des GBV (VZG); German Archaeological Institute; NFDI4Objects)

Archaeological field research is very heterogeneous, encompassing methods like excavations, surveys, and building recordings. Documentation requirements vary greatly across archaeological disciplines and the regional heritage agencies. In addition, the recorded data from numerous specialist disciplines involved, for example from natural science, have to be integrated. User requirements for software to document field research are also diverse. Input workflows should be intuitive. The navigation of the data should support analysis and interpretation. In addition, the security and integrity of the data should of course be guaranteed. And finally, the data should be as easy as possible to export in an appropriate form for publication and long-term archiving.

In its search for suitable software to document its field projects and to replace the its old system, the German Archaeological Institute (DAI) defined a number of requirements that were considered particularly important:

- A sufficiently flexible, adaptable data model.
- A standardized core data schema for data comparison across geographical, temporal and thematic boundaries.
- Multilingual data entry.
- Offline and online functionality with robust data synchronization.
- Effortless publication of primary research data in accordance with the requirements of the international research community and the funding providers.
- The exclusive use of open source software.

As no suitable software was found, the decision was made to design one from scratch. The focus was on enabling complete documentation of archaeological fieldwork, supporting existing workflows, and improving them through the use of customised digital technologies. This distinguishes Field from generic platforms, such as GIS or CAD.

The individual roles of the software were split into separate components: a desktop application for on-site data entry, a server component for synchronisation via the Internet and a dynamic publishing platform. The software is now being further developed together with the community within NFDI4Objects.

3 THE MILESIAN APPROACH IN CONTEXT: ORGANIZING A DATA CENTRIC WORKFLOW BETWEEN FIELD AND FIND PROCESSING

Steinmann, Lisa (Universität Hamburg) - Sliwka, Fabian (Universität Hamburg) - Huy, Sabine (Christian-Albrechts-Universität zu Kiel)

Large and diverse research hubs such as the Miletus Excavation need to take a normative and unifying approach to data management across multiple concurrent projects. The first publication of the Miletus Documentation Manual in 2021 (DOI: 10.25592/uhhfdm.11389) establishes a modular workflow for the different work areas and projects in Miletus. The Manual sets transparent guidelines for systematic documentation and collaboration, as well as data quality and storage.

The new documentation system relies on a highly customized idai.field-database, which all researchers use for data collection. Custom tools supplement this workflow: Mainly milQuant, an intuitive app that synchronizes with the database to provide quantitative visualizations without demanding technical expertise from its users. Our approach enables and promotes swift collaboration and data flow between a diverse group of researchers representing the full spectrum of different archaeological disciplines and methods.

Due to its hierarchical data model, idai.field inherently integrates data generated in the numerous work areas of an archaeological excavation. However, the default configuration lacks a specific module for the immediate communication of observations between field and find processing right when and where it is needed: during the excavation itself. To bridge this gap, we established the 'First Impression'-form that allows researchers from both areas to share notes on intermediate results with their respective counterparts in an immediate and efficient manner. milQuant completes this qualitative approach as a quantitative tool, combining data from both field and depot to generate conclusive information packages for further analysis. Furthermore, it has proven to be a quick and powerful tool for quality control of newly collected data on site.

In our presentation, we will showcase the systematic workflow and collaboration between field and depot, using case studies from recent excavations in Miletus with reference to the Documentation Manual.

4 CURATING DIGITAL ARCHIVES: DATA MANAGEMENT AND STANDARDISATION

Green, Katie (University of York) - Zoldoske, Teagan (University of York)

The archaeological intervention done in advance of building a new high speed rail line connecting the North and South of England is one of the largest in UK history. While the High Speed 2 (HS2) project has created a wealth of new information, before any of that information can be disseminated to the general public it must first be properly collected, documented, and linked. To this end, effective data management is vital and should be in place before data collection has begun. It is integral to facilitate effective data collection and dissemination while keeping it FAIR - Findable, Accessible, Interoperable and Reusable - in order to achieve the greatest public value for an archive.

From the beginning of the project HS2 created technical specifications. These technical specifications aimed to standardise data collection processes, facilitating both data utilisation by HS2 and its transfer to the Archaeology Data Service (ADS), the digital repository responsible for the long-term curation of the dataset. However, not all facets of archaeological data collection were confined by strict technical specifications in order to allow contractors to employ their own systems and methodologies. This paper will examine the implementation of technical specifications by the HS2 project on the ADS workflows. It will discuss how, when detailed standardisation was specified and data was approved by HS2 before deposit it resulted in greater uniformity in the data. It will then compare this with instances where data had less stringent control, necessitating greater processing time by the ADS to optimise dissemination and to ensure data remained FAIR. The paper will conclude by reflecting on HS2's data management practices and their potential application to projects both large and small.

5 COMBINING FLEXIBILITY AND STANDARDISATION IN BORN-DIGITAL FIELD RECORDING

Indgjerd, Hallvard (Museum of Cultural History University of Oslo)

Challenges of data sharing, consistency and compatibility are neither new nor unique to borne digital data, but have become far more visible with the tools and expectations of the digital era. Fundamentally, this is a positive development, but it does require innovation and attention to data management at all stages of research.

For example, incorporating Linked Open Data standards and controlled vocabularies at the collection stage, is likely to result in an improvement of data FAIRness by default, making it less of a daunting task towards the end of a project.

As a pragmatic approach, this paper supports the use of software- and platform-agnostic data strategies that allow field archaeologists and specialists to leverage their existing knowledge while preserving the integrity of the data.

While focusing on Mediterranean projects, the paper will compare experiences of digital recording in small research-focused fieldwork projects with those of larger institutions, exemplified with the Norwegian University Museums' field units. The goal of creating consistently valid, preservable, and FAIR data is shared across the two research

situations, but the opportunities and constraints differ considerably. Thus, different approaches to software development and data management strategies might be necessary.

Special attention will be paid to the integration of GIS and 3d data in field recording solutions. The advent of cheap, but flexible RTK GNSS receivers, faster 3d modelling workflows, and customisable Open Source web-GIS libraries has created radically new opportunities. Spatial analysis and data capture need no longer be separate actions, but can take place on site by those closest to the data in the dirt. This has potential to break down barriers between researchers and foster a more reflexive field praxis.

6 HOCUS POCUS AND THE LOCUS IS DONE. USING LARGE LANGUAGE MODELS IN TRANSCRIBING AND PARSING FIELD NOTES

Paukkonen, Nikolai (University of Helsinki)

For the last two years, various so-called artificial intelligence (AI) applications and especially large language models (LLM) have been featured prominently in the media. Multiple uses in various fields have been already found, with several attempts made to utilize them in archaeology as well. One possibility would be to use advanced speech-to-text capabilities in addition to LLM's chat interface to format freely spoken documentation (describing e.g. stratigraphical units, finds or samples) into a shape that can be used for instance to automatically update stratigraphical databases.

In this paper I present a prototype of an open-source Android application that communicates with OpenAI API to convert audio recorded through its microphone into pre-formatted JSON data. In addition to presenting the application itself, some test results from the field are also examined, with focus on the ease of use and reliability. The approach could make possible fieldwork without writing - whether on notebooks, laptops or tablets - and thus ensure consistent quality of documentation, even in extreme conditions, such as subzero temperatures or rain.

7 DIGITAL RECORDING FOR FIRST RESPONSE MISSIONS TO CULTURAL HERITAGE SITES IN DISASTER ZONES

Fritsch, Bernhard (DAI) - Iacono, Elvira (DAI) - Marzban, Pouria (DAI) - Ducke, Benjamin (DAI)

The German Archaeological Institute (Deutsches Archäologisches Institut, DAI), the Federal Agency for Technical Relief (Technisches Hilfswerk, THW), and the Leibniz Research Institute for Archaeology (LEIZA) have jointly developed KulturGutRetter (KGR), as a first response unit for recording and securing cultural heritage material affected by destructive events. The intention behind it, for the existing expertise in Germany, is to focus on a team of experts that can act quickly in the event of a crisis in order to assist in stabilizing, preserving and, where needed, salvaging objects and buildings.

In order to facilitate future rescue missions and to guarantee a consistent and efficient collection of data, KGR is working on systems of data collection, evaluation and processing that can be used before, during and after a catastrophic event. While data acquisition and management in a KGR mission necessitate lots of special requirements, setting up an appropriate data model utilizing open source software is fundamental to satisfy the needs of different areas of expertise involved. The overall workflow and tools used can also easily be adopted for excavation documentation and archaeological research purposes.

In this presentation, the complete process of the KGR mechanism from gathering data in challenging environments by using mobile devices, up to the final transfer of completed data packages, are shown as well as the possible adoptions of the workflow for other areas of archaeological work. The goal of the digital backbone of KGR is to use international standards in terms of terminology and, at the same time, to keep the processes as simple as possible, so that the work can quickly be executed also by volunteers and on short notice, since time is a crucial factor in documenting cultural heritage in crisis situations.

1078 WOMEN AT ARCHEOLOGICAL CONFERENCES FROM THE 19TH CENTURY TO THE LATE 1990S: PRESENCE, REPRESENTATION AND EXPERIENCES

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Gustavsson, Anna (Gothenburg University) - Coltofean, Laura (Research Cluster 5: History of Archaeology, German Archaeological Institute, Germany) - Bucolo, Raffaella (University of Verona, Italy) - Gutschmiedl-Schumann, Doris (University of the Bundeswehr Munich, Historical Institute, Germany)

Session format: Regular session

This session explores female presence and experiences at archaeological and related scientific meetings in Europe and beyond from the long nineteenth century to the late 1990s. It aims to survey all aspects of women's representation and participation at congresses, conferences, symposia and more, from amateurs and professionals to independent

and accompanying delegates (e.g., as wives and daughters of male delegates). The focus is especially on archaeological meetings (e.g., CIAAP, UISPP, EAA); however, congresses of archaeosciences (e.g., ICAZ) and other archaeological sub-disciplines are equally relevant, as well as neighboring fields such as geology, anthropology, history and paleontology depending on the extent of their interdisciplinary nature and connection to archaeological research activities. We welcome papers that examine any of the following topics and more:

- methodological approaches to identifying and studying women at congresses via newspapers, archives, oral histories and personal accounts, among other sources;
- case studies about with female participation in general at specific congresses;
- case studies reconstructing individual women's experiences at conferences;
- the networking, knowledge exchange and career perspectives that such events opened for women;
- the role of intersectionality in female access to, participation in, and experiences at congresses.

Finally, the session also aims to map the current state of research on women's engagement in congresses in the history of archaeology and establish a network of researchers interested in the topic.

ABSTRACTS

1 ROSALIE OLIVECRONA AND THE 1869 INTERNATIONAL CONGRESS OF PREHISTORIC ANTHROPOLOGY AND ARCHAEOLOGY IN COPENHAGEN

Gustavsson, Anna (Dep of historical studies, Gothenburg University)

In 1870, the Swedish author and women's right activist Rosalie Olivecrona (1823-1898) published a travel report and review covering the 1869 CIAAP congress in Copenhagen. The report was printed in *Tidskrift för hemmet*, a women's magazine founded by Olivecrona and her friend Sophie Adlersparre (1823-1895). The magazine was dedicated to "the women of the Nordic countries". The text is valuable both as contemporary congress report, and because it is a published account authored by a female participant.

This paper aims at discussing Olivecrona's impressions and experiences at the congress 1869, by looking into which themes and elements she chose to write about, and how she wrote about them. Apart from educating her readers and update them with scientific news, Olivecrona commented on the participation of women at the congresses, and in science in general. Furthermore, this contribution will discuss how the report -the genre and Olivecrona's specific report- can serve as a point of departure for a deeper analysis of the issues and debates in the society of the era, which was mirrored and confronted in Olivecrona's text.

2 SCIENCE BEHIND LEISURE: WOMEN AT THE 1876 INTERNATIONAL CONGRESS OF PREHISTORIC ANTHROPOLOGY AND ARCHAEOLOGY

Coltofean, Laura (Archaeology and Gender in Europe (AGE) - EAA Community; Research Cluster 5: History of Archaeology, German Archaeological Institute)

This paper discusses the participation of women at the 8th Congrès international d'anthropologie et d'archéologie préhistoriques (CIAAP; International Congress of Prehistoric Anthropology and Archaeology) organized at the Hungarian National Museum in Budapest, Hungary, in 1876. Using the publications resulting from the congress, newspapers articles and archival material, the paper first explores the methodological approaches which can be applied to identifying the women who joined the 1876 CIAAP – and other similar scientific meetings in general – and subsequently to reconstructing their collective and personal experiences at the event. The paper then offers an inter-sectional, quantitative, and comparative analysis of female and male, both domestic and international, presence at the congress, which aims to assess the existence of underlying patterns in their attendance. It also examines the ways in which women are portrayed in the scientific programme, in preparing the archaeological exhibition of the congress, in leisure activities such as excursions, parties, and meals organized as part of the congress, as well as in anecdotal accounts. Finally, the paper offers insights into individual women's experiences at the 1876 CIAAP, highlighting the networking and knowledge exchange they engaged in, as well as the career opportunities the event opened for them.

3 JOHANNA MESTORF AT THE INTERNATIONAL CONGRESSES OF PREHISTORIC ANTHROPOLOGY AND ARCHAEOLOGY 1869-1876

Koch, Julia (Universität der Bundeswehr München)

Johanna Mestorf, curator at the Museum Vaterländischer Alterthümer (Museum of Patrimonial Antiquities) at the University of Kiel (Germany) from 1873 and director of this museum from 1891 to 1909, was one of the few women to obtain a paid position in European archaeology in the 19th century. The participations to the International Congresses of Prehistoric Anthropology and Archaeology (CIAAP) in Copenhagen in 1869, Bologna in 1871, Brussels in 1872,

Stockholm in 1874 and Budapest in 1876 are named as important stations in her professional career. She published detailed reports on her travels from 1871 to 1876. Through her participation, she gained national and international reputation among the (male) scientific community. But what was so special about it, apart from the fact that she was at the first congresses the only woman to take part as a professional scientist?

The first part of the paper presents the obstacles that a single, middle-class woman in 19th century Europe had to overcome if she wanted to travel to a congress. How did Johanna Mestorf prepare for her participation? How did she finance her travels? What social restrictions did she experience?

The second part examines Johanna Mestorf's participation in the congresses. How did she manage to be recognised as an archaeologist even though she was not allowed to give papers herself? What role did she play at these congresses? And how did she manage to personally build up an international network that included prominent archaeologists of her time?

The paper will discuss in more detail the importance of travelling to conferences for Johanna Mestorf's career and the effect of her presence on the acceptance of women in archaeology in the 19th century.

4 THE ARCHAEOLOGIST MARGARETE GÜTSCHOW AND WOMEN'S PARTICIPATION AT THE 3RD INTERNATIONAL ARCHAEOLOGICAL CONFERENCE OF ROME IN 1912

Bucolo, Raffaella (Verona University)

This paper aims to explore the participation of women in archaeological conferences in the early 20th century, starting from a specific case of study, an individual experience of Margarete Gütschow (1871-1951). Gütschow should be included among the first women who played a role in the development of the archaeological discipline: her life story, found partly within her correspondence, has allowed us to understand her personality and work as part of the German Archaeological Institute in Rome.

In 1912, she attended the 3rd International Archaeological Conference, which was organized in Rome by the most important scholars of that time. By examining the conference program and archival material, I will investigate female participation at the Roman Conference of that year in terms of numbers and roles. At the same time, one of my goals is to understand the possible networking that the specific event opened for Margarete Gütschow. Her correspondence and life story are enriched with the names of other female archaeologists, friends, and colleagues with similar paths.

As known from an archival document, during the event, exclusively women participants could be hosted at the "Lyceum" of via del Tritone, the seat of a female cultural association: it would be interesting to define the role of the "Lyceum" as a place of exchange among women or of isolation from men.

5 WOMEN OF ARCHAEOLOGY AND THE LIMES CONGRESS

Ivleva, Tatiana (Newcastle University) - Jones, Rebecca (Heriot-Watt University)

The paper discusses the participation, role, and influence of female archaeologists in the International Congress of Roman Frontier Studies ('LIMES Congress'). This Congress is a worldwide academic forum for researchers working on all aspects of Roman frontier archaeology. The Congress has a long history, with 25 congresses in the 75 years since the first congress in 1949. The number of male attendees has always outnumbered the number of women, perhaps no surprise given the military focus of the conferences and history of our discipline.

In this paper, we present an analysis of the presenters' gender over the past 70 years and discuss the involvement of female researchers and professional female archaeologists on specific geographical frontier zones and topics. Our research of the past Congress' books of abstracts and proceedings has shown a notable discrepancy in the gender balance in the study of certain Roman provinces and the topics presented. Research on military sites, the Roman army, and late Antiquity is heavily dominated by men, with no area seeing more women presenting than men. However, the balance is reasonable when it comes to certain aspects of material culture, frontier society, and civilian settlements. Moreover, while female scholars working on Eastern European, Balkan, Rhine, and Danube frontiers are well-represented and frequently attend the Congresses, there is an overwhelming and continuous dominance of male academics when it comes to research on British, Near Eastern, and North African frontiers. We evaluate the reasons for such discrepancies and discuss whether the growing number of participating women archaeologists has contributed to shifting the balance. Alongside the official Congress publications, we have used oral histories and personal accounts of still living women participants.

6 THE ROLE OF WOMEN ARCHAEOLOGISTS IN ORGANIZING ARCHAEOLOGICAL CONGRESSES IN UKRAINE

Shabelnikova, Irina (Oles Honchar Dnipro national university)

Archaeological congresses in Ukraine were held at the initiative of the Moscow Archaeological Association from 1869 to 1911. During this period, 15 congresses were organized, 6 of which in Ukraine: the 3rd and 11th in Kyiv (1874, 1899), the 6th in Odesa (1884), the 12th in Kharkiv (1902), the 13th in Katerynoslav (1905), and the 14th in Chernihiv (1908). These meetings contributed to research on antiquities in the places where the next congress was to be held, to the emergence of archaeological associations and museums, and overall to the formation of archaeology as a discipline in Ukraine. Reports and summaries on archaeology, history, historical geography, art history, ethnography, numismatics, etc. were presented at the congresses and published in the volume of summaries "Trudy". In addition, the excursions and exhibitions included in the program introduced numerous archaeological monuments into scientific circulation.

Dozens of publications have been devoted to the congresses so far, focusing especially on their scientific content. However, these meetings have not been examined yet from the perspective of women's history. This paper, therefore, discusses the role of women archaeologists in organizing archaeological congresses in Ukraine, which was one of the easiest ways for them to join the archaeological community of the conservative intellectual society of the nineteenth and early twentieth centuries. It particularly focuses on women such as P. Uvarova, K. Melnyk-Antonovych, K. Skarzhynska, A. Kartsova-Miklashevska, A. Skrylenko, N. Polonska-Vasylenko, V. Kozlovska, I. Fabrycius, and M. Viazmitina, among others. Their participation in these events is an example of their search for ways to influence the social and cultural realities of their times, as well as an attempt to assert themselves as specialists in the field of archaeology.

7 WOMEN'S PARTICIPATION IN ARCHAEOLOGICAL CONFERENCES IN THE EARLY FEDERAL REPUBLIC OF GERMANY

Gutmiedl-Schuemann, Doris (University of the Bundeswehr Munich, Historical Institute)

The aim of this paper is to explore the participation of women in archaeological conferences in the early Federal Republic of Germany (especially in the 1950s). Several conferences, mainly focusing on prehistoric and protohistoric archaeology, were held regularly in different places, such as the Annual Meeting of the "Nordwestdeutscher Verband für Altertumsforschung" or the "West- und Süddeutscher Verband für Altertumsforschung". However, since each conference was organized independently by local groups, the representation of women and female archaeologists varied from one event to another from year to year.

For this paper, I examined archival material, especially lists of participants and conference programs. This material reveals that the participants were sometimes registered and addressed in a gender-neutral way, while in other occasions and conferences gender was highlighted by the modality used to register the participants. This can also be observed in the conference programs.

After presenting the archival material, I will explore the impact of the different modes of representation of female participants on the women archaeologists and their careers.

This paper is part of the ongoing research project "Akteurinnen archäologischer Forschung zwischen Geistes- und Naturwissenschaften: Im Feld, im Labor, am Schreibtisch" (AktArcha) on female archaeologists at the Historical Institute of the University of the Bundeswehr Munich.

8 "NO NEED TO HIDE IN THE CORNER": THE LEGACY OF MARIA GIMBUTAS (1921-1994) AT INTERNATIONAL CONFERENCES AND SCIENTIFIC EVENTS

Civilyte, Agne (Lithuanian institute of History)

This paper is dedicated to the works of archaeologist Maria Gimbutas (1921-1994), the creator of the famous Kurgan and Mother Goddess hypotheses. After escaping from the Soviet occupation and the looming repressions in her home country, Lithuania, Gimbutas survived difficult years in refugee camps in Germany and experienced many challenges as an immigrant in the United States. Despite these hardships, she remained an active researcher and defended her doctoral thesis at the University of Tübingen, Germany in 1946.

Gimbutas continued working after she moved from Germany to Boston in 1949. Her participation in different congresses, especially where she first presented her ideas about the migration patterns of the Kurgan people, brought her into the spotlight. This paper will give an overview of how Maria Gimbutas worked as a co-organizer of congresses, how the topics of those scientific events and of her own papers were selected, and how her ideas were received in archaeology in the second half of the twentieth century based on archival material, personal memories, and her diary.

Furthermore, the paper will discuss how Gimbutas managed to maneuver complex political constraints and disseminated her ideas not only in the free world, but also behind the Iron Curtain during the Cold War.

9 HELGA HERDEJÜRGEN, A MODERN ARCHAEOLOGIST

Cipriani, Mariella ("Tor Vergata", University of Rome)

This paper intends to draw attention to a prominent female figure in twentieth-century classical archaeology: Helga Herdejürgen (Bremen, 1938-Bonn, 2001). As a student of classical archaeologist and art historian Ernst Langlotz (1895-1978), she authored more than 40 publications, including monographs, corpus of sarcophagi, exhibition catalogues, articles and reviews. She had important contributions to the field of Tarentine coroplastic art, the study of the sarcophagi from Campania, Ravenna and Ostia and the "luxury mythological reliefs" from Rome. Moreover, she bravely challenged widely accepted ideas in classical archaeology and suggested new interpretations, as in the case of the "mythological Spada reliefs" which she dated to the Augustan age instead of the Hadrian age. She faced with rigorous scientific method and great determination all the challenges of her life, including illness in her final years. She worked as an independent researcher in Basel and Bonn and then as a corresponding member of the German Archaeological Institute in Rome, where she lived for a great part of her life. Despite her important research, she never received the proper academic recognition she deserved. Unfortunately, she died just a few months after receiving the invitation to participate as main speaker in the 41st Conference on Magna Grecia in Taranto, one of her main research topics. Despite her important work, Helga did not participate in any other conference except the "International Vase Symposium" in Amsterdam in 1984 and this paper examines the reasons behind this intriguing aspect of her scientific activity.

1081 EXPLORING WETLAND SETTLEMENTS: ARCHAEOLOGICAL RESEARCH METHODOLOGIES AND EMPIRICAL INSIGHTS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Di Giamberardino, Giulia (Sapienza Università di Roma) - Hafner, Albert (Universität Bern) - Mangani, Claudia (Museo Civico Archeologico "Giovanni Rambotti") - Hinz, Martin (Universität Bern)

Session format: Regular session

This session explores the invaluable insights offered by wetland settlements; an exceptional but challenging data source compared to dryland conditions. The recovered information from these sites plays a pivotal role in reconstructing the life of past communities.

Our session focuses on archaeological research methods applied to investigate wetland contexts. We invite papers focusing on methodologies to reconstruct various facets of everyday life within these settlements, encompassing human-environment interactions, interpersonal relationships, settlement origins and evolution, distinctive features.

The session encourages both traditional and innovative methodologies, with an empirical emphasis on direct contextual knowledge acquisition. We particularly encourage papers highlighting scientific innovations and advancements in research methods, such as but not limited to the following:

- Dendrochronology and dendrotypology (which, due the traditional approach and scientific innovation, are useful for defining the shape and size of structures and settlements, as well as for understanding the dynamics of forest management);
- Material distribution in space (which, with the use of GIS and statistics methods, helps us to understand the different areas of use within the structure and settlement or the connections between different communities);
- Micromorphology (which can enhance our knowledge in understanding phenomena that may influence the entire settlement life, such as lake level fluctuations, to more specific situations, like hearth components extracted from thin sections).

Embracing a pragmatic approach, alternative methodologies and approaches beyond those specified are most welcome. While the geographical focus is on Central and Southern Europe, and especially the Alpine area linked to the serial, transborder UNESCO World Heritage "Prehistoric pile dwellings around the Alps" and the Mediterranean regions, case studies from other areas are encouraged. The session targets the Neolithic and Bronze Age facilitating meaningful cross-contributory comparisons.

1 SOME METHODOLOGICAL THOUGHTS ON PILEFIELD ANALYSES AND DENDROCHRONOLOGY

Bleicher, Niels (Underwaterarchaeology / DendroLab City Of Zürich) - Nelle, Oliver (Landesamt für Denkmalpflege Baden-Württemberg) - Bolliger, Matthias (Archäologischer Dienst, Kanton Bern) - Blum, Jonas (University Zurich)

Circumalpine prehistoric wetland and lakeside sites often yield very large pile fields containing several tens of thousands of piles. Dendrochronological crossdating of these is the basis for many different analyses – be it of architecture, social space or typochronologies. Frequently, these pile fields represent remains of several if not many construction phases one on top of another. Identifying and interpreting the individual phases within these stacked ground plans is a difficult task, the methodology of which has attracted too little attention. This also holds true for underlying assumptions that are often made implicitly or even unconsciously. Standard spatial statistics are frequently of little help as they are designed to describe only one point process at once. Furthermore, in the case of short tree-ring series, the context can be important for the dendrochronological crossdating, resulting in non-independent dendro-dates. But what is context in a multi-process point cloud? How can we define and identify context? How can we form and test hypotheses?

In this paper, we reflect on these questions and outline possible approaches to their solution.

2 HOW ASTRONOMERS REVOLUTIONIZED ARCHAEOLOGY: TREE RINGS, SOLAR OUTBURSTS, AND ARCHAEOLOGICAL INTERPRETATION

Hafner, Albert (University of Bern; Oeschger Centre for Climate Change Research)

In 1929, the American astronomer Andrew Ellicott Douglass published a seminal paper in dendrochronology titled “The Secret of the Southwest Solved by Talkative Tree Rings. This ground-breaking work outlined Douglass’s findings on the correlation between tree rings and climate, laying the foundation for dendrochronological dating methods. In 2012, Japanese astronomers led by Fusa Miyake presented another most significant paper titled “A signature of cosmic-ray increase in ad 774-775 from tree rings in Japan. For nearly a century, dendrochronology has played a crucial role in archaeological dating. In the 1940s, the first studies were conducted on wood samples from pile-dwelling settlements. Since the 1980s, a continuous tree-ring calendar has been available for areas north of the Alps. This revolutionized established chronological models. The discovery and application of “Miyake events” in archaeology brought a paradigm shift in absolute dating, showcasing the intricate interplay between dendrochronology and radiocarbon dating. This presentation will delve into the evolution of dendrochronology from its inception in the study of pile dwellings to the present day. It will explore the transformative impact of high-precision dating on archaeological interpretation.

3 HIGH RESOLUTION EARLY SUMMER PRECIPITATION RECONSTRUCTION FOR THE 55TH-52ND CENTURIES BC IN THE KASTORIA BASIN, NORTH-WESTERN GREECE

Maczkowski, Andrej (University of Bern) - Francuz, John (Institute of Archaeological Sciences, University of Bern, Switzerland) - Bolliger, Matthias (Institute of Archaeological Sciences, University of Bern, Switzerland; Laboratory for Dendrochronology, Archaeological Service Canton of Bern, Switzerland) - Giagkoulis, Tryfon (School of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Kotsakis, Kostas (School of History and Archaeology, Aristotle University of Thessaloniki, Greece) - Hafner, Albert (Institute of Archaeological Sciences, University of Bern, Switzerland)

The Neolithic site of Dispilio on the shores of Lake Kastoria, Greece, is arguably the best-known lakeside settlement in the southern Balkans. The long research history and excellent preservation at Dispilio offer a unique insight in Neolithic way of life. In the 2019 fieldwork campaign several hundred wooden piles - remains of prehistoric buildings - were sampled for dendrochronological analysis. The dendrochronological analyses yielded an oak and a juniper tree-ring chronologies spanning the 55th-52nd centuries BC. The combination of dendrochronology and annual radiocarbon have recently provided calendar-year absolute dating for Dispilio’s tree-ring chronologies, placing the end of the juniper chronology at precisely 5140 BC. As tree-ring growth in the region is in great part limited by summer moisture availability, tree-rings can be used a proxy for climate reconstructions. A modern reference collection of juniper tree-rings sampled around Lake Prespa have been used as a calibration dataset with modern instrumental climate data. This modern reference tree-ring chronology revealed that juniper tree-ring growth in this part of the Balkans is most sensitive to May-June precipitation. The coefficients describing the relationship between modern tree-ring and instrumental climate data were applied to the prehistoric Dispilio juniper chronology thus providing the first annually resolved early summer precipitation spanning from the later 55th till mid-52nd century BC in the region.

4 WOODWORKING AND WOOD MANAGEMENT IN A PREHISTORIC PILE DWELLING: THE CASE STUDY AT LUCONE D

Maltese, Giuseppe (Department of Cultures and Civilizations, University of Verona – Italy) - Martinelli, Nicoletta (Laboratorio Dendrodata – Italy) - Saletta, Emanuele (Lares - Restauri S.R.L. – Italy) - Baioni, Marco (Museo Archeologico della Valle Sabbia – Italy)

The Lucone D settlement, one of the sites identified in the inframorainic basin of Lucone di Polpenazze del Garda (Italy), has been excavated, under ministerial concession, by Museo Archeologico della Valle Sabbia from 2007 to today. The site, dated by dendrochronology between 2034 and 1967 ± 10 cal BC, is a good example of an Early Bronze Age pile-dwelling settlement. The research produced concrete data regarding the elevation of the pile-dwelling structures and the use of wood resources. In Sector 1 (the excavation is divided into two sectors), a programme of extensive dating of all vertical poles using dendrochronology made it possible to recognize the various felling phases and therefore the contemporary elements. However, applying this method at Lucone D has revealed some challenges, i.e., managing a vast amount of planimetric and chronological data and interpreting a complex operational chain of timber management. This includes storing logs felled in later years and possibly reusing structural elements already in place.

A significant aspect of the site is that the settlement was involved in a fire, which led to the end of its first phase, the collapse of the structures, and the preservation of many wooden and clay structural elements belonging to the houses. This allowed a detailed analysis of the architectural aspects, highlighting various types of joints and ropes. The framing elements show remarkable skill in woodworking, with different wood taxa, allowing a typological classification. Integrating the techno-morphological and xylological analyses gives us a clear vision of the use of wood species in building the village. This vision is made tangible by the first virtual reconstruction of one of the identified structures (2031 BC).

5 THE RECONSTRUCTION OF DWELLINGS IN WET AREAS THROUGH STRUCTURAL CALCULATIONS AND DIFFERENT METHODOLOGIES: AN INTERDISCIPLINARY APPROACH

Di Giamberardino, Giulia (Sapienza Università di Roma) - Mangani, Claudia (Museo Civico Archeologico “Giovanni Rambotti”) - Vanzetti, Alessandro (Sapienza Università di Roma) - Baioni, Marco (Museo Archeologico della Valle Sabbia)

The structural reconstruction of dwellings, especially in wet environments, has until today mainly focused on the location and foundation of buildings (the issue can be oversimplified through the opposition between raised and ground floors) and on their planimetric reconstruction.

Different pieces of information and methodologies can be combined together, like dendrochronology, planimetric reconstruction, distribution of archaeological materials, and paleoenvironmental data for the reconstruction of lake-shore fluctuations over time. These pieces of information, extremely useful on their own, could potentially provide more insight through the in-depth study of other methods still waiting widespread application, such as structural calculations derived from structural engineering applied to archaeological excavation data. Even if these methods are suited for modern goals, they can provide a baseline for the study of the past.

It is thus possible to expand interdisciplinarity through a critical quantitative approach, in order to obtain a more secure reconstruction of the pile-dwelling, beyond typological issues. Data can be properly connected together, through a more realistic reconstruction of the pile-dwelling, also for answering questions such as the technological skill of the group/single builder, the actual use of spaces inside the house, the social organization of community and settlement systems, the evidence of possible contacts and transmission of knowledge within wider areas (such as the Alpine arc), the wider cultural interconnections.

The aim of this intervention is to test the utility of the structural calculations as a mediator of the different research strains; it will be discussed through different case studies, among which Lucone di Polpenazze, aiming also to understand whether data recovered from contemporary and past excavations of wet contexts are sufficient or require new integrations.

6 THE PROTOHISTORIC LAKESHORE SETTLEMENT OF PADULI (COLLI SUL VELINO, RI). MULTIDISCIPLINARY APPROACH TO THE KNOWLEDGE OF A WETLAND SITE

Virili, Carlo (Department of Science of Antiquities, Sapienza University in Rome) - Zanini, Alessandro (Independent researcher) - Jaia, Alessandro M. (Department of Science of Antiquities, Sapienza University in Rome)

Since 2015 the Department of Antiquities -Sapienza University of Rome has been excavating the lakeshore settlement of Paduli near the modern Piediluco lake. The aim of the project is the analysis of the diachronic development of human adaptation to the lake site. The environmental context has inevitably conditioned the settlement structure and the socio-economic articulations of this territorial system made up of a polycentric network of lacustrine villages with a long continuity of life. The beginning of the occupation of the site seems to begin in the initial phases of the Middle

Bronze Age, a moment which marks the genesis of a long historical cycle of occupation of the Piediluco basin which lasted without discontinuities until the oldest phase of the Early Iron Age. In the Recent Bronze Age the development of the settlement proceeds with the presence of a domestic structure resting on a reclamation platform made up of wooden beams. The Final Bronze Age is the period of maximum development of the area. Paduli site occupies almost twenty hectares of surface and could be the most extensive site of the local settlement system. In the Early Iron Age, shows a use to open area over a base platform consisting of a grid of wooden branches. The data collected by the multidisciplinary study (radiometric, archaeometric, paleobotanical, archeozoologic, sedimentological and paleoclimatic) confirms the importance of the site: at the end of the II millennium BC, phenomena of social complexity seem to emerge behind which there are rising local elites capable of inserting themselves into the network of international traffic could be hidden. Few generations after its maximum, the site undergoes a contraction up to the almost total disappearance of the archaeological evidence in Recent Iron Age, as happens, in synchrony, in almost all the sites of the Piediluco lake.

7 LOST AND FOUND: THE PREHISTORIC PILE-DWELLING IN BUDINŠČINA, CROATIA

Jerbic, Katarina (University of Bern, Institute of Archaeological Sciences) - Solter, Ana (Archaeological Museum in Zagreb) - Hafner, Albert (University of Bern, Institute of Archaeological Sciences)

One of the earliest known records on pile-dwellings on Croatian territory date back to 1885, when Š. Ljubić, director of the Archaeological department of the National Museum in Zagreb, found sharpened wooden piles in a marshy ground near the village of Budinščina in today's north-western Croatia. He reports that the piles were placed in regular formations in the ground and he identified them as remains of a prehistoric pile-dwelling, comparing them to the Terramara pile-dwelling in Italy. He presented his findings to Luigi Pigorini, the archaeologist working on Terramara at the time, who's work there is considered as one of the crucial findings of the 19th century "Pile-dwelling fever" around the Alpine lakes. After a season of excavations and personal consultations with Pigorini in the form of letters, and a presentation at a prehistoric pile-dwelling conference in Celje (Slovenia) Ljubić published his work on Budinščina in two short reports in 1885 and 1887. Although he presented the site as highly significant, the interest in the site has faded, and Budinščina hasn't been excavated since. That was until 2024 when, as part of the SNSF-funded post-doctoral project "Between the Alps and the Balkans: Prehistoric pile-dwellings around Croatia", the site was included in the program as a revision investigation in the form of sediment core samples, test excavation trenches and drone footage. In this paper we will present Ljubić's findings by using data and archaeological finds from the Archaeological Museum in Zagreb's archive and depots. This research will then be used as comparative data for the new findings expected to emerge from the planned revision in 2024. A crucial part of the paper includes the original letters between Ljubić and Pigorini, adding historical value and significance to the re-emerging interest in the topic of prehistoric pile-dwellings across Croatia.

8 THE WETTER PART OF THE NEOLITHIC DAWN OF EUROPE: RESULTS FROM LIN 3, LAKE OHRID, ALBANIA

Hinz, Martin (University of Bern) - Anastasi, Adrian (Institute of Archaeology - Academy of Albanological Studies, Tirana) - Brunner, Mirco (University of Bern) - Anastasi, Kristi (Université Lumière Lyon 2) - Hafner, Albert (University of Bern)

Initiated in 2019, the EXPLO project has embarked on a comprehensive examination of lakeshore settlements in the southern Balkans, with a focus on the vicinity of Lake Ohrid. The project expanded its research to include the Albanian Lin 3 site near Pogradec in 2020. Our findings at the Lin 3 site reveal at least two distinct phases of settlement, offering a glimpse into the early Neolithic lifestyle in Europe from a wetland perspective. The initial phase, identified through land-based wetland excavations, dates back to 6000-5800 BCE, positioning Lin 3 as the continent's earliest known Neolithic pile-dwelling settlement. At present there is evidence of an even earlier occupation of the site, which aligns the origins of the site with the beginning of Neolithisation in the Balkans, but in general the absolute chronological information available to us confirms the multiple phases typologically identified so far.

A subsequent phase, explored primarily through underwater archaeology, features a significant fortification represented by a three-tiered palisade complex from the late 6th millennium. Anticipated updates on its dating will be disclosed during our presentation. Echoing the magnitude of defensive structures found in Thessaly's renowned Neolithic sites, such as Sesklo and Dimini, this discovery promises to reshape our understanding of Neolithic defensive strategies and community organization. This presentation aims to unveil the latest findings from Lin 3, highlighting its significance in the broader context of Neolithic.

9 SIEVING FOR BONES: FISH EXPLOITATION IN THE PO PLAIN DURING THE BRONZE AGE

Prillo, Vito Giuseppe (University of Padua, Department of Cultural Heritage, Italy.) - Baioni, Marco (Museo Archeologico della Valle Sabbia, Gavardo, Italy.) - Cupitò, Michele (University of Padua, Department of Cultural Heritage, Italy.) - D'Aquino, Silvia (University of Padua, Department of Cultural Heritage, Italy.) - Minniti, Claudia (Department of Sciences of Antiquities, Sapienza University of Rome, Italy.) - Nicosia, Cristiano (Department of Geosciences, University of Padua, Italy.) - Sarnico, Valeria (Department of Humanistic Studies, University of Ferrara, Italy.) - Vidale, Massimo (University of Padua, Department of Cultural Heritage, Italy.)

This paper will present and discuss the zooarchaeological evidence of fishing activities practiced during the Bronze Age in the Po Valley (northern Italy), where numerous pile-dwelling and Terramara sites were located. In particular, freshwater fishing had to play a central role for the subsistence of settlements located in a geographical area strongly connected to water sources and wetlands.

Due to the fragile state of preservation of fish remains, our knowledge of these practices has remained limited and has focused primarily on documentation of tools that may be associated with them, such as fishhooks and net floats.

Analyses of fish remains found in the sites of Lucone di Polpenazze (EBA), Oppeano 4D (MBA), La Muraiola - Povigliano Veronese (MBA), Pilastrì di Bondeno (MBA-RBA), Fondo Paviani (RBA) and Villamarzana (FBA-EIA) were carried out as part of a doctoral project developed at the University of Padua and here presented. They revealed that the fishing was mainly geared towards pike and cyprinids.

Biometric and seasonal data further define the importance of fish in the diet throughout the Bronze Age and provide new information on the fishing strategies practiced by ancient communities.

10 A UNIFIED RAW AND FIRED CLAY ANALYSIS METHOD: MATERIAL SHEET AND APPLICATION TO "LUCONE D" PILE DWELLING SITE STRUCTURES

Bonusi, Stefano (Museo Archeologico della Valle Sabbia; Università degli Studi di Padova) - Baioni, Marco (Museo Archeologico della Valle Sabbia) - Tasca, Giovanni (Università degli Studi di Padova)

The study of raw and fired clays, known in Italy as "concotti", is often a niche topic within the archaeological community, leading to a lack of uniformity in study methods and data processing. In this context, we aim to fill this gap by proposing a unified study method based on the compilation of a materials sheet specifically designed for this class of materials.

This sheet is intended to be completed in two distinct phases: one during excavation and one during the study. The fields include excavation coordinates, the preservation state of the fragment or structure, possible recognizable signs on the element's surface, color (based on Munsell charts), paste class, weight, and firing/burning; it also includes dedicated spaces for the insertion of a schematic drawing of the fragment, as well as its identifying photo and reference code within a digital archive. These precautions are essential for studying these materials over time, as clays, even when preserved, are often subject to wear and tear.

The practical application of this sheet followed its creation during the study of materials from the UNESCO pile-dwelling site of "Lucone D" of Lucone di Polpenazze (IT), specifically focusing on fragments of a structure identified, among other hypotheses, as a possible grain storage silo built using a modular elements construction technique.

This technique was previously known for the Iron Age, extending back at most to the Late Bronze Age, and now, through the observations made in this study, it can be dated back to the Early Bronze Age.

1082 THE ARCHAEOLOGY OF EU-POTARCH: THE PRODUCTION OF POTASH, TAR, RESIN AND CHARCOAL IN THE ARCHAEOLOGICAL RECORD

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Nelle, Oliver (State Office for Cultural Heritage Baden-Württemberg; University of Regensburg) - Deforce, Koen (Ghent University; Royal Belgian Institute of Natural Sciences) - Burri, Sylvain (French National Centre for Scientific Research, TRACES UMR 5608 CNRS - Université Toulouse Jean Jaurès)

Session format: Regular session

Potash, tar, resin, and charcoal (PoTaRCh) are four materials closely linked in their materiality, of extraordinary importance for societal resource use and the most important products of non-timber forest use in Europe. Related to production and use are questions of competitive material sourcing, sustainability, overexploitation and socio-economic consequences which bring together scholars from different disciplines, as well as museum actors and people still producing in a traditional way. A newly established EU-COST-action (www.cost.eu/actions/CA22155) aims to improve, by networking of scientists and practitioners researching and working on PoTaRCh in Europe and beyond, the understanding of (pre-)historical developments and patterns and the heritage legacy. In this session, we focus on

the archaeological record of the production sites, including archived ecofacts. Numerous studies in Europe investigate charcoal production sites, but also tar production. Potash and resin production is rarely tracked archaeologically, thus contributions on these non-timber woodland products are highly welcomed, as are all contributions dealing with excavations, lidar-detection, using the sites as archives for environmental history, etc. Charcoal production sites are used as archives for woodland reconstructions by analysing their wood charcoal remains. Distribution and density give valuable insight into former land use intensities, also in marginal regions. Archaeological excavations are important to understand usage period and multiphasing. The archaeological sites yield remains of the processing, which can be analysed for their chemical composition.

ABSTRACTS

1 THE PRODUCTION OF POTASH, TAR, RESIN AND CHARCOAL IN THE ARCHAEOLOGICAL RECORD

Nelle, Oliver (Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart; Regensburg University) - Deforce, Koen (Ghent University) - Burri, Sylvain (CNRS; University of Toulouse)

Potash, tar, resin, and charcoal (PoTaRCh) are four non-timber materials made from trees. Their production has altered woodlands and landscapes and has left innumerable remains in the case of charcoal production, a considerable number of remains in the case of tar production, but only a few or no traces in the case of potash and resin production or sourcing. In this contribution, we address aspects of the archaeological record of PoTaRCh, show examples of case studies in France, Belgium and Germany, and start to identify gaps which we wish to close in the near future. The archaeological remains of PoTaRCh provide the (pre-)historic material base, the legacy found in the soil, to be able to address questions of competitive material sourcing, sustainability, overexploitation and socio-economic consequences. Production sites, if dated, serve as a temporal-spatial sequence of palaeoarchives of the PoTaRCh-technological evolution in Europe, as well as environmental changes, former vegetation composition and as sources for material for analytical characterisations.

2 INTERDISCIPLINARY RESEARCH ON CHARCOAL KILN SITES IN MONTIERI (TUSCANY-ITALY): ENVIRONMENTAL DYNAMICS AND WOODMANSHIP PRACTICES BETWEEN 18TH-20TH CENTURY

Pescini, Valentina (Catalan Institute of Classical Archaeology (ICAC)) - Gabellieri, Nicola (Università di Trento)

This contribution presents interdisciplinary research on charcoal kiln sites carried out at Poggio di Montieri, Central Italy, a hill heavily exploited in the Middle Ages for the extraction of silver-bearing ore, and then managed until the 19th century with a multiple land use system based on pasture.

Linking together archaeological surveys with anthracological and dendro-anthracological data, as well as with information from historical texts (e.g. by-laws), cartography (e.g. cadastre and pre-cadastre maps of 19th - 18th centuries), and historical ecology observations this research outlines the environmental dynamics that occurred in this area in the last few centuries. In particular, the multiple land use systems and the slope vegetation cover changes will be discussed as well as the definition's criteria applied in cartography for land use descriptions.

Charcoal production sites are valuable archives for woodland reconstructions and environmental management characterization. However, their study needs to be inserted in a cross-disciplinary framework research able to cross-check different historical, archaeological, and environmental sources to identify, in a more realistic way, the woodmanship practices and the complexity of their environmental effects through time. The limits and potentialities of these different sources will be discussed to identify a methodology suitable for the accurate study of the charcoal production sites.

3 A LANDSCAPE AND ENVIRONMENTAL STUDY OF HISTORIC CHARCOAL PRODUCTION IN WEST AND SOUTH YORKSHIRE

Atkinson, Christopher (University of Sheffield)

Charcoal has been an important fuel resource since at least the Iron Age, largely fuelling the iron and steel industries up until the industrial revolution of the 18th century, before being replaced by fossil fuels. The fuel has also been important for the textile industry, heating, cooking, as well as for other applications. Despite its importance in society, the archaeology of charcoal production within the UK has received limited archaeology attention compared to its European neighbours, with investigation relating principally to the identification of individual charcoal burning platforms during chance woodland surveys. These surveys are often associated to the development of woodland management plans, or as part of short-term community or research projects.

This paper summarises my on-going White Rose College of Arts and Humanities funded PhD research at the Department of Archaeology, University of Sheffield which takes a multi-disciplinary approach to the investigation of charcoal production sites within South and West Yorkshire in England.

Utilising traditional woodland survey techniques, remote sensing, historic map regression, historic archives, place-name evidence, geophysical survey, trial excavation, charcoal and pollen analysis, and radiocarbon dating, this research aims to improve the understanding of the charcoal industry in the region.

This integrated research aims to examine the distribution of the charcoal industry across the study area, whilst serving to assess the characteristics of charcoal burning platforms. Excavation also highlights patterns of fuel selection choice and woodland management; narratives of woodland character change; and a chronology of charcoal production at five case-study locations.

This presentation serves as a summary of my research into charcoal production within South and West Yorkshire. The paper will have a particular focus on the ancient woodland of Shipley Glen, Baildon, in West Yorkshire, where investigation has included excavation and environmental sampling for the purpose of pollen and charcoal analysis.

4 EXPLORING ESTONIA'S CHARCOAL BURNING LEGACY

Tomson, Pille (Estonian University of Life Sciences) - Saage, Ragnar (University of Tartu) - Kama, Pikne (Estonian National Heritage Board)

The practice of charcoal burning has previously attracted attention from archaeologists solely in connection with iron smelting in Estonia. The aim of this presentation is to systematically overview existing information about charcoal burning and discuss future research needs.

Within the cultural heritage register, there are 43 charcoal burning sites, of which 14% have been completely destroyed, 38% are difficult to recognize, 43% are partially maintained, and only 2 sites (5%) are well-preserved. None of these sites are under legal protection or have been scientifically studied. The prevalence of charcoal burning heritage is likely much broader, as indicated by archival records at the Estonian National Museum. Questionnaires gathered responses from 98 correspondents of the Museum from various regions of Estonia in 1941-1942. Among them, 71% described charcoal burning at specific sites, 14% mentioned obtaining charcoal from home ovens, 12% were unfamiliar with charcoal burning. Among the 97 responses, charcoal burning in pits was described in 42 cases, while 19 cases mentioned burning in stacks.

In 2023, a charcoal burning area was discovered in the Karula upland in southern Estonia, covering approximately 4 km². This area was identified visually using LIDAR relief maps from the Estonian Land Board. Seven burning pits were measured, ranging from 130-190 cm x 210-265 in diameter and 70-100 cm in depth. These pits were dated to the period of 1284-1410 calAD. Additionally, seven stacks with an average diameter of 6.3 m, along with two smaller stacks (diameter 5.4m), were found. These stacks were dated to the period of 1495-1656 calAD. Archaeological excavations are planned for the summer of 2024.

These findings demonstrate that charcoal burning has been widespread in Estonia. The significance of charcoal burning in the local economy and its importance in the landscape have been underestimated and require further investigation.

5 STUDY OF PRODUCTION TECHNIQUES AND INVESTIGATION OF CHEMICAL DEGRADATION OF MULTI-COMPONENT ARCHAEOLOGICAL ADHESIVES

Bertelli, Irene (Department of sciences of antiquity, Sapienza University of Rome, Italy; Department of chemistry and industrial chemistry, University of Pisa, Italy) - Nardella, Federica (Department of chemistry and industrial chemistry, University of Pisa, Italy) - Mattonai, Marco (Department of chemistry and industrial chemistry, University of Pisa, Italy) - La Nasa, Jacopo (Department of chemistry and industrial chemistry, University of Pisa, Italy) - Ribechini, Erika (Department of chemistry and industrial chemistry, University of Pisa, Italy)

The history of adhesives is closely linked with the history of humankind since joining together two different parts to obtain a composite tool was a huge step forward in the evolution of Prehistoric men [1], [2]. However, over the years, the base material, typically resinous substances, required improvements. For that aim additives, such as ochre and beeswax, may be added to manipulate adhesive performance [3], [4]. Given that it is not only important to identify the constituents but also to understand how they interact with each other. This could bring information on the production techniques, giving valuable insights into the environmental, technological, and cultural contexts of ancient societies. Another important aspect to explore is the investigation of the chemical degradation of such adhesives due to natural aging. Obtaining information on the changes that occur in material over time could allow us to obtain more instruments for its preservation and restoration. To fulfill the objectives, a chemical-analytical approach mainly based on pyrolysis and mass spectrometric instrumentations will be needed. In addition, a "bottom-up" approach, starting with the study of the simplest substances, up to more complex systems and archaeological samples.

[1] Wilson et al, Int J Adhes Adhes, vol. 104, no. August 2020, p. 102717, 2021.

[2] Rageot et al., *Mediterranean Journal of Archaeological Science*, vol. 126, 2021.

[3] Kozowyk et al., *PLoS One*, vol. 11, no. 3, Mar. 2016.

[4] Langejans et al., in *Oxford Research Encyclopedia of Anthropology*, Oxford University Press, 2022.

6 DEBONDABLE ADHESIVES: AN ARCHAEO-INSPIRED ADHESIVE FOR MODERN APPLICATIONS

Aleo, Alessandro (Delft University of Technology, Faculty of Mechanical Engineering; Leiden University, Faculty of Archaeology) - Langejans, Geeske (Delft University of Technology, Faculty of Mechanical Engineering; University of Johannesburg, Centre for Anthropological Research)

Here we present the first results of an industrial project where ancient materials provide inspiration for future applications. The BiDebA (Biobased Debondable Adhesives) is an interdisciplinary 'Interegg' project. Together the project partners aim to develop a solution for circular composite repair by engineering bio-based adhesives, derived from renewable resources, to facilitate effortless detachment of parts on command. Adhesives hamper recycling, consider the fastening of components in car batteries and the difficulty of repairing glued composite materials. Our approach draws inspiration from archaeological and historical materials and integrates recently developed bio-based adhesive formulations into existing pilot-scale debonding and composite repair setups. In this contribution, we present an overview of archaeological and historic debondable adhesives: the material composition, their application and material properties. We discuss how and when debondable adhesives were used in the past to resolve issues of recycling and repair. In addition, we discuss the test results of resin and starch based adhesives and a range of additives from international and standardized lap shear impact tests. Our results will be incorporated in the further activities to fine-tune the debondable adhesive for the industrial demonstrator.

7 IDENTIFYING PREHISTORIC TARS

Langejans, Geeske (Delft University of Technology; University of Johannesburg) - Aleo, Alessandro (Delft University of Technology) - Chasan, Rivka (University of Turin) - Fajardo, Sebastian (Leiden University) - Kozowyk, Paul (Delft University of Technology)

Adhesives have been an integral component of human technology for hundreds of thousands of years. The earliest Middle and early Upper Palaeolithic European adhesive finds consist of birch tar, conifer resin, and potentially tree gum, pine wood tar appears a later invention. In this paper we discuss and review possible lines of evidence for identifying tar during the Palaeolithic and Mesolithic in Europe. We review how birch and (pine) wood tar can be produced and how potential archaeological production features may be identified. Using these data we argue that it is implausible that Mesolithic hearth pits were used as tar pits, as they are sometimes hypothesised to be. Another way to identify ancient adhesives, and perhaps even their production techniques, is through spectrographic and molecular analysis of their constituents, like biomarkers such as retene and betulin. The data from such analyses, however, rarely provide straightforward results. We also consider the material properties of tars in terms of strength and durability, and we show that birch tar may have been a preferred material over resin products. Finally, we stress the importance of (experimental) knowledge of the production processes and the importance of a molecular comparative collection when interpreting the archaeological record.

8 THE POTARCH PRODUCTION IN THE BIELSKA PLAINE (NORTHERN-EASTERN POLAND). A CASE STUDY OF THE BIAŁOWIEŻA PRIMEVAL FOREST AND BEYOND

Szubski, Michal (Cardinal Stefan Wyszyński University in Warsaw) - Szubska, Magdalena (Cardinal Stefan Wyszyński University in Warsaw)

The development of remote sensing methods, especially airborne laser scanning, has contributed in the increased interest in mounds of various forms and functions occurring in landscapes. In the past, the form of these mounds was often interpreted by archaeologists as barrows. When we began intensive studies of these features in the various forests, it turned out that the majority of them are associated with production of a charcoal or a tar in the past.

In recent years, we conducted research in the Bielska Plain (north-east Poland), an area of 2740 km² which is covered in more than 30% by forests. Within this area is located the massif of the Białowieża Forest – one of the oldest forests in Europe. On this area, through remote sensing, 1890 mounds of various forms were located. The exceptional level of protection, and consequently, the very good state of preservation of the features, allowed the study of the mounds and an attempt to identify their function. Using various statistical and spatial methods, we attempted to categorize the morphological types of mounds and connected them in terms of functionality. During the research, we also conducted excavation reconnaissance of two charcoal kilns and a tar kiln.

Studies in various parts of Poland showed that the number of PoTaRCH features are usually dozens or hundreds in one forested area. On a national scale, there are thousands of such monuments, leading to both research and heritage management challenges.

9 RESEARCH ON CHARCOAL BURNING PLATFORMS IN THE CZECH REPUBLIC. METHODS, RESULTS AND PERSPECTIVE

Dejmal, Miroslav (MUNI - Ústav archeologie a muzeologie) - Příbylová, Michala (Archaia Brno z.ú.) - Šimík, Jakub (Archaia Brno z.ú.) - Houška, Jakub (The Silva Tarouca Research Institute) - Brejcha, Roman (National Heritage Institute)

Charcoal burning was one of the most important forest crafts. To the present day, artificial charcoal burning platforms are the evidence of the charcoal burning activity. There is a huge number of them in the forests of the Czech Republic and so far they have been only sporadically excavated archaeologically. Currently, these relics of historical production activities are being destroyed on a large scale by calamitous logging caused by the bark beetle. The platforms are not only an archaeological relic, but also contain an important paleoecological record and are also part of today's ecosystem.

As part of our earlier multidisciplinary project, we were able to investigate five sites across the Czech Republic. This large-scale project has allowed us to investigate charcoal burning platforms using many common and less common research methods.

The paper evaluates the contribution and limitations of individual research methods that were used. It attempts to summarize the findings obtained so far during the research of historical charcoal burning in the Czech Republic. And finally, it sets out the possibilities and challenges for the future research of charcoal burning.

10 "CHARCOAL FOR CHARLEMAGNE" - FUELWOOD EXPLOITATION, IRON MINING AND EMERGENT ELITES IN THE YOUNGER EARLY MIDDLE AGES (C. 700-1000 AD)

Lebsak, Michael (Albert-Ludwigs Universität Freiburg; Institute of Archaeology of the Czech Academy of Sciences, Brno; Masaryk University Brno)

This presentation explores the economic transformations of the younger Early Middle Ages (c. 700-1000 AD), focusing on archaeological case studies from Northern Bavaria, Germany, as a significant mining region. Iron played a multifaceted role in the given period, serving as the backbone for agricultural activities, infrastructural elements such as bridges and ships, and the military expansion of emerging elites. Therefore, the economic significance of iron was an important driver of political decision-making.

Central to the iron economy was the intensive utilization of charcoal as a primary fuel source for both smelting and processing. Recent archaeological excavations in the Upper Palatinate region in Northern Bavaria have yielded evidence for an intensive iron industry and moreover a rich anthracological dataset from pyrometallurgical devices, charcoal pit kilns and regular settlement features. This source provides valuable insights into the Early Medieval paleoenvironmental conditions, but also in the metallurgical chain and fuelwood consumption, even if it often derives from rescue excavations without targeted sampling strategies.

The dynamic environmental impact of iron mining and fuelwood production is in the present context emphasized as not being an historic necessity, but an effect of interdependent economic choices between elite and non-elite actors. Integrating anthracological data with other environmental indicators and archaeological-historical sources enhances the understanding of medieval economies and the socio-ecological contexts that shaped them.

11 PAST CHARCOAL MAKING REMAINS IN CURRENT OLD-GROWTH FORESTS HIGHLIGHT PAST HUMAN ACTIVITY IN THE FRENCH PYRENEES AND ROMANIAN CARPATHIANS

Py-Saraglia, Vanessa (Université de Toulouse-CNRS GEODE UMR 5602) - Saulnier, Mélanie (Université de Toulouse-CNRS GEODE UMR 5602) - Burri, Sylvain (Université de Toulouse-CNRS TRACES UMR 5608) - Larrieu, Laurent (INRAE, UMR DYNAFOR & CNPF-CRPF Occitanie) - Poirier, Nicolas (Université de Toulouse-CNRS TRACES UMR 5608) - Labbas, Vincent (IRPA-KIK/Université de Liège)

Recent historical ecology research carried out in six of the best-preserved old-growth fir-beech forests in the Romanian Carpathians and French Pyrenees has revealed evidence of past human activity. These forests, located far from villages and on steep slopes, were exploited for timber, but also crossed by herds and used for grazing. An archaeological survey has also revealed numerous remains of charcoal production, including in some hard-to-reach areas. According to radiocarbon dating, charcoal production dates back to the early Middle Ages, and developed mainly in modern times. This production was probably based on the valorisation of the remains of logging activities. This hypothesis was tested by charcoal analysis combined with charcoal diameter reconstruction and tree ring growth pattern analysis. The results show that both fir and beech were harvested. In the Romanian Carpathians, spruce was also used, as well as yew, which is known to be very harmful to most livestock. The results also suggest that this activity was not solely related to logging, but may have been carried out in conjunction with silvo-pastoralism.

1083 BIOGRAPHY, PERSONHOOD, POLITICS, ANCESTRY AND LUCK: THE ARCHAEOLOGY OF LIFE PATHS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Robb, John (University of Cambridge) - Thompson, Jess (University of Cambridge) - Tafuri, Mary Anne (University of Rome "La Sapienza")

Session format: Regular session

A human biography implies both a cultural ideal of what a human life (and afterlife) should be and an individual's particular pathway through it. This is so whether we are considering a Neolithic person dying and becoming a remembered, sentient ancestral presence, a Bronze Age person performing roles such as warrior or authoritative senior woman, a Roman politician amidst the *cursus honorum*, a medieval person anticipating purgatory, and for that matter, a student contemplating the narrow pathway to senior academic. Moreover, biographies involve politics and power: how to become a valued social person of a particular kind. They thus combine ideas about gender, experience, value and power with strategic planning and luck. How are biographical figures such as leaders, ancestors or knowledge specialists the focus of power or political action? How do they cope with contingency, health, intersectionality and gendered lives, mobility, and the slings and arrows of outrageous fortune?

This session explores the nexus of personhood and life narratives, political life and contingency. While these issues overlap, their connections haven't been explored. The other aim is to bring together different fields participating in the discussion. These issues have been explored in areas as diverse as osteobiography, diet and mobility, kinship, health and disability, varying lifeways, memory and monuments, gender and leadership, and iconography. But each of these themes discuss aspects of how people shape their lives and how human lives unfold; how do they speak to each other?

ABSTRACTS

1 SPECTACLE AND AUTHENTICITY IN FORENSIC BIOHISTORY

Duncan, William (ETSU) - Stojanowski, Christopher (Arizona State University)

Over the last two decades there seems to have been an increase in what can be called historical forensic cases in popular media, cases in which specialists were called on to provide a positive identification of an historical personage, characterize some facet of their life or death, or using past remains to characterize aspects of an historical incident. These have ranged from the internationally sensational (Richard III) to the regionally relevant (Pedro de Corpa, a martyred priest from Georgia). This type of work has been called forensic biohistory, and over the last decade we have attempted to explore and define the nature of forensic biohistory as a framework for engaging past bodies. Here we briefly characterize forensic biohistory, its research agenda, scope of work, and unique ethical issues that are endemic to such work. We also present the results of a survey of more than 200 cases to identify themes that run through bi-historical forensic research. Spectacle and authenticity undergird many of the cases that we found. Historical narratives that involve violence, criminality, royalty, or other sources of fame frequently drive inquiry in biohistorical work. At the same time, misinformation is an increasingly glaring problem for public discourse, and the need to validate narratives surrounding the past as authentic has never been higher. Bodies above all are undeniably indexical (in the Peircean sense) for personhood, and as such have singular potential for validating some narratives as true or authentic. We suggest that the interest in forensic biohistorical cases is thus driven in part by both spectacle and authenticity.

2 AFTER THE LBK LIFEWAYS PROJECT: REFLECTIONS A DECADE LATER

Bickle, Penny (University of York) - Whittle, Alasdair (Cardiff University)

Some 10 years ago, with many collaborators, we completed an extensive research project aimed at combining isotopic data, osteological analysis and funerary practice to explore diversity in the lifeways of the earliest farmers in central Europe. Focused on the Linearbandkeramik culture (LBK, c.5500–5000 cal BC), the results suggested widespread similarity in diet (in line with the common perception of LBK uniformity) and generally a greater lifetime mobility for females than males. Yet interesting variation in the data beyond this appeared at the scale of lifeways, when health, diet, mobility and burial rites were combined in individual biographies. Females may have moved more than males, but not always in the same way, with the same outcomes. Our aim with this reflective paper is to consider critically what our "lifeways" approach revealed about the lives of LBK communities and individuals. The patterns that appeared could not easily be explained by singular models, such as unified practices of gender, kinship or status, but could only really be made sense of as the histories of individual lifeways - the kinds of messy contingency experienced in everyday contexts. This made writing broader narratives more challenging, with headline findings which captured some, but not all, of the variation often dominating the discussion, and the conclusions other researchers took on board. We particularly address how diverse timescales, genders and kinship might have intersected for early farmers, in a social

nexus composed of multiple allegiances and alliances, ranging from households to much wider networks. Finally, we ask how individual lifeways contribute to building better models of LBK sociality, at varying scales, and to the understanding of more detailed LBK histories.

3 NARRATIVE BODIES AND PERIOD LIVES: CHANGING BIOGRAPHIES IN PREHISTORIC EUROPE

Robb, John (University of Cambridge)

Biography is often conceptualised atheoretically as simply telling a person's life story from whatever materials – skeletal, textual, or material culture – are at hand, and as something archaeologists do to create "human interest" stories. But biography is both more complicated and more important than that. Biography provides a normative narrative of what a human life should be; this gives people an interpretive framework for understanding their own lives, a motivational impetus, and a means of integrating people into larger stories of social groups and histories. Biography involves a process of self-objectification which happens through practical activity, but also through material culture and ritual occasions such as life events.

One implication of this is that biographies are cultural narratives as well as individual lives, and they vary historically. A human life story in modern, medieval, or prehistoric times had different parameters – what was "human"? when did life begin and end? What were the important qualities and events in it? We thus need to imagine biographies in terms of period lives, lives told appropriately to their cultural context; and how people in different historical moments constructed biographies tells us a lot about cosmology, personhood and politics.

This thesis is illustrated briefly by contrasting life narratives in prehistoric Italy, as known through bioarchaeology, funerary archaeology and material culture, particularly between the Neolithic and the Bronze Age when new forms of political personhood were dramatized and enacted in different kinds of life stories.

4 LIFETIME IDENTITIES AND BURIAL PATHWAYS IN COPPER AGE ITALY

Daniele, Annamaria (Sapienza University of Rome, Department of Antiquity) - Recchia, Giulia (Sapienza University of Rome, Department of Antiquity) - Dolfini, Andrea (Newcastle University. School of History, Classics and Archaeology.)

The paper explores the nexus between lifetime identities and burial pathways in Copper Age Italy based on a re-examination of 4th and 3rd millennium BC cemeteries from northern and central Italy. It has long been noted that, in the 4th millennium BC, formalised burial customs emerge throughout Italy, in which a broader section of the community is given access the grave than in the Neolithic period. It has also been noted that the funerary identities laid out in the grave focus on neatly defined lifetime gender and age identities, and in some cases, to new emerging socially distinct figures. However, little has been said regarding the nexus between social biographies, death circumstances, and the burial pathways available to the deceased. Three elements of this complex nexus will be brought to the fore in the paper: (1) the relationship between the living community and the community of the dead; (2) warrior identities and the 'biographies of violence' that may have defined their lives and deaths; and (3) the relationship between gender and age identities, burial treatment (e.g., articulation, disarticulation, and grave furnishings), and warrior burials, including occasional inversions of the accepted social norms. By exploring these life and death pathways, the paper aims to generate new insights into Copper Age Italian communities at the nexus between individual biographies and broader social identities.

5 ACTIVITY-RELATED SKELETAL CHANGES AND FUNERARY TREATMENT AT POPŮVKY (BELL BEAKER PERIOD, CZECHIA)

Ryan-Despraz, Jessica (University of Bern, Switzerland; Moravian Museum, Czechia) - Milella, Marco (University of Bern, Switzerland) - Lösch, Sandra (University of Bern, Switzerland) - Tvrđý, Zdeněk (Moravian Museum, Czechia)

Recent excavations from 2017-2019 in Popůvky revealed the second largest known Bell Beaker cemetery (3rd millennium BCE) in Moravia complete with 82 burial pits containing the remains of 75 individuals (67 inhumations and 8 cremations). Funerary treatment at Popůvky is heterogeneous and represented by varying degrees of material "richness", including prestigious child burials and evidence of kinship. Previous analyses evaluated demographic patterns and highlighted the presence of stress markers, some of which could be linked to nutrition. This study expands on this vast work by evaluating asymmetries and enthesal modifications of the humeri in an attempt to further explore the labor patterns and lifestyles of this population. These first results performing multivariate modeling of measurement data and enthesal scores suggest correlations between humeral morphology (e.g. "robusticity"), specific types of grave goods (e.g. archery-related items), and burial "richness". These results indicate an intriguing relationship between in vivo biomechanical stress, specific activities symbolized by grave inclusions, and patterns of social differentiation expressed by funerary variability. Continued research will explore additional patterns with regard to nutrition as well as comparisons with individuals from the nearby, contemporary cemetery of Hoštice 1 za Hanou. These findings contribute to a nuanced understanding of the lives and practices of the Popůvky Bell Beaker community, offering

valuable insights into the relationships between funerary treatment, skeletal manifestations of physical activity, and daily life.

6 MUMMIES ON THE MOVE: KINSHIP AND MOBILITY IN EARLY BRONZE AGE CENTRAL EUROPE

Rebay-Salisbury, Katharina (University of Vienna)

Archaeogenetic analysis can provide insights into biological relatedness, especially when combined with osteological and archaeological context analysis. This can help us understand social aspects of the Bronze Age. While genetic relatedness is important for kinship across cultures, meaningful social relationships emerge through enactment. Personal, emotional ties and social status can be expressed in the way bodies are handled, treated, and related to each other after death.

Isotope analysis has contributed to understanding mobility during the life course, but it has limitations in detecting changes in residence after adolescence. Furthermore, the issue of mobility after death has not been adequately addressed yet. In early Bronze Age Central Europe, there were high levels of post-funerary manipulations of human remains, suggesting that bodies were moved and reintegrated into the communities of ancestry. This challenges the assumption that cemeteries represent communities of people who lived together.

Based on the study of the cemetery of Drasenhofen in Austria dating to c. 2000 BC, this contribution will explore how the bodies of mothers, in particular, were subject to post-funerary manipulation and movement, highlighting the significance of the mother-child relationship in the life narrative of adults.

7 FLUID STATUS, MOBILE LIFE: A BIOGRAPHY OF THE DIVINER 'JUE' AT YINXU

Wu, Mengyang (Institute of Archaeology, Chinese Academy of Social Sciences; Department of Anthropology, University of British Columbia)

Identity cannot be assumed as a static category. As people go about their everyday lives, identities are constantly being formed, reinforced, and transformed. Thus, different sources and methods reveal “different aspects of someone” (Robb et al. 2019). The “person of interest” was the principal dead of Tomb M103 at Yinxu, the last capital city of the Shang dynasty (ca. 1250-1046 BCE). This tomb was fortunately not looted, while most of the large tombs went through a long history of looting or did not preserve skeletal remains owing to the burial structure. The burial yields direct material records and bronze inscriptions about the deceased’s status and social interaction in the Late Shang society. The nearly 50 pieces of deciphered inscriptions provide references to understanding his role and service at the court. The tomb owner is thus identified as the earliest known court diviner in East Asia, whose name ‘jue’ was frequently mentioned in oracle bone inscriptions during the reign of King Wu Ding.

By employing a multiscalar biography approach (Torres-Rouff and Knudson 2017) integrating archaeological, epigraphical, and multi-isotopic analysis (Sr, O, S, C, and N), this research offers different lines of evidence on the tomb owner of M103, including lineage name, sex, occupation, general status identification, dietary condition, origin, and mobility. Furthermore, these findings serve as a starting point for discussing how his identities were formed and implicated in the process of early urbanization at Yinxu. The diviner may be part of the “middle class” endowed with specialized, esoteric knowledge (M. L. Smith 2018, 2020), leading to a rethinking of the social dynamism of the Shang beyond the ruling elites and commoners. With the reconstruction of this individual’s biography, I highlight the recognition of diverse forms of mobilities in understanding how people congregated and were recombined over the city’s growth.

8 SOCIAL BELONGING AND RELATEDNESS AT THE RISE OF THE GREEK CITY-STATE: GENETIC EXPLORATION OF AREA 3 FROM THE HALIEIS NECROPOLIS

Tiliakou, Anthi (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Max Planck-Harvard Research Centre for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany) - Fabricius, Johanna (Institut für Klassische Archäologie, Freie Universität Berlin) - Schlehofer, Jenny (Niedersächsisches Landesmuseum Hannover) - Papadimitriou, Alksestis (Ephorate of Antiquities of Argolida, Hellenic Ministry of Culture and Sports, Greece) - Kossiva, Aggeliki (Ephorate of Antiquities of Argolida, Hellenic Ministry of Culture and Sports, Greece) - Bianco, Raffaella (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Max Planck-Harvard Research Centre for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany) - Krause, Johannes (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Max Planck-Harvard Research Centre for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany) - Stockhammer, Philipp (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Max Planck-Harvard Research Centre for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany; Institute for Pre- and Protohistoric Archaeology and Archaeology of the Roman Provinces, Ludwig-Maximilian-University Munich) - Mittnik, Alissa (Department of Archaeogenetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Max Planck-Harvard Research Centre for the Archaeoscience of the Ancient Mediterranean (MHAAM), Leipzig, Germany)

Whereas “kinship” or “family” have long been understood as biologically determined institutions, recent research has shown that these concepts are highly dynamic and vary greatly depending upon cultural contexts with both biological and social aspects being crucial for their understanding. When it comes to the Archaic-Classical Greek communities (ca. 800-490/490-323 BCE), scholars seem to mostly examine kinship ties through a prism that connects the formation of identities to the emergence of the polis and an increasingly structured social context, with its focal point being the “oikos” (i.e., household). Topics of discussion that arose from archaeological research were for example the place of the child within the community after death, the connection of status to the mode of burial treatment, and the post-marital burial place of women within a community. The majority of research weighs upon the Athenian model – or its comparison to the Spartan – for which more written information is available. In the current study we explore the genetic relatedness within a group of burials from a part of the Halieis necropoleis, situated in the rural landscape of the Greek Argolid. Taking under consideration the good level of preservation and documentation, Area 3 was selected containing 28 graves with 30 burials from which 25 individuals were sampled for ancient DNA analysis. Our questions address whether genetic ancestry and biological kinship might have weighed upon the formation of individual/group identities, marital ties and consanguineous relationships, and how these might be reflected in the spatial organization of the burial grounds and the preference of certain burial practices over others.

9 LIFE PATHS OF THE PARAHUMAN: ROMAN ENSLAVED, ASSEMBLAGES, AND DIASPORIC PERSONHOOD

Mol, Eva (eva.mol@york.ac.uk)

In this paper I want to explore the nexus of personhood and life narratives of Roman enslaved through the lenses of parahumanity and human-spirit-object assemblages. The Roman enslaved are an incredibly diverse group, with a plethora of integrated roles in societies: from teachers, doctors, and domestic servants to industrial and agricultural work forces, derived from all over the Empire. Through the reading of Roman sources, we also learn that the enslaved as a group were not always perceived as fully human, sometimes considered ‘speaking tools’ rather than humans (Varro, *Res Rusticae* 1.17). They were ‘fungible things’ (Joshel 2011): exchangeable, replaceable, substitutable and could be turned to items for sale or a repayment for loans.

Such ‘Otherness’ had an effect (Mol 2023). It occasionally set the enslaved apart from the ‘human’ into the domain of the parahuman (Allewaert 2013), drawing them into different exchanges with objects. By paying attention to how their life paths could sometimes be forced in fundamentally different trajectories from non-slaves (spatially, temporally, and materially, through kinship and representation), we can receive a new sense of the diasporic personhoods that emerged within this social category.

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10 BIOMOLECULAR ANALYSIS OF A ROMAN BURIAL FROM RURAL CAMBRIDGESHIRE REVEALS AN EXTRAORDINARY HISTORY OF CHILDHOOD MOVEMENT ACROSS THE EMPIRE

Booth, Thomas (Francis Crick Institute) - Silva, Marina (Francis Crick Institute) - Anastasiadou, Kyriaki (Francis Crick Institute) - Moore, Joanna (Durham University) - Walker, Don (MOLA (Museum of London Archaeology)) - Kelly, Monica (Francis Crick Institute) - Smith, Alex (MOLA Headland) - Bowsher, David (MOLA (Museum of London Archaeology)) - Montgomery, Janet (Durham University) - Skoglund, Pontus (Francis Crick Institute)

Excavations near the village of Offord Cluny in Cambridgeshire, UK by MOLA Headland in advance of the National Highways A14 Road Improvement scheme uncovered a single, isolated and unaccompanied skeleton of a person who had died in their early 20s and was buried in the ditch of a disused trackway not far from a Roman farmstead. We radiocarbon dated the skeleton to 126-228 cal. CE, in the Early-Mid Roman period. We sequenced their whole genome to ~4.12x coverage, which indicated that they were karyotypically male and carried genetic ancestries that were atypical of Roman populations of Britain, but instead comprised a mixture of ancestries related to Roman-period populations from present-day Armenia and Sarmatian-associated groups. Oxygen stable isotope analysis of their tooth enamel was consistent with a childhood origin outside of Britain and analysis of incremental carbon and nitrogen found that his childhood diet included high levels of C4-plants, consistent with a Caucasus or Pontic-Caspian location, and at least two episodes of dietary change. These results provide an impression of an extraordinary biography involving one person's childhood movements across the breadth of the Roman Empire. Was he enslaved, the son of a Sarmatian soldier caught up in the fall-out of the Marcomannic wars, or part of a Sarmatian cavalry unit? Was he embedded within the rural community who buried him or considered apart from them? Precise biographies will always be elusive requiring us to consider multiple possible narratives.

11 UNTOLD STORIES: 'BODY-OBJECTS', POLITICS, AND PERSONHOOD IN LATE PREHISTORIC SCANDINAVIA

Eriksen, Marianne Hem (University of Leicester; ERC StG 'Body-Politics') - Tollefsen, Emma (University of Leicester; ERC StG 'Body-Politics')

Some humans experience life trajectories that, through their situation in the social fabric, gender systems, and structures of power, as well as their health, physical disposition, and happenstance allow a pathway for them to become valued social persons, perhaps venerated leaders, ritual specialists, infamous warriors or later, ancestors. Others' lives are cut short, perhaps in childhood prior to becoming social individuals, or theirs were never fully recognised as lives at all: they emerged from circumstances where they were never going to be understood as valued social persons.

While the former figures are the well-known players of the grand narratives of the past, the latter are routinely written out. Bodies broken apart, not given formal burial, disappeared, dismembered, or turned into things — how do these 'body-objects' — somewhere on a continuum between object and subject — fit into understandings of larger social and political structures? In this paper, the inevitably partial and fragmentary biographies of such body-objects from Scandinavian late prehistory are presented, based on ongoing research of the BODY-POLITICS project. These are the untold stories of those who didn't end up in furnished burials with identities constructed through elaborate grave good assemblages, those who do not easily slot into the expected, bounded identity categories of Iron and Viking Age societies. How do these lives connect to larger questions of politics, personhood, and life narratives?

12 FROM LIFE PATHS TO DEAD COMMUNITIES. IDENTITIES AND BELONGING AT FIRST MILLENNIUM SCANDINAVIAN CEMETERIES

Arentz Ostmo, Mari (Department of Archaeology, Conservation and History, University of Oslo)

In First Millennium Scandinavia, mortuary topographies disclose dispersed burials and clusters of monuments bound to individual farmsteads and vast cemeteries used by wider communities. Cemeteries that display repeated use over centuries formed focal points in socio-political landscapes, as the loci for the transitions from living social relations to members of a community of dead bound to the same place of interment. Understanding burial practices as integral for the self-definition of communities, the burial sites also involve the negotiation of social order, social roles and relations amongst the living.

Cemeteries allow for explorations of both individual aspects of identity in terms of accentuated or under-communicated social roles and connections, alongside formations of shared, local practices within cemeteries involving body treatment, monument construction or the selective deposition of artefacts. Reiterated symbolic, ritual and material expressions may have become part of technologies of remembrance that served to anchor shared narratives and a sense of belonging to a wider community. The trajectories within enduring cemeteries then emerge as complex biographies binding together individuals and collectives, rooted in processes of forgetting and remembrance.

In this paper I will address the dynamic relationship between the individual and collective as these dimensions of identity emerge in burial practice. The political dimension lies in the stressing of what social roles were deemed significant

and thus appear likely to have political influence. I proceed to question whether different (gendered) social roles are stressed in burials located in cemeteries bound to individual farmsteads compared to large cemeteries for wider communities.

13 A LITTLE KNOWLEDGE IS A DANGEROUS THING: INTEGRATING BIOMOLECULAR ANALYSES TO RECONSTRUCT LIFE HISTORIES IN EARLY MEDIEVAL SCOTLAND

Koster, Lucy (School of Geosciences, University of Aberdeen) - Britton, Kate (School of Geosciences, University of Aberdeen) - Czére, Orsolya (School of Geosciences, University of Aberdeen) - Dittmar, Jenna (Anatomical Sciences, Edward Via College of Osteopathic Medicine (VCOM)) - Silva, Marina (Ancient Genomics Laboratory, The Francis Crick Institute) - Booth, Thomas (Ancient Genomics Laboratory, The Francis Crick Institute) - McCabe, Jesse (Ancient Genomics Laboratory, The Francis Crick Institute) - Curtis, Neil (Museums and Special Collections, University of Aberdeen) - Skoglund, Pontus (Ancient Genomics Laboratory, The Francis Crick Institute) - Girdland Flink, Linus (School of Geosciences, University of Aberdeen; School of Biological and Environmental Sciences, Liverpool John Moores University)

Biomolecular analyses, alongside other archaeological data, provide snapshots into particular aspects of the lives of past individuals from a specific angle and at a defined scale. Analysis of aDNA, dietary isotopes ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^{34}\text{S}$), and mobility isotopes ($\delta^{18}\text{O}$, $87\text{Sr}/86\text{Sr}$, $\delta^{34}\text{S}$) regularly address similar concepts, but from different perspectives. The increasing integration of biomolecular approaches highlights the fluid and contextual nature of these concepts, and also the need for greater discussion on how different data feed into interpretations of the life histories of past individuals and communities. This is especially true when these interpretations are applied to broader questions such as those surrounding mobility, kinship and relatedness, and status.

This presentation will discuss the complexities of integrating multiple types of data in relation to biomolecular results from eighteen individuals from Lochhead Quarry, an early medieval (5th to 7th century cal. CE) long cist cemetery in Angus, Scotland. Previous interpretations of the site have suggested that it may represent a family or community burial ground, potentially associated with the documented shift towards Christianity in the region. Strontium and oxygen isotope data is consistent with lifetime mobility both within and outwith Pictland, and current data indicates a lack of close genetic relatedness in the individuals buried at the site. However, stable isotope dietary data shows a lower protein intake than the majority of contemporary populations, which could indicate that these individuals were of a lower social status than other analysed groups. Sulphur isotope ratios are also consistent with local residence in later life. The resultant biographies have multiple potential explanations, each with different implications for understanding the individuals interred at Lochhead Quarry in the wider archaeological context. This presentation concludes that these multiplicities and complexities of life histories should be embraced, and reductive narratives rejected as they risk misrepresenting and overinterpreting data.

14 'WHERE INDIVIDUALS ARE NAMELESS AND UNKNOWN': OSTEOBIOGRAPHY AND THE SOCIAL AGENCY OF INDIVIDUALS IN THE PAST

Knusel, Christopher (Université de Bordeaux)

In 1957, Christopher Hawkes (of the ladder of inference renown) wrote: "the most scientific and therefore the best, because the purest, kind of archaeology is the prehistoric kind, where individuals are nameless and unknown, and so cannot disturb our studies by throwing any of their proud and angry dust in our eyes" (quoted in Christopher Evans, *Historicism, Chronology and Straw Men: Situating Hawkes' "Ladder of Inference,"* *Antiquity* 72[276]: 398-404). But Hawkes over-stated the situation to make a point about the validity of studying the past without texts. Individual identities, although not often named individuals can be known from archaeological material alone. This is why, osteobiography, the bioarchaeological reconstruction of the lives and deaths of individuals from the past, is appealing. This type of endeavour is as true for historic as for prehistoric people, not only for those "without history," but even those named individuals who are said to be historical. This contribution introduces two women, an Iron Age ritualist, a medieval aristocratic heiress, and a Bronze Age "Tall Man," a mix of the historic and prehistoric, all nameless at first, but all better known and one named after analysis. The results help to reveal individual social agency in ways that could not otherwise be known.

15 ON THE INTERSECTION OF HEALTH, DISEASE, AND COMMUNITY CARE: HOW THE LIFE PATHS OF LEPROSY PATIENTS IN MEDIEVAL ENGLAND UNFOLDED

Blom, Alette (University of Basel)

Leprosy has both represented a biological and social condition, with its social interpretation fluctuating between religious punishment and praise, while the risk of infection, disease severity and impairment depends on early and late life health. Moreover, leprosaria appear to have offered a relatively comfortable life style (based on historic records), but

also upheld admission criteria, and varied in size, wealth and facilities, meaning that the institute someone ended up in – if any – significantly influenced available health and community care, dietary provisioning, and risk of impairment. Studying the variety in how the lives of people with leprosy unfolded, especially compared to those without this condition, is therefore essential to fully understand the impact of the disease in social and medical terms.

This paper will focus on 483 skeletal remains from leprosia, monasteries/friaries, hospitals and parish cemeteries with leprosy cases from across the UK. Using osteobiographical reconstructions (osteology, palaeopathology, carbon and nitrogen isotopes of early (n = 30) and late life (n = 32), pathogen ancient DNA (n = 72), radiocarbon dating and historic research), complemented by pre-existing data from the same or near-by sites, these remains have revealed a huge amount of variation in the different life available to, and lived by, people with leprosy. Overall, this analysis shows that people tended to stay local, either with family/friends or in local institutes. Within such institutes especially, patients received an adequate diet, and lived out a comfortable life with community care and a high level of autonomy. This discussion will focus on the variation, similarity and intersections in the life courses of those with leprosy in comparison to contemporary and near-by non-leprosy cases, and to each other, focusing on early life health (index of poor childhood experience), dietary variation between institutes and site types, disease severity, and comorbidities.

16 **ARCHAEOLOGICAL PERSPECTIVE TO THE LIFE NARRATIVE OF A SWEDISH AUTHOR, CATHARINA SWEDENMARCK**

Lipkin, Sanna (University of Oulu) - Kallio-Seppä, Titta (Museum of Torne Valley) - Väire, Tiina (University of Helsinki)

Through her poems dedicated to the King of Sweden Gustav III, Catharina Charlotta Swedenmarck (1744–1813) gained a respected status both in the eyes of the king and the Swedish nobility. She was one of the first Swedish female authors and wrote a play, “Dianas fest”. Our research on archives suggests that she was a strong-willed woman who resisted the clergy to build a burial chapel on the manor lands of her late husband Carl Fredric Toll (1718–1784). This was extraordinary as burials outside church premises was forbidden, but Swedenmarck was determined because burial under the church floor was not allowed either. When the chapel in Kourla, Vihti, Southwestern Finland was finished in 1786 Swedenmarck reburied her husband inside the chapel. Some other family members, including Swedenmarck herself, were buried in the chapel that we studied in the autumn of 2020. Our research on the coffins, mummified (possibly embalmed) remains, funerary attire, and the relevant archival sources has revealed life narratives of the eight individuals buried in the chapel. In this presentation we will concentrate on that of Swedenmarck’s. We will discuss her life starting from isotope analysis revealing aspects on her diet from infancy to adulthood to her choices while building the burial chapel in Kourla. We will also consider the importance of the family members buried next to her and how she self was buried. Both archaeological and historical evidence draws a narrative of an affluent noble woman, who lived according to the expectations of her own class, but also reveals aspects that may be interpreted outlining her personality and character.

17 **MAKING IDENTITY, BIOGRAPHY, AND MEMORY THROUGH COLLECTIONS OF HUMAN REMAINS**

Granato, Julia (University of Oxford)

Archaeology is concerned with constructing narratives about past peoples based on material remains such as pottery sherds or grave goods, temples or even entire cities; with the physical, bony remains of the archaeological dead, we can even more deeply connect ideas of politics, cosmologies, violence, mortuary behavior, and more with the people who would have experienced them. In many historical collections of human remains in the West, such aspects of these individuals’ identities and narratives have been stripped away, and yet their bodies remain prominent fixtures in museums and historic sites meant to represent, communicate, or demonstrate the past. Thus, this paper seeks to explore the making (or unmaking) of identity, biography, and memory through collections of human remains on display: how do we assign identity and construct narratives through these human remains? How do these remains or sites hold identity or personhood? How are they given or deprived of agency? And, most importantly, how do these ideas interact at the intersection of archaeological study, politics, monuments, memory, and the public? This paper will first explore the specific and varying circumstances of these individuals’ lives and deaths leading to their placement in archaeological contexts, collections, and eventual displays. Next, it will propose a theoretical framework to approach and understand the context, assumptions, political dimensions, and roles of human remains displayed in different settings (i.e., museums of anthropology, medical history, national museums, historic sites, etc.). Finally, it will then utilize several case studies—including most prominently the Hyrtl crania at the Mutter Museum in Philadelphia, PA, USA and the ossuary at Sedlec in the Czech Republic—to demonstrate the construction of individual, community-wide and larger narratives in the study and display of collections of human remains.

1088 **PERSISTENT INTERPRETATIONS AND CONTINUAL CHANGES. NEW THEORIES AND ALTERNATIVE APPROACHES TOWARD INTERDISCIPLINARY NARRATIVES OF THE PAST**

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Limina, Valentina (Université catholique de Louvain; F.R.S. - FNRS) - Eypórsdóttir, Elísabet Ásta (University of Iceland) - Lancini, Loredana (Université catholique de Louvain) - Møller-Nilsen, Kristin (University of Iceland) - Vyverman, Sarah (Université catholique de Louvain; Ecole Normale Supérieure de Paris)

Session format: Regular session

Ancient space was the physical and mental place where individuals lived, interacted, and negotiated identity, beliefs, and cultural practices at different levels (house, grave, temple, city, family group, community, etc). Humans actively shaped natural and cultural landscapes, facing periods of increased climate instability and famine, conflicts, and phenomena such as the advent of Christianity or the relentless scourge of the Black Death. Understanding this often-far-reaching past requires tackling the challenge of integrating perspectives from the Socio-historical and Natural Sciences. By combining various sources and methods, archaeology enables us to understand how persistence and change shaped ancient space. However, the theoretical approach to contextualize ‘Persistence’ and ‘Change’ could be challenging. The need for alternative and nuanced narratives of the past becomes evident when approaching concepts such as resilience, adaptation, resistance, and fragility in archaeological reconstructions. An insightful reflection about vocabulary, methodology, and approach to these concepts, sometimes provided by other research fields, leads to multidisciplinary discussions actively contributing to research advancement.

This session welcomes contributions that examine the ever-changing relationships between humans, animals, and their environments. We particularly encourage papers on theoretical approaches to persistence and change in archaeology from Antiquity to the Middle Ages without geographical limitations. Points of discussion could potentially include:

- How do we best engage with and activate archaeological and environmental research data from often localized cultural landscape investigations to transcend various disciplinary limitations and address the more extensive historical phenomena?
- How do we investigate ancient contexts focusing on persistence and change, exploring interactions, resilience and adaptation strategies employed in the face of dynamic processes?
- How have the vicissitudes experienced by a territory led to/conditioned changes in landscape and infrastructures
- Can a space’s immutability or change depend upon its function and symbolic meaning? Are there any links between identity formation and territory evolution patterns?

ABSTRACTS

1 **PERSISTENCE AND CHANGE: DYNAMICS OF ALPINE ROCK ART DURING THE FINAL BRONZE AGE**

Brooks, Morgan (University of Auckland; The Holburne Museum)

This paper presents the findings from a study exploring the evolution, decline and disappearance of rock art communities in the Alpine region during the Final Bronze Age (FBA ca. 1200-800 BCE). It advocates for employing an interdisciplinary framework to investigate the patterns and intra-actions shaping the formation and dissolutions of rock art assemblages and, by extension, communities during this period, shedding light on the pivotal capacities and relational dynamics shaping their development.

Drawing upon relational ontology, assemblage and community of practice theory, this paper presents a critical framework for examining the various relational aspects of Alpine rock art. It applies this approach to understand the continuities, variances, and adaptations of practice during the FBA. Through a top-down approach, the study recontextualises the broader socio-cultural elements within the rock art phenomenon and explores how the interplay of topography and human agency facilitated intense trans-regional connectivity between communities, fostering constellations of rock art practice across the region.

Building upon this framework, the paper presents two potential motivators underlying the persistence and disappearance of rock art during the FBA, drawing insights from Patricia Gongla and Christine Rizzuto’s model on disappearing communities in modern business organisations. Specifically, it explores how shifts in organisational structures and changes in knowledge domains may have precipitated and encouraged noticeable transformations in the main rock art ‘poles’ of the Alpine region (Valcamonica: eastern pole; Monte Bego: western pole).

2 PERSISTING THROUGH CHANGE: RESILIENT COMMUNITIES IN ROMAN ITALY'S MIDDLE TIBER VALLEY

Hoffelinck, Adeline (Radboud University)

Towns in the Middle Tiber Valley, located within one of Italy's most densely developed urban areas – Rome's Suburbium – experienced significant changes during the transition from Republic to Empire. This transformation, characterized by losses in urban size as well as in substantive social and economic functions, was closely tied to Rome's demographic expansion and its corresponding increasing political, cultural, and economic control over the broader Tiber Valley. Conventional narratives, relying on ancient literary accounts, brand this process as urban failure, contrasting it with Rome's success. However, archaeological evidence from these towns, providing lived experiences of these events, thus enabling to challenge this historical narrative from below, paint a significantly more complex picture: communities endured despite these regional changes, yet persisted through changing.

This paper examines these urban transformations in the Middle Tiber Valley through the prism of community resilience theory. By integrating both old and new archaeological data, particularly from the towns of Falerii Novi and Veii, this talk retraces how communities perceived, dealt with, and adapted to key regional shifts by engaging with community resources, such as social capital. Communities persisted through exploiting their capacities to change. Through this process, they reorganized their urban environments while also envisioning and producing alternative urban futures, often deviating from the normative conceptualization of urban life as defined by ancient and modern standards. This talk then also aims to question why some ancient urban changes have been defined as successful, while others have been deemed as failed.

3 RESILIENT OR ANTIFRAGILE? ON THEORETICAL APPROACHES TO RECONSTRUCT ANCIENT LANDSCAPES. THE CASE OF THE AGER VOLATERRANUS (C. 3RD BC-5TH AD)

Limina, Valentina (Université Catholique de Louvain)

The paper reflects on the impact of theoretical approaches in archaeology to demonstrate how different conceptualizations led to alternative, sometimes contradicting, reconstructions of the past. Archaeologists usually use techniques, models, and concepts borrowed from different disciplines to interpret and contextualize ancient data and their environments. Reconstructing the past is never neutral, and contemporary understandings only sometimes reproduce the past complexity but could reflect methodological or theoretical bias; thus, it is pivotal to be aware of the necessity of alternative narratives that could explain different scenarios of persistence and change.

Resilience Theory has been increasingly applied in archaeology to understand human-environmental interactions better. However, another concept can be applied to archaeology: Antifragility.

Into the broader debate on theoretical applications from the so-called 'hard sciences' in archaeology, the project RELOAD, funded by FNRS at UCLouvain, intends to answer the question: Could northern Tuscany be considered a 'Resilience' or 'Antifragility' model between the centuries 3rd BC-5th AD? Through the case study of ager Volaterranus, the paper will show how alternative historical reconstructions could be achieved by integrating different sources and theoretical approaches. In the face of the Roman conquest, the elites of northern Etruria, particularly the Volterrani ones, have been defined as 'conservative' or 'resilient' for maintaining a solid identity reflected in the territory management. However, the community of Volterra responded in an antifragile manner to change in a diachronic perspective. Indeed, its elites managed to transform disadvantageous 'geographical' and political conditions into opportunities for progressive and multifaceted integration into imperial dynamics. Thus, despite persistent interpretations of Volterra as a resilient community, antifragility could eventually answer better to its peculiar dynamics of change. However, is it possible to benefit from alternative past narratives or assess their validity? How could new concepts help in reassessing historical problems and modifying current interpretations?

4 TWO FARMS, TWO ENVIRONMENTAL LEGACIES: COMPARING SOCIAL STANDING AND ENVIRONMENTAL IMPACT DURING ICELAND'S SETTLEMENT

Eyþórsdóttir, Elísabet (University of Iceland) - Erlendsson, Egill (University of Iceland, Reykjavík) - Júlíusson, Árni (Stefansson Arctic Institute, Akureyri, Iceland) - Farnsworth, Wesley (University of Iceland, Reykjavík; Globe Institute, University of Copenhagen, Denmark)

While the timing and impact of Iceland's settlement have been investigated through palynological investigations, few studies have adopted a holistic approach to reconstructing the nuances of environmental impact in a region associated with societal standing. Using a mosaic of historical, palynological, and geological data, we develop a more detailed understanding of the environmental impact of two farms, with documented different social standing, in Svarfaðardalur, North Iceland.

This project is part of the "Two Valleys" project, which examines settlement patterns, social shifts, and environmental changes in Svarfaðardalur and Hörgárdalur valleys. It seeks a holistic understanding of temporal and spatial shifts in nature and society. This study focuses on land use, resource management, and environmental change.

Paleoenvironmental research hypotheses are influenced by historical and archaeological information. This investigation centres on the Sakka and Kot farms situated in Svarfaðardalur. The findings indicate that Sakka was settled in the early landnám phase (considered to be AD 870 to 930) in Svarfaðardalur and emerged as a sizable and prosperous farm with elevated social standing. In contrast, Kot was founded approximately in AD 1100 in Skiðadalur and held a lower social status.

Peatland profiles near the farms were palynologically analysed, showing a decline in birch woodland between 1100 and 1300 AD, later than typically observed in Iceland. The delay at Kot is likely due to its late establishment, while Sakka's late woodland decline poses challenges, yet possible links to resource management, population expansion, or methodological aspects. By comparing the two farms, the study addresses the timing and nature of human impact and environmental changes due to land use. This research illuminates the intricate interplay between human activities, population expansion, and environmental changes in the valleys. Findings highlight the importance of considering sustainability and adaptability within a larger framework.

5 DOMESTICATION AND RESOURCE UTILIZATION IN NORTHERN ICELAND - IDENTIFYING SOCIAL ADAPTATION AND (RE)STRUCTURING FROM ZOOARCHAEOLOGICAL DATA FROM FARM MIDDEN SITES

Møller-Nilsen, Kristin (University of Iceland)

This presentation explores the social (re)structuring in and around the two neighbouring valleys Svarfaðardalur and Hörgárdalur in the Eyjafjörður area in northern Iceland in the time period from initial Norse occupation through the Medieval period (c. 870-1500 AD). This time period is marked by several major events defining the era, from periods of immigration to the island, the religious conversion from Norse paganism to Catholicism around 1000 AD, and the waves of the Black Death in the 15th Century. Concurrently with this, or perhaps because of this, Icelandic society saw a shift from a seemingly egalitarian society from the initial settlement around 900 AD, to an increasingly stratified society by the end of the Middle Ages. By studying the zooarchaeological material from farm midden sites in the area, the goal is to identify changes in economic resource and subsistence use, which in turn will serve as a proxy for adapting socioeconomic structures.

This paper presents the preliminary results from such analysis from three different archaeological farm midden sites in Eyjafjörður: Staðartunga farm in Hörgárdalur, Tjörn farm in Svarfaðardalur, and the church farm site of Miðgarðakirkja on Grímsey island, with particular emphasis on Staðartunga farm. By comparing the data from the zooarchaeological analysis with historical data in Iceland and beyond, the purpose is to identify zooarchaeological markers reflecting factors acting upon society during this time. Further, this paper will attempt to address how to interpret this information in a meaningful manner. How can we best contextualise this information within appropriate theoretical frameworks, and how do we apply it to further our understanding of the various processes and factors impacting social change?

6 PULLING TOGETHER POWER, WEALTH, AND PLAGUE IN MEDIEVAL NORTHERN ICELAND: CONTEXTUALIZING INTERDISCIPLINARY INFORMATION TO THEORETICALLY INTERPRET HUMAN-ECODYNAMICS IN THE PAST

Harrison, Ramona (University of Bergen, Department of Archaeology, History, Cultural Studies and Religion) - Juliússon, Arni (University of Iceland, Faculty of Philosophy, History and Archaeology) - Hjartarson, Arni (ISOR) - Hreidarsdóttir, Elin (FSI - The Institute of Archeology, Iceland) - Olafsson, Stefan (FSI - The Institute of Archeology, Iceland) - Erlendsson, Egill (University of Iceland) - Kristinsson, Axel (Reykjavik Academy, Iceland) - Brynjólfsson, Sveinn (Icelandic Met Office) - Møller-Nilsen, Kristin (University of Iceland) - Eyþórsdóttir, Elísabet (University of Iceland)

The Two Valleys Project employs a Historical Ecology perspective to allow for a constructive co-production of knowledge on Icelandic settlement history and social hierarchy by identifying different scales of past human-environment interactions and their consequences.

This paper takes a first stab at activating results from the specialist-focused sub-projects which span the social sciences, the humanities, and the natural sciences. The goal is to move toward an engaged and reflective discourse to jointly re-address key questions driving this research:

How did the Black Death, this major catastrophe that hit Iceland in 1402-1404, affect various aspects of its society after a severe decline in population size? How did this change the settlement structure and the organization of land use and landownership and thus the farm-scape?

While the Black Death pandemic without doubt was a plague of pan-European scale and consequences, natural disasters such as for example volcanic eruptions and landslides also had repeated, major impacts on the population and the economy. While volcanic tephra layers serve as geoarchaeological markers of the past, landslide events are more localized and can at times provide insight into personal tragedies.

A contextualization of our multi-scalar, multidisciplinary data sets will require reflections on the following:

How can we best trace these socio-economic and natural impacts and changes, if at all? What do we think we know of these tenant farmers and their landlords? How can we approach a story about Their lives in Our attempt of fitting together multifaceted components of this research program? Can we puzzle the pieces together, and How and Why will we know and decide about When and Where they could fit?

1089 RITUAL VARIANCE IN GRAECO-ROMAN RELIGIONS: COGNITIVE AND SENSORY THEORETICAL PERSPECTIVES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Mistic, Blanka (University of Vienna) - Graham, Abigail (Institute of Classical Studies (ICS))

Session format: Regular session

Interdisciplinary scholarship on ritual practices (including from psychology and the cognitive sciences) has long upheld that a ritual act needs to maintain a set order of movements and be performed in an identical manner as in previous instances in order to be learned and transmitted effectively (e.g. Hobson et al. 2017). Recent scholarship on ritual variance (Mistic and Graham 2024), however, has put this into question, arguing that variability in ritual practices can create more memorable and more emotionally profound ritual experiences. This session seeks to explore how religious rituals and ritual experiences could shift and transform within the Roman world from one individual to another and from one generation to another, while at the same time creating a sense of continuity within a culture, a social group, and/or a religious cult. The session encourages scholars to critically (re)examine established views and material finds relating to Roman religious rituals within cognitive and sensory theoretical frameworks, in order to push disciplinary boundaries and offer novel interpretations.

We invite submissions of papers addressing, but not limited, to the following questions:

1. How can cognitive and/or sensory theoretical perspectives help us understand better ritual variance and/or ritual continuity in the Roman world?
2. How does variability in ritual practices affect learning, remembering, and/or transmission of rituals?
3. How can the study of lived ancient religion, disability, and/or neurodivergence in ancient Rome broaden our understanding of variability of ritual practices and/or ritual experiences?
4. How can ritual variance and/or ritual continuity be traced in the material record?

ABSTRACTS

1 TRANSMISSION OF KNOWLEDGE AND RITUAL VARIANCE IN THE CULT OF MITHRAS

Mistic, Blanka (University of Vienna)

In recent years, several scholars of the ancient world have turned to the interdisciplinary cognitive sciences of religion in order to explain how religious rituals were learned, remembered, and transmitted in the ancient world. Employing theoretical approaches from cognitive science of religion and sensory archaeology, this paper examines how religious and ritual knowledge was learned and transmitted among worshippers of the divinity Mithras. Archaeological, epigraphic, and iconographic evidence from the Roman province of Pannonia will be examined in order to explore the roles that persistence and innovation played in the learning, transmission, and transformation of religious ideas and behaviours in the cult of Mithras. It will be argued that social and emotional bonds between worshippers, both on a personal and professional level, facilitated the learning and transmission of religious and ritual knowledge, while at the same time fostering social cooperation and group cohesion among worshippers in the cult of Mithras.

2 THE JERUSALEM PILGRIMAGE ROAD IN THE SECOND TEMPLE PERIOD: AN ANTHROPOLOGICAL AND ARCHAEOLOGICAL PERSPECTIVE

Abadi, Omri (Hebrew University, Israel) - Marciak, Michał (Associate Professor Institute of Jewish Studies, Faculty of History Jagiellonian University in Kraków, Poland)

The pilgrimage to the Second Temple included ceremonial elements of strong spiritual significance that elevated the participants to spiritual exaltation. This ceremonial process began with the first steps pilgrims took from their homes towards Jerusalem and concluded when they reached the Temple. The paper presents the ceremonial element of the

pilgrimage in light of archaeological and anthropological research, integrated with the historical sources and with reference to the topography of Jerusalem and its surroundings (including the use of a geographic information system). These tools are used to retrace the path that pilgrims walked and present what it meant for them. The paper also investigates whether the physical act of walking can shape the pilgrimage experience, and if so, how this occurs. It is also argued that the main approach to the Temple Mount for Jewish pilgrims led from the south (via the Kidron and Ben Hinnom valleys) and the construction of this route was designed with geophysical and architectural details to enhance the spiritual experience of pilgrims.

3 PERSISTENCE AND TRANSFORMATION IN RITUALS PERFORMED IN THE SANCTUARY OF ZEUS AT OLYMPIA FROM A VISUAL PERSPECTIVE

Sassu, Rita (Unitelma Sapienza University of Rome)

In the archaeological field, research on visual culture aims, among others, to seek the relation among the [1] ancient artefacts, monuments and landscapes, [2] the viewers and [3] the messages conveyed, that acquire a specific significance in accordance with the related context. Given these premises, the paper means to focus on the sanctuary of Zeus of Olympia with the aim of investigating the switch from Greek to Roman ritual practices performed on the occasion of the Pan-Hellenic celebrations. The latter exploited the potential of visibility to display religious and athletic performances that had a high impact on the emotions and psychology of the actors involved. The papers will explore the changes occurred in Roman Olympia by analyzing [1] the new sacred landscape, that gave a primary importance to novel types monuments and dedications, starting from the honorary statues praising Roman benefactors, generals and finally Emperors, that gradually replaced the previous images of winning athletes, [2] the new Roman actors implementing rituals and religious competitions and commissioning the erections of edifices and works of art, including the Roman Emperors themselves (see, for instance, Nero). By highlighting the changes occurred, the paper will stress the elements of persistence and continuity, that were purposely maintained and skillfully exploited by the Romans. The new rules understood the potential cultural value of the site of Olympia and of its ritual tradition and used it for their political purposes to obtain an international acknowledgement, by delivering novel contents through the performance of ancient rites, now marked by slightly altered schemes and above all new significances, and the dedication of artefacts and monuments. The power of visibility in this changing scenario will be assessed, too.

4 TO BE OR NOT TO BE: ERASING DEIFIED EMPERORS AND IMPERIAL CULT STATUS IN ROMAN EPHEOS

Graham, Abigail (Institute for Classical Studies and the British School at Rome)

Erasure is often presented as a top-down and uniform practice, disseminated from Rome across the Roman world. The impact of erasure, however, was specific to a city, its urban structures, benefactors and relationship with Rome. Imperial patronage could transform a city, empowering local institutions and benefactors as well as granting privileges such as neokoros status (the right to erect a temple for imperial cult) or to hold Olympian games. When a deified emperor was condemned, the removal of his/her name was ritualistic, a process designed to separate an individual from the power he/she represented. In practise, however, it is worth considering the broader implications of erasure: how did individuals differentiate between the games and spaces of Imperial worship from the individual who granted these privileges? At Ephesos, Domitian, Commodus and Geta were associated with neokoros status and/or Olympian games, but less attention has been paid to practical considerations: what did these erasures look like and how might they have impacted perceptions of Imperial rule? Can we separate Imperial power from an emperor?

Viewing erasures as a predominantly visual phenomenon, which varied in context, appearance and outcome (e.g. visibility, legibility), this paper employs theoretical models of and perceptive processes to consider how a broader audience of ancient viewers experienced and engaged with erasures, which did not require literacy to see or understand. Building upon recent studies of perception, cognition, and variance in ancient monuments (Ng: 2019a; Ng 2019b; Graham 2021 and 2024), this paper considers the different ways that erasure could be presented within similar urban spaces and/or within the same monument, and how subsequent changes to a monument could shape the way that the viewers engaged with its meaning and messages.

5 EPIGRAPHIC VARIANCE AND THE MAKING PROCESS OF SMALL ALTARS AT VINDOLANDA

Rome Griffin, Alexander (Lancaster University)

The presence of portable altars at Roman sites in Britain is well known. However, discussion of them is often cursory, only commenting on their diminutive size and the generally 'scrappy' nature of their inscriptions and decorations. This 'scrappiness', which is often dismissed as solely the result of a skill deficit, creates visual and textual variability; little focussed work has been undertaken to understand the overall effect of this epigraphic variance. This paper will examine the corpus of altars from Vindolanda to assess how the heterogeneity of these objects created epigraphy that was

distinct from entirely professionally made pieces, thus prompting a deeper consideration of the role that audience played in structuring epigraphic objects.

Furthermore, A.C King has recently suggested that the ‘scrapiness’ of these altars is partially the result of dedicants playing an active role in creating them. Whilst fully understanding the intentions of dedicants who chose to inscribe their own altars is impossible, my paper intends to demonstrate that examining the making process from an experiential standpoint can help us to draw some broad inferences regarding its ritual significance. This approach has been successfully applied to curse tablets, which parallel portable altars in that some appear to have been written by scribes and others by the dedicants themselves. Discussion of curse tablets has suggested that writing them may have sometimes formed part of the ritual process and this paper will examine whether the act of inscribing portable altars may have been similarly perceived.

Combining these two facets will allow these informative but largely overlooked objects to be considered from new theoretical angles and will aid in creating more nuanced discussion which recognises the significance of epigraphic variability, as well as the roles of audience and experience in structuring portable altars.

6 DISCREPANT DOGS: CANINE SYMBOLISM AND RITUAL VARIANCE IN THE ROMAN WORLD

Lundock, Jason (Full Sail University)

There are few, if any, species whose story through the millennia has been so intertwined with that of humans as the dog. For this reason, canines have been incorporated in a multiplicity of roles in the ritual behaviour of humans and they offer a fruitful case-study in ritual variance and cognitive association in the construction of religious practice. This paper shall focus on the development of ritual and magic practice involving canines in the Roman world from the Late Republic to Late Antiquity, approximately 200 BCE to 500 CE, to illustrate how a symbolic association may be utilised and adapted over time to fulfil the psychological and sociological needs within a given ritual community. Archaeological and textual sources shall be utilised in this discussion, with a particular focus on the iconography of ritual objects, to illustrate how the role of the canine varied and how its symbolic association was utilised for the construction of ritual practice by a diversity of groups. Theoretical lenses from the fields of psychology and neuroscience, with a focus on cognitive associative reasoning, shall help to inform our interpretation of these behaviours and how the diversity of practice helped to create a pluralistic social identity through ritual performance in the Roman world.

1090 ARCHAEOBOTANICAL HERITAGE: COLLECT, PRESERVE, SHOW, SHARE!

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: D’Auria, Alessia (University of Naples “Federico II”, Department of Agricultural Sciences) - Speciale, Claudia (IPHES-CERCA, Catalan Institute of Human Palaeoecology and Social Evolution) - Kerfant, Céline (IPHES-CERCA, Catalan Institute of Human Palaeoecology and Social Evolution) - Matteredne, Véronique (CNRS - MNHN, UMR 7209 Archéozoologie-Archéobotanique, sociétés, pratiques, environnements.)

Session format: Regular session

The broad topic of the session is The Life of Archaeological Heritage in Society. The specific topic is the valorization of the Archaeobotanical Heritage (macro- and micro-remains) as one of the essential witnesses of the daily human activities in the past; from the wooden shipwrecks of several meters long to the phytoliths collection, archaeobotany offers a wide variety of materials and opportunities to show how humans in the past used plants for any kind of purpose. Unfortunately, even today, little interest is placed in this type of material, especially in its use for didactical, outreach and educational values in museums, universities and elsewhere. Moreover, there are very few communications about plants remains in the scientific media. We would like to invite scholars who work with archaeobotanical remains (from charred to waterlogged wood, from carpological remains to microremains) and who are involved in the valorization of archaeobotanical collections and their use for educational purposes. We would like to emphasize the difficulties associated with the classification, preservation, and valorization of archaeobotanical material and collections, also but not only the historical ones (for example, the collection from the Vesuvian area, see the National Archaeological Museum of Naples and the Archaeological Park of Herculaneum, Italy, or the collections of the Museum of the University of Tübingen, Germany, or the Museum of Vojvodina, Serbia), as well as the methods employed to make them usable and enjoyable for everyone. We encourage archaeologists and archaeobotanists with virtuous experiences in physical or digital exhibitions, educational activities for children and adults, didactical practices for university students, any kind of valorization project that allowed the archaeobotanical heritage to be well preserved and shared with the scientific community and the wide public as well.

ABSTRACTS

1 BRAIN DATABASE: A SHARED RESEARCH COLLECTION FOR EFFECTIVE AND MULTIFACETED OUTREACH OF ITALIAN ARCHAEOBOTANY

Florenzano, Assunta (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia; NBFC - National Biodiversity Future Center, Palermo) - Mercuri, Anna Maria (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia; NBFC - National Biodiversity Future Center, Palermo)

This paper provides an overview of BRAIN - Botanical Records of Archaeobotany Italian Network, a unique and large research network in which plant micro- and macro- remains are collected in the same database, and to which different experts can contribute. BRAIN aims at sharing the archaeobotanical studies carried out in archaeological sites and human-influenced off-sites located in Italy and some Mediterranean countries. Since 2014, hundreds of archaeobotanical metadata have been entered in BRAIN; the database reports lists of sites, their location, culture, archaeological contexts, and how many types of botanical analyses have been performed in research studies since the 1980ies. The compilation of the great wealth of archaeobotanical data from both peer-reviews scientific journals and grey literature improves our knowledge on plant-human interaction during pre-historical and historical times, and increases the impact of archaeobotanical research on recent issues such as environmental sustainability, biodiversity, nature conservation under global change. In this regard, particular attention is being paid to the long-term human-environment dynamics based on floristic data by BRAIN within the ‘National Biodiversity Future Center’ for biodiversity management and conservation planning. Plants are at the heart of BRAIN, as a paramount element related not only to nature but also to the cultural, social, technical, and symbolic realms in which humans are embedded. The vast set of data collected in BRAIN presents archaeobotany as a self-informative science; whether through searching a catalogue of sites and plants, their chronology and location, this reference database aims to increase awareness of the role of plants in human life.

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2 THE INTERNATIONAL COMMITTEE ON OPEN PHYTOLITH SCIENCE: A COMMUNITY EFFORT TO IMPROVE THE COLLECTION, PRESERVATION AND SHARING OF PHYTOLITH DATA

Kerfant, Celine (on behalf of ICOPS (International Committee on Open Phytolith Science), Universitat Pompeu Fabra)

Phytoliths are plant microfossils used worldwide to answer a variety of questions in fields as diverse as archaeology, palaeoecology and palaeontology. The result is a profusion of phytolith terms and methodologies that partially hamper commensurable communication and sharing of knowledge among research communities.

The International Committee on the Open Science of Phytoliths (ICOPS) was established in 2021 to improve this situation and start moving towards implementing open scientific principles and practices. This presentation aims to outline the objectives and achievements of this community group, which include:

The implementation of training workshops in digital tools such as GitHub for researchers and students;

the creation of a website, using the GitHub environment, designed to store and share all data relating to ICOPS actions in a transparent way;

an open publishing guide to help researchers publish and share phytolith (raw) data;

the beginnings of the first ontology for phytolith research, designed in accordance with the International Code for Phytolith Nomenclatures (ICPN 1.0 and 2.0) to facilitate the accessibility and interoperability of phytolith data;

a community survey and FAIR assessment of existing phytolith data to establish FAIR (Findable, Accessible, Interoperable, Reusable) data guidelines for phytolith research.

Future plans for 2024 include talks from experts in open and FAIR science and clinic sessions to help and support researchers to implement open and FAIR practices in their research projects and data.

3 **ARCHAEOBOTANICAL HERITAGE: THE COLLECTION OF EDIBLES AND ORGANIC REMAINS OF NATIONAL ARCHAEOLOGICAL MUSEUM OF NAPLES (ITALY)**

D'Auria, Alessia (University of Naples "Federico II"; Department of Agricultural Sciences) - Miele, Floriana (National Archaeological Museum of Naples) - Di Pasquale, Gaetano (University of Naples "Federico II"; Department of Agricultural Sciences)

The eruption of Vesuvius of 79 AD was one of the greatest disasters in ancient times, and since 1738 the archaeological sites in the area have produced large quantities of botanical remains, going to form the so-called "Collection of Edibles and Organic Remains", currently housed in the National Archaeological Museum of Naples (MANN). It is considered as one of the most extensive archaeobotanical collections from the classical world and provides in-depth evidence of Roman dietary habits. Our study provided a first comprehensive overview of the specific features of each find of these plant remains. In particular 20 woody taxa and 31 herbaceous taxa have been identified. Among these the most frequent are plants for food use: the most common cereals were *Triticum dicoccum* and *Hordeum vulgare*, while *Vicia faba* var *minor* and *Lens culinaris* were the more common pulses. Frequent are also figs (*Ficus carica*) and dates (*Phoenix dactylifera*).

Despite the high relevance and uniqueness of these ancient organic materials (so that they were included in the Precious Cabinet hosted in the Herculaneum Museum at Portici and then in the Royal Bourbon Museum in Naples) they were neglected for a long time, due to criteria and conservation methods now outdated and inadequate compared to current scientific principles. From this point of view, it would be extremely important to focus the attention of scholars and sector experts to this unique archaeobotanical collection, which constitute a cornerstone of the cultural heritage of the classical world, especially with regard to food culture and ancient landscapes.

4 **NOT SO BEAUTIFUL ENOUGH? THE ARCHAEOBIOLOGICAL HERITAGE HIDDEN FROM PUBLIC**

Celma Martínez, Mireia (University of Murcia) - Haber Uriarte, María (University of Murcia)

The archaeobiological heritage is still presented as something extraordinary in most of the museums of the Iberian Peninsula. Only those remains that present shapes identifiable by the public and the most outstanding beauty, worthy of being shown, are considered suitable to be part of the permanent collections in display cases. On the other hand, the complexity of their recovery in archaeological sites and the correct treatment that the remains must receive during their study and storage make it even more complicated for them to enter the ordinary circuit of museum objects.

The absence of sufficient representation of the organic materiality of the everyday life of the past in these contexts of didactics and heritage pedagogy encourages this type of remains to be underestimated by society. It is even extended to Bachelor's, Master's, and professional archaeologists, who tend to consider inorganic materiality as the only one capable of formally explaining the past. In this paper, we present the state of the art through a review of the organic collections exposed to the public, developing a SWOT for the Iberian Peninsula.

We consider that the results of the research must be synthesized to be shown to the public and to be able to redefine the prominent role that organic remains played in explaining the changing history of past societies. In addition, we propose a new form of integrated presentation of the Archaeobotanical and Archaeobiological remains to improve the visitor's understanding and raise awareness among the general and specialized public of the importance of these remains given the unique information they offer us.

5 **CULTURAL HERITAGE AND BIODIVERSITY OF RIETI BASIN AND PIEDILUCO LAKE: ARCHAEOBOTANICAL EVIDENCE FROM LAKESHORE SETTLEMENT OF PADULI (CENTRAL ITALY)**

Vanacore, Lucia (Department of Agricultural Sciences, University of Naples Federico II) - Virili, Carlo (Department of Science of Antiquities, Sapienza University in Rome) - Jaia, Alessandro (Department of Science of Antiquities, Sapienza University in Rome)

The archaeological site of Paduli, situated close to the shore of the Piediluco lake (Colli sul Velino, Rieti, Latium) is part of the articulated context of lakeshore settlements that populated the Rieti basin and the Piediluco lake between the early Bronze Age (20th century B.C.) and the early Iron Age (9th century B.C.). Thanks to environmental conditions, the Paduli site provided a wide range of archaeobotanical remains, including charcoals, charred seeds, and waterlogged wooden structures. The study of these materials associated with knowledge of landscape ecology has enabled us to characterize the biodiversity of this area 3000 years ago and to make some suggestions about human activities related to the forest, as well as the use and knowledge of wood resources. Specifically, our results indicate the presence of two different forest landscapes: a large planifolia forest dominated by *Quercus robur* L. (pedunculate oak) and/or *Quercus petraea* Matt. (sessile oak), and *Carpinus betulus* L. (hornbeam); a mixed deciduous forest of the hilly zone dominated by *Q. cerris* L. (Turkey oak) and *Q. pubescens* Willd. (pubescent oak) associated with *Carpinus* spp. Furthermore, the results obtained from the study of wood artifacts reflect the specific needs of local communi-

ties, suggesting that the inhabitants of Paduli were able to select tree species based on the technological properties of wood. Nevertheless, they met their wood requirements from nearby local resources. In conclusion, the dissemination and promotion of this archaeobotanical heritage through its investigation and musealisation are not only useful for forest restoration works and valorisation of the landscape but also enrich knowledge about the archaeological site of Paduli, thereby enhancing the cultural identity of the local community.

6 **DIACHRONIC RECONSTRUCTION OF THE HUMAN-ENVIRONMENTAL RELATIONSHIP AT THE UNESCO WORLD HERITAGE SITE OF BUTRINT: A NEW ARCHAEOBOTANICAL PERSPECTIVE IN ALBANIA**

Tomasini, Riccardo (Sapienza University of Rome) - Moricca, Claudia (Sapienza University of Rome) - Hernandez, David (University of Notre Dame) - Molla, Nevila (Institute of Archaeology Tirana) - Hodges, Richard (University of East Anglia) - Sadori, Laura (Sapienza University of Rome)

Butrint, designated as a UNESCO World Heritage Site since 1992, is situated in the southern region of Albania, overlooking the Vivari Channel, and facing the Greek island of Corfu. Despite archaeological investigations having started in 1928, Butrint has been minimally explored from an archaeobotanical perspective. The present study represents the first in-depth archaeobotanical exploration of Butrint that seeks to reconstruct the diachronic human-environment relationships of this important archaeological site. Thanks to the extended occupation, spanning from the Archaic to Venetian period, Butrint offers a rich selection of different archaeological contexts across different epochs, containing abundant and well-preserved plant macroremains. The remains, sampled in 2022 and 2023, are mainly preserved through charring and waterlogging. Preliminary analyses were performed on materials from medieval contexts of the Western Defences (10th century AD), and the Roman forum (3rd century B.C. to 7th centuries A.D.). These reveal an assemblage mainly composed of cereals (*Triticum monococcum*, *Triticum turgidum* subsp. *dicoccon*, *Triticum aestivum/durum* etc.) and pulses (*Vicia lens*, *Lathyrus oleraceus*, *Lathyrus* sp. etc.) at the Western Defences, while a low presence of cereals and a high concentration of *Vitis vinifera*, *Sambucus nigra* and *Rubus fruticosus* is reflected in area of the Roman forum. In terms of charcoals, the most represented taxa are *Quercus sect. robur*, *Rhamnus/Phillyrea*, *Olea europaea* and *Acer* sp. This research not only aims to fill a significant gap in the archaeobotanical exploration of the site but also contributes to broader discussions on human-environment interactions in the Albanian and Mediterranean regions. The findings are anticipated to shed light on the adaptive strategies, subsistence patterns, and agricultural evolution of the diverse communities that inhabited Butrint over the centuries, enhancing our comprehension of the intricate interplay between human societies and their surroundings.

1091 **ARCHAEOLOGY AND NATURE MANAGEMENT: FRIEND OR FOE? HOW ARCHAEOLOGICAL HERITAGE IS DEALT WITH IN NATURE CONSERVATION CONTEXT**

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Cordemans, Karl (Flemish Land Agency) - Schreurs, José (Heritage Agency) - Byrnes, Emmet (Department of Agriculture, Food and the Marine)

Session format: Regular session

In October 2020 the European Commission proposed a new legal framework on the restoration of ecosystems which was agreed on in trilogue on November 10, 2023. The regulation envisages legally binding targets, including nature restoration for 20% of EU land by 2030. Member States will have to submit plans within two years on how they will meet the targets and conduct regular monitoring and reporting. This means that member states will be obliged to step up and scale up. The large scale of projects for nature restoration and development will no doubt have a great impact on the conservation of known and as yet unknown archaeological values in nature areas and reserves. Questions to be addressed include: How is the field dealing with this? Are European (such as Environmental impact assessment) and national regulations sufficiently specific to set conditions for nature development and management activities? How can there be cooperation with nature managers? Contributions are welcomed from all countries: it would be good to have whatever examples and experiences of archaeology in relation to nature management that are out there, whether they come from Europe or wider afield. Contributions can be broad: good or bad practices (practical, legislative, ...), case studies, more ethical or philosophical reflections,....

1 HOW ARCHAEOLOGISTS VIEW NATURE? AND HOW DOES THIS REFLECT IN NATURE PROTECTION LAWS?

Žaža, Petr (Masaryk University)

Nature in archaeology is often studied either as place where history happened, or when we need to find out about the climate past societies lived in, seldom is nature taken as a part of the bigger picture, that is, the landscape. Human factor often gets lost along the way. This is also true when talking about nature management and protection. Cultural landscape is omitted from the factors needing protection as well. Even though it might seem inconsequential, does the archaeological point of view not reflect the general view of our modern society on the connection between nature and archaeological heritage? One which also reflects on the need to protect nature in the first place. Yet, in many cases, the nature around us has been created by humans in the past, and especially in Europe, very few places remain a true nature-made habitats. This opens the possibility to deal with these problems of nature and heritage protection as a more intertwined topic. The goal of this presentation is to draw attention to the problems stemming from the fragmentation of efforts when dealing with nature and cultural heritage, and how can archaeology, more precisely a shift in archaeological theory, help with the lack of comprehensive approach when dealing with archaeological heritage in projected nature management restoration efforts?

2 IN THE FIELD OF CONFLICTING INTERESTS. CURRENT CHALLENGES AT THE INTERFACE OF CULTURAL HERITAGE AND ENVIRONMENTAL POLICIES IN SWITZERLAND

Schaer, Andrea (Archaeokontor GmbH/University of Bern)

In Switzerland, archaeology is often subsumed under the concept of nature and cultural heritage protection in legal frameworks. Nature conservation and the preservation of cultural heritage thus belong together, at least at the legal level, in a way that is constantly being negotiated.

In the current political environment, which is also characterised in this country by climate and, in particular, energy debates, various, sometimes conflicting trends can be observed. In order to understand these, it is first important to differentiate between environmental concerns. The concerns of environmental protection are not limited to the protection of biodiversity and the preservation of landscapes, the latter combined with spatial planning policy endeavours, i.e. concerns that are highly compatible with the archaeological guidelines laid down in the Malta Convention. More problematic with regard to archaeological heritage conservation and the preservation of architectural monuments are the concerns of nature conservation, in particular the concerns of the energy transition. At the same time, newly developed strategies pursuing a holistic approach, such as the concept of “Baukultur” (see “Davos Declaration on Baukultur 2018”), that challenge archaeology and the whole sector of cultural heritage management and ask for new, more comprehensive but also more inclusive approaches.

In the field of tension between climate and environmental protection and the protection of cultural heritage, archaeology must position itself in such a way that it is not perceived as an obstacle or a brake, but rather as a constructive discipline that can make its own independent and important contribution.

The presentation sheds light on the current political and social debate in Switzerland and uses examples of current projects to illustrate how the tensions described above play out at legislative level and in practice, and how ways are being sought to reconcile environmental concerns with cultural heritage issues.

3 THE EU HABITATS DIRECTIVE AND CULTURAL HERITAGE LEGISLATION AND REGULATION - SOME PERSPECTIVE FROM IRELAND

Kirwan, Seán (National Monuments Service, Department of Housing, Local Government and Heritage)

As a Member State of the EU Ireland has had experience of implementing the EU Habitats Directive since its introduction in the early 1990s. The Directive (among other matters) requires authorities consenting to or undertaking plans or projects to make screening determinations as to whether a process known as “appropriate assessment” (“AA”) must be carried out to consider effects on “European Sites” (in broad terms the network of habitats protected under EU law).

This core aspect of the Directive has been implemented in Ireland through the statutory planning and development code (as regards projects covered by that code) and, as a default, through a domestic implementing regulation requiring the necessary screening (and, where applicable, AA) to be carried out by any public authorities granting consent, or undertaking, projects.

In recent years work has progressed on a completely revised and modernised code specifically directed at protection of cultural heritage, which was enacted in late 2023. The work on that legislation, and now on the administrative steps

to implement it, have brought greater focus on the need for projects licensed or undertaken under that legislation to be subject to the requirements of the Habitat Directives (in particular as regards AA, but other issues also arise). A particular example would be cases of research archaeological excavation, for which the National Monuments Service would, in the normal course, be the sole regulatory authority (and thus the body charged with ensuring the Directive is complied with). Other instances also arise.

While the detail is technical and situated in an Irish (though also EU) legal context, examination of this matter offers opportunities to reflect on the need to accept that archaeological and cultural heritage projects need to be considered as regards natural heritage impacts just as much as any other project category.

4 STRIVING FOR SYNERGY: NATURE AND HERITAGE

Young, Janine (National Trust) - Caroli, Vivivana (National Trust)

As a direct response to the climate crisis the National Trust have set ambitious targets for nature recovery, aiming to plant 20 million trees by 2030 and create 25000 hectares of priority habitat by 2025. For the Trust’s archaeological advisors this represents new challenges. How can we protect the significant archaeological remains on Trust land, whilst also facilitating this response?

Recent guidance from bodies like Natural England is beginning to address this with the recent publication of ‘Heritage in Nature Recovery’ but most sector standards are aimed at the world of development, protecting the archaeology in the face of construction and don’t provide the right tools for incorporating archaeology in nature recovery projects.

This paper uses the case study of Attingham Park, a 1000-hectare estate in Shropshire containing part of Viriconium Roman city. An ambitious 30-year nature recovery vision for the estate is being created. The potential for significant buried archaeological remains forming part of the Viriconium hinterland is substantial and remains may be threatened by creation of woodland and wetland. To inform the archaeological response a 1000-hectare magnetometer survey has been carried out to inform the vision and enable a strategy to incorporate the archaeology. We will look at what we learnt from the geophysical survey and how the results be used and incorporated into the nature recovery vision without being seen as merely a constraint.

This paper will also address wider issues faced by the National Trust Archaeological advisors when working on nature recovery schemes, giving examples of successes and failures in our approach. For example; funding considerations, extent of mitigation required, strategies to promote an integrated landscape perspective. Finally and perhaps most importantly, how can we use our understanding of the past to help build resilient landscapes for the future?

5 NATURE AND HERITAGE: HOW TO SEDUCE NATURE MANAGERS?

Schreurs, Marie-José (Cultural Heritage Agency of The Netherlands)

In the Netherlands, large-scale nature restoration and development projects are being carried out in order to meet European 2030 goals on restoration of ecosystems. In addition, climate adaptation programs will lead to measures in nature reserves. Preserving heritage is not an explicitly stated goal in these assignments. The current legislation regarding monuments forms the framework within heritage is safeguarded. However, this legislation is not specifically focused on heritage in nature reserves. This means that many nature restoration activities do not require a permit. Common activities include removing sods and other methods to remove nitrogen-rich topsoil, raising the water table and closing ditches.

Our goal is to seduce nature managers to preserve heritage beyond what is legally required. The Cultural Heritage Agency of the Netherlands has started projects to increase awareness of archaeological heritage and provide advice on its preservation. We inform owners and managers about protected monuments and other archaeological sites and the expected archaeological heritage in nature reserves. Various methods have been used: Amongst others, giving archaeology courses for project leaders and managers of the large site management organizations in the Netherlands i.e. Staatsbosbeheer (State Forestry department) and Vereniging Natuurmonumenten (Society for Preservation of Nature Monuments). Together with these organizations we examine possible alternative measures and plan adjustments to achieve nature objectives and minimize damage to archaeological heritage.

Another example is the development of an archaeology module for schools in the Dutch green sector (agriculture, nature and food).

This presentation discusses the collaboration between the various stakeholders to promote heritage awareness.

6 INTEGRATING HERITAGE INTO LAND MANAGEMENT SCHEMES IN ENGLAND

Poppy, Sarah (HE - Historic England)

December 2022 saw the publication of legally binding targets for the environment in the UK, including the reversal of species decline by 2042, restoration of water bodies and a 2% increase in tree and woodland cover by 2050 to support net zero and nature recovery objectives. Heritage is recognised in Defra’s 25 Year Plan, under the theme of

“Enhancing beauty, heritage and engagement with the natural environment”, and is reiterated as an objective in the Environmental Improvement Plan published in 2023. However, the lack of statutory targets is proving to be a barrier to heritage being recognised as a priority in scheme policy and development. Drawing on Historic England’s recent experiences with the post-Brexit Farming and Countryside Programme, this paper will outline the nature-based schemes that are being developed and introduced in England, how the heritage sector is responding to address these, and reflect on the opportunities and challenges for integrating heritage.

7 SPATIAL CHALLENGES FOR ARCHAEOLOGICAL HERITAGE MANAGEMENT IN FLANDERS

Gheysen, Korneel (Flemish Land Agency) - Cordemans, Karl (Flemish Land Agency)

Flanders is a small and crowded region. This results in many claims regarding land use. Many of these claims are induced by European policies such as Biodiversity, Afforestation and Nature restoration targets, but also Water management and the common agricultural policy have had major effects on archaeological heritage management. In the years to come, the land use pressure will even increase due to big scale nature development projects and new developments to tackle climate change by the Flemish government. In this paper an overview will be presented on how archaeology and landscape is (or is often not) taken into account in land management and new developments. It will be demonstrated that there is a big difference depending on who is taking the initiative (private and public). We take a look on how policy deals with this and how this will develop. Some good practices and possible solutions will be presented too.

8 WELL TOGETHER? CASE STUDY OF A NATURE PARK AS A WETLAND AND ARCAHEOLOGY CONSERVATION OPERATIONAL ENTITY

Brancelj, Ana (Ljubljansko barje Nature Park Public Institute; University of Savoie Mont Blanc)

The aim of the contribution is to present of case study and to discuss the practices within the legislative and management framework of a nature conservation public agency, who is responsible of a wetland archaeological site.

Nature park Ljubljansko barje in Slovenia is a nature conservation public institute and since 2008 a site manager of cultural landscape that is loosing its wetland characteristics due to centuries ongoing drainage, unadapted agricultural practices, spreading urbanisation and lack of general understanding of the wetlands importance. For the reason of a spatial overlapping, the public institute is since 2011 also a site manager of one of the a UNEESCO world heritage site of the Prehistoric pile dwellings around the Alps. These are considered as best preserved organic remains dating from prehistory, that long remained intact and are extremely well conserved due to their waterlogged environment. The loss of the wetlands characteristics not only endangers the nature, habitat and biodiversity conservation as one of the principal goals of the institute, but also archaeological remains are at stakes, for the deterioration of their waterlogged milieu. What are legal and operational possibilities of a public institute for the joint protection of the biodiversity and archaeological heritage? What obstacles and which opportunities site manager encounters, what actions were already made, and what are the perspectives?

Our aim is to present a case study of one public entity that tries, within its formal obligation, to overcome the traditional dichotomy in nature and culture conservation. We will show what strategies are used to englobe the two goals, when the administrative and legislative circumstances are yet not set in the way to make things happen or work easily.

1093 LIFE AND DEATH IN THE CELTIC WEST: NEW INSIGHTS FROM BIOARCHAEOLOGY AND FUNERARY ARCHAEOLOGY

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: O’Brien Butler, Ciara (Cardiff University) - Faillace, Katie (Cardiff University) - Hemer, Katie (University College London) - Kinirons, Samuel (University College Dublin)

Session format: Regular session

Academic use of the term “Celtic” has long been controversial, with material, chronological, and lingual critiques. These criticisms have resulted in increasingly nuanced scholarship regarding the Iron Age and Early Medieval communities (800 BCE – 1000 CE) with “Celtic” language and material culture, acknowledging regional and chronological variation. Despite methodological and theoretical developments, bioarchaeological investigations remain a minority within “Celtic” studies; reasons for this paucity vary between regions, but include poor preservation, fewer developer-funded excavations, and, for the Welsh early medieval period, a comparative lack of surviving historical sources. However, in the past decade, several new discoveries of human and animal remains from archaeological excavations has led to a boom in osteological research in Wales, facilitating new comparisons to the better-studied areas within the “Celtic” world. These excavations cover a multitude of site types including Iron Age hillforts, Viking era settlements, and early medieval cist cemeteries, greatly increasing the interpretative potential of the remains. In particular, recent investigations have highlighted the interconnectedness of regions in these periods, emphasising a shared Irish Sea

heritage, as well as building on links between the Celtic West and Scandinavia and the Mediterranean world. These relationships form the inspiration for this session, which will integrate these results into our broader understanding of the Celtic West from 800 BCE to 1100 CE and contextualise the scientific data from human and faunal remains. This session invites all papers from osteoarchaeological and zooarchaeological perspectives (including biomolecular and histological studies), particularly those which integrate the funerary evidence or explore links between regions.

ABSTRACTS

1 FEEDING KING AND COURT: FOOD RENDERS, HUNTING AND FEASTING AT LLANGORSE CRANNOG, WALES

Best, Julia (Cardiff University) - Mulville, Jacqui (Cardiff University)

Llangorse Crannog is a gem in crown of Welsh archaeology. This royal site, associated with the kings of Brycheiniog, was in use between 890 and 916 AD before being burnt to the ground. Excavation revealed a rich array of artefacts including a substantial animal bone assemblage, which is currently the largest fully analysed assemblage in Wales of this date. With bone preservation being poor in many areas of Wales, this is a valuable resource. The zooarchaeological assemblage contains a unusually high proportion of wild animals, in particular red deer (*Cervus elaphus*), alongside key domestic species such as pigs, cattle and sheep/goats. Some species having distinct sections of the body represented, and the age profiles indicate that Llangorse was a consumer site. The animal bone has given an incredible insight into hunting targets and kill sharing, as well as shedding light on the wider provisioning of the site, including the probability of renders – gifted food. When analysed alongside the Welsh law-books such as Cyfraith Hywel (the Law of Hywel) this site provides a unique window into hunting, herding, feasting, kingship and social hierarchy. This allows investigation of status, display and sustenance in early medieval Wales, and can also reveal how different groups used the animal resources to negotiate power and identity.

2 BEYOND THE BONES: THE EARLY MEDIEVAL ANIMAL REMAINS FROM LLANBEDRGOCH, ANGLESEY

Hood, Meredith (Cardiff University; Amgueddfa Cymru)

Understandings of farming systems and human-animal interactions in early medieval Wales (5th-11th centuries CE) have, unfortunately, been limited by poor survival of faunal remains and sparse historical texts. The large animal bone assemblage from the enclosed settlement at Llanbedrgoch, Anglesey (Ynys Môn), in north-west Wales is therefore a valuable resource for understanding the use of animal products during what was a formative period in the creation of Welsh identity. A rich artefact assemblage from the site demonstrates trade and cultural contacts across the Irish Sea region and beyond, and the zooarchaeological remains are well-placed to provide an additional insight into the contribution animals made to the wider economy.

This paper will present the findings from zooarchaeological analysis of over 20,000 recorded animal bone fragments from Llanbedrgoch. Using methods such as species abundance, biometry, mortality profiles and stable isotope analysis, it will explore how this evidence base adds to our knowledge of food systems and animal husbandry practices at the site.

3 REDATING VIKING AGE DUBLIN: THE MARINE RESERVOIR EFFECT IN DUBLIN’S FURNISHED BURIALS

Kinirons, Samuel (University College Dublin) - Leggett, Sam (The University of Edinburgh)

This paper presents the preliminary results of a project which is re-dating eight Viking Age burials excavated in Dublin between 2002 and 2005. When these burials were originally submitted for radiocarbon dating c.20 years ago, they returned surprisingly early dates. Some of these suggested that the burials predated the first historically attested Scandinavian overwintering in Dublin in 841 CE and contradicted the typological dating of the accompanying grave-goods. These early dates are therefore of great significance, in that they are key to our understanding of the beginnings of Viking Age Dublin.

In recent years several isotopic studies have demonstrated that early medieval Scandinavians often had a relatively high proportion of marine protein in their diets. This means that their radiocarbon dates were skewed by the marine reservoir effect, making them appear older than they actually are. Several burials have since been re-dated, most famously those at Repton. These examples have called these Dublin dates into question and precipitated the current project.

This project has therefore sought to conduct isotopic testing to establish proportions of marine dietary intake and to re-date these burials taking marine reservoir corrections into account. The work was undertaken in collaboration with Dr Sam Leggett’s ArchaeoFINS project which aims to trace the re-introduction of substantial fish consumption

across the Irish and North Seas during the early medieval period. The redating of these burials therefore exemplifies the potential of an international collaborative study with a dual focus on local specificity and broader trends. It promises to expand our knowledge of both local chronologies and wider shifts in marine resource exploitation across northwestern Europe.

4 **CELTIC CONNECTIONS: INVESTIGATING MOBILITY IN EARLY MEDIEVAL WALES USING MULTI-ISOTOPE ANALYSIS**

Faillace, Katie (Cardiff University) - O'Brien Butler, Ciara (Cardiff University) - Madgwick, Richard (Cardiff University)

This paper investigates regional mobility networks among early medieval Celtic-speaking communities using material from North Wales and South Wales as comparative case studies, and identifies avenues for future isotopic work in the wider "Celtic" west.

Presenting new and unpublished multi-isotope ($^{87}\text{Sr}/^{86}\text{Sr}$, $\delta^{18}\text{O}$, $\delta^{34}\text{S}$, $\delta^{13}\text{C}$, and $\delta^{15}\text{N}$.) data from four sites in North and South Wales representing c. 100 individuals, this study provides evidence for widespread migration throughout early medieval Wales, both within and beyond its borders. Dietary isotopes are examined in identifying intra-regional migrants, and the overall range of values obtained from these sites is considered against the variation found at contemporary sites. These findings particularly build upon the pioneering work by Hemer which demonstrated diverse origins for multiple individuals from South Wales, including the identification of likely migrants from beyond Britain. Taken together, the isotopic evidence from Wales demonstrates greater variability than predicted by current mapping, which presents a challenge when situating these communities within wider networks, with potential connections in Ireland, Scotland, Cornwall, and the Mediterranean. Interpretive issues are further compounded by methodological inconsistencies ($\delta^{18}\text{O}$), variable mapping in regions that are potential connections, and a paucity of supporting material and historical evidence. Despite the caveats imposed on the dataset, the isotopic data from Wales demonstrates connected nature of early medieval "Celtic" communities with the wider world.

5 **BIOLOGICAL DISTANCE ANALYSIS IN EARLY MEDIEVAL WALES: EXPLORING KINSHIP AND POST-MARITAL RESIDENCE**

O'Brien Butler, Ciara (Cardiff University) - Lane, Alan (Cardiff University) - Madgwick, Richard (Cardiff University)

This paper presents the results of intra-cemetery biological distance analysis of four skeletal assemblages from Wales dating to the early medieval period. This formative period of Welsh history was one of great socio-political change. Archaeological research has revealed significant regional and chronological complexity in power structures, settlement patterns, and mortuary practice throughout the period 400-1100 AD. Bioarchaeology has historically had a limited contribution to these debates, however, due to the poor survival of bone in the country. In recent decades the corpus of human remains from Wales has grown substantially, enabling osteological evidence to inform on wider themes within early medieval research, most notably in the areas of mobility and migration using isotope analysis.

Through biological distance analysis, this paper adds a new dimension to the growing field of bioarchaeology in Wales – that of genetic affinities within cemetery populations. Analysis of dental metric data was performed to reveal whether communities practised matrilineal or patrilineal residence patterns, and to investigate the influence of biological affinity on cemetery organisation. Analysis of kin-structured burial was supported by spatial statistics to verify the existence of grave groups which may represent family plots. Four cemetery case-studies, two from southeast Wales and two from Anglesey, were used. The results highlight the intricacy of kinship systems and the ways in which kinship identities were translated into the mortuary arena in early medieval Wales. Post-marital residence analysis of these sites also revealed regional and chronological variation in patterns of sex-based mobility, suggesting residence practices and gender relations in early medieval Wales were more complex than previously understood. The use of biological and spatial analysis of cemeteries contributes greatly to our understanding of these communities in a period of upheaval and social change.

6 **LIFE AND DEATH IN IRON AGE WALES: RESULTS FROM RADIOCARBON DATING, HISTOLOGICAL AND STABLE ISOTOPE ANALYSES FROM CASE-STUDY SITES**

Bricking, Adelle (Amgueddfa Cymru - Museum Wales) - Davis, Oliver (Cardiff University) - Madgwick, Richard (Cardiff University)

The study of human remains provides us with our most direct window onto the Iron Age population in Wales. However, burial evidence from Wales has been understudied compared to areas such as Yorkshire and Wiltshire. This is due in part to poor preservation as acidic soils destroy much of the osteological material—for example, Rowan Whimster (1981) identified only eight records of Iron Age burial in the whole country. This led to the popular assumption that the lack of human bone means that the majority of burial rites were "archaeologically invisible", particularly excarnation

within hillforts. However, a more recent reappraisal of the published and unpublished literature on excavations of Iron Age sites by Oliver Davis (2017) has shown that the corpus of burial material in Wales is much larger than previously recognised. This provides an opportunity to assess funerary rites and treatment of the dead, mortality profiles, health, diets and origins of the Iron Age population in Wales.

This paper presents the results of recent radiocarbon, histological and isotope analysis from two sites with the largest assemblages – RAF St Athan in the Vale of Glamorgan and Dinorben in Conwy. Through a multidisciplinary approach that integrates radiocarbon dating, histotaphonomic, and isotopic analyses with a contextual examination of the burial sites, this paper aims not only to refine our comprehension of mortuary behaviours but also to shed light on the broader aspects of life in the Iron Age, including dietary habits and population origins in Wales.

1094 **PERFORMATIVITY, NETWORKS AND AGENCY IN GEOMETRIC ICONOGRAPHY. TOWARDS AN AESTHETICS AND VISUAL LANGUAGE ARCHAEOLOGY**

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Moreno Padilla, María Isabel (Instituto Universitario de Investigación en Arqueología Ibérica. Universidad de Jaén (España)) - Prieto-Olavarría, Cristina Alejandra (Instituto Argentino de Nivología, Glaciología y Ciencias Ambientales (IANIGLA). CONICET, CCT Mendoza (Argentina); Universidad Nacional de Cuyo (Mendoza, Argentina))

Session format: Regular session

Geometric patterns have accompanied human societies for thousands of years, from the Middle Paleolithic in Europe to the hunter-gatherers of the Early Holocene in America. They were developed in cave paintings, ceramics, textiles, sculptures, architecture, body ornaments, domestic tools, weapons, jewelry, among other materials. These patterns are found in various contexts and are associated with a wide range of periods. This broad range shows a complex manifestation, posing theoretical and methodological challenges for archaeological research. While some attention has been given to iconographic and semiotic analysis in recent decades, and new approaches have been incorporated from cognitive archaeology or material agency theories, we believe that the theoretical and methodological development of Aesthetic and Visual Language Archaeology remains limited.

This session examines geometric aesthetics as a historical and social process that legitimizes, conditions, or demands social changes. In this context, geometric patterns played a crucial role in shaping socioeconomic and symbolic structures, and this iconography was fundamental for the construction and consolidation of cultural dynamics. The session aims to showcase works that analyze the agency, networks, and performativity of geometric iconography in Archaeology and Anthropology. To achieve this, we contend that geometric language is not merely a passive accessory or a mere ornament without meaning; rather, it actively shapes historical trajectories.

From a diachronic perspective, we aim to explore various theoretical and methodological approaches that enable the analysis of geometric language and, in some cases, its integration with figurative iconography. The core themes of the session encompass investigations into: 1) the ontological and epistemological perspectives in geometric iconography; 2) new methodologies; 3) variability of materials linked to geometric patterns; 4) analysis of symbols, schemes, codes, and narratives; 5) levels of performativity of geometric language; and 6) connectivity between geometric and figurative language.

ABSTRACTS

1 **DIAMOND-SHAPED LATTICE PATTERN IN NUBIA (EGYPT, SUDAN)**

Wozniak, Magdalena (University of Copenhagen)

The decorative repertoire of medieval Nubia was mainly explored through the study of ornamental patterns in medieval mural paintings (Martens-Czarnecka 1982), as well as from the ceramic perspective (Adams 1986). While these works provide detailed typologies, characterising chronological periods, they do not investigate further the importance and possible meaning of this specific ornament, nor they discuss its widespread use on many different media. For example, the diamond-shaped lattice appears notably on the edges of garments of both common people and the elite since the period of Meroe (300 BCE – 300 CE) until the late period of the kingdom of Makuria (13th-15th c. CE). The goal of this presentation is to give an overview of the presence of the diamond-shaped lattice on various media in Nubia in a long-durée perspective, with a focus on dress (clothing, accessories) and to consider the possible significance of this pattern, which could help to understand the permanence of this ornamental tradition.

2 AVICENNIAN NOETICS AND AVERROIST AESTHETICS IN MARINID GEOMETRY

Emparán Fernández, María Antonieta (Albert-Ludwigs-Universität Freiburg)

After the loss of what Ibn Khaldun calls 'aṣabiyya within the Marinid dynasty (mid-13th - 15th centuries), other symbolic elements were developed by the Marinid dynasty to legitimise itself in power. One of these strategies was the construction of madrasas (superior educational institutions), which had an ornamental programme based on a complex geometrical system, the zillij (geometric ceramic tilework). According to Ibn Khaldun's master, al-Abili, the Marinid madrasas were institutions for disseminating the official dynastic programme, and therefore, the ornamental programme should not be considered to be unconnected with it.

This contribution will present the social and intellectual interactions to be considered when analysing the zillij and the process of construction of the geometric patterns as visual proof. With these elements, it is hypothesised that the designers of these geometric patterns correspond to members of the intellectual elite of Fez, and the geometric designs of the zillij possess a symbolic language addressed to their peers, the students and teachers of the madrasas. Therefore, the zillij reflects both an Avicennian noetic and an Averroist aesthetic.

3 UNVEILING ICONOMETRIC CONVENTIONS: TALAMANA IN CENTRAL INDIAN ART

Sharma, Priya (Archaeology; Art - Architecture; culture; ancient indian history)

Art was created in prehistoric periods on little objects and the walls of caves, depicting themes such as religion and nature. Ancient Indian art was created by fusing larger folklore with regional beliefs. This combination gave rise to intellectual art texts such as the Shilpa-Shastra. In the twelfth century, Vedic religious concepts coexisted with indigenous art in central India.

This essay discusses Talamana, an ancient measurement and proportion system of art in the creation of temple sculptures. It demonstrates how local beliefs persisted in the face of widespread religious notions. This study uses ancient Central Indian art to examine how major religious movements influenced regional thinking. Central Indian region in the context of this article covers almost 4,43,439 Square kilometres namely Chattishgarh, Madhya Pradesh, and Maharashtra.

The study allows us to understand how many forms of art coexisted in ancient India by examining both words and images. It also discusses the state of society at the time and asserts that diverse viewpoints could coexist peacefully even then. This is a quantitative research methodology involving textual analysis of existing literature along with new archaeological explorations. Prior context works were focused predominantly on representing traditional art literature. An equal number of works were also produced on architecture. An incorporated work of the two along with the regards of native tradition is yet to be done.

Sometimes, indigenous beliefs are incorporated into larger ones to make them seem less significant. This happens in three ways: First, smaller cultures may disappear as larger global beliefs become more dominant. Second, they may merge with larger beliefs to ensure their survival, not necessarily under pressure but out of necessity. Third, all beliefs can coexist, even if they differ or aren't well-documented historically, as seen in society today.

4 PRAEHISTORIC TEXTILES - MORE THAN JUST APPEARANCES AND HAPTIC

Banck-Burgess, Johanna (ComTex)

Ornamental elements, such as geometric patterns, are compared with each other in archaeological research on different object carriers. Often regardless of whether they are visible on everyday tools or sacred items, objects of different materials or functions, like ceramics or weapons. Research on prehistoric textiles has shown that the visual perception of textiles is significantly supplemented by another essential factor. A factor that is completely beyond visual perception. In prehistoric times, textiles are not exclusively decorative. Patterns are incorporated during the manufacturing process. Supplemented by details in the production process that are culture-specific and hidden from the eye of the beholder, i.e. not visible to the naked eye. Subsequent decoration, such as embroidery, in which the textile is a pure decorative medium, did not exist in the textile production in prehistoric Central Europe. What conclusions can be drawn from this? Is it even possible to interpret patterns in isolation from the carrier medium? This article provides textile archaeological background knowledge on this topic as a basis for discussion.

5 GIVING SHAPES TO PLANTS. THE ABSTRACTION OF PLANT MOTIFS IN IBERIAN PAINTED POTTERY (3RD-1ST CENTS. BCE)

Harding, Pablo (Universidad Autónoma de Madrid) - Uroz-Rodríguez, Hector (Universidad de Murcia)

This paper analyses the phenomenon of the abstraction of plant motifs into geometric as evidenced in Iberian figurative ceramic iconography from the south-east and east of the Iberian Peninsula (3rd-1st centuries BC). The case study chosen is the four-petalled flower, which appears most explicitly in Illicitan style pottery, whose regional variants

reveal a generalised tendency towards schematisation which, at its most extreme, reduces the flower to purely geometric forms: four-pointed 'X' shapes and 'double axe' motifs consisting of two triangles facing each other.

The recent re-evaluation of the role of geometric decoration has highlighted the nature of the fine line dividing plant and geometric motifs, a point noted but left unexplored for decades. This difficult distinction, which obeys the complex dynamics of abstraction and schematization, has recently been explored for motifs such as "stars/asterisks" and "S" shapes, which straddle both categories.

The four-petalled flowers can be linked to the symbolic sphere of the female divinity, on whose body they appear on a ceramic vessel from La Alcudia and a plastic vessel from Libisosa. The locations chosen for the placement of these motifs are repeated regardless of their level of abstraction: below the handles or in the centre of plant compositions. Also, geometric variants are not the result of a linear evolution: they appear, to a large extent, during the same period. There is evidence of regional preferences: a widespread trend towards diversity and schematization, with plant-based variants being more frequent in the southeast.

This paper argues that the abstraction of plant motifs into geometric shapes can be traced back to the very beginning of figurative ceramic iconography and reveals the capacity for semantic and conceptual synthesis of Iberian painters, who worked on behalf of the Iberian elites.

6 MORE THAN JUST CONCENTRIC CIRCLES. PERFORMATIVITY AND AGENCY IN IBERIAN POTTERY OF THE UPPER GUADALQUIVIR (SPAIN)

Moreno Padilla, María Isabel (Instituto Universitario de Investigación en Arqueología Ibérica. Universidad de Jaén)

Can geometric decoration on potteries communicate ideological messages and contribute to legitimizing and reinforcing social changes? Is geometric language a reflection of social and cultural identities? Was it play an active role in times of crisis and change, especially those linked to conflict? Is there a geometric code that can be analyzed, characterized, and contribute to the understanding of Iberian societies?

This work asserts the importance of a phenomenon barely addressed in the archaeological research of Iberian societies in the western Mediterranean during the Iron Age: decoration, language, and, by extension, geometric styles. Specifically, this proposal emphasizes the analysis of potteries decorations developed between the late 3rd century BC and the 1st century AD, in a period defined by the Second Punic War and its impact on the territory.

The analysis of different contexts, such as Ilturgi (Mengíbar, Jaén), Castulo (Linares, Jaén), Castellones de Céal (Hinojares, Jaén), or Tutugi (Galera, Granada), highlights the role of these decorations in the mechanisms of socialization and identity reconfiguration that take place after the conflict. In this period, characterized by the dismantling of Iberian geopolitical structures and Roman territorial control, the performativity of geometric iconography reaches its peak: the pattern of regularity and stylistic changes detected in geometric production during this period reflect the new dynamics of aestheticization of these societies. At the same time, they serve as a means of social, cultural, and identity resilience.

7 SYMBOLIC GRAPHIC CODES AND THEIR ROLE IN THE COMMUNICATIVE PROCESS IN THE SOUTHERNMOST PART OF THE WORLD (PATAGONIA, CHILE)

Muñoz-Soto, Camila (Université Paris 1 Panthéon-Sorbonne, ED112, UMR 8068 TEMPS; Universidad de Castilla-La Mancha, Fac. de Ciencias de la Educación y Humanidades)

The rock art of the continental sector of the southernmost part of Patagonia, Chile, has often been a materiality left behind in the study of the social and cultural dynamics of the hunter-gatherer groups that settled in this vast region, on the contrary to the recording of more traditional materialities. This is why its study has been constantly relegated to the characterization and identification of styles which, nevertheless, have allowed us to determine that we are dealing with a graphic expression that is above all non-figurative, in which representations based on lines and dots predominate.

In the present work, the aim is to leave this notion aside in order to understand these elements as symbolic graphic codes, whose construction is not only based on the morphology of the motif. A geometric code analysis methodology is used, which considers the symmetry, colour and technique of the motif, and its position within the panel. In addition, the sites where pictographs were carried out and their possible relationship with other figurative codes are analysed. In this way, we intend to get an insight into the communication dynamics developed by the different groups settled across different areas of the continental territory of the extreme south of Patagonia during the last 3,200 years cal BP.

8 THE LINE IS ALIVE. ANDEAN ONTOLOGICAL PERSPECTIVES ON THE GEOMETRICAL ICONOGRAPHY OF TIWANAKU KERU VESSELS (500-1100 CE)

Villanueva Criales, Juan (Universidad Mayor de San Andrés)

Due to its figurative iconography, the Tiwanaku society has traditionally been understood as exceptional within the Bolivian Andes. The keru vessel, the most emblematic ceramic of Tiwanaku, was perceived as a kind of diffuser of its influence on regions and populations possessing simple geometric motifs, allowing for civilizational and imperial narratives. Given that the post-Tiwanaku style is also geometric, ruptures were posited between the indigenous past and present, narratives always functional to neocolonialist and nationalist projects.

This work starts from the opposite extreme by recognizing, from the beginning, that Tiwanaku imagery is predominantly geometric and incorporates an Andean theoretical-ontological framework. First, keru vessels today are not considered objects to mediate the interaction between humans and other beings but rather subjects that participate in those interactions. Although the Andean world is made of living materials, manipulating these materials involves turning them into people (jaqichayaña, as Arnold documents) with defined characteristics. The Tiwanaku repertoire includes ceramics with human or animal shapes, thus, living bodies in the same way Alberti proposes for ceramics from northern Argentina. On the other hand, giving personality to a hyperboloid vessel could require something similar to what Lagrou documents among the Cashinama: animating the body through the dynamism of geometric graphics, involving the viewer's gaze in the movement, from which the figures emerge only as a consequence.

The analysis of kerus from several European and Bolivian museums allows us to argue that their painted geometry segments horizontal spaces in various ways, creating circular movements that give life and character to the ceramics. Although animal and human images can emerge from this geometry, this is not always necessary: the geometry is alive. In this light, Tiwanaku fits more easily into the worlds of indigenous creation of yesterday and today.

9 AMERINDIAN SHAMANIC PERSPECTIVISM AND DIAGUITA VISUAL ART: CONTRIBUTION OF SYMMETRY IN INDIGENOUS IDENTITIES CONSTRUCTION

González Carvajal, Paola (El Olivar Foundation)

Chilean Diaguita culture developed in the semi-arid north of the country, between years 1,000 to 1,536 AD, and stands out for a complex abstract and symmetrical visual art development (González 2013). Diaguita art is linked to a long tradition of South American Shamanic Art (González 2016); this tradition is still present in current Amazonian indigenous peoples such as Shiiipibo-Conibo and Cashinahua, among others. The Diaguita culture belonging to this tradition is suggested by contextual aspects, such as the practice of hallucinogen consumption, and the association of its art with an animal alter ego (jaguar), as well as by the existence of intrinsic characteristics of its visual art. The use of complex symmetries stands out in them; endless variability, gradual complexity, hypnotic attraction, among others. Also highlights the kinetic properties of his visual art, which produce movement or vibration illusion on the designs, and the possibility of visualizing them in positive/negative, producing an interplay between figure and background (González 2013:76). Els Lagrou (2012) studies visual techniques used in symmetrical art of the Amazonian Cashinahua, intended to produce optical games in their designs; the author links these graphic techniques with Amerindian perspectivism, and a conception of the animist world (sensu Viveiros de Castro 2018). This ontology is characterized by the idea of transformability of forms and bodies.

On the other hand, the excavation of living and funerary areas on Diaguita site El Olivar (Cantarutti and González 2021; González 2023), allowed to contextualize Diaguita art, and characterize the mortuary practices of a specific community for four centuries. Relationships between artifacts, camelids and humans, suggest the existence of an ontology related to Amerindian shamanic perspectivism, also visible in their visual art.

10 GEOMETRIC DESIGNS OF VILUCO CERAMICS. APPROACH FROM ARCHAEOLOGY AND INDIGENOUS KNOWLEDGE (MENDOZA, ARGENTINA)

Prieto-Olavarría, Cristina (IANIGLA, CONICET) - Herrera, Liliana (Comunidad Huarpe Guaytamari; Organización de Naciones y Pueblos Indígenas en Argentina) - Candito Herrera, Cintia (Comunidad Huarpe Guaytamari)

This work arises from the need to establish an intercultural dialogue around the interpretation of the geometric designs of Viluco ceramics (Mendoza, Argentina). Three women who work and/or live in the high mountains of Mendoza (Argentina), intertwine our knowledge to generate a shared story about a set of archaeological vessels that were produced approximately 500 years ago, but continue to mean in the present. We rely on the knowledge generated by archaeological studies, especially on Andean visual languages, and the knowledge of the Huarpe community acquired through oral tradition and practical knowledge. The latter is part of the narratives that this native people transmit not only within their own community, but also to the rest of the national and foreign people (at educational and cultural centers, in lectures and conferences).

This research makes visible the knowledge of the native communities that have been silenced by the official voices (science, museums) and helps to build a notion of heritage, tangible and intangible, which functions as a means for transformation and social innovation.

11 SYMMETRIES OF CULTURE

Washburn, Dorothy (Oberlin College; University of Pennsylvania)

This paper introduces scholars at EAA to an annotated bibliography of studies in English that explore how the property and concept of symmetry appears in different domains of culture. Here I present a sampling of these studies, focusing on how symmetry is manifest in plane pattern geometry classes on many kinds of materials—ceramics, textiles, tile, wood, brick, metal, etc.. This approach has not only enabled systematic description of the organization and generation of decorative patterns, but also has disclosed how pattern symmetries are structural metaphors of the same symmetries in other domains of culture. Within a given culture there are preferred symmetrical ways to structure activities from fundamental cosmic principals, to kinship networks, to village layouts. I describe studies that illustrate how the continuities and changes in pattern symmetries correlate with continuities and changes in activities in the social, economic and political domains as well as with environmental factors. The bibliography will be published in the journal *Symmetry: Culture and Science*. An annotated bibliography that describes work in the Americas in Spanish and Portuguese is being collated by Diego Jorge Gallardo, Jujuy University, Argentina, and will appear in a future issue of the journal.

1095 SCALE MATTERS. THE COMPLEXITY OF RECONSTRUCTING PAST HUMAN-ENVIRONMENT INTERACTIONS

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Walker-Friedrichs, Fiona (Kiel University) - Vandam, Ralf (Vrije Universiteit Brussel) - Willett, Patrick (Vrije Universiteit Brussel)

Session format: Discussion session (with formal abstracts)

This session delves into the dynamic interplay between different scales of analysis and the spatial diversity of human-environment relationships throughout history. Environmental archaeology prioritizes understanding these relationships, offering insights for contemporary dialogues on sustainability, resilience, and the delicate equilibrium between humans and their surroundings. Recognition of scalar and contextual specificity works to avoid imposing universalized assumptions in our interpretive frameworks about how environments were used by past peoples. When universal explanatory frameworks are uncritically applied to discrete regional contexts, they often work to obscure our comparative understanding of human-environmental relationships.

Recent years have witnessed a surge in studies focused on ever-increasing 'big-data' analyses. However, this growth brings with it a discernible challenge – a widening gap between the abundance of data and the interpretations that can be drawn from them. The datasets crucial for reconstructing human-environmental interactions clearly vary in resolution, accuracy, and sampling intensity, presenting an obstacle to straightforward syntheses.

In this session, through the presentation of diverse case studies at various scales, we aim to unravel the nuanced challenges posed by these divergent datasets through the presentation of diverse case studies at various scales and analytical frameworks. By scrutinizing the intricacies within our empirical approaches, we hope to not only illuminate the past but also pave the way for more robust methodologies and interpretations in the future.

ABSTRACTS

1 WHY SCALE MATTERS

Walker-Friedrichs, Fiona (ROOTS- CLuster of Excellence, Kiel University)

The session's introduction underscores the importance of adapting research methods and inquiries according to the scale of our studies. Despite the prevalence of "big data," it's essential to recognize that data collected over larger areas differ significantly, necessitating distinct approaches compared to smaller-scale studies. Interpretations applicable to one site may not be transferable to a site just several kilometres away, and the nuances between sites are often overlooked when combining larger datasets. This challenge is further compounded by variations in the resolution, accuracy, and sampling intensity of datasets crucial for reconstructing human-environmental interactions, posing a significant obstacle to straightforward syntheses.

This issue can be effectively illustrated by plant stable isotope data. Plant stable isotope data (for example $\delta^{13}\text{C}$ or $\delta^{15}\text{N}$) exhibits a strong regional dependence and significant natural variability even at the local level. Consequently,

questions arise regarding whether long-term studies over a large area reveal overarching trends or instead unveil divergent regional trends.

2 RECONSTRUCTING PLANT FOOD ECONOMY AT A FUNNEL BEAKER VILLAGE: HANDLING ABUNDANT DATA FROM A SMALL SITE

Krubeck, Sara (Kiel University)

On a small island in a former fjord in the Western Baltic area lies the site Oldenburg LA77, Schleswig-Holstein. It stands out as the best archaeobotanically investigated Neolithic site in northern Germany, providing a sound data base for further investigations. The preserved settlement remains, dating to 3270-2920 cal BCE (Middle Neolithic) are a regional expression of the Funnel Beaker Complex. The features were extensively excavated and systematically sampled for botanical macro-remains, thus enabling an uncommonly broad and detailed statistical evaluation of plant-use and distribution at the site, structured not only spatially by context attribution, feature type and terrestrial vs. wetland area, but also temporally over the three archaeologically distinguished settlement phases. Crops dominate the botanical inventory and yield a strong basis for plant food economy reconstructions. A temporal trend of favouring emmer over barley becomes visible. Significant deviations in the ratios of grains vs. threshing remains and weedy species as well as in the frequencies of the main cereal types emmer and barley can be found in the comparison of house contexts, well features and the settlement margins at the shore zone, permitting a reconstruction of the spatial pattern of economic activities, i.e. food production, involving plants. The identified pattern furthermore implies social aspects of task specialization and communal strategizing. Gathered wild plants like fruits, nuts, herbs and others are included in the quantitative analyses and discussed in terms of their role within the agriculturalist subsistence strategy.

3 EXPLORING THE POTENTIAL OF WELL-LIKE FEATURES AS A SOURCE OF ENVIRONMENTAL ARCHAEOLOGICAL INFORMATION. CASE STUDY FROM SOUTHERN BULGARIA

Katreva, Yoanna (Faculty of History, Sofia University "St. Kliment Ohridski", Sofia, Bulgaria; Division of Palaeobotany and Palynology, Institute of Biodiversity & Ecosystem Research, Bulgarian Academy of Sciences, Sofia, BULGARIA) - Marinova, Elena (Laboratory for Archaeobotany, State Office for Cultural Heritage Baden-Württemberg, Gaienhofen-Hemmenhofen, Germany) - Andonova-Katsarski, Mila (Division of Palaeobotany and Palynology, Institute of Biodiversity & Ecosystem Research, Bulgarian Academy of Sciences, Sofia, Bulgaria) - Boyadzhiev, Kamen (Exhibitions department, National Archaeological Institute with Museum, Bulgarian Academy of Sciences, Sofia, Bulgaria) - Boyadzhiev, Yavor (National Archaeological Institute with Museum at the Bulgarian Academy of Sciences, Sofia, Bulgaria) - Bozhinova, Elena (Regional Archaeological Museum – Plovdiv, Bulgaria) - Zidarov, Petar (Freelance archaeologist) - Petrov, Valeri (Institute of Ethnology and Folklore Studies with Ethnographic Museum, Bulgarian Academy of Sciences, Sofia, Bulgaria)

This study aims at exploring the potential and limitations of plant micro- and macrofossils preserved in two deep negative features for reconstructing the past natural and anthropogenic environment. The study sites, the Chalcolithic tell of Yunatsite and the multiphase flat settlement site near Skutare are located in Southern Bulgaria. Both features were dug into such a depth that they reach the current groundwater table. This opens up the discussion whether they served the specific function of wells within the two settlements. The reduced oxygen conditions lead to good preservation of plant remains accidentally or intentionally found in the backfill of the features. In order to study these deposits, sediment samples and sediment cores were collected from tell Yunatsite. The results suggest the use of coniferous wood (high concentrations of fir, *Abies* sp.) as a construction material, also recorded amongst the macro-botanical remains and show a notably open landscape with predominantly non-arboreal pollen (NAP) with strong presence of palynological anthropogenic indicators. A profile-sampling technique was applied to an EBA feature from Skutare, where twenty-five samples were extracted representing the various stages of the gradual filling. The pollen concentration is rather low and variable taxon diversity is lacking. The grass and herbs pollen are dominated by the grass family (Poaceae), the Daisy family (Asteraceae), the Goosefoot (Chenopodiaceae) and Chicory (Chicoriaceae) subfamilies. The arboreal pollen (AP) group presented oak (*Quercus* sp.) and alder (*Alnus* sp.). The above palynological data also correspond to the macro-botanical samples, where cereal cultivars (mainly barley, *Hordeum vulgare*) were amongst the archaeobotanical remains, while oak charcoal dominates the anthracological assemblage. As a whole, the sampling strategy proved to be efficient to obtain detailed and diverse environmental evidence, while the results – promising for reconstructing the anthropogenic environment adjacent to both sites.

4 ON UNINTUITIVITY OF SCALE: THE EMERGENCE OF GROUP AGENCIES THROUGH SPATIAL INTERACTIONS IN SOCIAL-ECOLOGICAL SYSTEMS

Sikk, Kaarel (University of Tartu)

The complex systems approach, particularly agent-based models (ABM), has been extensively used in studying settlement systems for over two decades. ABMs, centred around the concept of agency in decision-making and actions,

have seen diverse applications. Urban systems have often been modelled with cities as agents, interacting through urban flows, while archaeological studies have focused on smaller units like villages or households to investigate both contemporary urban phenomena and the historical formation of settlement patterns. This variability in the choice of agency level reflects the social complexity of the studied systems or the empirical data available. Yet, the integration of these levels and their collective impact on settlement forms poses an ongoing question.

This research explores a theoretical ABM of settlement system formation from a social-ecological systems perspective, built on the micro-actions of individuals making residential choices within a spatially explicit landscape. These decisions, influenced by local environmental conditions and the spatial relation to other agents (social context), propel changes in spatial structures, leading to a dynamic complex system characterised by information flows and feedback loops. An exploration of the model across its full parameter range, including sensitivity to spatial configuration and the stochastic nature of individual choices, reveals the generative power of spatial interactions. These interactions lead to the emergence of group agencies, distinct from the behaviours of individual agents and formed solely through the spatial interplay and environmental interactions, challenging the direct application of individual-based concepts like affordances or environmental determinism to system-wide patterns. Linking different levels of decision-making agencies requires understanding the complexities separating them.

5 UNRAVELING THE COMPLEXITY OF HUMAN-ENVIRONMENTAL DYNAMICS IN THE WESTERN TAURUS MOUNTAINS. INSIGHTS FROM INTERDISCIPLINARY RESEARCH AT SAGALASSOS

Vandam, Ralf (Vrije Universiteit Brussel) - Willett, Patrick (Vrije Universiteit Brussel) - Şenkul, Çetin (Süleyman Demirel Üniversitesi)

Three decades of interdisciplinary research from the Sagalassos Archaeological Research Project (KU Leuven) have provided extensive amounts of archaeological and environmental datasets for the Western Taurus Mountains in SW Turkey. The picture emerging as a result of this research is very complex and heterogeneous from both archaeological and environmental perspectives. The wide disparities in local hydrology, topography, and geomorphology within the Sagalassos study area interact to create conditions for a patchwork of vegetative cover and soil conditions – which, alongside political, social and economic factors, must also have impacted human activity. In this paper, we give a detailed overview of our new human-environmental research endeavors by presenting the first new results and outlining ongoing and future efforts. First, we have taken new pollen cores (including ITRAX analysis) to gain a better insight into past vegetation changes. Second, we are studying the relationship between modern pollen records and modern vegetation to help convert fossil pollen records into more accurate quantitative vegetation reconstructions. Third, we are aiming to collect high-resolution paleoclimate data, i.e. stable isotope analysis of lake sediments (Burdur and Gölcük Lakes) and cave stalagmites (Insuyu Cave). Lastly, we are continuing our archaeological survey research to expand the area and chronological range of comparability with the environmental data.

6 A TALE OF TWO CHESTNUTS: MODELLING THE ECOLOGICAL NICHE OF *CASTANEA CRENATA* AND *AESCULUS TURBINATA* DURING THE JOMON PERIOD

Brainerd, Leah (University of Cambridge) - Crema, Enrico (University of Cambridge)

The Jomon period (16,000–2,800 cal BP) of prehistoric Japan was characterised by a subsistence economy that poorly fit with traditional categories such as 'hunter-gatherers' or 'neolithic' due to the extensive use, management, and in some cases, possible domestication of a range of plant resources. In particular, the exploitation of several arboreal species, namely *Castanea crenata* (chestnut), *Toxicodendron vernicifluum* (lacquer tree) and, at a later date, *Aesculus turbinata* (horse chestnut), has led some to coin terms such as 'arboreal neolithic' (Imamura 1999). Chestnut and lacquer trees have evidence for management from the Early Jomon, but from the Middle (ca 5,500 - 4,500 cal BP) to the Late Jomon (ca 4,500 - 3,300 cal BP), fossil records indicate a shift, with horse chestnut becoming equal to or surplanted chestnut as the dominant wild nut species consumed across Eastern Japan. Concurrent with these changes, we observe increased levels of social stratification and major demographic fluctuations across the archipelago. The shift from chestnut to horse chestnut in Eastern Japan has been traditionally attributed to the 4.2-kiloyear cooling event, yet no formal assessment has been made to determine where and whether this climatic deterioration impacted the ecology of *Castanea crenata* making its exploitation less sustainable and promoting the consumption of the more labour-intensive *Aesculus turbinata*. This paper will explore the relation between the occurrence of *Castanea crenata* and *Aesculus turbinata* during the Middle to Final Jomon period by examining the physiological requirements of both plants and modelling them via ecological niche modelling. When examined in conjunction with the spatial distribution of archaeological sites during this period, these models will provide insight into where and whether these subsistence shifts were determined by environmental constraints during the latter half of the Jomon period.

1097 THE MINDREADING OF MATERIALITIES. ARCHAEOLOGY OF MOVEMENT AND SIGHT

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Silva Gago, María (INCIPIT-CSIC) - Vindrola-Padros, Bruno (Kiel University) - Verdonkschot, Jadranka (INCIPIT-CSIC) - Santos-Estévez, Manuel (INCIPIT-CSIC) - Zaghi, Regina (INCIPIT-CSIC)

Session format: Regular session

Interpreting the archaeological record, archaeologists make a painstaking effort to read the material's mind. However, novel neuroscientific methods formally support the role of the material world as an active element in our cognition too.

This session aims to discuss how thought is shaped by archaeological materialities, addressing locomotion in proposals of cognitive archaeology.

This topic is comprised of the study of the gaze (ocular movements), general bodily movement and navigation, but also the directed motion and techniques of the body in creation (e.g. pottery making) or expression (e.g. dancing).

This includes tracing depictions and traces of bodily expression in the archaeological record, but also an attempt to break the fourth wall in the study of modern participants' (visual and motive) interactions with archaeological remains or material processes. By studying the way that movement, behaviour and gaze are conditioned by materialities and the pertaining processes, it is aimed to deduce meaning in terms of cognitive and interpretational patterns.

Methods currently available to trace people's thoughts and actions in different relations to material culture are addressed. We are also interested in discussing new approaches in experimental design, data analysis and modelling, highlighting for example the use of eye-tracking, other trackings of bodily movement or Transcranial magnetic stimulation (TMS) and Electroencephalography (EEG) methods as techniques for exploring past cognition based on human – materiality relationships. Central to the contribution of these (neuro)scientific methodologies is a theoretical spine, as valuable archaeological narratives can be constructed only if scientific methods converge with a solid framework of thought.

We combine different narratives in interpreting archaeological depictions, tracing movement in the archaeological record, but also practising an enactive and cognitive approach of the senses in archaeology. Not only a joining of methodologies is discussed here, but also the transcending of ontologies.

ABSTRACTS

1 WAYS OF SEEING, WAYS OF WALKING. ROCK ART SITES AS A SOCIAL DEVICE

Santos-Estévez, Manuel (INCIPIT-CSIC) - Silva-Gago, María (INCIPIT-CSIC) - Zaghi-Lara, Regina (INCIPIT-CSIC)

In previous experiences, we have observed that viewers' behavior changes depending on the chronology of the panel. For example, in Alpine and Atlantic rock art for carvings dated in the Neolithic, observers could place themselves around the panel, and none of them would have a privileged viewpoint. However, in the Bronze and Iron Ages, the group of observers should be placed in front of the panel, and therefore they would have more restrictions to their movement surrounding rock, this would mean that there were fewer viewpoints to observe the panel, and the proximity to the rock would vary amongst observers.

This research uses movement-tracking techniques to take a more systematic approach to this question. Here we present the results obtained in two rock art sites, one dated in Neolithic and the other in Iron Age, both belonging to Atlantic rock art. The Neolithic one is located in a prominent outcrop, with many irregular surfaces, where the predominant designs are geometric, carved in horizontal and convex surfaces. The other site is located at the bottom of a valley, on almost vertical surfaces; in this case, the most frequent motifs are quadrupeds. This study pretends to analyse in what way the physical conditions of these sites, the shape of the panels, the structure of the compositions, and the iconography constrain the navigation through the panel. We aim to find the relationship between chronology, the movement of the observers and the way of seeing rock art.

This study is part of the project "XSCAPE: Material Minds". The general question of the project is to understand the interactions between the mind, objects, and the world. In line with this question, we analyze in what way rock art sites condition human movement, body posture, and its possible relation to the social structure of each period.

2 DANCING THE GAZE: REPERTOIRE FOR IMAGINING PREHISPANIC DANCES IN COLOMBIA

Posada, Carolina (Antioquia University)

Dancing the Gaze: Repertoire for imagining prehispanic dances in Colombia is a doctoral research in Arts at the University of Antioquia. Its main objective is to contribute to the historiography of dance in the country, as current

studies primarily focus on the colonial and 20th-century periods. The research emerges from the interest in exploring native dances, seeking their traces between the years 10,000 BCE and 1492 CE. Dance, although ephemeral, leaves graphic traces, bodily memories, and oral narratives, prompting the search for its imprints.

During the exploration of various museums in the country, over 100 images have been found in pieces of goldsmithing, pottery, petroglyphs, and pictographs that suggest the existence of dance performances related to rituals. To comprehend and engage with these images, the icon+choreo+graphy approach has been developed. This method combines iconographic appreciation, choreological studies, and an understanding of the ritual context, linking them with vital concepts from "indigenous philosophers" in Latin America and Mesoamerica. The aim is to approach the images from the cosmogonies specific to the territory and anchor the dance gesture in its relationship with elements such as space, time, movement, sound, and the paraphernalia necessary for transformation or becoming.

Beyond being mere material objects evidencing the past, these images represent a present that harbors the very essence of dance. In this context, the communication focuses on morfokinemas as indicated by Kaepler, akin to the minimal units of meaning mentioned by Cusicanqui. The purpose is to appreciate the gesture in its minute details, emphasizing its maximum symbolic value.

3 RETHINKING HUMAN BEHAVIOUR. AN EXPERIMENTAL STUDY ON THE VISUAL EXPLORATION OF CERAMICS

Silva Gago, María (Instituto de Ciencias del Patrimonio (INCIPIT-CSIC)) - Valiño-Perez, Arturo (Instituto de Ciencias del Patrimonio (INCIPIT-CSIC)) - Lima-Olivera, Elena (Instituto de Ciencias del Patrimonio (INCIPIT-CSIC)) - Fernandez-Pestonit, Alba (Instituto de Ciencias del Patrimonio (INCIPIT-CSIC)) - Martinez-Otero, Luis (Instituto de Neurociencias (Instituto de Neurociencias CSIC-UMH)) - Criado-Boado, Felipe (Instituto de Ciencias del Patrimonio (INCIPIT-CSIC))

Vision is a key source of sensory information in humans. The relationship between individual and environment is driven by vision, but it is essential to selectively focus attention on selected stimuli due to the huge amount of information from the surroundings. The patterns of visual attention can be studied through eye-tracking technology, which consists of measuring eye position and movements. Considering the relevance of visual perception in the human genus and embodied theories of cognition, this technology can provide a useful approach to understanding human behaviour from an evolutionary perspective. Visual behaviour has been analysed before related to different kinds of archaeological remains, from stone tools to rock art, showing divergences between objects from different chronologies. In the current study, we present the preliminary results of the analysis of prehistoric ceramics from several periods and sites, which show that visual behaviour varies according to chronology. As time and cultures evolve, visual exploration became higher and more vertical. These differences can reveal behavioural patterns associated to this materiality.

4 BREAKAGE AND UNCERTAINTY: HOW POTTERS LEARN FROM UNPREDICTABLE PHENOMENA

Vindrola-Padrós, Bruno (XSCAPE Project on "Material Minds" (ERC 2020 Synergy Grant 951631); Institute of Pre- and Protohistoric Archaeology, Kiel University) - Scholtus, Lizzie (XSCAPE Project on "Material Minds" (ERC 2020 Synergy Grant 951631); Institute of Pre- and Protohistoric Archaeology, Kiel University)

Given the ubiquity of ceramic materials in human history, a large part of archaeological research today is invested with understanding how people learn about pottery craftwork in a social environment and the material consequences of this process. A crucial, yet often unrecognised, part of pottery making is knowing about the different instances where breakage can occur and how to respond to these phenomena, which has been articulated elsewhere as part of a theory of breakage (Vindrola-Padrós, 2023). Continuing this line of argumentation, this paper aimed to systematically analyse the way in which potters learn from breakage phenomena and identify the cognitive effects of this process. Our hypothesis was that the knowledge about how wheel-thrown pottery breaks during manufacture becomes structured through repeated exposure to contingent breakage situations, such that with growing experience this knowledge becomes part of the subject's generative model of the object. To corroborate this hypothesis, a cross-sectional study on over 40 participants with different levels of expertise of wheel-thrown pottery was performed. Participants were asked to perform a series of tasks including drawing, free-viewing and task-driven viewing typical pottery fracture patterns with eye-tracking equipment, and responding structured questions about their background knowledge of the craft. Through these mixed methods, clear distinctions could be made between the cognitive response of experts and non-experts.

References

Vindrola-Padrós, B., 2023. Outline of a theory of breakage. *Anthropological Theory* 23, 255–291. <https://doi.org/10.1177/14634996221139900>.

EXPLORING THE NEURAL PLASTICITY OF EARLY POTTERS: A MULTIDISCIPLINARY INVESTIGATION

Forte, Vanessa (Department of Science of Antiquities, Sapienza University of Rome) - Sartori, Luisa (Department of General Psychology, University of Padua) - Visalli, Antonino (IRCCS San Camillo Hospital, Venice) - Yildirim, Mustafa (Department of Cognitive Psychology, Ruhr University Bochum) - Galati, Gaspare (Department of Psychology, Sapienza University of Rome) - Vidale, Massimo (Department of Cultural Heritage: Archaeology, History of Art, Cinema and Music, University of Padua) - Faresin, Emanuela (Department of Cultural Heritage: Archaeology, History of Art, Cinema and Music, University of Padua) - Vallesi, Antonino (Department of Neuroscience, University of Padua)

This contribution presents the preliminary results of a study exploring the neural plasticity of early potters, combining experimental archaeology, cognitive neuroscience, and behavioural techniques. The development and transformation of ceramic technology during the Neolithic marked a profound shift, on the one hand, in the economy, social dynamics, and cultural practices, and, on the other hand, it likely demanded new cognitive and motor skills necessary to manage the constraints of a new raw material, such as clay. Drawing on cognitive approaches and the integration of archaeological methods with neuroscience techniques, our research explores the neuro-cultural mechanisms underlying ancient craft behaviours. Through a pilot study involving intensive training in Neolithic pottery-making techniques, participants' neural and behavioural changes were measured alongside their material production. Employing TMS-EEG co-registration, we examined neural indices, and analysed shape variations in handicrafts longitudinally, before and after training.

Our findings suggest changes in the primary motor cortex and enhanced symmetry and consistency in vessel and coil productions after intensive pottery training. This multidisciplinary approach contributes to shed light on mechanisms of material culture variation and human cognition and is promising for understanding technological evolution and its impact on past societies across different historical periods.

1101 IMPRINTS - TRACING LATE PREHISTORIC ENVIRONMENTAL IMPACT IN SOUTHERN EUROPE THROUGH NON/LOW INVASIVE METHODS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Vinci, Giacomo (University Of Padova) - Brandolini, Filippo (University of Newcastle) - Zeviani, Camilla (University of Cambridge) - Stoddart, Simon (University of Cambridge)

Session format: Regular session

At a global scale, human-induced modifications on the environment appear to have been widespread from around 1000 BCE. However, especially in the Mediterranean, the environmental impact of late prehistoric societies has long been underestimated.

Forest clearance, agricultural practices and grazing carried out in Southern Europe in the 2nd and 1st millennium BC had unprecedented and widespread effects on the long-term environmental dynamics, deeply modifying the vegetation cover, soils, and natural landforms. Prehistoric monuments, sometimes strongly degraded through millennia, are often a tangible product of these widespread anthropogenic activities. Overall, evidence of massive impact on the ecosystems is documented before Roman times by a growing number of studies.

In the last years, several non or low invasive methods (e.g. GIS-modelling, remote sensing, surveys, corings, geophysics) combined with a wide range of analyses (e.g. radiocarbon, pollen, OSL, micromorphology, seda-DNA) have been increasingly used to trace the environmental impact on these landscapes. In many cases, these methods are affordable and suitable to produce high resolution and comparable data.

To what extent and in which regions is it possible to detect major imprints of late prehistoric communities? Is it possible to track down unsustainable practices (e.g. replacement of species, extensive agriculture, fire activity?) that have consequences on landscape and settlement changes at specific regions?

By delving into the environmental impact of late prehistoric societies, we not only enrich our understanding of the past, but also acquire valuable insights that can guide current environmental management and policy. Ultimately, this contributes to a more ecologically responsible and sustainable future.

We aim to address these questions and issues by adopting a multi-proxy approach (including, but not limited to, geo-archaeological, GIS-based and statistical, palaeo-ecological) in order to detail and compare the magnitude of human impact in this crucial period across the Mediterranean region. Different scales of analysis are also very welcomed.

ABSTRACTS

1 FRONTIER TERRAMARE: PRELIMINARY PALAEOENVIRONMENTAL RECONSTRUCTIONS FROM THE TERRAMARE OF RONCHI DI CAORSO (PC)

Zappa, Jessica (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia) - Scacchetti, Federico (AR/S Archeosistemi Società Cooperativa) - Bonometti, Paolo (AR/S Archeosistemi Società Cooperativa) - Mazzieri, Paola (Soprintendenza Archeologia, Belle Arti e Paesaggio per le Province di Parma e Piacenza) - Zerboni, Andrea (Dipartimento di Scienze della Terra "A. Desio", Università degli Studi di Milano) - Cremaschi, Mauro (Dipartimento di Scienze della Terra "A. Desio", Università degli Studi di Milano) - Carra, Marialetizia (Dipartimento di Storia Culture e Civiltà, Alma Mater Studiorum Università di Bologna) - Mercuri, Anna Maria (Laboratorio di Palinologia e Paleobotanica, Dipartimento Scienze Vita, Università degli Studi di Modena e Reggio Emilia)

The Terramare of Ronchi di Caorso is an archaeological site inhabited during the Middle and Recent Bronze age (3550–3170 BC), representing the westernmost Terramare village of the Po Plain, in northern Italy. In fact, archaeological material of both the classical Terramare production as well as more western productions were found during excavations, demonstrating a mixture of cultures and extensive exchanges at this settlement.

Preliminary palynological analyses were performed on 20 samples, coming from the west moat of the settlement. About 50 different pollen taxa were found, mostly belonging to non-arboreal plants (NAP). The forest cover, when present, is mostly represented by deciduous Quercus and other elements of the mixed oakwood (*Carpinus betulus*, *Ostrya carpinifolia*, *Corylus avellana*, *Tilia*, *Fraxinus excelsior* and *Acer campestre*). Additionally in the most recent phases of exploitation of the site we detected the presence of hygrophilous species as *Alnus* and *Pinus*, thus suggesting a cooler condition than in the previous phases. Among NAP, plants belonging to the API (Anthropogenic Pollen Indicators) and LPPI (Local Pastoral Pollen Indicators) groups are predominant, including especially cereals (*Avena*/*Triticum*, *Hordeum*), *Cichorieae* and other *Asteraceae*, *Brassicaceae* and *Ranunculaceae*. Generally, the pollen assemblage shows an open landscape, with very low forest cover around the site, that is mostly characterised by grasslands and synanthropic communities.

Many remains of cereals (grains, fragments, glume bases, spikelets) characterise the samples studied so far from a carpological point of view.

Among them, various species of wheat (*T. monococcum*, *T. turgidum* ssp. *dicoccon*, *T. spelta*), barley (*Hordeum vulgare*) and millet (*Panicum miliaceum*), accompanied by undetermined fragments of cultivated pulses.

Dogwood and elderberry are the food fruits attested with herbaceous and anthropogenic weeds (mainly *Chenopodium*, *Rumex*, *Lysimachia*).

Ash and deciduous oak are the first remains identified through the anthracological study, confirming what was reconstructed from the pollen analyses.

2 ENVIRONMENTAL CHANGES AT THE DAWN OF METALLURGY IN A PREHISTORIC ALPINE MINING REGION IN TRENTO, ITALY

Piazzalunga, Giorgio (Dipartimento dei Beni Culturali, Università degli Studi di Padova, Italy) - Dal Corso, Marta (Dipartimento di Geoscienze, Università degli Studi di Padova, Italy) - Avanzini, Marco (Ufficio ricerca e collezioni museali, Museo delle Scienze di Trento, Italy) - Bellintani, Paolo (Umst soprintendenza per i beni e le attività culturali, Provincia autonoma di Trento, Italy) - Silvestri, Elena (Umst soprintendenza per i beni e le attività culturali, Provincia autonoma di Trento, Italy) - Nicosia, Cristiano (Dipartimento di Geoscienze, Università degli Studi di Padova, Italy)

What was the environmental impact of early metal ore mining and metallurgy? Is it possible to detect it? Was it significant and lasting or limited and reversible?

We focus on human-environment interaction in a prehistoric mining district in the south Alpine region of Trentino (north of Italy). By studying palynological records in natural archives, we can provide diachronic evidence of anthropogenic activities through independent proxies, which help the understanding of socio-environmental dynamics in the area.

The southeast Trentino was a key spot for copper smelting activities between the III and II millennium BCE. Archaeological evidence identifies two phases: the first dates to the Late Copper Age – beginning of Early Bronze Age and it is distinguished by small scale and poor mastery smelting process, and by settlements in the valleys and the foothills. The second dates to Recent and Final Bronze Age, when copper ore exploitation took place on a larger scale, as testified by more than two hundred smelting sites in middle mountain areas. A chronological gap occurs in the local archaeological record: between the two phases smelting sites seem to be absent so far, although metal objects originating from Trentino ore can be found in contemporaneous European sites.

In the framework of the ERC CoG project GEODAP (Geoarchaeology of Daily Practices), stratigraphic, chronological and pollen analyses were carried out on two sediment cores from Lago di Caldonazzo (Valsugana) and from biotope Malga Laghetto (Lavarone plateau) to unravel the ecological consequences of metal production in this alpine region. The two sites differ in size, altitude, catchment area and therefore offer integrative viewpoints on the human influence on the ecosystems through time. By the distinction of deforestation, slash-and burn agriculture, shepherding and grazing, different land-use patterns could be tracked back and implement the reconstruction of the development of mining regions.

3 TRACING THE LONG-TERM ENVIRONMENTAL AND SETTLEMENTS DYNAMICS IN THE COASTAL PLAIN OF NE ITALY SINCE MIDDLE HOLOCENE

Azzalin, Mattia (University of Padua) - Vinci, Giacomo (University of Padua) - Donders, Timme (University of Utrecht) - Gerats, Wouter (University of Utrecht) - Fontana, Alessandro (University of Padua)

Besides the Lagoon of Venice, the other tidal and brackish environments characterizing the NW Adriatic Sea experienced an evolution of over 8000 years that strongly imprinted the available resources of the coastal plain and partly constrained past settlement dynamics. We analyzed some key areas where important paleo-ecological archives are available and the human occupation is documented since mid-Holocene. In particular, we focused on the area around Concordia Sagittaria and Aquileia, that became important Roman cities, but where large sites are attested since late Neolithic.

This research integrates LiDAR-derived DEMs, interpretation of remote-sensed images and detailed paleobotanic and micropaleontological analyses. The stratigraphic architecture of the coastal plain has been reconstructed through the use of over 5000 boreholes produced in the last 20 years in the framework of the collaboration between Padova and Utrecht universities, during student fieldworks and specific research projects.

Near Concordia Sagittaria a large incised fluvial valley was formed by the Tagliamento River during Late Glacial, separated by scarps of over 10 m high from the rest of the plain and up to 1500 m wide. Since around 8500 years BCE the marine transgression transformed this depressed landform into an estuary extending for over 15 km landward. This peculiar setting attracted prehistoric groups over the edges of this valley. At the same time, this fluvial incision represents a unique ecological archive with an almost continuous sedimentation until historical time.

Recent geological surveys documented the existence of other incised fluvial valleys near the city of Aquileia. In this sector, a number of brackish swamps formed since around 6000 years BCE have been detected and mapped allowing to record the evolution of the ancient human impact. Overall, these investigations open new perspectives for archaeological and paleo-environmental studies in the area, that corresponds to the northernmost lagoon zone of the Mediterranean.

4 EFFECTS OF ANTHROPOGENIC AND CLIMATIC CHANGES ON THE APENNINE LANDSCAPE DURING THE LATE BRONZE AGE: PALYNOLOGICAL EVIDENCE FROM CENTRAL ITALY

Vignola, Cristiano (Department of Environmental Biology, Sapienza University of Rome) - Bettelli, Marco (National Research Council, Institute of Cultural Heritage Sciences (CNR-ISPC)) - Cardarelli, Andrea (Department of Science of Antiquities, Sapienza University of Rome) - Di Renzoni, Andrea (National Research Council, Institute of Cultural Heritage Sciences (CNR-ISPC)) - Sadori, Laura (Department of Environmental Biology, Sapienza University of Rome)

In the Mediterranean region thousands of years of plant exploitation by human societies strongly impacted on the vegetation. Holocene pollen records in Italy revealed the imprints of economic activities on the landscape since the Bronze Age: changes in forest cover and the use of fire are clearly attested from the mid-Bronze Age in association with the expansion of cultivation and grazing. Since abrupt climatic oscillations occurred during this time span, they could exacerbate the effects of woodland clearance depauperating forest composition and structure, as well as causing erosion processes. In particular climatic, palynological, and geoarchaeological data indicates conditions of increased aridity during the Late Bronze Age and suggests different drivers of deforestation and soil exhaustion.

We present new pollen data from an in-site record of central Italy dated to the end of the Bronze Age. Sediment samples were recovered from anthropogenic deposits of Monte Croce-Guardia (Arcevia) spanning three centuries. The site is located on the Apennine ridge at 666 m asl and overlooks a wide territory from the mountain slopes to the Adriatic coast. Modern vegetation is dominated by the mixed deciduous oak forest typical of mid-altitude environments. Despite the pollen conservation bias due to taphonomic processes, palynological analysis shows that Mediterranean trees represented an important component of local vegetation, suggesting different climatic conditions during the Late Bronze Age. In addition to natural constraints, the abundance of xeric herbs could refer to a landscape modelled by human activities in the surrounding of the site, like grazing. The palaeoecological dynamics of central Italy will be further investigated in the frame of the NRRP project National Biodiversity Future Center, that aims to develop conservation plans for Italian protected areas by reconstructing past changes in animal and plant variability.

5 HUMAN IMPACT ON THE ENVIRONMENT AND LAND USE EVOLUTION: MULTI-PROXY ANALYSIS AT THE BRONZE AGE SITE OF "LA MURAIOLA" (ITALY)

Bandini, Beatrice (Department of Cultural Heritage, University of Padua, Italy) - D'Aquino, Silvia (Department of Cultural Heritage, University of Padua, Italy) - Polisca, Federico (Department of Cultural Heritage, University of Padua, Italy) - Breglia, Francesco (Department of Geosciences, University of Padua, Italy) - Dal Corso, Marta (Department of Geosciences, University of Padua, Italy) - Piazzalunga, Giorgio (Department of Cultural Heritage, University of Padua, Italy) - Nicosia, Cristiano (Department of Geosciences, University of Padua, Italy)

Since the Middle Bronze Age (MBA), the Po Plain experienced a demographic growth and a considerable increase in settlement size. Large embanked settlements, known as 'Terramare', spread as a result of a deliberate plan involving living areas and structured agricultural systems around the sites. The resources required by these settlements likely implied a significant impact on the environment, which can be traced through archaeological indicators of land over-exploitation.

Within the framework of the ERC CoG project GEODAP (Geoarchaeology of Daily Practices), this study presents the first results of archaeobotanical and micromorphological analyses from recent excavations at the MBA settlement of La Muraiola di Povegliano (Verona, Italy). The samples subjects of these analyses come from sequences that include the natural substrate before occupation, the paleosol on which the settlement is established and two macrophases of the site's life.

Anthracological analysis reveals human impact evidence on the environment from the beginning of occupation, marked by a potential deforestation through fire. Furthermore, data on the use of forest resources are presented and potential indicators of stress on tree vegetation are discussed. The carpological study highlights cereal cultivation as a fundamental economic activity for this community, suggesting a drastic change in land use, from a forested area to a settlement with its own subsistence economy. Micromorphological analyses have identified another anthropic activity that may have affected the environment, such as breeding in the initial phase of the site, providing useful insights for the functional interpretation of the anthracological assemblage in the second phase, where domestic waste associated with structural evidence is recognised.

A multi-proxy approach supports the hypothesis of an increasing anthropogenic impact on the surrounding area, which contributes to the scenario of overexploitation of the environment by Terramare communities during the Middle Bronze Age.

6 ENVIRONMENTAL IMPACT OF BRONZE AGE MONUMENTS: THE MOUND OF UDINE AND THE FRIULI PLAIN (NE ITALY)

Vinci, Giacomo (University of Padua) - Fontana, Alessandro (University of Padua)

Late prehistoric monuments are often the only remnants of complex cultural past landscapes and constitute the tangible product of widespread human-induced modifications on the environment. Recent geoarchaeological investigations including new stratigraphic cores drilled at the hill dominating the city of Udine (NE Italy) indicate the "Castle Hill" as the largest anthropogenic mound erected in Europe before Roman times.

Located in the middle of a vast alluvial plain, the mound measures 30 m in height and over 400,000 m³ and consists of alternations of gravelly and clayey lenses for its entire thickness. It was erected around 1400-1300 BCE, probably in a short lapse of time, by extracting the earth deposits from the surroundings. This excavation led to create a depression that was used as a water basin for supplying the coeval fortified settlement.

Paleopedological, botanical and geochronological investigations on the cores also allowed to reconstruct the environmental setting existing when the mound was built. In particular, pollen analyses enlightened clear signs of strong anthropogenic impact that occurred in the area even before the construction of the mound. These include the degradation and management of pristine forests, its conversion into open fields and the introduction of new species related to agro-pastoral activities.

As documented by a growing number of studies on coeval communities in the Po Plain (Terramare Culture), both the archaeological and palynological data from Udine and other fortified settlements in the Friuli Plain demonstrate unprecedented landscape changes and human impact on the alluvial environments of northern Italy since the second half of the 2nd millennium BC. At the same time, the monumentality of the Castle Hill opens new perspective on the study of labor organization, land management and, ultimately, on the demography of these Bronze Age communities.

7 RECONSTRUCTING LONG-TERM HUMAN IMPACT IN CENTRAL ADRIATIC ITALY USING LEGACY AND NEW DATASETS

de Neef, Wieke (Otto-Friedrich Universität Bamberg)

This contribution discusses methodological challenges in the reconstruction of pre-Roman human-environment interactions in Central-Adriatic Italy. Our understanding of pre- and protohistoric impact on the hilly landscapes between the Apennines and the Adriatic coast remains fragmentary. This can partly be explained by research biases, including a focus on burial contexts and fieldwork preferences for easily accessible agricultural land. Further obscuring factors are the extensive 20th century reforestation programs in the mountainous inlands, the poor preservation of botanical remains in a series of recent excavations, and the lack of high-resolution LiDAR data for large parts of the Adriatic (pre-)Apennine ranges. However, legacy excavation contexts and environmental proxies from a wider region provide extra information. Combined with new fieldwalking data and geophysical surveys, these proxies can now be used to piece together the long-term human impact history of the present-day regions of Marche and Abruzzo. In this presentation, I illustrate the challenges of using fragmentary data for such reconstructions with recent research in the Potenza and Misa valleys (Marche).

8 THE ORIGIN OF LANDSCAPE INSTABILITY IN THE FOURTH MILLENNIUM BC OF THE TROIENESE OF UPLAND SICILY

Marras, Gian (University of Cambridge) - Stoddart, Simon (University of Cambridge) - Schmidt, Frjida (University of Cambridge) - French, Charles (University of Cambridge) - Malone, Caroline (Queen's University Belfast)

The central region of upland Sicily has a unique landscape of vast pasturelands and croplands that mantle gently to steep sloping rounded hills. However, these slopes are affected by the intense mobilisation of soil materials which leads to different forms of surface erosion and downslope deposition. When did slope instability start to occur across the landscape of upland Sicily? What is the role of prehistoric settlement in driving past and ongoing geomorphodynamic processes? To address these questions, in this work, we will focus on slope deposits of the Troina intermontane valley located within the Nebrodi Mountain Range of central Sicily. In particular, a detailed lithostratigraphic analysis of deposits has been carried out on the occasion of an archaeological excavation that opened various trenches on a midslope position along the western flanks of the Troina valley. Geochronology through radiocarbon dating and micromorphology on undisturbed block samples from the different investigated units have been undertaken to establish the absolute chronology, processes, and causes at the origin of these deposits. Following an integrated approach of lithostratigraphic analysis, soil micromorphology, and radiocarbon dating, this work sheds new light on the origin of the landscape instability that characterises present-day upland Sicily. By combining and discussing data from previous geoarchaeological research that highlighted several phases of erosion and deposition along the Troina Fiume di Sotto Valley, and regional fossil pollen sequences, this study unravels the impact that Copper Age communities at ca. 5,000 BP had on driving geomorphic trajectories across the central upland region of Sicily.

1102 STRATEGIES TO RULE THEM ALL. A TRANSNATIONAL ANALYSIS OF LANDSCAPE CONTROL AND SCALES OF POWER BETWEEN 5-16TH CENTURIES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Blanco Torrejón, Laura (Universidad de Salamanca) - F. Pereiro, Mario (Institute of Archaeology (University College London)) - Ramos Soriano, Mario (Universidade de Santiago de Compostela) - Baeza Gomariz, Leonor (University of Salamanca) - Sánchez Serrano, David (Rey Juan Carlos University)

Session format: Regular session

Regarding the different theoretical perspectives formulated in recent times about territorial control and the exercise of power in pre-capitalist societies, there is one indisputable idea: there is no unique and simple strategy that allows such control. In order to understand those phenomena, in this session we will seek to analyse the strategies of landscape control and its archaeological records between the 5th century and the 16th century, adopting a worldwide comparative perspective.

Most societies express their landscape power through the application of many coercive measures ranging from punitive actions to less obvious ones, such as tax control or the creation of an ideological control system. All these tools are used in a multiscale way by the different social groups of a community which leaves a remarkable archaeological footprint (i.e. fortifications, agricultural exploitation, religious buildings, burials...)

Having this in mind, how do these actions affect the rest of the community? How do the dominated classes face these strategies of territorial control? Do the strategies of local or supralocal powers change or adapt to deal with active or passive resistance? And above all, how can we report all these changes through Archaeology?

ABSTRACTS

1 ABULA (ÁVILA, SPAIN) AS A CENTRAL PLACE IN LATE ANTIQUITY HISPANIA THROUGH VISIGOTHIC SLATES

Sánchez Serrano, David (Universidad Rey Juan Carlos)

The Late Roman city is the result of an economic and social process that started at the end of the second century (ARCE, 2023), undergoing changes in its urban physiognomy (GURT y SÁNCHEZ, 2009; DIARTE, 2015). The processes of transformation that have taken place since the Late Roman period reveals a process of regionalization that prevents the extrapolation of conclusions from other areas. Thus, the application of the term city in the Douro Valley is imprecise (TEJERIZO, 2015), while its status as a Roman civitas barely distinguishes it from other central places between the 5th and 7th centuries.

Abula was a city of relative importance during the Imperial period, as a result of which it would be configured as an episcopal see with Priscillian since the year 380 (BALMASEDA, 1998); this led to the early Christianization of the city with the consequent transformation of its physiognomy (BARRACA, 2012; FABIÁN, 2021), giving rise to a settlement that could well be inserted into the category of first generation castles (TEJERIZO, 2015). The status of Abula as an episcopal see since the 4th century and the concentration of numerical slates around the settlement, as well as the existence of drawing slates with religious themes, could suggest the association of this intense accounting activity with the religious and civil authority of the central place. According to the data, nothing seems to deny the status of central place for Late Antique Abula, whose materiality, especially the number of slates found, is comparable to other hierarchical sites of the Douro.

2 SIMILARITIES AND DIFFERENCES IN POWER'S EXERCISE BETWEEN CORNWALL AND GALICIA DURING EARLY MIDDLE AGES (5TH TO 10TH CENTURIES)

Soriano, Mario (Universidad de Santiago de Compostela; CISPAC)

As a consequence of the fall of the Roman state, new territorial powers emerged that largely replaced it. These had limited success over time, as they generally ended up falling. In this situation of weakness of state power, new strategies for territorial control were developed, which would end up leading in subsequent centuries to the construction of early medieval states, with important differences in the various geographies of the Mediterranean and the Atlantic. However, despite the fact that great narratives have been offered about the general transformations, we still do not understand in depth its mechanisms or the processes related to it in its entirety in certain spaces, such as the northwest of the Iberian Peninsula or the Southwest of Great Britain. But do both societies respond the same to this situation? How is this response given? Then, is it comparable? What can offer archaeological analysis to our comprehension of the period? That is why with we are doing this presentation: to provide a working hypothesis that answers that questions. Thus, it will be discussed how the exercise of these post-Roman and pre-feudal powers occurred in the aforementioned geography, by the analysis and comparison of the archaeological record of two small peninsulas: West Penwith (Cornwall) and Barbanza (Galicia).

3 WHY BUILD A CASTLE IN EARLY MEDIEVAL GALLECIA (8TH-11TH CENTURIES)? REFLECTIONS ON THE NEEDS OF TERRITORIAL CONTROL

Pereiro Fernández, Mario (Universidade do Minho; Universidade de Santiago de Compostela)

The use of fortified sites of military origin is a constant for the control of a certain territory. This phenomenon will proliferate in much of Europe in the central period of the Middle Ages, with the appearance of elite strongholds and strategic fortifications. Functionally born for the control and defense of a specific territory, these constructions will end up forming part of the administration of the landscape and the evolution of the state in this period. For Gallecia, northwest of the Iberian Peninsula, it is a phenomenon that is documented as beginning in the middle of the 8th century. It is interesting to identify the different adaptations that this type of fortifications have, from initiatives by aristocratic powers to their use by state-level projects. The archaeological study of these strongholds allows us to identify certain construction and location patterns that adapt to the needs of their owners within the political reality in which they are inserted.

4 DEATH AND LANDSCAPE. POWER, CONTROL AND LEGITIMATION THROUGH THE BURIALS DURING THE 8-11TH CENTURIES AD IN THE NW IBERIAN PENINSULA

Blanco Torrejón, Laura (University of Salamanca)

When we think about territorial control during the Early Middle Ages, we usually highlight the building of complex structures such as fortifications or the imposition of a certain political and economic system. However, this control

can be exercised through a more simple and daily action: the reuse and creation of funerary areas. This paper aims to explore the socio-political trends that have their direct reflection in the landscape management by local elites via the establishment of a series of isolated or small groups of anthropomorphic burials. This important amount of sarcophagus and rock-cut graves scattered across the north-western part of the Iberian Peninsula are often the only remains that we have from this social group. The locations of these inhumation areas are not random, they respond to strict strategies to legitimate its power into its territory due to a visual and mnemotechnic technique known by the whole community. Along these centuries we witness differences in the morphology and conformation of the funerary areas, at the same time as the political power change between local elites, aristocratic circles supported by the Astur-Leonese kingdom, and the Church. Thus, political, social and economic dynamics that function as starting points for the flourishing of modern states.

5 PEASANT PLACES. RECONSTRUCTING THE MEDIEVAL PEASANT LANDSCAPE IN NORTHERN IBERIA (9TH-11TH CENTURIES)

Baeza Gomariz, Leonor (University of Salamanca)

This paper aims to study the spatial organisation established by different social agents in the Liébana region (Cantabria, Spain) between the 9th and 11th centuries, through the study of its landscape.

Since the 1990s, historical research has made progress in understanding the landscape as an expression of the collective identity of the community, which expresses its territoriality through the appropriation, exploitation, and defence of the space it recognises as its own.

The aim is to insert the local communities in their spatial context, deploying a wide range of analyses, firstly, through the use of GIS (visibility, isochrones of the villages, optimal routes to the cultivation areas and their adaptability to the soil). And, secondly, through the phenomenological study of the landscape based on the information preserved in early medieval documentation (mainly the Charters of Santa María de Piasca and Santo Toribio de Liébana). This double approach allows us to analyse the perception of the landscape by the social agents, as well as to try to understand the spatial organisation and to put forward hypotheses for its topographical reconstruction in the landscape.

This paper will present the results of the application of this methodology in the current municipality of Cabezón de Liébana. Here, in a territory under the influence of a supralocal agent such as the monastery of Santa María de Piasca, we observe a peasant population, interconnected by a network of secondary roads, which carried out the exploitation and management of its territory to its maximum potential. There is evidence of their own internal organisation and hierarchy, in matters of spaces demarcated according to other neighbouring agents (whether local or not), or in their assessment of the value of primary and secondary products (animals, cereal, wine, tools...). All this as part of an internal process of non-aristocratic social differentiation.

6 THE CREATION OF AN EARLY MEDIEVAL REGIONAL HIERARCHY FROM WITHIN. EXPLORING THE MONASTIC LANDSCAPES OF SAMOS AND MONTE AMIATA ABBEYS

Sanchez-Pardo, Jose Carlos (University of Santiago de Compostela) - Fernández Ferreiro, Marcos (University of Santiago de Compostela) - Blanco-Torrejón, Laura (University of Salamanca) - Rodríguez González, Celtia (University of Santiago) - Santos-Salazar, Igor (University of Trento) - Farinelli, Roberto (University of Siena)

Monasteries often became main spatial and political nodes of rural territories in the early Middle Ages, especially in areas with a smaller or weaker presence of urban centers. Through purchases, donations and other strategies, some monasteries were able to create important areas of lordly dominion, controlling villages, agrarian spaces and productive infrastructures. However, the study of monastic domains has traditionally been carried out only employing the written information left by the monasteries themselves, and often from a top-down theoretical perspective in which monastic power is directly imposed on peasant communities. In this presentation, we will summarise the main results of the ARPAMED and ECOLOC projects, funded by the Spanish Ministry of Science, in which the monastic landscapes of the abbeys of Samos (Northwest Spain) and Monte Amiata (Central Italy) are studied and compared in an interdisciplinary way. The combination of macro-scale analysis of the controlled territories using Geographic Information Systems together with micro-scale archaeological fieldwork in the villages and agricultural spaces that formed part of both monastic domains allows us to model more complex and diachronic interpretations of the establishment of spatial networks of power and socio-economic relations in the Early Middle Ages in Galicia and Tuscany.

7 CONFLICT AND INTEGRATION: A DISCUSSION ON THE NORMAN CONTROL SYSTEM OVER LOMBARD BENEVENTO BETWEEN XI AND XII CENTURY

Ricchiuti, Daniele (Sapienza Università di Roma)

Between early XI Century and the first half of XII Century the Normans built in Northern Campania a strong feudal network, meant to guarantee control over lands and people. In addition to defense and exploitation of fiefs, a key

aspect in this system was, of course, the interaction with the (mainly) Lombard population living in the region: as conquerors, Normans imposed their rule on them, but at the same time, this new aristocracy interacted deeply with its subjects, defining a very complex relationship.

This is especially true for Benevento: a city not only ethnically Lombard, but also politically subject to direct papal rule. Rather unsurprisingly, this situation determined a tense relation between Benevento and the neighboring Norman powers. Here fundamental questions arise: how local Norman barons dealt with this autonomous Lombard enclave? Were they capable to impose a strong (even if indirect) rule over the city and the surrounding landscape?

Answering these questions, a first key-element is the survey of known fortification around Benevento: we will map known Norman strongpoints around the city, merging archeological and architectural data with information provided by written sources. This should allow us not only to carry out spatial analysis with a GIS software (especially regarding visibility), but also to evaluate the relation between this fortified backbone and strategic assets like roads.

In addition to these mainly archeological data, we will also focus on written sources to evaluate other aspects which were part of the same Norman system of landscape control. In particular, the paper will deal with warfare (through the analysis of different campaigns) and economic and fiscal tools used by the ruling Normans.

All these data will help us in the defining a complex scenario, in which conflict and hegemonic rule were deeply related with forms of political and economic integration.

8 MEDIEVAL COLONISATION AS AN EXPRESSION OF SUPRALocal POWERS

Mazackova, Jana (Masaryk University) - Zaza, Petr (Masaryk University) - Vaneckova, Daniela (Masaryk University)

Reconstruction of medieval colonisation of the Bohemian-Moravian Highlands (Czech Rep.) has been analysed based on systematical research of the Rokštejn Castle and its closer hinterland. This highland was not settled until the 12th century, and as such represents a sort of a power vacuum. Landscape is thus anthropologically changed during and after this period, which lasts until the end of the 13th century, when we can presume the political structures stable, as is evident through parcelation of the landscape (mainly field systems). Yet, the fortification systems in and around the Rokštejn lordship do not correspond with the agricultural landscapes, clearly demarcated by anthropogenic features (e.g., ridge and furrows). Analysis of historical and archaeological data can further be used for recreating the political situation on local and regional scale, however, power is certainly represented by the settlement structure, as it is in itself, a way of controlling the population through taxes, resource allocation, and other revenues the political extent of the lordship's power allows.

1103 EMBODIED IDENTITIES: UNRAVELING SYMBOLIC THREADS THROUGH ORNAMENTS, GARMENTS, AND PORTABLE OBJECTS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Kurawska, Aldona (Institute of Archaeology and Ethnology Polish Academy of Sciences) - Baysal, Emma (Department of Archaeology, Ankara University) - Sobkowiak-Tabaka, Iwona (Faculty of Archaeology Adam Mickiewicz University) - Cartolano, Mattia (University of Bologna) - Yelözer, Sera (National Geographic Society funded Small Things Big Stories Project)

Session format: Regular session

Personal ornaments, encompassing a diverse array of modified or unmodified objects, have left an indelible mark in the archaeological record. Beads, pendants, necklaces, bracelets, and other adornments crafted from natural and human-made materials seamlessly integrate with garments, collectively altering the body's appearance. Their visibility and durability suggest shared cultural significance beyond personal needs, prompting interactions within and between social groups. Worn to stand out within communities, distinguish from other groups, facilitate communication, denote status, role, marital status, age group, and tribal hierarchy, ornaments played a multifaceted role in societal dynamics throughout prehistory.

In parallel, recent research has shed light more broadly on portable symbolic elements of material culture like ornaments, plaques, and figurines, as well as tools and handheld devices with incisions or patterns. Despite receiving less scholarly attention than monumental structures, these items hold immense significance in understanding the symbol-making and communication traditions of prehistoric communities. They offer valuable insights into the lives and identities of individuals and groups, with contextual nuances revealing details in burials, domestic spaces, or waste deposits. Manufacturing techniques, decoration styles, and material composition provide essential information about artisans and systems of exchange.

This session welcomes contributions exploring evidence of body adornment practices and portable symbolic items, emphasizing their significance in shaping identities, meanings and symbolically charged communication. From personal ornaments in burial contexts to the interpretative potential of small finds, we invite diverse perspectives on dia-

chronic changes, social systems, and innovative theoretical approaches to deepen our understanding of the intricate relationships between bodies, identities, and material culture throughout prehistory and beyond.

ABSTRACTS

1 SHELL ORNAMENTS OF GRAVETTIAN COMMUNITIES: MOBILITY AND SOCIAL IDENTITY IN UPPER PALAEOLITHIC POLAND

Kurzawska, Aldona (Faculty of Archaeology, Adam Mickiewicz University) - Wilczyński, Jarosław (Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Department of Vertebrate Zoology) - Apolinarska, Karina (Institute of Geology, Adam Mickiewicz University) - Mrozek-Wysocka, Małgorzata (Institute of Geology, Adam Mickiewicz University) - Głód, Anna (Institute of Archaeology and Ethnology, Polish Academy of Sciences)

Ornaments from various studies primarily related to the Palaeolithic period serve as tools to explore the communication of personal identity or group affinity, exchange and social networks, management strategies, and finally, the ethnolinguistic diversity of human groups. The discovery of ornaments made from shells originating from the Mediterranean has significant implications regarding the identity of Upper Palaeolithic communities in Poland, the establishment of movement directions, the mobility and connections among groups. However, these exceptional finds are consistent with those related to other communities in Central Europe. Despite their uniqueness, these ornaments do not stand out in their type or form from the known Upper Palaeolithic tradition; instead, they confirm their belonging to it.

In this study, we analyze distinctive shell ornaments discovered at two archaeological sites associated with Gravettian communities. We discuss the implications of these particular ornaments in understanding human mobility and social identity. Therefore, a comprehensive analytical, comparative, and microscopic study is conducted, encompassing taxonomic identification of shells, determination of stable isotopes of carbon and oxygen for source recognition, use-wear examination of the ornaments, and analysis of the residues present on them. The study also investigates technological and taphonomic modifications of the material and compares this collection with the use of similar shell ornaments in the broader Upper Palaeolithic world. We address several issues, including the use of shell ornaments by Gravettian groups, exploring diversity in raw material sources, and the selection of specific types by humans. The procurement of ornaments from a great distance may be indicative of expanding social networks during the Upper Paleolithic.

2 DIACHRONIC EVOLUTION AND GEOGRAPHIC DIFFERENTIATION IN LATE EPIGRAVETTIAN SOCIETIES: BIOGRAPHICAL APPROACH TO ORNAMENTS FROM TAGLIENTE ROCK-SHELTER (VERONA, NE ITALY)

Hoareau, Leïla (CEPAM UMR 7264) - Fontana, Federica (Università di Ferrara) - Beyries, Sylvie (CEPAM UMR 7264, CNRS)

The biographical approach to archaeological objects makes it possible to grasp all the stages of life and observe the many cultural choices made during the life of the objects. Applied to ornamental objects, this approach offers the possibility of perceiving the place of ornamental practices in the social life of past societies. The typology of the objects is considered to be central to the definition of ornamental practices, but other aspects of their biography may have social and cultural significance: the methods of manufacture, the way in which they were assembled into a particular ornamental composition, and the ways in which the objects were abandoned are all significant biographical events.

We used this biographical approach to study the corpus from Tagliente rock-shelter, which contains several hundred marine shell ornaments documenting ornamental practices in the early Late Glacial period (16,000 - 14,000 cal. BCE). This has revealed a partial evolution in ornamental practices, affecting only shell selection and technical choices, while ornamental compositions remained stable. The choice of shell species reflects both a possible adaptation to resource availability, which was strongly affected by Late Glacial environmental change, and a reliance on networks of connections with distant groups. In addition, the choice of species and the way they were assembled in different ornamental compositions reveal regional practices, pointing to a differentiation of groups through their appearance within the vast Epigravettian techno-complex.

3 NEW DATA ON THE LATE MAGDALENIAN SYMBOLIC CULTURE IN POLAND

Plonka, Tomasz (Institute of Archaeology University of Wrocław) - Przeździecki, Michał (Faculty of Archaeology Warsaw University) - Diakowski, Marcin (Institute of Archaeology University of Wrocław) - Niedźwiedzki, Robert (Institute of Geological Sciences University of Wrocław) - Ziółkowski, Grzegorz (Faculty of Mechanical Engineering Wrocław University of Science and Technology)

In the thirteenth millennium BC, southern Poland was a flourishing area of Late Magdalenian settlement. Stone artefacts typical of Magdalenian flintwork have been found at sites from this period, as well as objects relating to the symbolic world of Magdalenian foragers: anthropomorphic figurines, engravings, pendants and pigments.

In recent years, we studied new symbolic artefacts excavated at the site Ćmielów 95 in Lesser Poland, at Birów in Upper Silesia, and near Wschodnia Cave at Wojcieszów in Lower Silesia. The last two were stray finds, a fragment of a reindeer tine with rows of drilled points and a perforated bear rib, both directly dated by radiocarbon. In examining ornamentation, we used microscopic observations, tomographic method (CT) and experiments.

The most complete set of artefacts from Ćmielów included fragments of pigment, fossils, stone slabs with engravings and fragments of two ornamented rondelles made of red pigment. Analysis of the fossils, rocks and pigments showed that they came from the vicinity of the site. The engravings are composed of geometric motifs; most of the engraved lines were repeated. Research on the objects from Birów and Wschodnia Cave allowed us to determine the method of their production (drilling, cutting).

Late Magdalenian symbolic artefacts from Poland show features specific to finds from Central and Western Europe. So far, there are no figural engravings here, and the female figurines typical of Magdalenian were made of stone - mainly flint, using knapping, and the rondelles known from this area were made of red pigment. These data allow us to conclude that the Late Magdalenian foragers from the area of today's southern Poland had a specific and original symbolic culture with numerous local accents.

4 MESOLITHIC TRADITION IN NEOLITHIC CONTEXT - PERSONAL ORNAMENTS IN FUNERARY PRACTICES OF CENTRAL EUROPE: A CASE STUDY FROM POLAND

Głód, Anna (Institute of Archaeology and Ethnology Polish Academy of Sciences) - Kurzawska, Aldona (Faculty of Archaeology Adam Mickiewicz University) - Apolinarska, Karina (Institute of Geology, Adam Mickiewicz University) - Sobkowiak-Tabaka, Iwona (Faculty of Archaeology Adam Mickiewicz University) - Żurkiewicz, Danuta (Faculty of Archaeology Adam Mickiewicz University)

During the Neolithic period in Europe, there was a notable increase and dissemination of personal ornaments. This was believed to be primarily driven by changes in the social organization of Neolithic communities, advancements in craft production, exchange networks, and the procurement of raw materials. Throughout this period, a consistent pattern of continuity and change in the utilization of personal ornaments is discernible, both across time and geographical regions. Present-day Poland, situated on the periphery of influences mainly from the south (specifically, the Danubian influences from the Transcarpathian area), experienced the impact of these influences primarily through the introduction of foreign materials and different traditions. However, a substantial number of ornaments were crafted from locally available materials. Among these, there are ornaments characteristic of Mesolithic populations in Eastern, Central, and Southern Europe: beads made of small snail shells, pendants made of animal teeth, bone bracelets, arm-lets, and boar tusk pendants. These artifacts were discovered in the region of present-day Poland exclusively in richly equipped female burials associated with early Neolithic communities in the second half of the fifth millennium BC.

In our presentation, we delve into the use of these "Mesolithic" ornaments in multi-elemental decorations such as hip belts, headdresses, and appliques, often composed of hundreds of beads made from various materials. We offer a comprehensive analysis of these ornaments concerning their identification, sources of procurement, along the identification traces of their use. All of this is aimed at revealing their significance as visual markers of identity, social status, symbols of wealth and prestige, reflections of traditions, ancestor legacies, beliefs, and rituals. Furthermore, we explore whether these ornaments reflect intensive interactions between early farmers and hunter-gatherers or if they were brought by agricultural communities originating from the southern regions.

5 SMALL THINGS, BIG STORIES: BODILY IDENTITIES AT THE NEOLITHIC TRANSITION IN SOUTHWEST ASIA

Baysal, Emma (Ankara University)

The Neolithic transition saw some fundamental changes in the way that people interacted with both the world around them and with each other, which can be traced through their personal ornaments. The small items of material culture associated with the human body are rich sources of information not only about past materials and technologies, but also about the people who made and used them. In this presentation I will use studies of personal ornaments to explore what we can find out about identities at the dawn of the Neolithic, with the aim of centring people and their experi-

ences in the interpretation process. Using the case study of in situ burials from Boncuklu Tarla, southeast Türkiye, I will look at human-jewellery relations at both macro and micro scales to identify community and individual experiences of identity creation and communication. Analyses of the objects that people associated with their bodies, and in some cases, artefacts that transgressed bodily boundaries in a process of physical transformation, will be used to consider perceptions of age, sex and status within this early sedentary society. In conclusion the presentation will consider wider questions of time, ownership and communication as expressed in personal ornaments.

6 LEAF-SHAPED MOTIF IN NEOLITHIC ENGRAVINGS. A DISCUSSION OF IMAGE PRODUCTION AND INTERPRETATION OF PORTABLE OBJECTS

Cartolano, Mattia (University of Bologna)

The Neolithic in south-west Asia is a key transitional period in which prehistoric communities adopted new lifestyles and produced a wider range of symbolic artefacts. The extraordinary monumental architecture adorned with chiselled figurative images and the mortuary practices of detached skulls have received particular attention in recent years. On the contrary, small items such as beads, plaques and shaft straighteners have not been extensively analyzed. This presentation will focus on the markings visible on these small finds retrieved from Pre-Pottery Neolithic (ca. 9700-6600 BC) in southwest Asia.

Leaf-shaped motif consists of a set of specular incisions of parallel oblique marks joined by a straight line in the middle. This type of engraving can be observed on portable items found at Pre-Pottery Neolithic sites such as Demirköy, Tell 'Abr, Tell Qaramel, Mureybet and others. What is interesting is that these marks are sometimes situated along with other incisions and have never been examined comparatively. The present work aims to deep dive into the analysis of leaf-shaped incisions in Neolithic portable objects in order to assess the significance of these engravings for late hunter-gatherers and early farming communities with regard to personal and community identity and symbolic communication.

7 A NEOLITHIC TECHNOLOGICAL APPROACH TO THE PRODUCTION OF STONE BEADS: INSIGHTS FROM THE ANALYSIS OF THE NAHAL HEMAR CAVE ASSEMBLAGE

Bar-Yosef, Daniella (Steinhardt Museum of Natural History) - Porat, Naomi (Geological Survey of Israel) - Groman-Yaroslavski, Iris (University of Haifa)

The stone beads assemblage of Nahal Hemar Cave, southern Israel, was analyzed to reconstruct the technology applied by artisans during the Pre-Pottery Neolithic B (9,900-9,400 cal BP). The study of 35 beads recovered at the site highlights three main inter-related aspects: a broad range of raw materials used, the workmanship necessary for the production of the beads in accordance with their types, and the fashioning of beads into types that are suitable for a particular method of using them. Raw material identification was based on SEM-EDS analyses. Eleven minerals identified provide a clue to the vast geographical range from which they were extracted. The typological characterization showed that beads have mostly a round and lenticular transverse section. Based on experimentation we found that the makers of the beads had an intimate acquaintance with the properties of the minerals. The microscopic wear analysis indicates the methods of abrasion and polishing, where the round beads are rolled and the lenticular beads are abraded on a flat surface. The analysis also indicates selective methods of drilling and binding that are consistent with bead types. We conclude that decision-making processes in bead production took into consideration the constraints posed by the properties of the stone and the tools that were used for manipulating them. This technological approach reflects a consolidated framework of careful planning and execution that contributes to the wider perspective of novel trends of the Neolithic period paralleling other developments associated with the establishment of village life and agriculture.

8 THE PRODUCTION AND UTILIZATION OF PLASTER BEADS FROM NAHAL HEMAR CAVE: A MULTI-DISCIPLINARY APPROACH

Shafir, Yaara (Zinman Institute of Archaeology, School of Archaeology and Maritime Civilizations, University of Haifa) - Groman-Yaroslavski, Iris (Zinman Institute of Archaeology, School of Archaeology and Maritime Civilizations, University of Haifa) - Friesem, David (University of Haifa) - Bar-Yosef Mayer, Daniella (The Steinhardt Museum of Natural History, Tel Aviv University)

The Pre-Pottery Neolithic B period (PPNB 10,500-8,400y BP) in the Levant is known for the expanding sedentary farming lifestyle attended by an emerging social differentiation within the growing human population. This transition is represented inter alia by the production and use of personal ornaments and beads, usually made of shells and colorful stones, and by elaborate funerary practices, with special attention to the skull. In this context, the color-coated plaster beads from Nahal Hemar Cave in the southern Judean Desert (dated to ~9,000y BP) are unique, since although plaster was extensively used for construction, burials and decoration, this is the only known case of plaster beads.

Employing a multi-disciplinary approach combining methods of morphological, mineralogical and use-wear analysis, this study aimed to reveal the production techniques and raw-material sources of the beads, as well as their possible modes of use. The results showed that the beads were produced in the vicinity of the small cave in which they were stashed, and contrary to suggestions made by previous studies, were most likely made without pyro-technology. This was tested in a re-creation experiment, in which plaster beads were produced using unheated calcite rocks and the modeling methods identified in the morphological analysis. The use of non-pyrogenic plaster shifts the discussion away from the Neolithic lime plaster industry toward the versatility of Neolithic artisans and their aesthetic and technological choices. While the specific use and meaning of the beads remain unclear, their presence in the context of the mortuary items found in the cave and the minimal wear on the delicate beads, suggest that they may have been used as decoration for the dead rather than worn by living people.

9 BEADS AND IDENTITIES AT AŞIKLI HÖYÜK: A NETWORK OF RELATIONSHIPS

Yelözer, Sera (Small Things, Big Stories Project funded by National Geographic Society, Istanbul, Turkey) - Pereira, Daniel (Centre National de la Recherche Scientifique (CNRS), UMR-5199 PACEA, Bordeaux, France) - Rigaud, Solange (Centre National de la Recherche Scientifique (CNRS), UMR-5199 PACEA, Bordeaux, France) - Duru, Güneş (Mimar Sinan Fine Arts University, Istanbul, Turkey)

Because beads can be assembled and carried on the bodies, disassembled to be distributed between individuals and groups, they play a central role in conveying symbolic messages and creating social and cultural ties within and between communities. When found in funerary primary contexts and analyzed with appropriate methodology, personal ornaments provide a clear snapshot of how they were associated with specific biological sex and age categories, and in some cases habitual activities visible through osseous stress markers. By crossing personal ornament data, funerary practices and bioanthropological data it is thus possible to discuss if socially constructed concepts such as gender, social age, personhood, and kinship were materialized through personal ornament associations and position on the bodies within past societies. One way to approach these themes is through the analysis of the bead-type associations between individuals buried within a site.

In this study, we report the preliminary results from a range of statistical analyses (analysis of variance, SNA and PCoA) applied to a dataset of 30 individuals and their ornaments from Aşıklı Höyük, a Pre-Pottery Neolithic site in Central Anatolia, Turkey. We performed the analysis in the R software extending an already published Archaeological Similarity Network analysis protocol (Pereira et al. 2023). The analyses show that bead-type presence/absence and counted data provide different results. Bead-type associations significantly differ between age classes, and the sex of the individuals who wore them. The analysis highlights stylistic similarities between some of the adult females and sub-adults and also identifies some groups which cannot be explained by age class, sex or spatial proximity within the site. These results suggest that while age and sex may have played a role in bead-type similarity between some individuals, other social and cultural factors, that still need to be discussed, also influenced the observed diversity.

10 ORNAMENTS OF IDENTITY? DOUBLE-HOLED TRAPEZOIDAL CHALCOLITHIC PENDANTS AS A CULTURAL MARKER IN THE SOUTHERN LEVANT

Golani, Amir (Israel Antiquities Authority)

Cultural identity is often defined through archaeological material culture and can be distinguished in personal adornments. This is not surprising as bodily ornamentation is one of the most personal expressions of cultural identity imaginable; wearing them transmits information. A methodology developed in previous research has often shown that if a distinctive form, decoration and mode of use associated with jewelry has a clearly defined geographical and chronological dispersion related to a defined cultural entity, it can be seen as a cultural marker that identifies the wearer with a cultural group.

In the southern Levant, material culture remains associated with the Late Chalcolithic period (4500-3800 BCE) in funerary and non-funerary contexts alike frequently include a distinctive pendant of trapezoidal/rectangular form, usually with two holes at one end and often decorated in a distinct fashion. These pendants are usually made of shell, though bone, ivory and various stone examples are also found.

The morphological and technological concept of these pendants may have had their antecedents in the region of Anatolia during the 9th-8th mill. BCE, yet in the southern Levant, they first appear only during the Late Chalcolithic period and do not continue in use afterwards, suggesting they be seen as a cultural marker of the local Chalcolithic population.

11 PERSONAL ORNAMENTS FROM OSSEOUS RAW MATERIALS AND MOLLUSC SHELLS IN THE LATE NEOLITHIC IN EASTERN BALKANS

Vitezovic, Selena (Institute of Archaeology, Belgrade)

Recent discoveries at three Late Neolithic sites in the eastern Balkans, specifically within the Thrace region in Bulgaria, have revealed rich portable findings. Notably, these discoveries include large collections of personal ornaments intricately crafted from various osseous materials—bones, teeth, and marine mollusk shells—acquired either locally or through exchange routes. Noteworthy techno-types encompass simple forms with a broad geographical and chronological reach, such as bracelets made from marine bivalve shells, while others indicate local cultural traits, like cylinders made from long bones. These items were meticulously produced and often adorned with incised motifs or dots, presented as unfinished perforations. The array of ornaments extends to include pendants and decorative pins of diverse, unique, or rare shapes, potentially reflecting the individual artisans who created them and/or those who wore them.

In the broader context, the technological procedures employed in crafting most ornaments reveal substantial investments in labor, time, and skill. Significantly, wear observed on these ornaments suggests prolonged usage before eventual disposal due to breakage or loss. The combination of a high production investment and extended use implies significant value and significance attached to these items. It is reasonable to assume that they served as displays of status and identity, whether for a group or an individual. This paper aims to analyze possible connections between the raw materials, technological procedures, and the invested time and skills with the symbolic meaning and significance of these ornaments within the local communities.

12 BEYOND WARRIORS: INVESTIGATING LATE NEOLITHIC FEMALE BURIALS THROUGH COPPER ORNAMENTS

Sobkowiak-Tabaka, Iwona (Adam Mickiewicz University) - Kurzawska, Aldona (Institute of Archaeology and Ethnology, Polish Academy of Sciences) - Przybyła, Marcin M. (Dolmen Company, Kraków) - Włodarczak, Piotr (Institute of Archaeology and Ethnology, Polish Academy of Sciences)

The imperative of aesthetically treating the body of the deceased has been a crucial aspect of funeral rituals since the 3rd millennium BC, persisting through the Bronze and Iron Ages and intricately connected with the evolving trend of individualization. This phenomenon has significantly shaped the ideological landscape of European communities, particularly towards the conclusion of the Stone Age. These practices held considerable importance across diverse age and gender categories. While the emphasis on aesthetically treating the deceased is prominently observed in the category of adult men, commonly known as the warriors' beauty, our presentation will shift the focus to recently discovered women's graves in southern Poland. Within these burials, remarkable sets of ornaments, including circular or spiral earrings, wire necklaces, moon-shaped pendants, and intricate, segmented copper diadems, have been unearthed. These opulent items underscore the high status of women in these societies. Additionally, detailed microscopic analyses of the copper ornaments within these graves have provided valuable insights into organic materials associated with the clothing of the deceased and the assembly of decorations. This comprehensive examination not only contributes to a nuanced understanding of the intricate burial practices but also illuminates previously unexplored dimensions of the social and cultural dynamics of Late Neolithic societies.

13 STATUS AND IDENTITY DURING THE CHALCOLITHIC OF INNER IBERIA: THE STONE BEADS FROM THE TOMBS OF HUMANEJOS (MADRID, SPAIN)

Paulos-Bravo, Rodrigo (Complutense University of Madrid) - Garrido-Pena, Rafael (Universidad Autónoma de Madrid) - Herrero-Corral, Ana Mercedes (Austrian Archaeological Institute, Austrian Academy of Sciences) - Flores Fernández, Raúl (Independent scholar, Madrid, Spain)

During the first half of the 3rd millennium BC, a series of changes took place in the populations of the interior of Iberia that can be traced through the archaeological record, such as an increase of grave goods, the first appearance of copper tools/weapons or the use of elements of personal adornment made on exotic raw materials (variscite). At the Humanejos site (Parla, Madrid, Spain), 160 stone beads were discovered in the graves of just seven individuals, dating between 2800 and 2500 BC. Given their quality, singularity and scarcity they would have a significant symbolic meaning and role in the construction of social status, gender and personal identities during their lifetime and also in the burial ceremonies. To understand their value in those societies, it is crucial to identify whether these ornaments were specifically manufactured for the grave or instead they were part of the everyday image of their bodies.

Most of the raw materials used in their fabric are exotic, coming from distant places, hundreds of kilometers away. The mobility and exchange of these exotic goods reveals intense network of inter-regional contacts that reached its peak during the Bell Beaker period. However, at Humanejos, the use of rock beads is limited to the first half of the 3rd millennium BC, with a clear connection with the first copper elements documented in the region.

14 A NEW STYLE OF CLOTHING AND ORNAMENT? SOME EARLY BRONZE AGE BURIAL GIFTS FROM WEST ANATOLIA

Oguzhanoglu, Umay (Pamukkale University)

The Anatolian Early Bronze Age is characterized by major transformations regarding the process towards centralization and urbanization. Archaeological records this transformation was related to a newly emerging and increasingly powerful elite class. The elite in question which usually live within reinforced citadels and some central buildings, manifest themselves through various practices such as owning prestige objects and practicing special rituals -including special drinking ceremonies-. The long-distance communication networks established by these elites carry prestige objects as well as raw materials, products, and technology. Undoubtedly, new clothing and adornment items - either locally designed or imitated after long-distance interactions- must have emerged as a part of looking like a real "elite".

This presentation aims to examine some West Anatolian burial gifts, some of which are considered to have become widespread as a result of interregional trade, including metal spirals, pins (mostly clothespins), and some personal weapons as signs of a new clothing/ornament style that emerged among the elite. Some recently excavated tombs in Western Anatolia, yielded pins and spirals made of gold and silver as well as daggers made of copper/copper alloys which have been in use since the beginning of the Early Bronze Age (EBA I/ca. 3200 BC). In the following period (EBA II), daggers, razors, spirals, pins, and toggle pins continue as a collection of personal belongings inside the graves. This situation should be associated with the fact that the elites, who began to differentiate themselves at the beginning of the EBA, adopted a new understanding of clothing and added some materials and styles that they learned from long-distance relationships to this new style of adornment. They might also have converted some personal/daily clothing materials of neighboring cultures into prestige objects.

15 BEADS IN DIBBĀ AL-BAYAH: EXPLORING PERSONAL ORNAMENT AND IDENTITY CONSTRUCTION ACROSS THE LATE BRONZE AGE - EARLY IRON AGE TRANSITION

Larosa, Nunzia (University of New England, Australia) - Genchi, Francesco (University La Sapienza of Rome)

Beads are one of the most frequent finds in an archaeological excavation after ceramics. In the last decades the analysis of their internal variability, modes of production, uses and contextual associations has been used to track changes in group identity over time, with raw materials acting as a proxy for long range trade and cross-cultural interactions. Yet, the study of personal adornment still plays a secondary role in the reconstruction of the human historical narrative, especially in Southeastern Arabia (United Arab Emirates and Sultanate of Oman), where beads themselves are often overlooked or relegated to the status of minor finds.

More than twelve thousand beads have been recovered from the Late Bronze to Iron Age funerary context of Dibbā al-Bayah in Oman. This research explores the archaeological significance of beads as an indicator of cultural variability and identity construction among the Late Bronze Age and Iron Age communities of northern Oman (ca. 1600-300 BC), based on a series of specific stylistic, technological and morphometric features. A systematic and integrated methodological approach is complemented by provenance analysis (LA-ICMPS) to better understand the social (i.e. differences in status, interregional connectivity, and social identity) and economic (i.e. differential access to wealth/luxury items, differences in trade networks) characteristics of the societies in Southeastern Arabia during this period of rapid and major social transformation.

16 FASHIONING WOMEN IN KERMA - BODY ORNAMENTATION AND CLOTHING IN THE EASTERN CEMETERY (2100 - 1450 BCE, SUDAN)

Yvanez, Elsa (University of Copenhagen) - Skinner, Lucy (University of Copenhagen)

Located in Upper Nubia, in modern Sudan, the Bronze Age site of Kerma developed as the economic, religious, and cultural epicenter of the Kushite kingdom, between c. 2100 BCE and 1450 BCE. Before falling under Pharaonic rule, the town housed a stratified population, whose elite buried their dead in chamber graves under large tumuli. Recurring material assemblages and burial characteristics indicate the codification of funerary rituals, well known from the early 20th Century extensive excavations of the Eastern Cemetery, led by Georges Reisner, as well as more recent work carried out by Charles Bonnet and Matthieu Honegger. Excavations have uncovered a wealth of organic remains from garments (animal skin and textiles) and personal ornaments, and documented the frequent practice of interring other humans in the burial to accompany the primary body or tomb owner. This was especially the case in the Classic Kerma period, where large royal tumuli were outfitted with 'sacrificial corridors'. Today stored at the Boston Museum of Fine Arts, the archives and artefacts recovered by Reisner show that some of the female 'accompanying-dead' were prepared for burial dressed and adorned with similar items - including leather skirts and head adornments, as well as other body ornaments. This presentation will build a picture of selected funerary assemblages related to female accompanying-dead, and question how clothing and body ornaments help us to better define their identities. By comparing these

findings to the assemblages associated with other female burials (the primary deceased), we will attempt to reconsider questions of gender, social roles and status at Kerma.

17 THE LEG RINGS OF THE KOBAN CULTURE IN THE CENTRAL CAUCASUS

Kotova, Nadezhda (Institute of Archaeology Ukrainian Academy of Sciences, Kyiv) - Makhortykh, Sergey (Institute of Archaeology Ukrainian Academy of Sciences, Kyiv)

In the 9th-8th centuries BC., the Koban Culture of the mountainous Central Caucasus reached its highest development, which is also reflected in the spread of numerous and varied women's ornaments. Sociological and anthropological studies of personal adornments highlight the importance of this category of material culture in marking life stages and expressing gender and age-specific characteristics. Our paper examines the role of gendered adornment in the Koban Culture in the Late Bronze - Early Iron Age Central Caucasus, based on evidence for bronze leg-rings from burial contexts in the 9th-7th centuries BC. Tombs in the Koban and Tli cemeteries indicate that pairs of anklets (both decorated and undecorated) were a highly visual symbol associated with the body and they were worn primarily by high-status women. Leg rings often appear in combination with other personal ornaments, such as bronze temple and zoomorphic pendants, belts, arm and finger rings, bead strings, which will also be subjected to our analysis, as they allow us to determine the chronology of the funerary assemblages under consideration. The custom of decorating the legs with anklets has no local origin in the Koban Culture, so the question of its appearance here is examined in the light of cultural interrelations with various regions of Western Asia where this tradition has its oldest roots.

18 PERSONAL AMULETS FROM THE LATE SCYTHIAN NECROPOLIS CHERVONY MAYAK

Dzneladze, Olena (Institute of Archaeology of NASU)

The Late Scythian hill-fort and necropolis Chervony Mayak are located on the right bank of Dnipro in Kherson district. In total 177 burial structures were excavated at the Chervony Mayak necropolis presented by individual and collective burials, as well as several cenotaphs.

Various amulets occupy a separate place of grave goods in the funeral rite of the Late Scythians. They were found on the neck and chest of the buried as part of necklaces or as separate pendants, and were also found on the belt and hips as part of filling of leather purses. Mostly amulets accompanied the burials of children and women, less often men. Beads amulets were also found on horse harness.

In total, 160 various amulets were found at Chervony Mayak among the personal grave goods of the buried. Amulets found in Chervony Mayak could be classified into following categories: the Egyptian faience, bucket-shaped pendants, bells, openwork pendants, knobby rings, eye beads, holed coins, animal bones, fangs, claws, cowrie shells and holey stones – “Chicken Gods”.

Amulets in the Late Scythian culture were associated with ideas and beliefs about the evil eye, jinx, spoiling etc. Late Scythians used these items as apotropaic amulets and charms for protection themselves from evil forces.

According to usage of such amulets in the Roman and barbarian societies, it is possible to assume that the Late Scythians also believed in power of amulets for different aims: protection of damage, the evil eye, as well as attracting good luck, fortune and fertility.

Young women and children were the main owners of such amulets as the most vulnerable groups of the Late Scythian society.

19 SKIN ORNAMENTS: EXPLORING IDENTITIES AND MATERIALITY THROUGH BODY MODIFICATION IN PAZYRYK

Pereira Gómez, Mar (EcoPast GI-1553; University of Santiago de Compostela)

Personal ornaments often transcend their mere aesthetic function to become deeply rooted manifestations of identity and culture. Among the oldest forms of ornamentation are body modifications, which can manifest through temporary practices such as painting, or through permanent alterations like tattooing or scarification. For many cultural groups, these modifications not only represent the transition from the natural to the social, but also affirm the full humanity of an individual.

Considering tattooing as an object, we venture to explore beyond the physical designs etched into the skin. We delve into a deeper analysis of the societies that practice them, recognizing that these bodily markers transcend physical boundaries to reflect complex social, cosmological, and ritual interactions within a community.

Throughout history, all cultures have employed some form of body art as an integral part of their cultural expression. Focusing on the case of the human remains discovered in Pazyryk, tattoos stand out as one of the most distinctive ornaments of this culture. They impress not only for their technical and artistic quality but also represent a deeply ingrained form of cultural and social expression in that ancient society.

With this study, our aim is twofold: on one hand, to deepen our understanding of the techniques and processes used to create these body art pieces. On the other hand, we seek to better comprehend these societies through their artistic and cultural expressions.

20 UNVEILING IDENTITY DYNAMICS IN THE SILVER 'ACORN' EARRINGS FROM TALL AL-'UMAYRI, JORDAN

Verduci, Josephine (University of Melbourne)

Within the corpus of Iron Age metal jewellery from the Near East is a unique pair of Late Iron Age earrings. These earrings, distinguished by their acorn-shaped pendants, have no direct parallel. Nevertheless, they are part of an adornment tradition that circulated across the Mediterranean during the period of Phoenician expansion from the 7th century BCE. This work aims to examine this specific category of material culture in light of the growing body of research on ancient Near Eastern jewellery through the lens of phenomenological theories of embodiment. In addition, I apply a symbolic interaction framework to examine the role of adornment in identity construction and memory formation. The person who wore these earrings almost certainly used them to construct and broadcast their elite identity by employing a valuable form of adornment with introduced cultural elements. Simultaneously, the pendants' acorn imagery may have actively linked social identity, particularly female identity, to fertility and sustenance through their mnemonic attributes. Thus, this study seeks to reveal how individuals employed these objects to convey personal intentions, denote social status, and communicate ritual ideologies, thereby reflecting the multi-faceted dimensions of identity expression.

21 BEADED IDENTITIES: THE CONSTRUCTIVE POWERS OF JEWELLERY IN DANISH VIKING AGE BURIALS

Thompson, Emma (University of Leicester)

Within Viking Age archaeology, we are beginning to explore the concept of “living objects” in graves. This proposes that artefacts could be charismatic and animated, with social biographies of their own, and experience their own death and burial. The discourse, thus far, has mostly concerned objects conventionally associated with men, particularly swords. There is value to this, as there is significant burial and literary evidence to support the importance and impact of swords, but we are missing critical nuance about the items typically associated with women, such as brooches and beads, further relegating these objects to passivity. In the medieval literary evidence, jewellery could have personal names, much as weapons could. Consequently, we must also examine the transformative powers of apparel, both in their creation and (re)use. Just as we make jewellery, it makes us.

Interpretations of grave goods are often contentious, particularly when considering the “true” identity of the deceased. Burials are famously staged events where mourners choose how and where the deceased is buried and, most relevantly, what to include within the grave. To this end, these contexts contain complex intersections of real and idealised identities, influenced by what the respective society deemed acceptable. Despite their caveats, graves offer a unique and valuable avenue to explore individual and collective identity constructions. Historically, there have been tendencies to treat grave goods as passive objects: transmitters of meaning or conduits for metaphor. However, we must assess the role objects play in adorning, constructing, and idealising bodies in life and death.

This paper will examine 95 graves containing jewellery from a larger dataset to explore how these objects actively construct the mortuary identity of the deceased, in tandem with other burial characteristics. This includes body-object and object-object negotiations, as well as further contextual evaluations.

22 OBJECTS OF IDENTITY? THE ROLE OF GRAVE GOODS IN VIKING AGE FUNERARY PRACTICES

Norstein, Frida Espolin (Department of Archaeology and Classical Studies, Stockholm University)

Within Viking Age archaeology grave goods have been central for the discussion of identities. Different types of artefacts have been regarded as especially significant for signalling specific aspects of identities, particularly related to gender, status, and in some areas also ethnicity. Partly due to the nature of the source material, which consists of often very poorly recorded graves, little attention has generally been paid to variations in how they were used and how they relate to the dead body. Are they likely to have been personal belongings? At what stage did they become part of the funerary rituals, and how visible would they have been? This paper examines the role of different types of grave goods, such as jewellery and weapons, but also more mundane artefacts like whetstones in funerary practices, in order to assess the relationship between the artefact and the deceased body, and what this can tell us about the role of different types of grave goods in signalling and creating personhood and identities both before and after death.

23 MEDIEVAL PILGRIM BADGES FOUND IN NORWAY – PILGRIMAGE TO ITALIAN SHRINES FROM THE FRINGES OF THE CATHOLIC SOCIETY

Simonsen, Margrete (Museum of Cultural History)

In this paper I will focus on the finds of pilgrim badges in Norway, with provenance from Italian shrines as Rome, Lucca and Bari. A recent find of a pilgrim badge depicting St. Nicolaus, is a starting point. Apart from this find, there are all together six finds from Italian shrines. These are small metal images of the saints with loops or holes for fastening, used to fasten on clothes, hat or bag. Used as signs for pilgrims as a social group, for personal adornment and symbolic content. Their finds context varies, from stray finds to other finds recovered by excavations in churches, monasteries and medieval towns. I will further discuss what the pilgrim badges represent and their meaning in Medieval society. Also, the pilgrimage, different pilgrims and motives, the secular and the penitential pilgrims. I will further refer to the historical records and what they tell about pilgrimage to these shrines. Finally, I will discuss connections and cultural ties between Rome and the fringes of the Medieval Catholic community, such as Norway.

24 ADORNED IN SILK AND SILVER: TABLET-WOVEN BANDS IN HIGH-STATUS FEMALE DRESS OF THE LATE VIKING AGE

Rimstad, Charlotte (National Museum of Denmark)

In the Late Viking Age Scandinavia (900-1050 AD) a change took place in the dress habit of high-status females. While the female clothing of first half of the Viking Age was closely connected to the oval brooches that carried the suspended dress, a dress without brooches was used in the late part of the period. From several female graves in Jutland, such as Hørning, Hvilehøj and Fyrkat, evidence of precious tablet-woven bands of silk, silver and gold threads have been found, both used as decoration on garment edges and on top of fur garments. The tablet-woven bands were produced of imported materials and their quality not only expresses the high skills of the artisans who made them but also underline the high status of the females wearing them. They are clearly symbols of power and prestige. The project “Female dress of the Late Viking age” investigates the bands and garments in order to see why this change of dress happened, how the new dress type was constructed and what role the tablet-woven bands played. Aspects of production and decoration are addressed through fibre and dye analyses and comparative sources included. The project thus seeks to answer questions on production, inspiration, import, status and identity in the later part of the Viking Age. In this paper, the initial results of the project are presented.

25 JEWELS, PIGMENTS AND COSMETICS: AN ENQUIRY INTO THE BUDDHIST CLAY SCULPTURE IN AFGHANISTAN (4TH/5TH -8TH CENTURY)

Forgione, Giulia (University of Naples “L’Orientale”; Italian Archaeological Mission in Afghanistan)

The subject of this presentation is the Afghan Buddhist sculpture in clay and stucco, a tradition which reached its apex from the 4th/5th century to the 8th century CE.

We still have insufficient knowledge about the material and technical aspects of this artistic production, as well as about its iconographic codes and meanings. This is partly due to the fact that there is still limited research on the cultural background of this tradition, but also because the fragility of the materials is responsible for the poor preservation of the artworks. Despite the difficulties, however, new and more inclusive studies, which take into account all fragments of any size, even the most minute ones, are now significantly expanding our knowledge.

The fundamental role played by ornaments and jewels in the characterization of both images and their settings is well-known. What is more, recent excavations at Mes Aynak (Logar province) have brought to light real jewellery that shows the same forms documented in plastic art in important archaeological sites such as Tapa Sardar (Ghazni area).

Colour must have also played a significant part, especially when it reflects a non-naturalistic use, which in turn suggests some sort of symbolic value. However, the pigments used to paint the sculptures were often obtained from the same precious materials (such as gems and gold, or materials that resemble them) that were used to produce jewels. Viewed from this perspective, pigments can be considered as “precious substances” that adorned the figures.

After a brief overview combining jewellery, precious substances and pigments, the presentation will focus on how the choice of colours may not only conceal a high symbolic meaning but may also reflect commonly accepted beauty standards and customs, such as the use of specific pigments for specific body parts.

26 BODY DECORATIONS IN THE ANDES, AN EXAMPLE OF BODY PAINTING AND TATTOOING IN THE CHANCAY CULTURE

Bak, Judyta (Jagiellonian University)

In the cultures of the pre-Hispanic Andean region, body painting and tattooing were widely known customs, attested to by numerous empirical evidences. The long tradition of this practice is assessed by the rich and diverse archaeolog-

ical material, including –but not limited to– pottery representations of people bearing tattoos and mummified human remains whose bodies are covered with decorations. A perfect example of a culture where evidence of practicing this art of body decoration has been preserved to this day is the Chancay culture (1200-1400 AD), from the central coast of nowadays Peru. It is worth noting that the perception of painting and tattooing in the aesthetic dimension is the domain of modern times, while in archaic societies it is a procedure present in several connections within an integrated socio-cultural system. The main purpose of the speech is to present the evidence, preliminary analyses, and plausible interpretations of tattooing/body painting practice in the Chancay culture.

1107 MANIPULATING SENSES AND STAGING THE INCONCEIVABLE. DISCOVERING THE EMBODIED PAST BY PHENOMENOLOGICAL EXPLORATIONS AND OTHER METHODS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Kranig, Friederike (Römisch-Germanische Kommission (Frankfurt am Main); Georg-August-Universität Göttingen, Abt. Christliche Archäologie und Byzantinische Kunstgeschichte) - Lorenzon, Marta (University of Helsinki) - Gheorghide, Paula (University of Helsinki) - Kerk, Lukas (Universität Münster, Abteilung für Ur- und Frühgeschichtliche Archäologie) - Sager, Tia (University of Toronto)

Session format: Regular session

Despite their individual and subjective nature, human sensory experiences are always a social construct, dependent on society, culture, or ethnicity. Through all ages, senses were and are utilized, deliberately stimulated and manipulated through purposeful staging. In both sacred and mundane contexts, the impact of architecture, sound, light, smell or haptics can help to engage with a new situation. Staging manipulates the sensorium and the subconscious of the receiver in order to make something imaginary bodily experienceable and thus to appear real.

Recent scholarship on perception, human behaviour, agency, and movement is being foregrounded in both ethnoarchaeological and architectural studies with a focus on the multi-sensoriality of material culture. Especially acoustics is something intangible that does not manifest itself within an object, but only in ongoing time. Of course, such fluid objects are difficult to research due to their ephemeral nature. For precisely this reason, however, we want to find new ways of thinking about senses and reconstructing the past in the archaeological practice. Once we get over the more deterministic tendencies, how can we combine phenomenological approaches with scientific data? How can we recreate sensory experiences through digital or analogue technologies? Can we conceive of an integrated methodology for experimental archaeology?

This session aims to unite diverse strands of research exploring novel avenues and directions in sensory and experimental archaeology. We invite presentations that explore different phenomenological and methodological approaches to the study of the chaîne opératoire of staging and perception, technical variability, investigations into buildings, monuments and roadways outside traditional approaches, and cutting-edge tools that contribute to the creation of new methodologies for experimental and ethnoarchaeological work. We encourage papers from a wide range of archaeological and nonarchaeological discipline, which are rooted in multidisciplinary research contributing to the evolution of sensory archaeology as a discipline.

ABSTRACTS

1 MANIPULATING SENSES AND STAGING THE INCONCEIVABLE: AN INTRODUCTION TO THE ONGOING SEARCH FOR NEW METHODOLOGIES

Kerk, Lukas (Abteilung für Ur- und Frühgeschichtliche Archäologie, Universität Münster) - Kranig, Friederike (Römisch-Germanische Kommission (Frankfurt am Main); Georg-August-Universität Göttingen, Abt. Christliche Archäologie und Byzantinische Kunstgeschichte) - Lorenzon, Marta (University of Helsinki) - Gheorghide, Paula (University of Helsinki) - Sager, Tia (University of Toronto)

Although intangible cultural heritage is becoming increasingly important in archaeological research, and although the senses have been of immense significance for everyday life at all times and in all societies, their archaeological investigation is still somewhat incomplete. The term “archaeology of the senses” imprecisely summarises the various, albeit interrelated, sub-areas. Whereas archaeoacoustics, for example, initially focussed mainly on the acoustic measurement of archaeological spaces, it now describes a growing field in which the audible is thought alongside the visible and the ephemeral accompanies the permanent. To research the sensescape of ancient cultures, approaches and methods from different disciplines are increasingly being integrated into the archaeological field. However, this transfer of methods not only adapts the theoretical approach, but often also its limitations and the resulting problems. In the theoretical discourse, this leads to antithetical pairs such as phenomenological and constructivist approaches or quantitative and qualitative field studies, which appear almost irreconcilable to each other.

In our introduction, we would like to consider different research directions that might sometimes appear contradictory at first glance and merge them into new approaches. This results in a methodological diversity, the applicability of which needs to be examined regarding the respective question. Which theory is behind the chaîne opératoire and how can it be applied to our research interest? Which opportunities does phenomenology offer and what is described by the concept of staging? How can quantitative and qualitative field studies or the study of the material and immaterial aspects be brought together? These and many other questions will be explored in our session, for establishing an understanding of the intangible cultural heritage based on sensory perception as a part of archaeological research.

2 PERFORMATIVE PILGRIMAGE OR DIVINE CHARITY? EXPLORING THE TRANSFORMATION OF BODILY IDENTITY AT ROMAN SANCTUARIES

Vierula, Sofia (University of Helsinki)

The classical interpretation proposes that Ancient Romans understood illness and disability as divine punishments, and healing was considered a divine intervention. However, critical examination of healing at Roman sanctuaries suggests that Roman pilgrims had agency on their bodily identities; a crucial aspect of the pilgrimage was the transformation of the identity of the body, the healing process. The pilgrims participated in bodily rituals and performances that changed their perception of the world and how others perceived them. Thank-offerings were left afterwards to commemorate these transformations and the changes in the pilgrims' perception, as well as to influence new pilgrims' perception of the divine presence.

Roman sanctuaries facilitated immobile deities that had deep connections to their locations. Thus, pilgrims had to travel to them. To connect with the deities, the pilgrims engaged in bodily rituals such as fasting and washing that transformed their bodily identity. One approach to understanding this process of healing in ritual space is the idea of performative body by Judith Butler (1990). This concept is applicable to Roman sanctuaries; for Romans, the identity of the body was performative and transformative. For example, incubation and bathing can be interpreted as performances with an intention to transform the body, and regulations such as uniform clothing existed to create the pilgrim identity.

Following Aldred (2021), movement transforms the bodily identity, and boundaries shape the development of this mobility. At Roman sanctuaries, these boundaries are set by the landscape of the ritual space. The sanctuary imposed natural order on the pilgrims' disorganised bodies, subjecting them to healing. As sanctuaries have innate liminality between the worldly and the otherworldly, they facilitate a connection to the divine that was achieved through ritual and performance, and that transformed the pilgrims' bodily identities. The perceived divinity existed in this transformation and in pilgrims' bodily agency.

3 SEMANTICS OF SMELL: EXAMINING AN IRON AGE LIMESTONE INCENSE BURNER FROM TELL AL-ASSARA, NORTHERN JORDAN

Lahelma, Antti (Unioninkatu 38F 00014 Helsingin yliopisto Finland)

Tell Al-Assara is a recently discovered fortified hilltop site near Irbid in Northern Jordan, preliminarily dated from the Late Bronze Age to the Hellenistic period (ca. 1500-63 BCE). One of the more unusual finds from the 2022 excavation season at the site, conducted by a joint Finnish-Jordanian team, consisted of a small, four-legged incense burner made of limestone, found in what was most probably a domestic context. The item found at Tell Al-Assara can be typologically dated to the Iron Age, possibly the Persian period (586-332 BCE). The artefact type as such is well known, as large numbers of roughly similar incense burners have been throughout the Ancient Near East, but its nature and function are contested.

In earlier research, incense burners of this type have been considered mainly from the point of view of religious history, as material evidence of a 'foreign cult' spreading throughout the Levant, but given their humble appearance and often clearly domestic find contexts, their function as 'cult objects' has more recently been called into question. The use of incense in an Iron Age tell is likely to have been a multi-faceted phenomenon, with both religious, domestic, apotropaic, hygienic and deodorizing dimensions, and these did not have to be mutually exclusive. A factor hindering our understanding of the nature of these artefacts is the relative paucity of natural-scientific analyses on the type of materials burned. In this paper, the results of chemical analysis from the contents of the Tell Al-Assara artefact and other contemporary finds from the region are discussed, and textual sources are explored with view to the 'meanings' associated with particular smells in Iron Age Levant. The aim is to better understand the odoriferous environment of the tell and the role that incense and smells played in the daily life of its inhabitants.

4 DOING LANDSCAPE: SENSORIAL AND ARTISTIC APPROACHES TO DONKALNIS AND SPIGINAS MESOLITHIC-NEOLITHIC RITUAL SITES IN WESTERN LITHUANIA

Ahola, Marja (University of Oulu; University of Helsinki) - Lassila, Katri (Aalto University) - Mannermaa, Kristiina (University of Helsinki)

During the Mesolithic and Neolithic periods, foragers residing in the Eastern Baltic, Scandinavia, and Fennoscandia buried some of their dead on lake islands or other coastal sites. Drawing from ethnographic accounts, these locations are often interpreted as 'deathscapes,' transitional areas where water separates the lands of the dead and the living. In this presentation, we adopt a more relational perspective on these sites and propose that a particular combination of spatial perception of landscape and the dynamic nature of coastal sites may have contributed to the personality and social agency of these places, resulting in their use as places for ritual activity.

To delve deeper into this hypothesis, we visited Mesolithic-Neolithic forager burial sites of Donkalnis and Spiginas (Western Lithuania) in the spring of 2023, investigating whether there was something about these places that could have set them apart from their surroundings during their period of use. Employing a phenomenology-based methodology, we approached and perceived the sites from several directions, documenting our sensory encounters with the landscape through notes and drawings. To incorporate an 'outsider's perspective', the archaeological investigation was complemented by artistic research conducted by a professional photographer capturing imagery and video art at the sites, along with interviews of the archaeologist responsible for the discovery and excavation of both locations.

As a result, we propose that the ancient foragers of this region interred human remains at Spiginas and Donkalnis to be part of the places themselves. Like other intentional depositional acts, this may have been undertaken to mark the location or to communicate with the surrounding world. Furthermore, we concluded that the application of artistic practices – whether through camera lens or drawing – proved beneficial to our analysis by slowing us down and creating 'mementos of moments' that we could reflect upon after the fieldwork.

5 SENSORY DIMENSIONS IN NEUROARCHAEOLOGY: EXPLORING MUDBRICK MANUFACTURING ACROSS THE MEDITERRANEAN

Lorenzon, Marta (University of Helsinki)

This contribution discusses sensory perception of earthen architecture combining neuroscience, phenomenology, and archaeology, specifically focusing on the manufacturing of earthen building materials and the experiencing of the built environment. The paper discusses the survey results of the multisensory experiences of both skilled and semi-skilled mudbrick manufacturers, drawing insights from experimental and ethnoarchaeologic fieldwork.

The analysis of the ethnographic data provides new evidence to increase our understanding of how individuals lived, experienced, and interacted with the built environment in their daily lives. It offers a detailed examination of multiple case studies in the Mediterranean, specifically in Crete and Egypt with cross comparisons with materiality from Minoan Crete and Graeco-Roman Egypt. Despite the predominant visual focus in archaeology, the argument posits that material culture, particularly earthen architecture, facilitated a multisensory encounter engaging all senses, transcending mere visual stimulation. This research contributes to a more holistic understanding of the lived experiences and sensory dimensions associated with earthen constructions in ancient contexts.

6 CROSSING THE THRESHOLD - EXPERIENCING TRANSITIONS. A NEOLITHIC PERSPECTIVE

Waszk, Benny (Johannes Gutenberg-Universität Mainz) - Kinzel, Moritz (Abteilung Istanbul des Deutschen Archäologischen Instituts)

The built environment of the early Neolithic of Southwest Asia was the first large scale laboratory of human – built space experiences; a game changer in the perception of space and human made sensescapes. A key to understand the importance of crossing borders and territories (as part of the Neolithic cosmos) is to study Neolithic doorways. In particular the monolithic portal stones found in the Urfa Region at sites like Göbekli Tepe offer a unique insight into the perception of transitions from one space to the other. Here all senses were activated and put in place; physically, visually, and metaphorically. Interestingly, there are several different concepts in place that show a skilful use of a set of options to create certain settings according to the needs of the user and possible narratives the builder wanted to convene. The contribution will present the results of a study of Neolithic portal stones from Göbekli Tepe and beyond and discuss the impact of the "access" for the perception of the buildings now and in the past.

7 VEILED VISIONS: THE INFLUENCE OF CURTAINS ON RELIGIOUS PERCEPTION IN LATE ANTIQUE CHURCHES

Mairhanser, Corinna (Ludwig-Maximilians-Universität München)

Across cultures and epochs, the gaze holds a prominent role in the realm of religion, allowing the viewer to interpret various forms of artistic expression, religious spheres, and abstract concepts. When visual perception is veiled by curtains, as is often the case in Late Antique and Byzantine churches, various staging effects occur. How did this make divinity and religious concepts tangible within churches, despite their abstract nature? What impact did the curtains have on the visitors' religious experience and visual perception? How can these effects be made understandable today?

Pictorial evidence suggests that curtains often operated at thresholds. They were arranged in various layers around the liturgical centre of the church, the Holy of Holies, in which the Christian belief manifested itself. Visitors moved systematically through these different spheres as they entered the church without being able to experience them in their entirety. In the process of perception, these textiles evoked culturally standardised imaginings without allowing for verification by looking behind the curtain. From a cognitive and psychological perspective, this *velatio* is the most intriguing function of curtains since the imagination of the beholder tries to visualise what is concealed. The activated *phantasia* surpasses the threshold of the concealed, creating its own reality, and fostering the illusion of deeper insight into the church's sacredness. The desire to unveil the supposed mystery of faith is symptomatic of the perception of veils and curtains in churches, but it is only one aspect of their function as media of presentation, highlighting and marking transitions. Through their dynamic and performative qualities, curtains captivate human attention, activate imagination, and heighten expectations.

This paper raises questions and provides new insights into how curtains elevate meaningful religious things, create sacred spheres, and define holiness by influencing human perception – effectively positioning the potentially visible “behind the veil”.

8 THINKING THROUGH THINGS: SURROGATE OBJECTS IN EIGHTH-CENTURY NORTHUMBRIAN CHRISTIANITY

Walsh, Ciarán (Queen's University Belfast)

In recent years research into the relationship between material culture and the mind has been revolutionised by developments in the philosophical tradition of speculative realism. This approach has allowed philosophers to circumvent the epistemological problems presented by the Kantian dichotomy between noumena (objects in the world) and phenomena (mental representations) by redefining the “mind”. In this tradition, the mind is not treated as something abstract that exists entirely within the brain, but as an emergent product that comes into being via the interactions of three individual agents: the brain, the body and the material environment. Applying these ideas to the field of archaeology, Lambros Malafouris's *How Things Shape the Mind* (2013) introduced the concept of “surrogacy”. “Surrogacy” is the quality that an object exhibits when it becomes part of human consciousness: not as an “aid” to thought, but as an essential component of a mental process that could not exist without it.

My presentation will employ the concept of “surrogacy” to analyse two objects from eighth-century Northumbria in order to suggest how these objects functioned as parts of the early-medieval mind. The two objects of my analysis will be the Ruthwell Cross (a 5-metre-tall stone cross, decorated with religious carvings and runic inscriptions of Old-English poetry) and St Cuthbert's Coffin (the elaborately decorated container in which the relics of St Cuthbert were transported around Northumbria). By closely observing features of how these objects were designed – as well as the historical records in which they are mentioned – I will suggest how these objects affected both the sensory perceptions of eighth-century Northumbrian Christians, and their interpretations of those perceptions. In medieval Northumbria, these objects were psychological necessities, giving medieval Christians the necessary material scaffolding to allow them to believe in a religious system which would otherwise appear inconsistent with reality.

9 THE SOUNDSCAPE OF LATE ANTIQUITY BETWEEN ETHNOLOGY AND (COMMUNITY) ARCHAEOLOGY. ACOUSTIC STAGING ON THE TUR ABDIN

Kranig, Friederike (Römisch-Germanische Kommission (Frankfurt am Main))

An investigation of complex soundscapes of ancient times and their contextualization in past and present communities requires new approaches that not only reconstruct sounds and acoustics, but also permit an understanding of their social-, cultural- and identityforming significance. Capturing the versatility of a region characterized by cultural density such as Tur Abdin is made easier or even possible, if the regional communities are included. Beyond the tried and tested approaches from ethnomusicology and archaeology and with the aid of community archaeology it is possible to make the immaterial object ‘sound’ and its effects on the individual and the community tangible and ultimately describable.

The Tur Abdin is located east of the Cilician Gate, which marks the entrance to the Mediterranean region. It describes the area ‘in front of it’ and thus a permanent transit area characterized by historically evolved transculturality. Part of this Mediterranean-West Asian ‘mixed culture’, as a coexistence of different linguistic, religious and ultimately ethnic identity groups, is, among others, the culturally and historically conditioned understanding of sounds, the musical experience. Being influenced by such culturally specific experiences, it is difficult for the western or ‘occidental’ ear to hear through the subtleties within this multilayered world of sound. Only through the exchange with the ‘initiate’, mutual understanding can be improved. Only in this way is it possible to understand a culture and its cultural history from the inside and to generate new possibilities of interpretation.

This play of thoughts focuses on the medium music as an intraculturally unifying, interculturally connecting element using the example of West-Syrian Orthodox Christians at the Tur Abdin. My considerations are based on my ongoing ethnomusicological and -archaeological field study on the possibilities of acoustic staging in late antiquity using the example of the monasteries of Deyrul Zafaran, Mor Gabriel and Mor Augin.

1108 ARCHAEOLOGY, TEXT, NARRATIVE, AND THE USABLE PAST IN GLOBAL PERSPECTIVE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Ó Riagáin, Russell (University College Dublin) - Nol, Hagit (Goethe Universität, Frankfurt-am-Main)

Session format: Regular session

The concept of the/a “usable past” was coined by Van Wyck Brooks in 1918 in an attempt to retrospectively bind together disparate cultural elements in the USA. The instrumentalising of the past to shape collective memory is a feature of all human collectivities. Salient examples of this in the politics of the present and the past are to be found in the use of the shared-but-exclusive heritage of perceived golden ages from around the globe—e.g., the Rashidun Caliphate, Roman Empire, Gupta Empire, Tawantinsuyu, Mali Empire or Tang era, among many other points in space and time—to justify contemporary political systems, social stratification and inter-polity relations. However, it would be difficult to argue that the deployment of a usable past by established social groups this is ever totalising, with individuals and groups having complex relationships with the past and narratives associated with it.

This session seeks to take stock of the research being done across the globe on these issues, both in the present and the use of the past in the past. Papers are encouraged in relation to both case-studies where textual and archaeological evidence intersect and contradict, and on areas for which documentary narratives do not survive. Studies treating these processes outside Europe are particularly encouraged, as are comparative treatments of the problematic. Research questions that could be posed include—but are not limited to—why usable pasts are so often linked to military highpoints; the use of the past by groups writing against one another in narrative complexes; gatekeeping and selectivity and the past; the removal of the past in colonial relations; archaeology shaping and being shaped by narrative; and on the past as a socio-political and cultural resource more widely.

ABSTRACTS

1 SAXO AND SNORRI AS ANTIQUARIANS AND AUTHORS? BUILDING USABLE PASTS THROUGH ARCHAEOLOGY IN MEDIEVAL DENMARK AND ICELAND

Ó Riagáin, Russell (University College Dublin)

The descriptions of funerary activity in the writings of both Saxo Grammaticus (died c. 1220 CE) and Snorri Sturluson (died 1241 CE), active mainly in Iceland and Denmark respectively, have been particularly influential in modern-day scholarly discussions of funerary practices in the period c. 400–1100 CE in northern Europe and the North Atlantic. This paper seeks to flip this on its head by examining where and how these descriptions might have come from. Firstly, the content of Saxo and Snorri's narratives of funerary activity, laws and traditions will be abstracted and outlined, and broadly compared against the archaeological evidence. Secondly, the paper will explore the extent to which these writings were based on the authors' being present at the opening up of burial monuments, if not actually carrying out excavations. Relatedly, it will then consider the extent to which they may have gathered descriptions of archaeological remains being encountered by farmers, similar to the activities of nineteenth-century antiquarians. Finally, the paper will explore how pre-existing narratives of funerary activity, such as Virgil's *Aeneid*, shaped Saxo and Snorri's interpretation and narrative construction. Doing so will shed light on the interaction and cross-pollination between different disciplines within the study of the past in the past, and provide important context for similar studies across space and time by demonstrating how the evidence through which we interpret the past itself came about through the interaction of archaeology and narrative.

2 ARCHAEOLOGY AND NATIONALISM: BETWEEN JEWS AND ARABS

Katz, Hayah (Kinneret College on the Sea of Galilee)

The use of archaeological research for the construction of national narratives was often used by peoples and nations as a tool for the construction of identity. In this context, a comparison between the attitude of Arab archaeologists to the field versus that of Jewish archaeologists during the Mandate period raises a question of principle. While during this time (mostly the 1930s), the Jewish community promoted archaeological research and thereby used it for the purpose of building a national Zionist narrative, Arab archaeologists did not act in a similar way. I suggest that it was derived from different consciousness of the past. It seems that the Palestinian national movement saw itself as having a clear and obvious right to the land and did not need evidence from archaeological excavations. In contrast, the Jewish community was essentially an immigrant society. There was no continuity of settlement in Palestine for this society. Therefore, the Zionist movement's effort to inculcate the connection between the past and the present focused on archaeological finds unearthed from the depths of the earth, since only these could create a tangible expression of the past.

3 "ANCIENT TEMPLES COLLAPSED": ACTIVATING THE USABLE PAST TO REWRITE MEMORY IN THE URBAN SPACE OF ROME

Jacobson, Kearstin (University of Texas at Austin)

Created across Europe between the thirteenth and seventeenth centuries are more than a dozen extant visual representations in fresco, panel painting, manuscript illumination, and pen and chalk drawing depicting a Christian procession within an urban environment. At the center of each procession is a man wearing the papal tiara and often carrying a scepter or an icon of the Virgin; nearby a nimbed and winged figure observes the procession from atop a fortified structure while sheathing his sword. The religiously-charged occasion these artworks depict is not an historical event. Rather, it is a constructed pseudo-history based on an event that occurred twice at Rome, in 590 and 603, under the leadership of Pope Gregory I: the laetania septiformis ritual. Invented by Gregory, the laetania septiformis was a penitential procession performed simultaneously along seven routes within Rome as an ad hoc ritual prompted by civic calamity. It required participation across the city's entire urban landscape by all the Christian population for its salvific success. Though these processions never crossed into the northwest sector of the city where Hadrian's Mausoleum is situated, their dramatic climax was overwhelmingly identified by later sources as the archangel Michael's appearance to Gregory from the top of this pagan monument. Both visual and textual narratives insist on Michael's epiphany, raising questions of historicity and memory while emphasizing the power of the huge Mausoleum and providing a rationale for its Christianization. This paper examines a variety of sources, including Gregorian literature mentioning the laetaniae septiformes, visual and textual accounts of the Mausoleum, the debated dating of a small chapel dedicated to Michael on its summit, and the topography of the Ager Vaticanus from the ancient to late antique periods, to understand how and why the monument was incorporated into a mythologized version of the processions.

4 QIN SHI HUANG, THE LEGALIST (FA) THINKERS, AND THE CURRENT CHINESE NATIONALISM

Zaharia, Daniela (University of Bucharest)

Founding hero, disruptor of traditions, tyrant, and protector of the people, Qin Shi Huang (259–210 BC) has since ancient times been the subject of spectacular rewritings of history on a veritable interpretative roller coaster. Historically, he was treated, together with his legalist (fa) ministers, as an enemy of tradition by the prevailing Confucian ideology of the Empire from the Han to the Qing dynasties. Sima Qian (145–86 BC) used him as a pretext for conveying transparent criticism on the regime of the Han Emperor Wudi; in the 19th century, he and the legalist reformers inspired nationalist voices calling for China's resurgence as an imperial power; in the 1950s, he served as an anti-Confucian historical landmark in Mao's propaganda. Since the 1980s, the history of the First Emperor has been periodically revised according to the ideological shifts that have accompanied the reforms responsible for China's present global standing. The significance of Qin Shi Huang is heightened by the discovery of his famous tomb at Xi'an (1974), which has since proved to be an archaeological site of enormous complexity. The current dispute concerning the investigation of the funeral mausoleum coincides with a new re-evaluation of Shi Huangdi and the legalists as architects of the Empire. Our analysis will focus on the more recent reassessment of China's initial imperial rule. This will be done by considering the viewpoints of both official propaganda and popular culture. From "The Emperor and the Assassin" (Chen Kaige, 1998) to the recent screenings of Sun Haohui's novel "The Qin Empire" as a long-running television series (2009–2020), the portrayal of the First Emperor has experienced substantial transformation, associated with current stages of Chinese popular nationalism as well as the government's aspirations to establish the country as a global superpower.

5 DEFINING SPATIAL HERITAGE, IDENTITY, AND CONSERVATION TARGETS: EXAMPLES FROM SYNTHETIC LANDSCAPE BIOARCHAEOLOGY OF PRE-HISPANIC ANDEAN MIGRATION

Scaffidi, Beth (University of California, Merced)

The heart of the Central Andes pulses with human movement—immigration across borders, to urban centers, periodic or seasonal flows of workers, post-marital relocation, pilgrims and fiesta-goers—circulating through complex roads weaving together mountains, jungle, and sea. Claims to ancestral origins, lands, and the routes connecting them remain vital to narratives, rituals, and embodied identities of individuals, communities, and sociopolitical groups. With human movement so constrained by the vertical environment, modern roads and paths necessarily follow much of the Qhapaq Ñan (Inca roads), which was in turn superimposed on earlier Wari imperial roads. UNESCO recognizes both the tangible components of the Qhapaq Ñan (e.g., roads, structures, and petroglyphs) and intangible cosmologies related to sacred huaca and mountain apu worship as fundamental in shaping Andean cosmovision across a millennium throughout six countries. Even as tourists and local economies begin to benefit from Qhapaq Ñan tourism, aridification, glacial retreat, and coastal flooding intensified by climate change threaten the survival of traditional human movement spaces, beliefs, and practices.

Here, I explore how key findings from my bioarchaeological synthesis of pre-Hispanic human immigration patterns complement current understandings, meanings, and identity derived from the Qhapaq Ñan. I summarize human skeletal isotope meta-analysis methods and patterns before describing how I integrate the Qhapaq Ñan spatial network with landscape connectivity models, AMS and settlement pattern data to constrain isotopic baseline models to likely interaction zones. This narrows the differentiation of 'isotopically-local' and non-local individuals within a site and permits the identification of likely origin places and movement distances within zones. Isotopic similarity between groups along these key movement corridors reveals a nuanced history of human connection across these complex landscapes that can inform how stakeholder communities relate to each other and heritage management structures, and how they interpret, value, and conserve connective landscapes for future generations.

6 DISCONNECT BETWEEN TEXTUAL DESCRIPTIONS AND ARCHAEOLOGICAL AND GEOGRAPHICAL EVIDENCES AT AYODHYA

Jhunjhunwala, Bharat (Indian Institute of Management, Bangalore) - Randhawa, Manjit (Government Hospital, Patiala.) - Sood, Ankur (Advocate, Supreme Court of India)

Lord Rama makes a deep impression on the collective memory on the Hindus. Mainstream scholars and public believe that Rama lived at Ayodhya in the state of Uttar Pradesh around 2000 BCE. His rule is eulogized as a golden period of righteousness. The agitation of making a temple dedicated to Rama at this place forms the basis of revival of the Hindu religion.

The archaeological and geographical evidence, however, does not support the location of Ayodhya at this place. The earliest evidence of potsherds at the site is available only from 1600 BCE and the earliest structural habitations from 300 BCE. The descriptions of Ayodhya from the Valmiki Ramayana also do not match with the geography of the place. There is a disconnect between the textual narrative and the archaeological and geographical evidences. The ethnological evidence, however, is very strong here.

An alternative location for Ayodhya is believed to be at Ghuram in Patiala District of Punjab. Here, archaeological evidence is available from the Harappan period and it also matches with the geography described in the texts.

The paper makes a comparative examination of the archaeological, geographical, etymological and ethnographic evidences at the two locations. It describes how the more scientific location of Ayodhya in Punjab is suppressed to meet the political interests tied with the making of the temple at Ayodhya.

7 NINTH-CENTURY SAMARRA AND THE STRATIGRAPHY OF A MODERN NARRATIVE

Nol, Hagit (Goethe University Frankfurt)

One region in Iraq was excavated in the beginning of the 20th century. The 40 km-long cluster of sites was compared to the Arabic sources from the 9th to the 15th century CE and was identified as Samarra (Sāmarrā) or Surra Man Ra'ā. Samarra, according to historical accounts, was built by an Abbasid caliph in the mid-9th century in order to move his garrison and court from the capital then, Baghdad. As the story further goes, additional caliphs built various structures at the settlement until moving back to Baghdad at the end of the 9th century. The settlement apparently lasted much longer: the local mint (by the name Surra Man Ra'ā) has struck coins at least until the year 953 and geographers in the next centuries praise it. Only from the 13th and 14th century, do accounts describe the settlement as partially ruined. Nevertheless, 20th-century scholars – historians and archaeologists – picked one specific narrative, according to which the settlement was abandoned in 892. As a result, all the structures at the site, two identified as congregational mosques and many others as palaces, have been dated to the mid to late-9th century together with pottery and stucco from the site. These finds remain index fossils, used for dating parallels from other excavations and

surveys. Independent dating, however, provides different results. One inquiry of this talk revolves around the choice of Arab historians to glorify Samarra in a specific period, the mid-9th century. Another question is the reasons for modern historians to select this narrative. The third line of investigation regards the motivation of archaeologists to accept the narrative and the dates it implies even when these contradict the archaeological data.

1109 MESOLITHIC & NEOLITHIC EVOLUTIONARY TRAJECTORIES AT THE MEDITERRANEAN

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: García-Puchol, Oretó (Universitat de València) - Cortell-Nicolau, Alfredo (University of Cambridge) - Gallelo, Gianni (Universitat de València) - McClure, Sarah (University of California Santa Barbara) - Diez-Castillo, Agustín (Universitat de València)

Session format: Regular session

The last development of Mesolithic groups and the arrival of Neolithic newcomers triggered major changes in evolutionary population dynamics in the entire Mediterranean region, originating domino effects on cultural and socioecological trajectories at macro- and microlevel scales. The focus on narrative studies based on cultural sequences has been surpassed thanks to new structural epistemological perspectives that embrace systemic and agency approaches. This turning point reflects how human societies can be understood as complex systems that evolve in non-linear ways, changing by adapting to the effects of exogenous and endogenous causes. The great importance of pointing to high-resolution archaeological records based on accurate stratigraphic data and radiometric frameworks, that allow approaches at the scale of human events, and also the challenging interest of thinking on a population level, are fundamental in this new paradigm to approximate social relationship consequences considering local and regional dynamics. In this session, we adopt this view to embrace papers that take into account approaches aimed to highlight evolutionary trajectories in socio-ecological and cultural trends in Mesolithic and Neolithic Mediterranean societies, including regional or microregional views in diachronic perspectives. Research based on modelling the dynamics of culture change and socioecological trajectories (e. g. statistical modelling, morphometrics, approximate Bayesian methods, phylogenetics, social network analysis, etc.) are welcome. Our goal consists of promoting the debate concerning questions like (1) how cultures split, merge, and take form, (2) what kinds of exogenous and/or endogenous factors could explain cycles of stability and changes, and (3) how can we examine cultural traditions in terms of “core” or “packages” systems.

ABSTRACTS

1 SIMULATING THE NEOLITHIC SPREAD ALONG THE NORTHERN MEDITERRANEAN COAST

Fort, Joaquim (Universitat de Girona; ICREA) - Pérez-Losada, Joaquim (Universitat de Girona)

We consider the earliest Neolithic site in each of nine regions located along the northern coast of the western Mediterranean. We perform linear regressions using dates obtained by bootstrap resampling from the corresponding calibrated distributions. In this way, we find a spread rate between 7.5 and 10.6 km/year. Comparing to analytical equations and simulations, this implies that the length of coastal jumps was between 240 km and 427 km. These are the longest dispersal distances so far estimated for a Neolithic expansion. We also find that the importance of cultural diffusion in this Neolithic spread was less than 21%. Therefore, demic diffusion was responsible for at least 79% of the spread rate. On the other hand, comparing our simulations of a genetic cline or gradient to the mitochondrial haplogroups of early Neolithic individuals along the whole northern Mediterranean coast, we estimate that only between 2% and 6% of early farmers interbred with hunter-gatherers.

2 HUNTER-GATHERERS' RESISTANCE IN THE NEOLITHIC OF MEDITERRANEAN EUROPE

Kacar, Sonja (Austrian Academy of Sciences)

Recent aDNA studies reveal an increase in WHG ancestry in some parts of Western Europe, including the Mediterranean regions, more than a millennium after the establishment of the Neolithic in the area (during the Middle/Late Neolithic).

For our comprehension of regional neolithization processes, these results challenge certain paradigms. One prevalent notion is that the local hunter-gatherers were swiftly assimilated after the arrival of the first farmers. Furthermore, the assumption is that only established agricultural communities underwent further developmental trajectories.

Contrary to these assumptions, aDNA evidence suggests a prolonged coexistence of the two societies. It implies that each society may have maintained its distinct way of life, and interactions, initially limited, expanded over time, resulting in subsequent genetic and cultural blending.

Today, evolutionary narratives are nuanced, and prehistorians acknowledge that while certain major evolutionary trends exist, the local trajectories of societies are far from linear. Despite the notion of perpetual progress, societies do not unfold in a straightforward manner. They can simply reject innovations or changes, or even undergo ‘simplification’ by abandoning established assets—either intentionally or unintentionally, due to environmental changes or enemy threats. In fields such as postcolonial studies and anarchist archaeology, these “anomalies” are explored through the concepts of “resistance”, “borderlands” and “margins”.

However, while scenarios of extended coexistence align with our understanding of the Neolithization process as intricate and multifaceted, and find archaeological support in the context of North-Central Europe, such evidence is lacking for Mediterranean.

This presentation aims to tackle how we can archaeologically detect presumed ‘Mesolithic survival’. For instance, in the Adriatic, could a shift towards marine resources during the advanced Neolithic indicate cultural blending rather than a simple diversification of diet? The widespread presence of arrowheads from the Middle Neolithic, could it be indicative of conflicts with surviving hunter-gatherers rather than between distinct farming communities?

3 THE MESOLITHIZATION OF THE ATLANTIC FAÇADE OF THE IBERIAN PENINSULA IN THE LIGHT OF BAYESIAN STATISTICS

Pardo-Gordó, Salvador (Universidad de la Laguna) - Carvalho, António (Universidade do Algarve) - Extrem-Membrado, Vanessa (Universitat de València) - Aura Tortosa, J. Emili (Universitat de València)

The Late Mesolithic (c. 8500-7600 cal. BP) is a subject of intense archaeological study and debate considering the techno-typological changes that took place within the period in many areas of Europe and North Africa, which are characterized by different environmental conditions and cultural trajectories. In this sense, it could be, probably, the first cultural event of the Holocene that unified groups across Europe under a single techno-typology. However, the chronology of its earliest evidence (trapezoidal arrowheads) is still unclear in some regions of southwestern Europe.

This paper aims to present the first chronostratigraphic proposal for the Mesolithic transition process of the Atlantic façade of the Iberian Peninsula. To this end, we first show the protocol used for the selection of radiometric determinations and its subsequent chronological analysis at site scale applying a Bayesian statistic. Then, we will discuss the chronology of the mesolithization process in the area according to the periodization obtained for the Early (so-called Initial Mesolithic in Portugal) and the Late Mesolithic (so-called Geometric Mesolithic in Iberia) techno-typological complexes. Finally, we will show the interactive radiocarbon database where the radiometric information is stored.

4 EVALUATING CULTURAL TRANSMISSION PROCESSES FROM GEOMETRIC PROJECTILES USING EXPERIMENTAL PROTOCOLS: A CASE STUDY FROM THE NEOLITHISATION PROCESS IN EASTERN IBERIA

Donadei, Juan Pablo (Universidad de Valencia) - García puchol, Oretó (Universidad de Valencia)

In this work, an experimental study is undertaken to evaluate the variations generated through different models of cultural transmission. Assuming that cultural transmission processes are mechanisms, in addition to genes, by which acquired variation is inherited from information transmitted between individuals, we can assume that depending on the transmission mechanisms or patterns, we can obtain different combinations of acquired variation. Unfortunately, specialists rarely have access to the complete data from the archaeological record that would allow us to undertake these studies. For this reason, the development of experimental methods allows us to recreate multiple replicates with random assignment of groups to different conditions and obtain a complete data set.

To address the reasons that led to morphological changes in the geometric microliths from the Mesolithic and Neolithic periods of the Mediterranean Iberia, in this experimental proposal, we have worked on two models: the constant-group method (measures variation in social learning and individual learning conditions) and the transmission chain method (measures variation between generations). To do this, each group replicated the manufacture of geometric microliths tools (trapezoids and triangles) which were then analysed by geometric morphometry and multivariate statistical methods.

The results obtained show that materials manufactured under social learning conditions (indirect bias) generate less morphological variation (disparity) compared to those manufactured under individual learning conditions (guided variation). On the other hand, the linear transmission chain shows that, although morphological variation is observed between generations, mainly affecting the elongation index, the general shape of the reference model is preserved in all of them. These results corroborate the hypotheses presented in previous works.

The present work demonstrates that experimental programmes are an interesting tool for studying cultural change and serve as a reference for future comparative studies with the archaeological record.

5 THE ORIGIN AND TEMPO OF NATUFIAN SEDENTISM: A COMPARATIVE META-ANALYSIS OF SUBSISTENCE STRATEGIES

Elbaz, Sigal (Zinman Institute of Archaeology, School of Archaeology and Maritime Cultures, University of Haifa, Haifa, Israel) - Yeshurun, Reuven (Zinman Institute of Archaeology, School of Archaeology and Maritime Cultures, University of Haifa, Haifa, Israel)

The Levantine Epipaleolithic (24–11.7 ky BP) witnessed significant cultural and demographic developments culminating with an increasing degree of sedentism in the Natufian Culture. Research on initial sedentism has raised questions about its origin, and climatic and cultural drivers. Our research asks whether population growth led to the adoption of a sedentary lifestyle. We also aimed to help settle the debate surrounding the pace of cultural change, and whether there was a retreat after it occurred. We employed multiple lines of subsistence evidence, creating the largest database to date that we collected from 63 layers belonging to 42 archeological sites in the southern Levant. The database includes faunal and ground stones assemblages and their chrono-cultural and geographic information. We divided the southern Levant into the Mediterranean and arid zones. In each zone, we compared four chrono-cultural phases, Early Epipaleolithic (~24–18 ka), Middle Epipaleolithic (~18–15 ka), Late Epipaleolithic 1 (Early Natufian, ~15–13.5 ka), and Late Epipaleolithic 2 (Late Natufian, ~13.5–11.7). We tested indices of subsistence diversification, site-occupation intensity, and demographic growth.

In the Mediterranean, unlike the arid zone, the Early Natufian saw abrupt changes in subsistence strategies, resulting from intensification caused by resource depression. This supports the revolutionary nature of the Natufian culture and HBE models suggesting that Postglacial climatic improvements enabled Natufian groups to settle down for various reasons (expanding vegetation, protecting high-value locations, and exceeding residential movement costs of growing communities). Sedentism and population growth reinforced each other and as a result, people were compelled to intensify the exploitation of their local environments. No significant differences were found between the Early and Late Natufian periods, contrasting the ‘retreat to mobility’ model during the Younger Dryas. Moreover, we observed an increase in sites per area in the Natufian period that independently indicates population growth.

6 DISCRETE AND CONTINUOUS TYPOLOGIES: A CASE STUDY FROM EASTERN IBERIA

Rorhus, Katrina (University of Cambridge) - Cortell-Nicolau, Alfredo (University of Cambridge)

One of the most fundamental debates in archaeology is on the dichotomy between what the biologist Ernst Mayr (1959) calls “typological thinking” and “population thinking”. Drawing on the principles of biological evolution and the philosophical schools of empiricism versus positivism, typology is a multidisciplinary framework that is used to create order in fields that deal with large numbers of variable individuals. However, although the use of types in archaeology is widespread and almost subconscious, other disciplines (e.g. biology and philosophy) have moved away from this kind of thinking towards a more continuous, gradual, population thinking approach. To explore whether archaeology should emulate these changes, we looked at the morphologies of over 2000 geometric microliths from Eastern Iberia. These lithics are largely typed on the basis of morphology, and are therefore a good candidate to explore the legitimacy of archaeological ‘types’ and whether geometric microliths can be taxonomically described as wholly “discrete” or “continuous”. Through the combination of clustering methods and statistical regression, based on Geometric Morphometrics analysis, we characterise the differences between the morphologies of lithics of different types, and we assess the relationship between classic types and the continuous distribution of the arrowheads across the entire morphospace. Finally, potential ontological and taxonomic alternatives are offered.

7 DIPS AND UP-TICKS: EXPLORING POPULATION DEMOGRAPHICS OF THE NEOLITHIC ON THE DALMATIAN COAST OF CROATIA

LoBiondo, Matthew (University of California Santa Barbara) - McClure, Sarah (University of California Santa Barbara) - Podrug, Emil (Muzej grada Šibenika, Šibenik, Croatia)

The Dalmatian coast of Croatia has a long history of archaeological investigation of Neolithic lifeways that have documented shifts in material cultural and agro-pastoral practices. Expanding on this work, recent research has highlighted the importance of the Dalmatian coast as a key area for understanding the mechanisms and effects of the spread of agriculture. Scholars have detailed diachronic and coetaneous changes in socio-ecological and material culture economies alongside evolutionary trajectories. To contextualize the tempo and impact of changes in early farming strategies, we provide a reconstruction of Neolithic (~6000–4500 calBCE) population dynamics for Dalmatia using summed probability distributions and cumulative kernel density estimates of calibrated radiocarbon dates. Our demographic reconstructions indicate shifts in Neolithic subsistence strategies likely effected population levels. Previous scholarship has demonstrated that the development and production of fermented dairy products circa 5200 cal BCE and suggested it may have reduced infant mortality and lead to demographic shifts that enabled farming communities to occupy northern latitudes. Using demographic reconstructions we investigate if the production of these fermented

products not only facilitated movement to northern regions, but also resulted in a local population boom of middle Neolithic farming populations in Dalmatia.

8 POPULATION STRUCTURE AND TECHNOLOGICAL VARIABILITY IN THE NEOLITHIC CERAMIC ASSEMBLAGES OF DEHESILLA CAVE (SOUTHERN SPAIN)

Díaz-Rodríguez, Manuel (University of Seville) - Garcia-Rivero, Daniel (University of Seville)

Recent excavations in the Dehesilla Cave (Southern Spain) have provided a Neolithic sequence spanning from the mid-6th millennium cal BC to the mid-4th millennium cal BC. In this presentation, we address the technological diversity of the ceramic assemblages within and between the different chronological periods of the Neolithic occupation.

For this purpose, we have used the Analysis of Molecular Variance (AMOVA) and the PhiST statistic, which have been applied to the study of cultural variability for some years in diverse papers. This analysis provides a quantitative measure of whether and to what extent the observed ceramic assemblage is characterised by different populations, archaeological periods in this case.

Through this analysis, we will examine the degree to which period affiliation is comparable to an actual population structure (when individual subpopulations/groups show low variability within and high variability between pairs of groups). Moreover, the results of these analyses allow us to test the theoretical validity of the archaeological units of analysis as discrete and arbitrary groupings of a continuous set of variability or as coherent units amenable to future analysis.

9 EVOLUTIONARY HISTORIES OF THE NEOLITHISATION PROCESS IN THE MEDITERRANEAN: CROSSING POPULATION AND CULTURAL DATA

García-Puchol, Oreto (Universitat de Valencia) - Cortell-Nicolau, Alfredo (University of Cambridge) - Bernabeu-Aubán, Joan (University of Valencia) - Díez-Castillo, Agustín (University of Valencia) - McClure, Sarah (University of California Santa Barbara) - Gallelo, Gianni (University of Valencia) - Barrera-Cruz, María (University of Valencia)

Understanding patterns and processes of cultural change constitutes a crucial aspect of tracing social structure dynamics triggered by the neolithisation in a “longue durée” view. In this paper, we focus on the Central and Western Mediterranean as a part of the framework of the Evolmed project “PID2021-127731NB-C21: Evolutionary cultural patterns in the framework of the neolithisation process in the Western Mediterranean”. We aim to investigate the cultural trajectories in the context of the Neolithic spread assuming that the process encompasses a scenario involving demic expansion and opportunities for interaction. Recent works have contributed to testing the explanation of the Neolithic dispersal through the Mediterranean corridor taking into account demic and interaction processes using mathematical modelling, exploring relative demographic dynamics from SPDs, and evaluating the evolutionary hypothesis of cultural change. In this paper, we explore patterns of cultural variability in space and time trying to solve questions concerning the evolutionary forces behind them from a diachronic view (from 8500 to 6500 cal BP). The SPDs created will serve to compare relative population histories with relevant hypotheses of cultural change. The fluctuations (cycles) observed will be confronted with the dynamics of cultural variability. This work will be based on the relational databases hosted at the University of Valencia in the settings of several research projects aimed at compiling radiocarbon dates and cultural material data, currently expanded to a wide area, including the central-Northern Mediterranean and the Western Mediterranean.

10 NEURAL NETWORKS ASSISTING SOCIAL NETWORKS ANALYSIS TO MAP NEOLITHIC-CHALCOLITHIC DOLERITES CIRCULATION IN VALENCIA COMMUNITY (SPAIN)

Gallelo, Gianni (University of Valencia) - Jimenez-Puerto, Joaquín (University of Valencia) - Trull-Dominguez, Oscar (Polytechnic University of Valencia) - Bernabeu, Joan (University of Valencia)

Neolithic-Chalcolithic groups in the Mediterranean region of the Iberian Peninsula developed high technical capabilities in the manufacturing of dolerite artefacts. In an attempt to observe social relationships between these societies in Valencia Community (Spain) area several dolerite materials found in different archaeological sites and their potential raw material sources were studied. The materials were analysed employing a portable X-ray fluorescence spectroscopy, directly measuring the rock surface. The obtained data were processed by elemental relation and ratios calculations and through neural network protocol (SOM), to observe archaeological and geological samples distribution.

The identification of outcrops sources of dolerite artefacts used unsupervised machine learning algorithms, effectively mapping out similarities. The methodology has been enhanced by applying algorithms suited for analysing small-sized samples, facilitating a more nuanced understanding of the geochemical variability among artefacts. By doing this we

enable the observation of possible relations between the Neolithic-Chalcolithic communities in the Valencia region and the circulation of the analysed artefacts through social network analysis (SNA).

The integration of Machine Learning (ML) findings into SNA provides a novel methodological approach, allowing for the exploration of the social dimensions of artefact distribution and exchange networks. This approach not only sheds light on the technological and economic aspects of these ancient societies but also offers a window into their social structures and interactions. By employing a combination of ML and SNA, this study shows the potential of interdisciplinary methods in archaeology to uncover complex social and economic relationships in prehistoric communities.

Finally, the processed dolerite chemical information obtained was employed running SNA to observe the possible relations between the Neolithic-Chalcolithic communities in the Southern Valencia region and the circulation of the analysed artefacts. The results showed evidence of a common raw material procurement pattern at regional level, and nature and size limitations of the sample were evaluated.

1111 NON-INVASIVE ARCHAEOLOGY: INTEGRATING SATELLITE, UAV, AND GEOPHYSICS WITH TRADITIONAL FIELD METHODOLOGIES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Peters, Manuel J.H. (Montefortino Prospection & Digitalisation, Max Planck Institute of Geoeanthropology) - Wroniecki, Piotr (Montefortino Prospection & Digitalisation) - Trapero Fernández, Pedro (Cádiz University)

Session format: Regular session

The archaeological workflow is being revolutionised by non-invasive methods such as geophysics and remote sensing. Their application is increasingly prevalent due to their lower cost and increased ease of use. Examples include satellites and piloted aerial vehicles (UAVs) with RGB, laser, and spectral sensors; geophysical techniques such as magnetometry, GPR, and resistivity; and Artificial Intelligence (AI) for data collection and interpretation.

Compared to traditional approaches, these methods are a fast way of acquiring large datasets. Their systematic integration needs further exploration however, in order to unlock the true potential of these methods when seamlessly embedded into the archaeological process. This integration ranges from large-scale approaches to study sites and landscapes, to more focused applications in excavation data analysis.

Challenges can arise due to the interdisciplinary nature of these approaches, where external specialists may not fully grasp the archaeological needs, and archaeologists may not entirely understand the possibilities and limitations of the techniques. Furthermore, data processing remains complex; a technical understanding of the method itself is often required, and the standard process does not always align with the requirements of an archaeological context. This makes data visualisation challenging, especially for techniques such as GPR and LiDAR.

This session explores the dynamic relationship between non-invasive technologies and traditional methods in research-driven and development-led archaeology. We invite contributions dealing with the integration, comparison, and validation of non-invasive and invasive methods, including the use of remote sensing, geophysical prospection, pedestrian survey, coring, and excavation. Digital aspects of the workflow, including GIS, spatial analysis, and Artificial Intelligence, are also welcomed. Reflections concerning the theoretical and technical application of non-invasive methods are invited, as well as insights and considerations regarding methodology, potentially aligning with broader efforts to standardise methodologies and datasets across projects and regions. We encourage the evaluation of both successful and unsuccessful outcomes.

ABSTRACTS

1 REAPING THE BENEFITS OF LEAF-ON AIRBORNE LASER SCANNING DATA FOR CROPMARK ARCHAEOLOGY

Banaszek, Lukasz (Historic Environment Scotland)

Applications of airborne laser scanning (ALS) in archaeology have tended to focus on examining surface topography. Less well explored is the potential for such data to investigate levelled archaeological features that are expressed through differential arable crop growth (cropmarks). This is partly because airborne lidar surveys tend to take place outside the growing season, limiting the potential to explore this aspect of lidar data worldwide.

However, Scotland has blocks of data collected at the peak period for cropmark formation which cover 4814 archaeological sites recorded as cropmarks. This provides a unique dataset to evaluate airborne laser scanning data against traditional aerial reconnaissance outcomes across the Scottish Lowlands.

Also drawing on Sentinel-2 satellite imagery and targeted field visits, this paper evaluates the utility of large-area leaf-on airborne laser scanning data in recording cropmark archaeology. The outcomes of this study are relevant to archaeological survey in arable landscapes across Europe and beyond.

2 LANDSCAPE UNDER THE POINT CLOUD: UNVEILING THE PAST WITH ENHANCED VISUALISATION AND HIGH-RESOLUTION LIDAR DATA FROM SLOVAKIA

Lieskovský, Tibor (Department of Theoretical Geodesy and Geoinformatics, Faculty of Civil Engineering, Slovak University of Technology in Bratislava) - Ďuračiová, Renata (Department of Theoretical Geodesy and Geoinformatics, Faculty of Civil Engineering, Slovak University of Technology in Bratislava)

Since 2018, Slovakia has joined the list of countries with available airborne laser scanning data for the whole territory. Data provided by the Geodesy, Cartography, and Cadastre Authority of the Slovak Republic are free to use and accessible as a classified point cloud with a density of the last return of 20 – 40 points per sq. meter.

We used the point cloud to interpolate digital elevation models with resolution of 25 cm/pixel for the entire territory and of 10 cm/pixel for selected areas with remnants of architecture in a ruinous state. We are developing an integrated high-resolution visualisation of these data to integrate multiple data visualisation approaches into a unified form, increasing the efficiency of detecting different types of archaeological features in various types of landscape.

We present our experiences with the use of high-resolution LiDAR data and specialised visualization techniques for identification and interpretation of archaeological features structure remains, integrating these data with other sources, such as archaeological databases, geophysical surveys, and old maps and plans. We show examples of uses in applications such as the refinement of historical maps, research in the field of landscape archaeology and ecology, and public outreach.

This work was supported by the Slovak Research and Development Agency under Contract no. APVV-22-0151.

3 THE RIGHT PLACE AT THE RIGHT TIME - AIRBORNE RGB DERIVED SLOPE MAPS AS GUIDE FOR UPLAND ARCHAEOLOGY FIELD SURVEY

Zanotti, Erik (Università of Bologna) - Putzolu, Cristiano (Università of Bologna) - Fiorini, Silvia (Università of Bologna) - Debandi, Florencia (Università of Bologna) - Cavazzuti, Claudio (Università of Bologna)

Here we present a case study of blended approach between field survey and UAV support when confronting particularly problematic contexts such as the uplands, and in this case the northern Apennines (Italy). The widespread presence of forestall coverage, combined with the hilly nature of this landscape often prevent systematic survey to achieve convincing results, especially when focusing on prehistoric settlements whose visibility is usually low. With this background, we looked for alternative methods to survey mountain sites, not just with the aim of identifying potential signs of structural remains, but also searching for a cost-effective solution to plan long term exploration for the researched area. Being well acquainted with the impressive, yet still expensive, results of airborne LiDAR technology, we employed “regular” RGB drones for less analytical purposes. In a landscape profoundly conditioned by seasonal climatic shifts, both with regard to the thickness of vegetal canopy and presence of snow on the higher peaks during increasingly shorter winter seasons, we suggest that choosing the right moment of the year could overturn our point of view on the discrepancy of results attainable with these two diverging methodologies. Stressing the importance of well-tuned post-processing procedures, deriving from the elaborations of DTM’s rasters obtained from aerial orthophotography, we tried to expand the range of possible strategies when dealing with apparently impenetrable grounds. Presenting both “successful” and unsuccessful examples of post-processed data acquired during mid-seasonal drone surveying campaigns, we advocate for a potentially proficient use of analogical technologies when investigating upland contexts, eventually putting the accent on the need of ground truthing steps to come full circle.

4 ALL FEATURES GREAT AND SMALL: COMPARING LIDAR SYSTEMS AT ANCIENT MAYA SITES IN BELIZE

Thompson, Amy (The University of Texas at Austin) - Willis, Mark (Flinders University) - Houk, Brett (Texas Tech University) - Fernandez-Diaz, Juan Carlos (University of Houston)

The increasingly common use of light detection and ranging (lidar) in the field of archaeology has fundamentally transformed our understanding of landscapes, human-environment interactions, and social organization. Combining lidar with traditional pedestrian survey we can explore the dynamic relationship between field-verified and remotely-sensed data. In this paper, we examine two classes of lidar data collected at ancient Maya sites in the Belize Estates Archaeological Survey Team (BEAST) permit area in northwestern Belize. In this heavily forested region, traditional settlement mapping is slow and expensive: archaeologists have only mapped 6.5 km² using traditional pedestrian survey since the late 1990s. Therefore, the ability to map large areas with lidar is literally game changing. In conjunction with the National Center for Airborne Laser Mapping (NCALM), in 2022 we collected approximately 650

km² of crewed aircraft lidar data using the Titan sensor, providing a new understanding of settlement patterns, social organization, and landesque capital across the landscape. In 2023, we collected 5 km² of UAV/drone-lidar data using a Zenmuse L1 lidar sensor attached to a DJI Matrice 300 multirotor drone. The drone survey overlaps with the NCALM data, focusing on the kingdom of Chan Chich and the minor center of Gallon Jug; these sites are located on landscapes of varied modern land use practices including a manicured resort, cattle pasture, and non-managed jungle foliage. Here, we compare the effectiveness of crewed-aircraft and drone lidar in landscapes of varying modern land management strategies and vegetation density with respect to coverage, cost, and data quality. Integrating the pedestrian survey data, we conduct accuracy assessments of these two technologies. Rather than finding one lidar sensor better than the other, we highlight the synergies of using a multi-method approach to understanding ancient landscapes while incorporating the impact of modern anthropogenic activities to our understanding of past human behaviors.

5 THE EDUCATION MOAT SURVEY IN BENIN CITY: USING GEOMATIC TECHNIQUES FOR AN ARCHAEOLOGICAL SURVEY

Hubert, Jan (Deutsches Archäologisches Institut)

The Education Moat Survey in Benin City aimed to comprehensively study the so-called inner moat or Iya systems together with MOWAA and the German Archaeological Institute. These earthworks are encircling Benin City, but smaller networks can be found in the periphery as well. For the survey advanced geomatic science tools are employed. The survey integrates 3D photogrammetric overflights, assessed the condition of the eastern inner moat, mapped community boundaries, and trained MOWAA geomatic specialists. Cutting-edge technologies like the Mavic 3E drone, DJI Matrice 300 RTK with Lidar, Emlid Reach RTK GNSS receiver, photogrammetric as well as GIS software were utilized.

The methodology made use of satellite imagery for basemaps, UAV surveys with RGB cameras, LiDAR for detailed 3D models, high detailed orthographic imagery as well as digital elevation models. To verify the results from remote sensing, on-site ground surveys with mobile GIS apps connected to RTK GNSS receivers, and GIS for data post-processing was employed. Results provided insights into the moat's condition, course, and cultural significance. Combining technology with the transmission of oral history by the communities, the study mapped community boundaries, located shrines, and documented landmarks. Ground surveys so far validated aerial data, revealing an immense loss in the moat's original extent in the eastern part of the inner city.

Beyond the specific case the importance of geomatic science in African and Nigerian archaeology is rising across the continent. Nevertheless, there is untapped potential as these tools become more affordable, with many programs, like QGIS, even available for free. To fully harness these advancements, researchers need to stay informed and receive training in these emerging methods, enabling them to recognize the benefits and apply them effectively in their archaeological research. Edocation ensures sustained research in Benin City beyond 2024 by empowering archaeologists with vital training and tools.

6 RECONSTRUCTING THE DIFFERENT BUILDING PHASES AT THE CASA DEL CITARISTA IN POMPEII (ITALY) USING GROUND PENETRATING RADAR (GPR)

Corradini, Erica (Institute of Geosciences, Christian-Albrechts-University Kiel, Germany) - Busen, Tobias (Deutsches Archäologisches Institut (DAI), Berlin, Germany) - Haug, Annette (Institute of Classics | Classical Archaeology, Christian-Albrechts-University Kiel, Germany) - Erkul, Ercan (Institute of Geosciences, Christian-Albrechts-University Kiel, Germany) - Fischer, Simon (Institute of Geosciences, Christian-Albrechts-University Kiel, Germany) - Stuempel, Harald (Institute of Geosciences, Christian-Albrechts-University Kiel, Germany) - Rabbel, Wolfgang (Institute of Geosciences, Christian-Albrechts-University Kiel, Germany)

The Casa del Citarista on Insula I 4 in Pompeii is amongst of the largest in the city with an extension of 2700 square meters, and reached this extent thanks to the progressive incorporation of various properties. This complex building process led to the development of an irregular plan, with two atria and three peristyles. The extension visible today might have been reached in the first century AD, and it belonged to members of the very powerful Popidii family. We present a GPR survey conducted in addition to architectural investigations undertaken on site. The GPR survey was done with a GSSI dual frequency (300 and 800 MHz) antenna with the aim to detect building structures lying below the existing ancient floor levels. The southern sector of the Casa del Citarista shows different GPR reflectors which can be assigned to the different building phases identified during the architectural survey. In particular, reflectors between 0.5m and 1.20m confirm the assumption that at least two anterior houses (I 4,A and I 4,B; 3rd/2nd century BC) were incorporated during time. During the 2nd/1st century BC the original atrium house expanded to the northeast, delivering the construction of a porticus, whose floor is visible in the GPR record as well. A third construction phase occurred during the Late Republican and brought to the establishment of two peristyles. The discovered elements like a drainage channel for the new reservoir in the central peristyle and a water drainage channel from the

peristyle roof on the east highlight the hydraulic engineering work between the two peristyles. The most surprising result was the detection of a cistern in the northern sector. Due to a 3D modeling we were able to reconstruct its shape including the bottom and a transversal passage at the southern edge.

7 FEATURE DETECTION IN THE ARGENTINEAN ANDES: MULTISCALE ASSESSMENT OF SATELLITE, UAV, AND SURVEY DATA

Peters, Manuel J.H. (Max Planck Institute of Geoanthropology) - Jambajantsan, Amina (Max Planck Institute of Geoanthropology) - Zuccarelli, Veronica (Max Planck Institute of Geoanthropology)

The Cusi Cusi micro-region in the Argentinean Andes presents a unique challenge for archaeological research. This rugged area is situated within the Puna of Jujuy at an elevation ranging from approximately 3800 to 4200 meters above sea level, and is characterised by plains interrupted by sharp changes in elevation. The archaeological, historical, and modern features existing in the region attest to a long-term human presence and include cattle enclosures, habitational structures, retaining walls, perimeter walls, burial mounds, and agricultural terraces.

The Puna of Jujuy is situated in the "Lithium Triangle", an area that includes territories in Argentina, Bolivia, and Chile, holding 60% of the lithium in the world. As a result of the political reforms of 2023 and 2024, the dynamics concerning indigenous rights and underground resource ownership are increasingly complex. In particular, new extractive politics are bringing increasing pressures on indigenous landownership and environmental stability. This situation illustrated the growing importance of documenting the region, both its archaeological heritage as well as the contemporary circumstances of indigenous communities.

This research integrates satellite and UAV imagery with pedestrian survey datasets, machine learning, and physical ground-truthing. Specifically, we undertake a multiscale assessment of automated feature detection on satellite data and high-resolution UAV-based photogrammetry to determine their effectiveness in detecting and analysing various features. The validation process included on-site ground-truthing visits, providing insights into the heritage and challenges of the Cusi Cusi micro-region.

8 NEW WAYS TO SEE THE SURFACE. A CASE STUDY FROM THE MEGALITHIC PHENOMENON OF THE SOUTHEAST OF THE IBERIAN PENINSULA

Cabrero, Carolina (University of Granada) - Garrido, Antonio (University of Jaén) - Esquivel, Francisco Javier (University of Granada) - Cámara, Juan Antonio (University of Granada)

The megalithic cluster of the Gor River valley (Andalusia, Spain) is one of the biggest dolmenic groups in Europe, with 238 tombs registered during the first general campaign by the end of the 19th century. Despite its high potential for the research on megalithism and for the understanding of the prehistoric societies of the area, the scarcity of modern archaeological works and the lack of protection measures have led to the loss and destruction of a big part of the group, as only 151 megaliths were possible to find during the last surface survey carried out in 2019. With the aim of recording the location of these lost megaliths, Digital Terrain Models and LiDAR data, both publicly available thanks to the Spanish National Geographic Institute, have been used to analyse the terrain, permitting the location of 230 structures similar in shape and size to those actually documented on the surface, but that were not noticed until this remote survey. In order to test this high quantity of possible megalithic structures, a new surface survey by traditional means has been carried out in three selected areas of the cluster chosen for sampling. This new combined survey has led to the verification of 10 out of 25 possible locations, given also very interesting new data for areas that were recently studied by traditional means, making it clear that the application of new techniques leads to new results even in the most revised areas. The survey has permitted also to test the possibilities and limitations for this type of digital survey of the terrain applied to the megalithic phenomenon of the Southeast of Iberia, characterized by the presence of small burial chambers, which allows to test the limit of the resolution of this kind of mapping and its application for small-sized archaeological structures.

9 THE VILLA SETTE BASSI RELOADED: INTEGRATING UAV AND SATELLITE DATA FOR AN HOLISTIC MONITORING OF CULTURAL HERITAGE

Clementi, Jessica (Department of Earth Sciences, Sapienza University of Rome) - Sanvito, Veronica (Department of Earth Sciences, Sapienza University of Rome) - Marini, Roberta (Nhazca s.r.l.) - Molinari, Antonio (Department of Earth Sciences, Sapienza University of Rome) - Massi, Andrea (Department of Physics, Sapienza University of Rome; Nhazca s.r.l.) - Roascio, Stefano (Ministero della Cultura, Parco Archeologico dell'Appia Antica) - Reginaldi, Michele (Ministero della Cultura, Parco Archeologico dell'Appia Antica) - Mazzanti, Paolo (Department of Earth Sciences, Sapienza University of Rome; Nhazca s.r.l.)

Detecting and monitoring deformations that affect cultural heritage sites and their surroundings is a crucial aspect in developing preservation strategies, especially in the case of extensive archaeological areas. A collaboration agreement

for joint research promoted in 2022 by the MiC – General Directorate of Cultural Heritage Security and the CERL Research Center, University of Rome Sapienza aims at ensuring the security of the cultural heritage and deepening its knowledge and conservation. The Villa Sette Bassi archaeological site, one of the largest residences in the Roman suburbio, is chosen as the case study. Following the canonical scheme of the monumental villas of the Roman countryside, the complex consists of several pavilions developed around a large garden. The residence also had its own aqueduct, today preserved for a long stretch. The application of integrated non-invasive methodologies (i.e. Change Detection analysis of various types of images including optical, multispectral, thermal, and radar images acquired from satellite and UAV platforms; the differential SAR interferometry (DInSAR) and the Advanced DInSAR (A-DInSAR) techniques) offers valuable information about the spatial and temporal evolution of the identified changes or displacements. The products of these processing chains will be integrated and managed by a GIS platform, that can ultimately generate products (maps) as concrete support for the authorities responsible for the protection of the archaeological heritage, thus for the monitoring of both the exposed and still unexcavated archaeological heritage and the planning of effective and preventive conservation activities.

10 THE 2023 FIELD EFFORTS AT COLHA: INTEGRATION OF MAGNETOMETRY AND EXCAVATION; AND A RETURN TO TZAK NAAB FOR GEOPHYSICAL SURVEY

Neuhoff-Malorzo, Patricia (Independent Researcher; SWCA Environmental Consultants) - Adam, Manda (University of Texas at Austin) - Valdez, Jr, Fred (University of Texas at Austin)

The 2023 field season in Northern Belize focused on a return to the site of Colha combining new methodologies and excavation efforts in the search for Maya Preclassic and Postclassic evidence. Additionally, the 2023 season included training of students in geophysical survey at the site of Tzak Naab, with the intent to return in 2024 to ground truth the results of the geophysical survey. The overall field program allowed for new geophysical surveys at the sites of Colha, and Tzak Naab. These surveys facilitated the continuation of previous research avenues as well as new research into the Postclassic.

During the 2023 field season at Colha research into the identification of the Maya Postclassic, was directed by Manda Adam. Geophysical surveys, specifically magnetometry, were conducted under the direction of Dr. Patricia Neuhoff-Malorzo. The magnetometry surveys identified several structural delineations which were complemented by excavation efforts. Leading to the successful identification of Postclassic evidence.

The search for the Preclassic, under the direction of Dr. Fred Valdez, was conducted in the main plaza area and included both geophysical survey and targeted excavation efforts. Magnetometry survey was limited due to time and space but served to direct excavation efforts and resulted in the discovery of an undated wall. Further examination of the survey and excavation data provides direction for targeted efforts in future seasons.

The field efforts at the site of Tzak Naab focused on student training in magnetometry survey and the search for evidence of activity areas. In addition, the field efforts served to repeat previous seasons evidence with extensive discussion based on how geophysical survey can direct excavation efforts for future seasons. This data directed the 2024 excavation efforts.

11 NEW TECHNOLOGIES FOR THE PRESERVATION OF PRE-COLUMBIAN ARCHAEOLOGICAL HERITAGE IN SOUTH AMERICA: THE MAPHSA PROJECT

Moderato, Marco (CASES, Universitat Pompeu Fabra, Spain) - de Souza, Jonas (CASES, Universitat Pompeu Fabra, Spain) - Madella, Marco (CASES, Universitat Pompeu Fabra, Spain) - Tapscott Baltar, Alan (CASES, Universitat Pompeu Fabra, Spain) - Heidgen, Shaddai (CASES, Universitat Pompeu Fabra, Spain) - Fajardo Bernal, Sebastian (Leiden Institute of Advanced Computer Science (LIACS), Leiden University, the Netherlands) - Vargas Ruiz, Juan Carlos (Universidad del Magdalena, Colombia) - Neves, Eduardo Góes (Museum of Archaeology and Ethnology, University of São Paulo, Brazil) - Strauss, André (Museum of Archaeology and Ethnology, University of São Paulo, Brazil)

This contribution explores comprehensive methodologies employed by the Mapping the Archaeological Pre-Columbian Heritage in South America (MAPHSA) project, integrating transregional datasets from Brazil and Colombia. The project encompasses a broader range of cultural heritage and enabling cross-cultural comparisons aiming to establish an integrated database incorporating both legacy and newly acquired information related to the pre-Columbian archaeological heritage of South America. Embracing the FAIR data standard sharing philosophy, MAPHSA endeavors to provide an open-access digital resource.

This innovative undertaking marks the inception of the first-approach of geospatial and data repository singularly devoted to the contextualized mapping of archaeological heritage in Brazil and Colombia. Beyond its immediate geographical impact, the database serves the research community within the surveyed countries, as well as the broader international archaeological community and national heritage agencies. Through these efforts, MAPHSA

makes a substantial contribution to the advancement of heritage preservation and the facilitation of interdisciplinary cross-border studies.

MAPHSA adopts a multidisciplinary approach that combines archival work, remote sensing, machine learning, and on-ground surveys to meticulously identify and assess the preservation status of archaeological sites. The workflow seamlessly integrates diverse datasets into a Postgres/PostGIS geodatabase, utilizing the Arches information management platform with a CIDOC CRM ontology data model. Drawing on the experience garnered from similar-scale Arcadia-funded projects, MAPHSA establishes itself as a trailblazer in the field.

This initiative extends beyond technical aspects, fostering international awareness about the vulnerability of South American heritage to threats like deforestation, agricultural expansion, and fire, aiming to catalyze a paradigm shift in public perception and stimulate concerted preservation efforts, particularly in culturally significant areas like the Amazon and Cerrado savanna.

In summary, MAPHSA pioneers seamless integration of a comprehensive database and multidisciplinary methodology, setting a precedent for meticulous archaeological mapping and advocating global awareness and protection of South American cultural heritage.

12 AN INTEGRATED GEOPHYSICAL INVESTIGATION OF THE PREHISTORIC LANDSCAPE IN THE FORESTS OF SCHALTENRAIN, SWITZERLAND

Medaric, Igor (University of Zurich, Department of Archaeology; University of Ljubljana, Department of Archaeology) - Geitlinger, Timo (University of Zurich, Department of Archaeology) - Blum, Jonas (University of Zurich, Department of Archaeology) - Della Casa, Philippe (University of Zurich, Department of Archaeology)

This presentation will focus on the preliminary geophysical survey results and discuss their potential in detecting prehistoric remains in densely forested environments. During the winter of 2023/24, an extensive multi-method geophysical survey was conducted in the forests of the Schaltenrain hills in the Bernese Seeland region of NW Switzerland. The survey targeted small key areas within the extensive forest landscape, focusing on significant archaeological features identified by previous surveys or through analysis of airborne laser scanning (LIDAR) data. These features included burial mounds, terraces, potential communication routes, and potential remains of prehistoric settlements. By investigating these key locations, the geophysical survey aimed to provide more information to help reconstruct the prehistoric landscape. The results were then validated by coring and test-pitting several of the identified anomalies to improve the interpretation of the geophysical data. This validation process was crucial not only to improve the understanding of the various archaeological features, but also to assess the applicability of different geophysical methods on these structures. The ultimate promise of this research is to provide a comprehensive overview of specific natural environments, working procedures, and processing steps. It can serve as a fundamental framework increasing the efficiency of the application of geophysical methods to the chosen geopedological forest context and to similar settings in the future.

13 BARCZEWKO/ALT WARTENBURG - UNCOVERING AN ABANDONED MEDIEVAL TOWN THROUGH AERIAL PHOTOGRAPHY, GEOPHYSICS, AND EXCAVATIONS

Koperkiewicz, Arkadiusz (Institute of Archeology, University of Gdansk) - Wroniecki, Piotr (Montefortino Prospection & Digitalisation)

Barczewko is a town in Poland, situated in the historical region of Warmia. Originally home to Prussian tribes, it was conquered in the Medieval by the Teutonic Order, establishing a powerful state along the Baltic Sea. This state included autonomous episcopal domains, with Warmia at its heart. Nicolaus Copernicus and Aeneas S. Piccolomini (who would later become Pope Pius II) were active in the area. The Order was engaged in extensive military campaigns to conquer Lithuania. Medieval chronicles note that one of the bishops founded the town of Wartenberg in 1325. A sudden Lithuanian attack in 1354 caught the inhabitants during their daily routines. The sudden raid and fire rapidly consumed the settlement, representing a classic “Pompeian scenario”. The relics reveal the spatial layout of the early urban colony and the cemetery of its first settlers. The rediscovery of its significance was facilitated by non-invasive surveys revealing a veritable time capsule. The site was transformed, and the new non-urban settlement was similarly named, with the prefix “Alt”. The hill behind the village was known as the Old Town, enabling the placename to endure to the present day.

In our presentation, we will demonstrate how each urban element was archaeologically identified and verified against a map of geophysical anomalies. By using specific examples, we aim to provide a comparative analysis of stratigraphic units that were sources of geophysical anomalies. The majority of verifications were positive. Besides its historical significance, the site has become a benchmark for interpreting and understanding geophysical anomalies in the study of abandoned Medieval urban sites.

Research funded by the National Science Center, project 2021/41/B/HS3/01694 titled “Barczewko – A History Written by Fire. The Medieval Lost City and Urbanization of the Galindian Forest” 2022-2024.

14 THE USE OF NON-DESTRUCTIVE METHODS TO RECONSTRUCT THE SETTLEMENT STRUCTURE OF HIGH AND LATE MEDIEVAL VILLAGE LHOTKA

Petráš, Josef (Independent Researcher)

Geophysical methods have become an integral part of non-destructive archaeology in the 21st century, with their main advantage being the accuracy and speed of prospection. In particular, magnetometry and GPR methods have proven to be very useful in locating archaeological objects. These methods were used in the reconstruction of the internal and external areas of the abandoned High and Late Medieval village of Lhotka. This village is located in the area of the former Brtnice manor, situated in the Bohemian-Moravian Highlands. Its abandonment is dated by written sources before 1399, when it first appears as deserted. Using a hand-held magnetometer and GPR, several home-steads, their orientation and position in the internal area were identified. The geophysical prospection also identified anomalies in the area of the presumed village square and the location of a modern coal mill. The combination of mutually verifying methods was ultimately further supplemented by verification using other non-destructive methods such as the use of metal detector, microprobe, radiocarbon dating or phosphate analysis of soils. A 3D model of the site was created using UAVs, which was used to generate the DEM, and the remainder of the field of the vanished village was discovered using LiDAR. Thanks to the interplay of all methods, it was possible to reconstruct the approximate form of the village, its economic background, the original burial horizon and to place it in the historical context of the settlement.

15 GEOPHYSICS AND ARCHAEOLOGY ON THE TRAIL OF THE OTTONIAN KINGS AND EMPERORS - THE MEDIEVAL CENTRE OF POWER AT MEMLEBEN

Biermann, Felix (State Office for Heritage Management and Archaeology Saxony-Anhalt, Halle (Saale); University of Szczecin) - Grönwald, Holger (State Office for Heritage Management and Archaeology Saxony-Anhalt, Halle (Saale)) - Heikkinen, Mikko (State Office for Heritage Management and Archaeology Saxony-Anhalt, Halle (Saale)) - Meller, Harald (State Office for Heritage Management and Archaeology Saxony-Anhalt, Halle (Saale)) - Wehner, Donat (State Office for Heritage Management and Archaeology Saxony-Anhalt, Halle (Saale))

Memleben on the river Unstrut (Saxony-Anhalt, Germany) is of great historical importance, as the Ottonian King Henry I († 936) and his son, Emperor Otto the Great († 973), died here. For a long time, researchers have been trying to understand the design, structure, topography and functioning of the early and high medieval centre of power, which consisted of the palace ("Pfalz"), a monastery, at least one hillfort, several open settlements and a market site. In particular, the location of the Pfalz has been unclear for a long time. A current major research project (State Office for Heritage Management and Archaeology Saxony-Anhalt, Halle [Saale]) is providing important information in this regard, using large-scale geophysical prospections (magnetic survey currently covering more than 58 hectares, ground penetrating radar, electromagnetic induction survey, electrical resistivity tomography), field surveys and extensive excavations. Large-scale magnetic surveys were carried out along the Unstrut river valley at potential sites based on both historical sources and aerial photos, followed by both excavations and further surveys in detail informed by the magnetic results. These in turn informed each other, resulting in a mutually supporting network of research. The project has been agile and able to call up detail surveys to clarify specific questions on very short notice. This has not only provided important new insights into the medieval Pfalz and settlement complex, but has also yielded interesting methodological insights when comparing the results of various geophysical and archaeological investigations. The lecture will provide an overview of this project with a methodological focus.

16 UNDERSTANDING AN ANOMALY. INTEGRATION AND INTERPRETATION OF NON-INVASIVE DATA IN THE OSTROWITE ARCHAEOLOGICAL PROJECT (NORTHERN POLAND)

Sikora, Jerzy (Institute of Archaeology University of Lodz) - Wroniecki, Piotr (Montefortino Prospection @ Digitalisation)

The long-term archaeological project at Ostrowite in Pomerania, Poland, offers a unique opportunity to assess, confirm, and integrate diverse archaeological and environmental data. Uncovering evidence of human activity spanning from the Late Palaeolithic to significant Early Neolithic, Early Iron Age, Roman Period, and Medieval (11th-14th centuries) phases, the site has served as a testing ground for a variety of non-invasive and invasive archaeological techniques since 2006. The project has conducted numerous aerial surveys (manned and unmanned), comprehensive geophysical surveys using magnetic gradiometry, earth resistance, and GPR methods, ALS data analysis, phosphate and surface surveys, including metal detection, alongside extensive environmental analyses integrated with GIS.

This approach has facilitated the creation of a guide for interpreting various geophysical anomalies and cropmarks, aiding in the reconstruction of the site's settlement landscape across different periods. The prevalent use of non-invasive techniques and GIS integration has also shaped the excavation strategy, leading to the deployment of small test trenches to investigate specific locations, anomalies, or cropmarks, eliminating the need for extensive trenching.

Simultaneously, detailed excavations in areas susceptible to agrotechnical damage have not only verified the findings from non-invasive surveys but also enriched our catalogue of anomalies and cropmarks, enhancing our understanding of the site.

17 NON-INVASIVE RESEARCH IS A JOURNEY NOT A QUICK FIX. SURVEY PLANNING AND INTERPRETATION AT THE HILLFORT IN GRĄBCZYN, POMERANIA, POLAND

Wroniecki, Piotr (Montefortino Prospection & Digitalisation) - Niedziółka, Kamil (Institute of Archaeology, University of Gdansk) - Marczewski, Maciej (Firma Archeologiczna Glesum)

Faced with the challenge of initiating a non-invasive survey in an area with little prior research, our team addressed key issues in archaeological exploration: selecting the right methods, deciding how to sample the site, and interpreting our results without jumping to conclusions or succumbing to aprioristic assumptions. Hillforts often lead to expectations of certain significant findings, which can shape our understanding of the data. However, each site, such as the Grąbczyn Hillfort in Pomerania, tells a unique story that may not align with common patterns.

This case study showcases the integrated, multidisciplinary approach that was applied to investigate the archaeological landscape, with a focus on Grąbczyn Hillfort. The study utilized non-invasive techniques such as magnetic gradiometry and GPR, while aerial prospecting with RTK UAV and UAV ALS/LiDAR provided high-resolution imagery for landscape study, documentation, and accurate terrain models. We will discuss how we developed an understanding of an archaeological site and its landscape through the systematic use of field techniques and the creation of interpretation strategies by merging established archaeological knowledge with field-collected data.

Since 2023, numerous test trenches have been laid out, guided by questions derived from the analysis of non-invasive datasets. These efforts aimed to investigate the origins of various anomalies, contributing valuable insights into the spatial layout of the Hillfort. However, the natural background limited the clarity of results, producing faint anomalies due to minimal contrast between the fill and surrounding soils. Despite these challenges, the findings were promising, revealing internal divisions within the hillfort and evidence of burning. While the new data resolved some existing questions and refined our understanding of the site, it also raised new inquiries that necessitate further investigation.

18 MINDING THE GAP BETWEEN GEOPHYSICAL DATA AND INTERPRETATION AT HISTRIA, ROMANIA

Rabinowitz, Adam (The University of Texas at Austin) - Neuhoff-Malorzo, Patricia (Independent Researcher)

Between 2018 and 2023, the Histria Multiscalar Archaeological Project (HMAP), a collaboration between the University of Texas at Austin and the Institute of Archaeology "Vasile Pârvan" in Bucharest, conducted a magnetometry survey of 4.5 hectares in the area of the site known as the "Plateau". The "Plateau" was part of the urban settlement from the late 7th century to the 1st century BCE, when it was occupied by residential and industrial structures. From the late 1st century CE forward, it became one of the city's extramural cemeteries. HMAP's magnetometry survey was designed to collect information about the urban infrastructure of the Greek period and to identify burials associated with the Roman period. Ground-truthing of the results showed that linear features with greater magnetism are roads constructed with large amphora fragments, while circular highly-magnetic features are pottery kilns. These results challenge assumptions that this part of the city had an orthogonal street grid in the Greek period and that ceramic production activity was confined to spaces along the city walls. More surprisingly, they confirm the accuracy of a previous magnetometry survey carried out in this area from 2000-2003, the results of which had long been considered to be problematic. The risks of overinterpretation are highlighted both by this situation and by our own attempts to classify buried features before ground-truthing. Test trenches revealed some anomalies we thought could be tombs to be ground-squirrel burrows and a modern archaeological dump, while other minor variations in the magnetic measurements were revealed as tombs only after excavation. More extensive excavations around features identified in the 2018 survey have also been crucial for the interpretation of the magnetometry results, while the combination of previous and current magnetometry surveys, together with drone-based photogrammetry, expand our ability to understand larger patterns of activity across the area.

19 ANALYSES OF CUCUTENI-TRYPILLIA SETTLEMENTS IN THE REPUBLIC OF MOLDOVA: INTEGRATION OF NON-INVASIVE, MINIMALLY INVASIVE AND INVASIVE INVESTIGATION METHODS

Schmauderer, Jessica (German Archaeological Institute, Romano-Germanic Commission; Friedrich-Alexander-University Erlangen-Nuremberg, Institute of Prehistory and Early History)

The Cucuteni-Trypillian culture (5200-3100 BC), spanning from the eastern Carpathians in Romania through the Republic of Moldova to Ukraine, has been the subject of extensive research since the 1960s. Multi-year research campaigns by the Romano-Germanic Commission of the German Archaeological Institute, initiated in 2007 in col-

laboration with international partners, have employed a comprehensive approach by combining noninvasive techniques with minimally invasive and invasive investigations.

The interdisciplinary approach made it possible to analyse settlement landscapes on a macro level, providing insights into settlement dynamics. To supplement the settlement landscape image of Cucuteni-Trypillia sites, aerial photographs from US spy satellites from the Cold War period were systematically examined. Suspicious areas were then investigated through a geomagnetic survey lasting several weeks. Settlements with promising magnetic images were analysed by core drilling to enable rapid interpretation and dating of the sites. This also served to verify the results from non-invasive methods.

Furthermore, a combination of diverse investigative methods was also used to analyse the Stolniceni 1 site at a micro level. Remote sensing and magnetic measurements identified over 1000 features. A combination of the evaluation of non-invasive investigations, core drilling and partial excavations was used to efficiently process these features, allowing a representative overview of the settlement to be obtained.

20 PRELIMINARY FINDINGS FROM NON-INVASIVE ARCHAEOLOGICAL INVESTIGATIONS IN SICILY, 2015-2022

Mozdziuch, Ewa (University of Opole) - Wroniecki, Piotr (Montefortino - Prospection & Digitalisation) - Mozdziuch, Sławomir (Institute of Archaeology and Ethnology Polish Academy of Sciences)

Between 2015 and 2022, the Centre for Late Antique and Early Medieval Studies at the Institute of Archaeology and Ethnology, Polish Academy of Sciences, undertook research in Sicily, focusing on the Norman influence on early medieval European culture. Through a combination of non-invasive techniques and targeted excavations, the project investigated two significant sites: the medieval monastery of Santa Maria di Campogrosso in Altavilla Milicia (north) and the Castello dei Tre Cantoni in Scicli (south). Utilizing advanced technologies including magnetometry, ground-penetrating radar (GPR), GPS RTK, and Lidar-equipped drones, the team uncovered previously unknown structures. These findings include a monastery building dating from the 12th to the 15th century in Altavilla Milicia, a 14th-century building workshop, and a segment of the 15th-century castle church of Santa Maria della Raccomandata in Scicli, previously known only from texts. All discoveries, initially made through non-invasive methods, were later verified by excavation, significantly contributing to our understanding of Norman architectural and cultural impacts in Sicily. The work was funded by research projects of the National Science Centre (NCN 2017/25/B/HS3/01699; NCN nr 2021/43/B/HS3/01988).

1112 THE DAY AFTER: THE MATERIALITY OF RESILIENCE, MEMORY AND INEQUALITY IN POST-DISASTER SCENARIOS

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Forlin, Paolo (University of Bologna; Northwestern University (USA)) - Gür, Selin (University of Bern) - Bognione, Marcella (University of Bern) - Cavalazzi, Marco (University of Bologna; University of Michigan) - Brown, Peter (Radboud University Nijmegen)

Session format: Regular session

Natural hazards are key agents in transforming landscapes, sometimes in largely irreversible ways. These significant episodes of environmental change can have profound repercussions for affected human societies across different timescales and spheres of life.

This session focuses on 'natural' disasters and aims to explore how catastrophes stimulated the transformation of cultural landscapes throughout the past. In so doing, the session seeks to shine new light on how human societies were impacted by natural hazards in different periods and cultural settings, and how they responded to short- and long-term consequences unleashed by these processes. Instead of simply examining 'continuity' and 'discontinuity', we seek to debate the materiality of resilience, adaptation, power, inequality, agency and memory in both pre- and post-disaster scenarios.

We invite contributions that reflect on the critical role played by disaster-affected societies in shaping cultural landscapes and ecologies. Disasters may be considered both windows of opportunity and stimuli for innovation but also manifestations of structural environmental injustice and catalysts for increasing social inequality. We also invite methodological papers that are more focused on the identification, assessment and dating of destructive events, or of post-disaster responses.

The session encourages theoretical and methodological papers focusing on European and Mediterranean case studies without chronological restrictions.

Session presenters will be invited to contribute to the publication of a special issue of *Quaternary Environments and Humans* which will be devoted to the archaeology of disasters.

ABSTRACTS

1 THE POLITICAL ECOLOGY OF A DISASTER: THE 1248 MONT GRANIER MEGA-LANDSLIDE REVISITED

Forlin, Paolo (University of Bologna; Northwestern University)

In November 1248, the failure of the northern cliff of the Mont Granier in Savoie (France) gave way to what was destined to represent the largest historic landslide in Europe. About 350 million cubic meters of debris collapsed into the valley floor, causing the disappearance of at least five settlements and irreversibly changing the landscape over 35 square kilometres. Rather than remaining an abandoned and desolated land, the boulder field which was since then called 'Les Abymes' soon became a stage for the elaboration of ecological and political strategies of 'recolonisation'. Landslide debris, buried villages, surviving churches, post-landslide lakes, political landmarks and a newly founded town are discussed to reflect on the feudal reshaping of such a 'wasteland'. In particular, my paper investigates the materiality of the post-disaster landscape and considers the archaeology of memory, inequality, and resilience from a political ecology perspective. This work draws on the EU-funded project 'WasteLands' which investigates post-disaster scenarios in medieval Europe.

2 WHAT MAKES A DISASTER DECISIVE? EVALUATING CAUSAL PATHWAYS IN POST-DISASTER SCENARIOS

Brown, Peter (Radboud University)

Natural disasters, including floods, droughts, and earthquakes, are often recognised as important events in the histories of regions, cities, and individual archaeological sites. The impact of such events on human populations, however, is often difficult to predict. Looking to the past, this paper attempts to understand why certain disasters seem to have resulted in major phases of cultural change while other, apparently similarly high-magnitude events, were apparently overcome without significant longer-term repercussions. At different moments in time, cultural, economic, political, and social developments overlapped to, at least partially, configure a society's capacity to respond against challenges imposed by a disaster. Wars, political turmoil, or economic problems, for example, often occurred in close association with natural disasters—at times magnifying their impact, reducing a society's ability to restore conditions to pre-event norms, or in some cases, as a result of the conditions created in a disaster's aftermath. This paper examines case study events from across the medieval world, using archaeological and historical evidence to explore the degree to which pre-event conditions combined with the 'moment(s) of disaster' shaped 'causal pathways' that, to some degree, pre-configured the impacts and outcomes of catastrophic events. Did more prepared, or 'resilient' societies, in which existing stressors—such as wars, sources of inequality, or political and economic problems—were relatively absent, overcome disasters with fewer longer-term impacts than those beset by existing exogenous and endogenous problems? While it is not always possible to offer definitive answers, medieval archaeological and historical evidence allows such questions to be explored in a way that is not possible for modern disasters, helping us to understand both the possible long-term impacts of these events as well as the factors which appear to have magnified or minimised their impacts on populations in the past.

3 WET FEET IN DUSTY RIVERS: THE RESILIENCE OF SOUTHERN MESOPOTAMIA'S HYDRO-CULTURAL LANDSCAPE

Borkowski, Sebastian (University of Bern)

The paper examines the resilience of the hydro-cultural landscape of Southern Mesopotamia to natural disasters in the context of political instability during the transition from the 3rd to the 2nd millennium BC.

In the 3rd millennium BC, the Mesopotamian alluvial plain was developed into a hydro-cultural landscape to support settlements and irrigation agriculture in an arid climate. To prevent catastrophic flood events and river avulsion, it was imperative to maintain levees and clean riverbeds. This is extensively documented in the administrative record of the Ur III period (c. 2112–2004 BC). However, the Sumerian City Laments, ideological literary compositions of the Isin-Larsa period (c. 2025–1763 BC), allude to the collapse of the hydro-cultural landscape and the subsequent deterioration of major cities following the decline of the Ur III state. In conclusion, the Sumerian City Laments celebrate the restoration of cities, with a special emphasis on the deeds of Išme-Dagan of Isin (c. 1955–1937 BC).

To challenge the validity behind the ideological message of the Sumerian City Laments, this paper presents an interdisciplinary and data-driven approach to holistically evaluate the medium-term resilience of the hydro-cultural landscape of Southern Mesopotamia to catastrophic flood events and river avulsion. The method used in this study combines a diachronic spatial analysis of settlement patterns and paleo-channels with a temporal network analysis of geographic information in the textual record of the late 3rd and early 2nd millennium BC.

4 **ASSESSING VULNERABILITY TO EXTREME EVENTS IN A FLOODPLAIN WITH HIGH RATES OF VERTICAL GROWTH: THE NORTHERN ROMAGNA REGION (ITALY)**

Cavalazzi, Marco (Università di Bologna; University of Michigan) - Abballe, Michele (Università Ca' Foscari Venezia) - Bortoluzzi, Daniele (Università di Milano) - Maranzana, Paolo (Boğaziçi University)

This paper investigates the response of local communities in the northern Romagna plain (north of Ravenna) to extreme events in the Late Antique and Medieval Periods (4th/5th - 15th centuries CE). Located in northeastern Italy, the northern Romagna plain poses a considerable challenge for archaeological research due to the considerable impact of geopedological biases, which stems from a high sedimentation rate caused by flooding and land reclamation. In particular, the region experienced extreme floods from the Apennine rivers, which, combined with a relevant subsidence rate, resulted in the deposition of thick alluvial layers that covered the more ancient archaeological layers.

These environmental factors have also been historically determinant, affecting human settlement patterns and landscape development, and they continue to do so today, as unpredictable extreme floods still impact life in this region.

With these premises in mind, this paper will discuss the research we conducted in this region employing a multiscale approach and crossing different methods of investigation, such as artefact survey, excavations, geoarchaeological investigations, and the analysis of written sources. The collected data shed light on the strategies adopted by local communities, particularly during the Late Antiquity and Middle Ages, to cope with extreme events and to adapt to a vulnerable and hazardous environment.

Thus, this paper provides new insights into the mechanisms of local socio-ecological systems in responding to extreme events while also addressing methodological challenges that are present in investigating these difficult “clay landscapes” (Mills and Palmer, 2007). Indeed, these landscapes were deeply affected by this kind of vulnerability as well as today are posing a significant challenge for archaeologists, due to their geopedological characteristics.

In this way, this research can assist local communities in developing a more conscious understanding of their historical relationship with past disasters, helping them address the contemporary challenges of landscape management.

5 **THE LATE MESOLITHIC STOREGGA TSUNAMI (CA. 6150 BCE): EXPLORING IMPACT AND POST-DISASTER RESPONSES**

Kilhavn, Havard (University of Stavanger)

To explore the impact of a tsunami that happened more than 8000 years ago upon a population of mobile hunter-gatherers is no easy task. However, since the discovery of the North Atlantic Storegga tsunami in the late 1980s, researchers have commonly assumed that the demographic consequences of the tsunami for Late Mesolithic coastal populations would have been catastrophic. For example, summed probability distribution modelling (SPD) of radiocarbon dates has previously been used as a proxy for exploring the demographic impact of the tsunami in north Britain. In conjunction with the 8200 cal. BP climatic cold event, the tsunami is here thought by some to have caused a Late Mesolithic “population collapse”.

To explore the impact and possible post-disaster responses of the tsunami, I approach this prehistoric disaster through complementary methodological approaches, taking both “top-down” and “bottom-up” perspectives. The top-down approach seeks to identify and assess the impact of the tsunami through an SPD-modelling of radiocarbon dates from the Atlantic coast of Norway. The results are used to question whether this method is suitable for exploring the demographic impact of the tsunami, which in turn has consequences for earlier claims of a “population collapse” caused by the tsunami. Late Mesolithic populations might have been more resilient in the face of a tsunami event than what is often assumed. By using a detailed numerical modelling of the tsunami, it is also possible to get a “bottom-up” perspective on how the tsunami could have been experienced by Mesolithic people on the ground, exemplified by the study of tsunami impact upon an island off the coast of South-Western Norway. Combined, the two approaches offer new insights into both the potential impact and post-disaster responses and scenarios in the wake of the largest tsunami ever recorded in the North Atlantic.

6 **CULTIVATING RESILIENCE: THE ROLE OF AGENCY AND MEMORY IN THE URBAN MARKET GARDEN 'BOOM' OF POST-EARTHQUAKE POMPEII (AD 62-79)**

Venner, Jessica (Institute of Classical Studies)

In AD 62, a major earthquake hit the town of Pompeii, causing extensive damage to its infrastructure. This natural disaster, coupled with a recent famine, meant that efforts to repair the town were slow. In addition, while the effects of the earthquake meant that most of Pompeii's population were faced with lifestyle challenges, such as displacement from demolished or damaged properties or food and water shortages others, namely the (wealthy) landed, were in a position to create opportunity from failure.

Between the AD 62 earthquake and the AD 79 eruption of Vesuvius, Pompeii witnessed a notable surge in market gardens within the city walls. Garden numbers increased by 280%, rising from an estimated total of 11 pre-earthquake to 42 post-earthquake. While some scholars have connected garden development to crisis response in Pompeii (Jashemski, 1977; Pesando, 2011; Esposito, 2018), a systematic quantification of the phenomenon has not been attempted, nor has the role of agency and memory in the phenomenon been explored.

This paper presents the first visual depiction of garden development in post-earthquake Pompeii. Guided by contemporary resilience and memory theory, it explores the pivotal role of the town's agricultural heritage in driving this transformative phenomenon. A close examination of the sites illustrates that this rapid growth was the result of diverse micro-actions implemented largely by the individual efforts of landowners and gardeners rather than state intervention. Motivated by economic incentives, and equipped with generational knowledge or ‘memory’, these grassroots initiatives inadvertently fostered a more resilient city poised to tackle future challenges, with positive implications for local food security, employment, income, and infrastructure. In addition to quantifying Pompeii's market gardens for the first time, this study aims to connect the town's cultural legacy to a flourishing market and provide a conclusive example of crisis-driven garden cultivation in antiquity.

7 **BEYOND THE SEISM. THE RESPONSE TO THE EARTHQUAKES IN THE NORTHERN AREA OF SICILY BETWEEN HISTORICAL AND ARCHAEOLOGICAL SOURCES**

Boglione, Marcella (University of Bern; École Pratiques des Hautes Études Paris)

Like today, in the past, earthquake disasters broke and overwhelmed daily relationships between people and community ties, and broke - perhaps even more severely than in the present - the residential roots of populations that often remained eradicated from their places sometimes forever.

Seismic disasters have always made people think, discuss, hypothesise: to understand how they happen, propagate, what damage they do, how one can defend oneself and how to react. Yet their effects, although they have been the subject of studies for centuries, are not known in widespread Italian culture. Even when, in relatively recent times, historical knowledge of seismic effects in the long term became an intrinsic part of scientific research, a conscious and shared memory of the danger was not created.

Sicily is one of the most seismically active regions in Italy in terms of earthquakes frequency and intensity. Just think of 11 January 1693 when the whole of Sicily was shaken by a very strong earthquake with a 7.4 magnitude. Known as the ‘Val di Noto earthquake’, the devastating quake destroyed more than 45 towns and caused at least 60,000 fatalities. The powerful tremors triggered a devastating tidal wave in the Ionian Sea, whose waves reached as far as Greece. Collapse and serious damage also occurred in Messina and in some towns on the north-eastern coast; injuries and partial collapse occurred in Palermo, Agrigento, Reggio Calabria and, more seriously, in Malta.

The paper aims to address the response to seismic and related events that occurred in the northern part of Sicily, from Trapani to Messina through the centuries, between the first millennium BCE and the first millennium CE in order to create a historical memory of the resilience of the population.

8 **FROM BAYRA TO VERA. THE COLLAPSE AND SUBSEQUENT RECONSTRUCTION OF A TOWN IN THE AFTERMATH OF AN EARTHQUAKE**

Alonso-Valladares, Moisés (University of Granada) - García Porras, Alberto (University of Granada)

On November 9th, 1518, an earthquake destroyed the town of Vera (Almería, Spain). Its inhabitants quickly organised the reconstruction, which involved abandoning the hill where the town was based and looking for a new settlement in the plain. The Andalusian town of Vera (formerly known as Bayra) would never recover from the strong tremor and the houses and buildings stayed buried.

It remained buried for over 500 years, until the spring of 2021, when the first archaeological campaign took place to evaluate the archaeological potential. Based on those excellent results, it was possible to launch a long-term project focused on the site and the consequences of the earthquake.

The dig brought out interesting findings, that allows us to reflect on the destruction and abandonment of the original settlement and the building of a new town involving deep changes within the population. In addition, the dig made possible to accurately document the 1518 earthquake and the response of the inhabitants of Vera, identifying the recovery of the houses and its later abandonment.

The practical implications of this process of resilience and change following a natural disaster, and the state led reconstruction of a town that involves some of the major figures of the early 16th century (Emperor Charles V, Pope Leo X, architect Francisco del Castillo) will be analysed in this work.

9 TRACING NATURAL CALAMITIES: LIPARI AS A CASE STUDY

Gür, Selin (University of Bern)

The Aeolian Islands are an archipelago of seven islands in the southern Tyrrhenian Sea, north of the Sicilian coast. They form a volcanic arc shaped by the Tindari Fault System. Lipari, also known as Meligunis in Greek, is the largest island in the archipelago. Systematic archaeological excavations have been ongoing in the Diana district since 1948. The region holds a history of uninterrupted settlement from the Bronze Age to the Roman Imperial Times. Notably, traces of sudden destruction in the 8th century BC offer strong evidence, leading to consideration of potential natural causes.

By combining modern geological data with archaeological methods, this ongoing research seeks to reconstruct the historical impact of natural calamities in Lipari. To gain a more holistic understanding of the dynamic interactions between human adaptation and the geological forces that have shaped the Aeolian Islands throughout history, the study aims to analyze whether architectural adaptations, such as structural reinforcement, were implemented as potential resilience strategies in response to calamities. The presentation will evaluate the current state of knowledge and archaeological data in the region, discussing the methodological approaches utilized in this research.

10 THE ARCHITECTURE IN RAW EARTH WITHIN THE GREEK COLONIES IN SICILY

Labartino, Davide (University of Bern)

The architecture in raw earth within the Greek colonies in Sicily constitutes a captivating field of study, often overlooked in scientific literature despite its historical and archaeological significance. This project aims to meticulously investigate the construction techniques, materials, cultural influences, and especially environmental factors shaping its evolution. It sheds light on how the Sicilian colonies were affected by natural disasters in different periods and cultural contexts, analyzing their short and long-term responses. The project focuses on the resilience, adaptation, and resistance of raw earth materials in pre- and post-disaster scenarios, employing a hands-on and interdisciplinary approach.

Research questions highlight nuances of this architectural form. Firstly, it explores predominant techniques in Greek, Phoenician-Carthaginian, and indigenous colonies in Sicily, seeking to identify construction methodologies through literature analysis and on-site inspections. For example, it would be interesting to investigate the colony of Himera in the area of the housing district, Selinunte in the area of the artisan district and the Phoenician-Carthaginian context of Mozia. Secondly, it delves into the contexts of applying these techniques, investigating material extraction locations and production sites. The core of the project examines the resilience of raw earth structures to natural disasters, particularly earthquakes (initially considering the context of Himera), identifying potential advantages and influencing factors. The methodology proposes innovative static and seismic tests, assessing the strength and response capabilities of raw earth structures to constant loads and seismic forces. Finally, it investigates cultural influences on raw earth architecture, aiming to identify the use of raw materials and cultural nuances in construction practices.

This underscores the importance of raw earth architecture as a forefront archaeological research field, offering new perspectives on techniques, materials, and socio-cultural and environmental contexts between the 8th and 5th centuries BCE.

11 BENEATH THE ASHES: ARCHAEOLOGICAL INSIGHTS ABOUT THE GREAT FIRE OF BUCHAREST

Motei, Raluca-Iuliana (Bucharest Municipality Museum) - Gavrilă, Elena (Bucharest Municipality Museum) - Pîrvulescu, Dan (Bucharest Municipality Museum)

Despite its destructive nature, fire served as a catalyst for change in 19th-century Bucharest, leading to the rejuvenation and reimagining of the urban landscape. While devastating, the significant fire provided local authorities with an opportunity to redesign and rebuild the city.

The Great Fire started on March 23rd 1847, the wind and flammable building materials fueled it for days, destroying a large area nowadays Historical Center of Bucharest, one of the most populated in the first half of the 19th century. Roughly 1,850 buildings were completely consumed by the fire, constituting one-fifth of the entire capital's structures at that time. In response, administrative and urban planning measures were implemented with the goal of minimizing the likelihood of a similar catastrophe happening again. These included the straightening and broadening of existing streets, as well the integration of more fire-resistant materials like brick or stone during the reconstruction phase.

Archaeological research frequently reveals elements that are less likely to have been documented in writing or can serve as a means to verify the accuracy of historical documents and visual representations. In the recent archaeological excavations conducted in the Historical Center, significant evidence of the destruction caused by the Great Fire and the subsequent extensive reconstruction efforts have come to light. Notably, visible traces of changes in the building alignment were uncovered, indicating a shift in the city's layout. Additionally, numerous cellars and subterranean infrastructure elements were integrated into the newly emerging cityscape. The results of archaeological excavations, when combined with historical records and visual representations, serve not only to authenticate the

extent of the destruction and subsequent reconstruction but also to offer valuable insights into the city's layout and architectural characteristics prior to the fire.

12 ECONOMIC AND SOCIAL TRANSFORMATION OF NEA PAPHOS (CYPRUS) AFTER THE 17/15 BCE EARTHQUAKE

Marzec, Edyta (Fitch Laboratory, British School at Athens; Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences) - Kajzer, Małgorzata (Institute of Archaeology and Ethnology of the Polish Academy of Sciences)

The search of earthquakes in archaeological and historical contexts has been the subject of multiple literary and archaeoseismic studies. To a great extent, research on this topic has so far focused on validating earthquake presence, and studies investigating their impacts on cultural landscapes are still rare. This is an effect of cautioning against overinterpreting the role of past disasters and the lack of a reliable methodological approach allowing for such interpretations.

Using the case study of Nea Paphos (southwest Cyprus), this pilot research project aims to investigate the economic and social consequences of its destruction by an earthquake in 17/15 BCE, followed by its extensive reconstruction with Imperial support. This research is utilising pottery pre- and post-dating the earthquake as a proxy to shed light on these enquiries, through an integrated macroscopic and laboratory analytical programme. The results suggested not only a change in pottery supply and consumption patterns but also a shift in the organisation of local manufacture, which caused an increased production of certain ceramic wares. It is possible that the influx of money from Rome created a high demand for labour and different types of ceramic material, which were essential during the phase of the city rebuilding. This paper is an important contribution to the way of approaching the economic, cultural and social transformations brought by catastrophes in antiquity.

1113 GOING BEYOND TRADITIONAL APPROACHES TO LITHIC RESEARCH IN PREHISTORY AND PROTOHISTORY: HYPOTHESIS, METHODS, VALIDATION, CONTRAST AND RAW DATA

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Abrunhosa, Ana (IPHES - CERCA - Institut Català de Paleoecologia Humana i Evolució Social; ICArEHB - Interdisciplinary Center for Archaeology and Evolution of Human Behaviour) - Vilmercati, Melissa (Sapienza, University of Rome - Department of Antiquities) - Prieto, Alejandro (University of the Basque Country UPV/EHU - Department of Geography, Prehistory and Archaeology) - Yeşilova, Görkem Cenk ((IPHES-CERCA) Institut Català de Paleoecologia Humana i Evolució Social; Universitat Rovira i Virgili, Dept. d'Història i Història de l'Art) - Sánchez de la Torre, Marta (Seminari d'Estudis i Recerques Prehistòriques (SERP); Institut d'Arqueologia de la Universitat de Barcelona)

Session format: Discussion session (with formal abstracts)

The study of stone raw materials and finished tools allows an understanding of the operational sequences, migration, trade, and socio-economic organisation of past human groups, particularly those belonging to Pre and Protohistory.

The determination of the origin of raw materials for tool making, and the selection of knappable materials, may give insight into the knowledge of the physical environment and settlement choices. Methods of analysis include macro and microscopic approaches, petrography, geochemistry, geoarchaeology, and mechanical properties definition. The study of reduction processes and/or manipulation through traditional techno-typological analysis coupled with specific approaches such as techno-economy, morpho-functional, production and use-wear traces, spatial analysis, statistics and archaeometry can lead to a more precise reconstruction of human behaviour. Although these different perspectives are traditionally studied independently as sub-fields of lithic studies, they are all interconnected. The availability of raw materials will determine choices and influence mobility patterns, while rock mechanical characteristics have direct implications for technological behavior and the technical and cultural adaptation of material culture. However, methods and procedures still largely vary between research teams and the communication between scholars from different regions and chronological research periods can become a challenge to effectively share, compare, and interconnect information from all these methodologies and approaches.

In this session, we invite researchers working on the multifaceted methodologies of stone research applied to Pre and Protohistory, from the survey and sampling of reference materials to the characterisation of the rocks and tools. The aim is to discuss methodological developments and approaches in stone research, data comparability, comprehend the current state of the art in lithic research and consider prospects in the field. We also welcome the formulation of standard protocols and the creation of frames of reference for raw data availability.

1 OLD AND NEW METHODOLOGICAL APPROACHES APPLIED IN BRONZE AGE LITHICS STUDIES: THE CASE OF COPPA NEVIGATA (SOUTHEASTERN ITALY)

Vilmercati, Melissa (Sapienza, University of Rome - Department of Antiquities)

The production and use of stone tools remained a common and reiterated activity throughout the Bronze Age, even though the archaeological research continues to consider this category of artifacts as secondary during such period. Because of this bias, there are still few studies on this topic, and, especially in Italy, they almost never go beyond the traditional typological issues.

The current paper aims to overcome this outdated preconception, pushing forward the study of the Italian Bronze Age lithic artefacts. The chosen case-study is the fortified settlement of Coppa Nevigata, one of the most extensively excavated archaeological contexts of the Italian Bronze Age. Because of its long occupation – throughout the entire Bronze Age till the beginning of the Iron Age (18th-8th century BCE) – it allows to answer in diachronic terms to specific questions about the production and use of stone tools.

This presentation will focus on the description of the integrated and multilevel protocol used in the study of the lithic assemblage from the site. The methodological procedure began with a classical techno-typological analysis and progressed through a morpho-functional approach combined with targeted experiments and statistics, and finally arrived at the use-wear study. This integrated analysis enabled the reconstruction of the aspects related to both the operational chain used in the settlement and the functions of the produced stone tools.

Because of its exhaustiveness, this method goes beyond the traditional approach used in the study of Bronze Age lithics, proving to be extremely useful for the understanding of the techno-morphological and functional issues related to stone knapping expertise. As a result, it can serve as a standardized protocol for analysing and compare lithic assemblages of other coeval contexts.

2 THE QUARTZITE AND QUARTZ LITHOTHEQUE FROM THE CENIEH: SEARCHING FOR RELIABLE, COMPARABLE AND ACCESSIBLE RAW MATERIAL DESCRIPTIONS

Prieto, Alejandro (Department of Geography, Archaeology and Prehistory, University of the Basque Country) - Cristóbal, Paula (Department of History, Geography and Communication, University of Burgos) - Llamazares González, Javier (Experimental Archaeology and Taphonomy Laboratory, CENIEH) - Cuartero, Felipe (ERC-MULTIPALEOIBERIA-StG, Department of History and Philosophy, University of Alcalá)

Raw material studies have been mainly focussed on tracing the origin of the rock artefacts discovered in archaeological sites. The distance in which a resource is separated from its geological source means the distance that humans moved or exchanged a particular material. This allowed the prehistorian to infer the extension of economic human territories, determine prehistoric migrations, or measure the significance of the social and interchange networks in the Prehistory. Furthermore, the characterisation of these rocks is allowing the understanding of the contexts where rocks were procured, the potential selective mechanism to obtain them, and even the reasons behind its exploitation.

How are we characterising these rocks? How should we describe them to make reliable descriptions? Should we need frames of reference to compare rock descriptions? And how are we sharing the knowledge we are producing?

In this talk, we are going to address these questions by the presentation of the quartzite and quartz lithotheque from the CENIEH. This collection is made of 73 samples that have been petrographically described through their thin sections and their surfaces, combining destructive and high-resolution techniques with non-destructive ones. The wide geographic and geological variety of the stored samples and the absence of a particular hypothesis to address when analysing the materials have challenged the description of the samples and have made us think over the aforementioned questions. In this presentation, we will show the collection and how their samples were characterised through the petrogenesis of the material. We will also think about the concepts of reliability, comparability and accessibility in lithic raw material characterisation and how they have been addressed in the study of this collection.

3 LOW AND HIGH MAGNIFICATION APPROACHES TO THE BIPOLAR TECHNIQUE: CONTROLLED EXPERIMENTAL GROUPS AND THE SITE OF LA CANSALADETA

Yesilova, Gökem (Institut Català de Paleoeologia Humana i Evolució Social; Universitat Rovira i Virgili, Dept. d'Història i Història de l'Art) - Ollé, Andreu (Institut Català de Paleoeologia Humana i Evolució Social; Universitat Rovira i Virgili, Dept. d'Història i Història de l'Art)

The bipolar technique represents a flaking strategy that endured from 3.3 million years ago until the 20th century, demonstrating a non-uniform geographical or chronological distribution. This method entails the deliberate applica-

tion of an active percussive element onto a core situated upon an anvil, thereby effecting intentional contact for the purpose of flake removal.

The challenge of discerning this technique in archaeological materials, notwithstanding its distinct fracture mechanism compared to freehand flaking, is a widely acknowledged aspect among researchers specializing in this field. From a macroscopic standpoint, the conducted research has proven instructive in delineating and interpreting the most characteristic features of this technique. Nevertheless, microscopic studies are poised to assume a distinct role in the interpretation and description of subtle macroscopic differences associated with this technique.

In this study, we investigate the technological indicators of the bipolar technique from a microscopic perspective, employing both low and high magnification approaches within a controlled experimental group comprising various raw material types. Our examination encompasses the identification and interpretation of the microscopic technological indicators of this technique in archaeological material. To achieve this, we compare the results of our experiment with those derived from the comprehensive analysis of refit sets identified during the technological study of the La Cansaladeta site (Middle Pleistocene), situated in northeastern Spain.

4 EXPLORING KNAPPING TECHNIQUES THROUGH 3D MICROSCOPY: PRELIMINARY RESULTS AND METHODOLOGICAL INSIGHTS

García-Natale, Martín Julio (Universidad Autónoma de Madrid, Departamento de Arqueología y Prehistoria) - Torres Navas, Concepción (Instituto de Historia, CSIC- Spanish National Research Council, Madrid, Spain,) - Baena-Preysler, Javier (Universidad Autónoma de Madrid, Departamento de Arqueología y Prehistoria)

Identifying knapping techniques is one of the most researched topics regarding the study of lithic remains left by our ancestors. Many approaches have tried to split hairs on how stone tools were produced. Qualitative ones have mostly been preferred, attending to the identification of characteristic stigmata produced by different knapping techniques. However, this type of approach has sometimes been too dependent on the experience and the understanding of the lithics by the researcher.

During the last few years, 3D analysis adapted to lithic studies has helped to homogenize and standardize data used to study the way stone tools were made. 3D microscopy, however, has been set aside for its use in traceological studies even though its potential on providing both quantitative and fine-grained qualitative data.

Here, we present some preliminary and encouraging results on the use of 3D microscopy for identifying knapping techniques. We focus on a specific methodology that provides quantitative and qualitative data that may be able to discriminate different knapping techniques through the development of an experimental protocol for providing specific replicas analyzed, as well as its comparison with archaeological lithic remains. We are confident that this methodology will provide more accurate results and help us understand the way our ancestors culturally evolved on the way they made their tools.

5 BEYOND TYPOLOGY - TOWARD A COMPUTER-AIDED DIACHRONIC ANALYSIS OF VARIABILITY IN LITHIC PROJECTILE MORPHOLOGY

John, Robin (Department of Prehistoric Archaeology, University of Cologne; Stiftung Neanderthal Museum) - Hussain, Shumon T. (Centre for Multidisciplinary Environmental Studies in the Humanities (MESH), University of Cologne; Department of Prehistoric Archaeology, University of Cologne) - Maier, Andreas (Department of Prehistoric Archaeology, University of Cologne)

Traditionally, lithic industrial variability in the archaeological record has been described mostly in typological terms. While typologies have a long history in Palaeolithic archaeology and can capture morphological diversity in various stone artefacts comparatively well, lithic artefact variability, i.e., the differences in shape and size within a single type, is only insufficiently reflected. To overcome this inherent problem of typologies, PyREnArA (Python-R-Environment for Artefact Analysis), a semi-automatic system for recording and quantitatively analysing morphometric data of lithic tools, was developed and progressively refined over the last couple of years. Instead of taking individual measurements on a single artefact after another and subsequently feeding these data into special computer programs for statistical analysis – a process both error-prone and time-consuming – we integrated these steps into a single implementation. Starting with a standardised way of orientating multiple artefacts on one image and afterwards recording standard properties, such as size, shape, or the position of modifications on each artefact, PyREnArA also records properties which are more difficult to measure manually, such as an artefact's surface area or the position of the centre of mass. These data can easily be fed into a variety of build-in quantitative methods like Geometric Morphometrics (GMM) or Redundancy Analysis (RDA). Combined with chronological information on the analysed artefacts, the latter may detect diachronic variability related to evolutionary processes. The degree of standardisation and variability within individual assemblages or larger geographic regions can also be calculated, visualized and compared. In this talk we apply our method to a subset of a dataset compiled for an ongoing PhD project (RJ) conducted at the Neanderthal

Museum and the University of Cologne, dealing with diachronic trends captured by the morphology of Upper and Late Palaeolithic shouldered points from across Europe.

6 "CHOCOLATE FLINT" – TWO SOURCE AREAS AND HOW TO DISTINGUISH THEM THROUGH ADVANCED PETRO-GEOCHEMICAL METHODS

Mandera, Sara (Institute of Archaeology, Nicolaus Copernicus University, Toruń, Poland) - Brandl, Michael (Austrian Archaeological Institute, Austrian Academy of Sciences, Vienna, Austria) - Sudoł-Procyk, Magdalena (Institute of Archaeology, Nicolaus Copernicus University, Toruń, Poland) - Hauzenberger, Christoph A. (Institute of Earth Sciences - NAWI Graz Geocenter Petrology & Geochemistry, Karl-Franzens-University Graz, Austria) - Werra, Dagmara H. (Institute of Archaeology and Ethnology, Polish Academy of Sciences, Warsaw, Poland) - Kerner-Gubała, Katarzyna (Institute of Archaeology and Ethnology, Polish Academy of Sciences, Warsaw, Poland) - Boroń, Tomasz (Institute of Archaeology and Ethnology, Polish Academy of Sciences, Warsaw, Poland) - Krajcarz, Maciej T. (Institute of Geological Sciences, Polish Academy of Sciences, Warszawa, Poland)

"Chocolate flint" is a siliceous raw material well known from the Holy Cross Mountains (HCM) in south-central Poland, which was of great importance in the Late Palaeolithic and Mesolithic economies. Only recently, previously unknown deposits have been discovered in the Kraków-Częstochowa Upland (KCU). This finding has challenged the previous notion of one singular source area of this raw material for chipped stone production and, consequently, our understanding of the lithic economy in east-central Europe. It is now clear that this more complex source situation and the associated networks of agents involved in the distribution of "chocolate flint" require a revision of assumed distribution patterns.

This study presents the first results of the ongoing multidisciplinary research endeavours to characterise the material and trace the distribution of artefacts made from "chocolate flint" within KCU and beyond. The primary goal of our provenance analyses is to differentiate this material from "chocolate flint" originating in the HCM. Our study involves petrography, microfacies analysis, geochemistry applying Laser Ablation ICP-MS and spectroscopic techniques such as FTIR (Fourier Transform Infrared Spectroscopy).

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7 A STANDARDISE APPROACH TO STUDY SURVEY LITHICS: THE NEW ASSEMBLAGES FROM THE LEBANESE-ITALIAN ARCHAEOLOGICAL PROJECT IN THE REGION OF TYRE

Bucci Casari, Francesco (Department of Ancient World Studies, University of Rome "La Sapienza") - Fusco, Marianna (Department of Ancient World Studies, University of Rome "La Sapienza"; Department of History and History of Art, University Rovira "I Virgili") - De Paolis, Paolo (Department of Ancient World Studies, University of Rome "La Sapienza") - Spinapolic, Enza (Department of Ancient World Studies, University of Rome "La Sapienza") - D'Andrea, Marta (Department of Ancient World Studies, University of Rome "La Sapienza") - Haider, May (Lebanese-University) - Badawi, Ali (Directorate-General of Antiquities)

The survey materials represent a valid element for indicate the presence of past human occupations. This is particularly relevant in areas or zones where no archaeological presence is reported in the general literature.

Although they do not provide an absolute chronological framework, surface collection is useful as a first step for the investigation of large, unrecorded areas.

Since 2019, the Lebanese-Italian Archaeological Project in the region of Tyre, combining pedestrian surveys and stratigraphic sondages, aims at reconstructing human activities and settlement patterns in the regions of Shawakeer and Ras el-Ain. In the framework of this project, a large number of lithic artifacts was collected from surface, documenting human activities in the project's area since the Palaeolithic Period. This is a substantial advancement in the scholarly knowledge of the region, because Tyre is not currently charted on maps for this period. This data represented a methodological challenge for the classification of lithic industries and the association with a specific techno-cultural complex. Thus, a traditional descriptive methodology was adopted, with qualitative analysis where possible, in order to understand the occupation timeframe of the region.

The classification and technological analysis of the lithic industries, together with the analysis of the spatial distribution of the artifacts, facilitated the development of a diachronic chronological framework for the area, showing the presence of lithic technologies spanning from the Lower Palaeolithic to the Bronze Age, through the creation of databases and their management in a GIS environment. The application of this traditional methodology has effectively facilitated the examination of a substantial quantity of lithic artifacts. Together with the analysis of the chaînes opératoires for the reconstruction of the reduction systems, whenever applicable, this method has allowed us to establish a preliminary relative chronology of the artifacts within the assemblages from Shawakeer and Ras el-Ain.

8 REVISITING THE MIDDLE PALAEOOLITHIC SITE OF RAS EL-KELB, LEBANON: A COMPREHENSIVE ANALYSIS OF LITHICS AND RAW MATERIAL

Soubra, Marya (Paleoanthropology, Senckenberg Centre for Human Evolution and Palaeoenvironment, Institute of Archaeological Sciences, University of Tübingen, Germany) - Hilbert, Yamandu (Paleoanthropology, Senckenberg Centre for Human Evolution and Palaeoenvironment, Institute of Archaeological Sciences, University of Tübingen, Germany) - El Zaatari, Sireen (Paleoanthropology, Senckenberg Centre for Human Evolution and Palaeoenvironment, Institute of Archaeological Sciences, University of Tübingen, Germany)

The Middle Palaeolithic site of Ras el-Kelb, excavated in the 1950s by Dorothy Garrod and Germaine Henri-Martin, remains a significant yet underexplored archaeological site in terms of modern archaeological methodologies and technological advancements. In this study, we conduct a comprehensive re-evaluation of 200 lithic artefacts from the original collection, employing new methodologies and scientific technologies. The analysis includes various artefact types, such as cores, flakes, blades, Levallois products, scrapers, and retouched pieces. Our primary objective is to refine the data concerning composition, function, and production techniques of the lithic assemblage. To achieve this, we employ qualitative and quantitative analyses, alongside low-power and high-power approaches for traceological analysis. Furthermore, we address the neglected aspect of local raw materials, aiming to provide insights into the procurement, utilization, and exploitation strategies by the Middle Palaeolithic population of the Lebanese coast. Our results indicate that the lithics from Ras el-Kelb were primarily utilized for diverse cutting and scraping tasks, suggesting a domestic character for the site's activities. In addition, our understanding of Ras el-Kelb's significance within the Middle Palaeolithic landscape is enhanced by contextualizing our findings within a broader geographic and chronological framework.

9 LITHIC RAW MATERIAL SUPPLY AT THE MIDDLE PALEOLITHIC SITE OF LOS ALJEZARES: GEOLOGICAL AND GEOMORPHOLOGICAL CONSTRAINTS

Chazarra, Nahum (Universidad de Valencia) - González, Jaime (University of Alicante) - Canseco, Davinia (University of Alicante) - Alfaro, Álvaro (University of Valencia) - Villaverde, Valentín (University of Valencia) - Eixea, Aleix (University of Valencia)

Los Aljezares represents one of the few Middle Palaeolithic open-air sites in the Iberian Peninsula. A U/Th age (132 ± 10 ka) from associated carbonate deposits allows us to attribute the site to the uppermost part of the Upper Pleistocene (MIS 5). To date, a total of two levels of human occupation have been identified in which the density of lithic remains is low compared with cave and rock shelter sites in the region. In this paper we present the first lithic raw material analysis and their catchment areas using the latest geological and geomorphological data available that take into account the evolution of the landscape, which in this area has been very fast due to factors like active tectonics and eustatic changes. New survey works were developed in the surrounding area, where some Upper Palaeolithic sites—such as Ratlla del Bubo o Cova del Sol—are located. These works allow us to characterise the different lithologies documented in the archaeological assemblage from a macro (colour, texture and appearance) and microscopic (thin sections that allow us to determine its mineralogy, inclusions, and fossils to assign the raw materials typology) point of view. With this information, we compare the different strategies used by hunter-gatherer groups from the Middle and Upper Palaeolithic in the central Mediterranean region of the Iberian Peninsula.

10 TECHNO-FUNCTIONAL ANALYSIS OF THE MOUSTERIAN LITHIC ASSEMBLAGE FROM GABASA CAVE (SPAIN)

Shveygert, Ekaterina (Universidad de Zaragoza; Instituto Universitario de Investigación en Ciencias Ambientales de Aragón (IUCA) de la Universidad de Zaragoza; Grupo de Investigación Primeros pobladores y patrimonio arqueológico del Valle del Ebro (P3A)) - López-Tascón, Cristina (Universidad de Zaragoza; Universidad de Oviedo; Instituto Universitario de Investigación en Ciencias Ambientales de Aragón (IUCA) de la Universidad de Zaragoza; Grupo de Investigación acreditado LANDS, Universidad de Oviedo)

Beyond the traditional descriptive typological methods, many archaeological techniques are currently developed to expand the boundaries of our knowledge of prehistoric societies. Thus, the techno-functional analysis applied to the study of lithic collections allows us not only to recognize the production of industries, but also their management and the possible specialised use of the tools.

The presentation focuses on the analysis of three selected lithic assemblages (d, f, and g archaeological levels) from the Middle Palaeolithic site named "Cueva de Los Moros I of Gabasa" located in the foothills of the southern slope of the Pyrenees (Huesca, Spain). A first technological study has been carried out on the three entire lithic assemblages, followed by the use-wear analysis of a selected sample from each level.

The present study aims, firstly, to both reconstruct the technological operational chains and identify the functionality of the lithic material, thus complementing existing data on the functional interpretation of the site. Secondly, we seek

to compare the different occupational stages of the cave, in order to understand and reconstruct its evolutionary process over time.

11 QUARTZ AND QUARTZITE IN A FLINT-BASED ASSEMBLAGE: THE CASE OF ABRI DU MARAS

Abrunhosa, Ana (IPHES-CERCA - Institut Català de Paleoeologia Humana i Evolució Social, Spain.; Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Tarragona, Spain; ICArEHB - Interdisciplinary Center for Archaeology and Evolution of Human Behaviour, FCHS - Universidade do Algarve, Portugal.) - Chacón, María Gema (IPHES-CERCA - Institut Català de Paleoeologia Humana i Evolució Social, Spain.; Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Tarragona, Spain; UMR7194 - HNHP (MNHN - CNRS - UPVD - Sorbonne Universités), Paris, France) - Moncel, Marie-Hélène (UMR7194 - HNHP (MNHN - CNRS - UPVD - Sorbonne Universités), Paris, France)

Raw material studies have conventionally centred on flint and obsidian to decode long-range mobility patterns. Nevertheless, recent methodologies have broadened the scope and acknowledged that other raw materials can be proxies for understanding various facets of human behaviour. On the other hand, local resources, their characterisation, and categorisation can be relevant in comprehending the factors influencing the exploitation of specific materials, the extent of material diversity explored, the technical and cultural reasons behind such choices, and the implications for site selection and temporality of occupation.

The Abri du Maras, located close to the Ardèche River's margins, a Rhône River tributary, is a Middle Palaeolithic site occupied by Neanderthal groups between MIS 7 and MIS 3 with a flint-based lithic assemblage. While the origin and procurement distances of flint have been relatively well-documented, the assemblage also includes a notable albeit previously overlooked proportion of quartz and quartzite. These materials, likely sourced locally, were often sidelined in research, a common occurrence in flint-dominated contexts.

The 'Quartz and Quartzite Neanderthal Assemblages of Payre and Abri du Maras' project, conducted under the MSCA CoFund fellowship at IPHES and MNHN (France), seeks to investigate the presence of these materials and understand the economic dynamics of lithic resource procurement and management at the local level.

The archaeological assemblage comprising 196 pieces from levels 4 to 6 of Abri du Maras and 858 from Payre levels D, F and G were characterised macro and microscopically based on geological criteria. The availability of local raw materials was defined through the study of cartography, survey and sample collection on the ancient terraces of the Ardèche River and its current banks.

Through this project, we aim to comprehend the significance of studying quartz and quartzite materials and present the latest findings and interpretations regarding their role in past human behaviour.

12 LITHOLOGICAL CHARACTERISATION OF RAW MATERIALS FROM SUB-UNIT IIIb OF TEIXONERES CAVE: A MULTIDISCIPLINARY APPROACH

Muñoz del Pozo, Alicia (Universidad de Zaragoza (UNIZAR). Departamento de Ciencias de la Tierra. C/ Pedro Cerbuna 12. 50009 - Zaragoza, Spain.; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.) - Gómez de Soler, Bruno (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.) - Chacón, María Gema (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.; UMR7194-HNHP (MNHN-CNRS-UPVD-Sorbonne Universités), Musée de l'Homme, 17 Place du Trocadero, 75116, Paris, France) - Picin, Andrea (Alma Mater Studiorum-Università di Bologna, Dipartimento di Chimica "G. Ciamician", via Selmi 2, 40126 Bologna, Italy.) - Bustos-Pérez, Guillermo (Universidad Autónoma de Madrid (UAM). Departamento de Prehistoria y Arqueología. Facultad de Filosofía y Letras. Campus Cantoblanco, 28049 Madrid, Spain.; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.) - Blasco, Ruth (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.) - Rivals, Florent (ICREA, Pg Lluís Companys 23, 08010 Barcelona, Spain.; Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.) - Rufà, Anna (ICArEHB - Interdisciplinary Center for Archaeology and Evolution of Human Behaviour, Universidade do Algarve, Campus de Gambelas 8005-139 Faro, Portugal.; Univ. Bordeaux, CNRS, MCC, PACEA, UMR 5199, F-33600 Pessac, France.) - Rosell, Jordi (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Avinguda de Catalunya 35, 43002 Tarragona, Spain.)

Teixoneres Cave (Moià, Barcelona) is part of the Toll Cave karstic system formed within Neogene limestones of Collsuspina formation. Filled with Pleistocene sediments dating approximately between 200 and 16 kya BP. The lithic industry in sub-unit IIIb (MIS 3) is formed by 5083 items, primarily composed of quartz, followed in abundance by chert, limestones, quartzites, hornfels, and sandstones.

This research focuses on examining the various lithologies comprising the lithic assemblage and the distinctive features that characterise each type of rock through macroscopic and microscopic analyses. Each lithology corresponds to a rock type with different geological origins, thus requiring different methodologies for each of them.

Quartz (n=2998) originates from conglomerates 5 km south of the site. Criteria such as colour, crystalline habit, and impurities are used for identification. Chert (n=1550) is mainly located 10 km to the east. Attributes considered include colour, texture, diaphaneity, inclusions, and features of its bedrock (fossils, crystal shapes). Limestone (n=125) texture is identified following the classification system proposed by Dunham (1962), along with the presence or absence of fossils. Quartzite (n=72) and hornfels (n=68) are analyzed to recognize the minerals associations present, as well as their size, crystalline habit, and type of contact between crystals. Sandstone (n=48) are classified based on clast size, matrix and cement percentage, and mineralogy. All these raw materials come from the fluvial courses near the site.

To gain a more precise understanding of the procurement areas and mobility patterns of the Neanderthals inhabiting Teixoneres Cave, it is crucial to consider the diverse analytical approaches required for each item based on its lithology.

The aim of this paper is to provide a comprehensive characterisation of the lithic assemblage from sub-unit IIIb of Teixoneres cave and to discuss the optimal criteria and approaches for characterising each type of lithology represented at the site.

13 NEW DIRECTIONS IN CHERT PROVENANCE: TOWARDS NEW BASIS FOR DETECTING MOBILITY AND TERRITORIAL BEHAVIOUR IN CENTRAL ITALY DURING PREHISTORY

Carletti, Elena (Sapienza University of Rome) - Eramo, Giacomo (University of Bari) - Cardarelli, Lorenzo (Sapienza University of Rome; CNR, Istituto di Scienze del Patrimonio Culturale, Area della Ricerca Roma 1) - Forti, Luca (University of Milan) - Allegretta, Ignazio (University of Salento) - Monno, Alessandro (University of Bari) - Conati Barbaro, Cecilia (Sapienza University of Rome)

New methods for lithic research are rapidly increasing among the scientific community, going far beyond the traditional techno-typological approach. Updated methodologies applied to the material culture can, indeed, deepen our understanding of past communities, enlightening the multifaceted spectra of human behaviour, otherwise unrevealed.

In this work, we will discuss the role of chert as a proxy for tracing provenance and the past human movement, according to a multi-scalar approach. In fact, the identification of the geographic origin of the knapped lithic raw material can offer a fresh perspective into mobility, territorial behaviour, and resource management.

In this talk, we will present the preliminary data obtained from the non-destructive provenance analyses applied to the Middle Palaeolithic assemblage from Grotta Battifratra (Sabina region, central Italy). Specifically, we will discuss about:

1. The creation of a new chert reference collection, currently lacking for the area;
2. The non-destructive chert characterization protocol (NM-PCI) of the assemblage, including petrographic and geochemical criteria;
3. A new statistical approach, developed to process the resulting multiple dataset.

The results obtained will clear the catchment area of the human groups occupying Grotta Battifratra rock-shelter during the Middle Palaeolithic, highlighting their routes to the knappable raw material. At the same time, the new geological reference collection will shed light on the availability and distribution of chert through the area and serve as a fundamental tool to perform provenance analysis in central Italy, encouraging future directions and developments.

14 ESTABLISHING EXPERIMENTAL BASELINES TO INTERPRET LOW-COST TECHNOLOGICAL BEHAVIOR DURING THE MIDDLE TO UPPER PALEOLITHIC TRANSITION IN SOUTHERN IBERIA

Ferar, Nolan (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB), Universidade do Algarve, Faro, Portugal) - Reeves, Jonathan (Technological Primates Research Group, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; Center for the Advanced Study of Human Paleobiology, Department of Anthropology, The George Washington University, Washington, DC, USA) - Moore, Mark (Archaeology and Palaeoanthropology, University of New England, Armidale, New South Wales, Australia) - Cascalheira, João (Interdisciplinary Center for Archaeology and the Evolution of Human Behaviour (ICArEHB), Universidade do Algarve, Faro, Portugal)

Reconstructions of population dynamics during the Middle to Upper Paleolithic transition in southern Iberia are currently based on inferences linking lithic assemblages to cultural technocomplexes to genetically distinct populations. The Iberian Middle Paleolithic is characterized by the prevalence of low-cost, expedient reduction strategies. Thus, assemblages dating to this period that are relatively simple technologically and lacking diagnostic Upper Paleolithic elements are commonly taken as evidence of late Neanderthal survival. Often comprised of “low quality” raw materials, especially quartzite and quartz, these assemblages are sometimes small, including few formal tools and cores. Given low-cost core reduction strategies are widespread throughout hominin evolution, the diagnostic status of such assemblages may be questioned. On the other hand, the variability and patterning within and between expediently produced assemblages remains relatively underexplored relative to that of higher-cost technological products—and their interpretive potential is therefore potentially untapped.

Experimental ‘baseline studies’ provide an informative starting point from which to explore the variability and patterning arising from expedient technological behavior, and ultimately to inform our interpretation of archaeological patterning. Following a protocol developed by Moore and Perston, quartzite and quartz cobbles are reduced at random. Properties of the resulting flakes and cores are recorded across the reduction sequence. The variability observed is considered a proxy for maximally expedient core reduction. For comparison, experimental samples of intentional discoidal and Levallois reduction are produced on the same raw materials. Machine learning can be used to explore to what extent, and via what properties, these reduction strategies can be reconstructed from their products. The impact of sample size and bias, realities in the archaeological record, is further explored by applying the trained algorithm to subsets of the overall dataset.

15 EXPLORING THE FACIES CONVERGENCE IN EVAPORITIC CHERTS FOR COMPREHENSIVE CHARACTERIZATION

Gómez de Soler, Bruno (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili (URV)) - Burton, Evie (Irish Centre for Research in Applied Geosciences (iCRAG); School of Earth Sciences, University College Dublin (UCD)) - Rodríguez-Salgado, Pablo (Irish Centre for Research in Applied Geosciences (iCRAG); School of Earth Sciences, University College Dublin (UCD)) - Bria, Judit (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili (URV)) - Menuge, Julian (Irish Centre for Research in Applied Geosciences (iCRAG); School of Earth Sciences, University College Dublin (UCD))

In the Northeast of the Iberian Peninsula, in the central Catalan region, the main geological formations housing chert are the evaporitic formations of the Paleogene marginal basins of the Ebro Depression. Their formation environment corresponds to shallow saline lakes, where depending on their location (center or margin of the lake) and phase (dilution, concentration, exposure), the surrounding lithology varies, causing differences in the attributes that characterise each of these cherts.

From a petrographic perspective, Cenozoic cherts from evaporitic environments are characterised by their great heterogeneity, which in many cases makes any further characterisation and assignment a challenging task. The use of complementary geochemical techniques such as X-ray fluorescence can help better control this variability.

The abundance of prehistoric archaeological sites in this region, where hunter-gatherers used this raw material to make their artifacts, necessitates the use of analytical techniques by archaeologists to reliably characterize the material. Due to its non-destructive nature, easy handling and data acquisition, and the possibility of obtaining a large amount of data in a relatively short period, X-ray fluorescence becomes a very interesting technique for archaeological discipline.

In this paper, we present the characterisation of six geological formations, corresponding to four evaporitic formations (Valldeperes fm., St. Genis fm., Pira fm. and Rauric fm.), a lacustrine marshland (Bosc d'en Borrás fm.), and a lacustrine formation (Montmaneu fm.). With over 40 outcrops and 450 samples analysed, our aim is to discern the convergence of facies, and assign archaeological assemblages of many sites of the region (e.g., Abric Romani, Cova de les Teixoneres, among others) to specific geological formations and its possible outcrop. This will allow us to establish procurement areas and, consequently, insights into mobility patterns.

16 TRANSFORMATION OF MICROLITHS DURING THE EARLY NEOLITHIC IN THE NEAR EAST: THE CASE STUDY ON GRE FILLA IN UPPER MESOPOTAMIA

Agirsoy, Zeynep Beyza (Ankara University, Department of Prehistory)

Microlith tools are small, thin, geometrically, and non-geometrically shaped tools used by people throughout prehistoric times in their daily lives, such as hunting and fishing. This study analyses the examples discovered in Gre Filla in order to understand how microlithic tools transformed/evolved/diversified throughout the phases of the Early Neolithic (Pre-Pottery Neolithic).

Gre Filla stands as a settlement in the Near East, providing recently acquired data on the Early Neolithic. Excavations conducted between 2018 and 2022 at Gre Filla, situated in the Diyarbakır province of Turkey, within the hypothetical boundaries of Upper Mesopotamia, unveiled a continuous archaeological deposit dating back to the Early Neolithic. Microliths, constituting 4% of the tools recovered from the Early Neolithic levels of Gre Filla, were primarily produced from obsidian raw material. The diverse techno-typological characteristics of these microliths can be attributed to settlement phases, period-specific phenomena, changes in hunting and fishing methods, and developments in social structures.

This study highlights the overall significance of the microlith finds from Gre Filla and discusses their contributions to our comprehension of the Early Neolithic's social, economic, and cultural dimensions. The discussion will involve a comparison with microliths found in other Early Neolithic sites in and around Gre Filla. Ultimately, through an examination of the transformation of microlith tools, the aim is to provide a thorough understanding of the lifestyle and techno-typological diversity of chipped stone tools during the Early Neolithic in Upper Mesopotamia and, more broadly, the Near East.

17 MINING STONE TOOLS FROM GARGANO FLINT MINES (SOUTH-EASTERN ITALY): TECHNO-TYOLOGICAL STUDY AND RAW MATERIAL CHARACTERIZATION.

Terziani, Andrea (University of Pisa - Department of Philology, Literature and Linguistics) - Volante, Nicoletta (University of Siena - Department of History and Cultural Heritage) - Cantisani, Emma (National Research Council of Italy (CNR) - Institute of Heritage Science (ISPC)) - Iannaccone, Roberta (National Research Council of Italy (CNR) - Institute of Heritage Science (ISPC)) - Magrini, Donata (National Research Council of Italy (CNR) - Institute of Heritage Science (ISPC)) - Galiberti, Attilio (University of Siena - Department of History and Cultural Heritage)

The first mining activities in our country date back to the beginning of the 6th millennium BCE. These works are represented by a set of structures involved in the extraction of flint nodules on the Gargano Promontory (South-eastern Italy), ranging from the Early Neolithic until the Early Bronze Age.

This contribution aims to show the results of a multidisciplinary study about some mining stone tools from five sites: Defensola A, San Marco, Martinetti, Tagliacantoni and Cruci. The study suggests a particular know-how related to the art of mining, since the first neolithization of Italy. This is demonstrated not only by the considerable extension of the underground works but also by a mining toolkit with a high degree of technological investment.

These artifacts were shaped through an expedient knapping sequence, sometimes followed by bush hammering, abrasion and polishing actions. Furthermore, notches or grooves are not so infrequent and they were put in place to fix a handle in perishable materials.

The mining tools were made exploiting local siliceous rocks with a coarse texture and sometimes even the embedding rock itself. The characterization of the raw material used in their manufacturing was obtained following an analytical protocol, using both non-invasive and micro-invasive techniques.

The samples were observed and described at different magnifications using an optical microscope. The chromatic coordinates were acquired with a non-invasive spectrophotometer. Elemental analyses were performed with a portable XRF, while the mineralogical composition was determined using X-ray diffraction on a few mg of powders. Finally, the acquired data were compared with the results of previous studies on these mines.

The collection of all these data on mining tools will enrich the knowledge about the work strategies for the exploitation of flint in the Gargano area, during the pre-protolithy.

18 COMPARABILITY OF LITHIC TECHNOLOGIES RESULTS: INSIGHTS FROM FOUR EARLY UPPER PALAEO-LITHIC ASSEMBLAGES

Gennai, Jacopo (University of Pisa, Department of Civilisations and Forms of Knowledge, Via dei Mille 19, 56126, Pisa, Italy) - Falcucci, Armando (University of Tübingen, Department of Geosciences, Early Prehistory and Quaternary Ecology working group, Schloss Hohentübingen, Tübingen, Germany) - Niochet, Vincent (Leiden University, Faculty of Archaeology, Van Steenis Building, Einsteinweg 2, 2333 CC Leiden, The Netherlands) - Peresani, Marco (University of Ferrara, Dipartimento di Studi Umanistici, Sezione di Scienze Preistoriche e Antropologiche, Corso Ercole I d'Este, Ferrara, Italy) - Richter, Jürgen (University of Cologne, Faculty of Humanities, Institute of Prehistoric Archaeology, Weyertal 125D - 50931 Köln, Germany) - Soressi, Marie (Leiden University, Faculty of Archaeology, Van Steenis Building, Einsteinweg 2, 2333 CC Leiden, The Netherlands)

Lithic studies play a pivotal role in Prehistoric Archaeology. Lithic assemblages have been used as proxies of human groups and often grouped into technocomplexes trying to present ethnic similarity. These might not mirror reality, especially during the Early Upper Palaeolithic (EUP) when a quick dispersal of Homo sapiens groups occurred, and related bio-cultural dynamics are still under investigation. Therefore, it is important to create a reference framework for lithics avoiding preconceived labels as much as possible. In addressing these issues, we run a comparative analysis between four Early Upper Palaeolithic (EUP) assemblages using a large, open-access database. These assemblages belong to stratified, taphonomically consistent, and radiometrically dated contexts to the 41-38 ka cal BP interval. Furthermore, they span the geographic extent of the EUP dispersal range, from the Near East to Western Europe. Following FAIR data principles, the raw data are stored in a public long-term repository, and our analyses are conducted transparently and reproducibly using the R programming language. The database includes discrete and metric attributes documenting technological processes within each assemblage. We explore the attributes and their significance through Multivariate Correspondence Analysis (MCA) which enables an effective exploration of the reduction processes and cultural adaptations during this period. Open-access databases address challenges related to data comparability and inter-analyst methodological disparities, contributing to the development of standardised protocols in lithic research. The findings provide specific insights into tool production and socio-economic organisation during the EUP, offering a factual and focused perspective on technological behaviours in prehistoric periods.

19 NEW PERSPECTIVES TO THE STUDY OF CHERT CATCHMENT AREAS FROM PYRENEAN LGM HUMAN OCCUPATIONS: THE CASE OF MONTLLÉO (SPAIN)

Sanchez de la Torre, Marta (Seminari d'Estudis i Recerques Prehistòriques (SERP), Universitat de Barcelona; Institut d'Arqueologia de la Universitat de Barcelona (IAUB)) - Rafart, Eulàlia (Seminari d'Estudis i Recerques Prehistòriques (SERP), Universitat de Barcelona; Institut d'Arqueologia de la Universitat de Barcelona (IAUB)) - Mangado, Xavier (Seminari d'Estudis i Recerques Prehistòriques (SERP), Universitat de Barcelona; Institut d'Arqueologia de la Universitat de Barcelona (IAUB)) - González Olivares, Cynthia (Seminari d'Estudis i Recerques Prehistòriques (SERP), Universitat de Barcelona; Institut d'Arqueologia de la Universitat de Barcelona (IAUB)) - Gratuze, Bernard (Institut de Recherche sur les Archéomatériaux - Centre Ernest Babelon (IRAMAT-CEB), CNRS - Univ. d'Orléans) - Rubio Campillo, Xavier (Grup de recerca Didàctica i Patrimoni (DIDPATRI), Universitat de Barcelona; Institut d'Arqueologia de la Universitat de Barcelona (IAUB))

The archaeological work developed at the site of Montlleó for more than twenty years has allowed documenting a long sequence of human occupation that begins during the LGM, around 23,000 cal BP and ends after the LGM, around 17,000 cal BP. To the obtained radiocarbon dates and the typological variability of the lithic industry, we can now add recent studies on micro-spatial distribution that have allowed documenting at least three horizons of human occupation linked to three chronocultural periods: the Upper Solutrean, the Badegoulian and the Lower Magdalenian.

The lithic industry, abundant in the archaeological record, is composed of a polyolithological tool, with a clear predominance on the use of chert. The archaeopetrological analysis of chert tools, including non-destructive geochemical analyses, has evidenced the existence of a wide variety of exploited types, whose origin is located on both sides of the Pyrenean mountain range. Evidence of possible contacts with other groups has been attested regarding the origin of some specific tools. Furthermore, the application of novel computational approaches has allowed the team to explore the role played by the site within the network of regional spatial connectivity pathways of this mountainous area.

In this communication we would like to present the case of Montlleó as an example of the use of multifaceted methodologies of stone research with the aim of improving our knowledge about past human mobility in mountain environments.

20 CHERT SOURCING USING LIBS: APPLICATIONS TO THE CASE OF COVA DEL PARCO (ALÒS DE BALAGUER, LA NOGUERA, SPAIN)

Le Guirriec - Cornu, Julien (Universitat de Barcelona) - Sánchez de la Torre, Marta (Universitat de Barcelona) - Bousquet, Bruno (Institut de Chimie de la Matière Condensée de Bordeaux (UMR 5026), Univ. Bordeaux - CNRS - Bordeaux INP) - Lefrais, Yannick (Archéosciences Bordeaux (UMR 6034), Univ. Bordeaux Montaigne - CNRS - Univ. Bordeaux - EPHE-PSL) - Mangado, Xavier (Universitat de Barcelona) - Belén González, Cynthia (Universitat de Barcelona) - Le Bourdonnec, François Xavier (Archéosciences Bordeaux (UMR 6034), Univ. Bordeaux Montaigne - CNRS - Univ. Bordeaux - EPHE-PSL)

Lithic materials are the most commonly found artefacts on Palaeolithic archaeological sites and Cova del Parco (Alòs de Balaguer, La Noguera, Spain) is not an exception. There, cherts originating from carbonate lacustrine environments were widely exploited by Upper Palaeolithic hunter gatherers populations, and in a similar way, this type of chert was also predominant in the archaeological set of different sites chronologically related to Cova del Parco from the south of the Pyrenees. Archaeo-petrographic sourcing studies have identified different potential sources placed in the first Pre-Pyrenean foothills and the middle Ebro Basin, but these approaches were unable to distinguish between sources.

With the aim of analyzing large archaeological corpus, including museum collections, we conducted a pilot experimentation of the use Laser Induced Breakdown Spectroscopy (LIBS) for chert geochemical sourcing. This portable instrument allows fast, scalable, micro-destructive analysis, and has rarely been used for chert sourcing, with only a few exploratory applications.

In this communication we will present the use of LIBS for chert sourcing, as well as an application using supervised classification models on LIBS spectra for determining the provenance of lacustrine cherts, allowing successful discrimination of lacustrine geological sources and providing predictions for the origin of a selection of chert artifacts recovered at the Middle Magdalenian level from Cova del Parco.

21 FROM LITHIC TO LANDSCAPE: MULTIDISCIPLINARY APPROACH TO LITHIC ANALYSIS OF FIELD SURVEY EVIDENCE IN MAREMMA REGIONAL PARK (CENTRAL ITALY)

Mustone, Gaia (Siena University) - Pizzolo, Giovanna (Siena University) - Tykot, Robert (University of South Florida)

This contribution presents the results on the analysis of the lithic materials found during the archaeological field survey activities carried out in recent years by the Prehistory Unit of the Department of Historical Sciences and Cultural

Heritage in the territory of the Maremma Regional Park (Grosseto District-central Italy). The investigations are part of the broader research project “Prehistoric landscapes in the Maremma Regional Park: field survey and GIS analysis of prehistoric evidence” (PRM 2020-2025).

The study of the lithic artefacts was conducted from a multidisciplinary perspective in which techno-typological analysis, observations of traces of use were combined, as well as analysis of the origin of the raw material through the pXRF technique for the obsidian finds.

The results of the study are particularly stimulating because they testify to a long frequentation of these areas not only in the recent phases of prehistory but also in more ancient moments dating back to the Middle Palaeolithic, related to the same landscape units. In addition to this, a network of contacts both on a local and broader scale is highlighted, indicating a certain degree of dynamism of these Neolithic communities and of the Metal Age.

Among the objectives of the research, we intend to experiment comparative analyses of lithic artefacts on a topographical and landscape scale to develop the interpretation of settlement strategies in a diachronic key: from the Middle Palaeolithic to recent Prehistory.

The interaction between the analyses of lithic tools and the transformation dynamics of the prehistoric landscape offers new insights into the research of the socio-economic organization of past human groups.

22 LITHIC TECHNICAL SYSTEMS OF EARLY LATE GLACIAL HUNTER-GATHERERS IN THE SOUTHERN ALPS: INSIGHTS FROM RIPARO TAGLIENTE (ITALY)

Fontana, Federica (Università di Ferrara) - Fasser, Nicolò (Università di Ferrara) - Bertola, Stefano (Università di Ferrara; Università di Firenze) - Visentin, Davide (Università di Ferrara) - Cecchetti, Marzio (Università di Ferrara) - Zen, Chiara (Università di Ferrara)

The reconstruction of the cultural traditions of hunter-gatherer groups represents one of the major challenges of prehistoric studies since the very beginning of the history of this discipline. Beyond the many critiques that may be advanced to the traditional classification system of prehistoric cultures, lithic technical systems are still one of the key elements reflecting the way past populations adapted to different territories and interacted with one another.

The latest part of the Palaeolithic in Europe is a period of rapid cultural changes and high landscape variability connected to climatic and environmental fluctuations. In the Italian peninsula, Late Palaeolithic groups are referred to the Epigravettian. Although the characterisation of lithic technical systems of this techno-complex has been the object of several studies in the last 50 years, its variability across time and space is still far from being defined.

Riparo Tagliente is a major Late Palaeolithic site in Southern Europe with the earliest evidence of human re-occupation of the southern slope of the Alps after the LGM, starting at 17,000-16,500 cal BP. Furthermore, it is one of the few known sites in Northern Italy for this timespan. Techno-economic and functional analyses have been carried out on the lithic assemblage from the lowest occupation layers of this site, allowing us to overcome the results of previous studies. On one side, more flexible reduction sequences have been highlighted. On the other, the large-scale use of the local resources of the Lessini haut-plateau, one of the districts with the richest chert outcrops of Southern Europe, is associated with some extra-regional cherts, reflecting the persistence of the long-distance connections of the Epigravettian groups who first re-established in the Alpine area after the Last Glacial Maximum.

23 REANALYSIS OF KRAKÓW-SOWINIEC I & II - UPPER TO MIDDLE PALAEOOLITHIC TRANSITION SITES

Stremski, Igor (Institute of Archaeology Jagiellonian University)

The talk aims to present my interpretation of lithic material found at the sites of Kraków- Sowiniec I & II. These sites were explored during salvage excavations preceding the raising of the memorial mound in the late 1930s. They are included in a larger cluster of sites at Blessed Bronisława Hill (Kraków-Zwierzyniec 1, Kraków-Księcia Józefa street, Kraków-Spadzista street). Some of the lithic material has been assigned to layers; nevertheless, most of it lacks stratigraphy altogether. Technological analysis revealed that some layers contain Levallois material, which is distinctive for this particular site, while others contain volumetric concept materials. The written record of the original research is sparse. My goal is to perform in-depth technological and typological analysis to review the finds and propose a new interpretation of the site's stratigraphy. The unstratified material includes numerous Levallois cores, as well as Upper Palaeolithic materials. Further research aims to divide finds into what seems to be two major groups: Middle Palaeolithic and Early Upper Palaeolithic (most probably Aurignacian). As the collection of artefacts is incomplete due to excavation methodology, it is impossible to utilise dynamic lithic analysis. Instead, the finds are being analysed with the 'chaîne opératoire' method aiming to reconstruct the main technological threads. The analysis includes measurements, determining flint type, pinpointing any anthropological modifications to the artefact, and so on. That is followed by assigning the finds to groups of shared technological features, mostly Levallois and Aurignacian. I believe interpreting the sites with today's knowledge could be beneficial to the state of research.

1114 NON-INVASIVE ARCHAEOLOGY: INTEGRATING SATELLITE, UAV, AND GEOPHYSICS WITH TRADITIONAL FIELD METHODOLOGIES PART 2

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Wroniecki, Piotr (Montefortino Prospection & Digitalisation) - Peters, Manuel J.H. (Max Planck Institute of Geoanthropology) - Trapero Fernández, Pedro (Cádiz University)

Session format: Regular session

The archaeological workflow is being revolutionised by non-invasive methods such as geophysics and remote sensing. Their application is increasingly prevalent due to their lower cost and increased ease of use. Examples include satellites and unpiloted aerial vehicles (UAVs) with RGB, laser, and spectral sensors; geophysical techniques such as magnetometry, GPR, and resistivity; and Artificial Intelligence (AI) for data collection and interpretation.

Compared to traditional approaches, these methods are a fast way of acquiring large datasets. Their systematic integration needs further exploration however, in order to unlock the true potential of these methods when seamlessly embedded into the archaeological process. This integration ranges from large-scale approaches to study sites and landscapes, to more focused applications in excavation data analysis.

Challenges can arise due to the interdisciplinary nature of these approaches, where external specialists may not fully grasp the archaeological needs, and archaeologists may not entirely understand the possibilities and limitations of the techniques. Furthermore, data processing remains complex; a technical understanding of the method itself is often required, and the standard process does not always align with the requirements of an archaeological context. This makes data visualisation challenging, especially for techniques such as GPR and LiDAR.

This session explores the dynamic relationship between non-invasive technologies and traditional methods in research-driven and development-led archaeology. We invite contributions dealing with the integration, comparison, and validation of non-invasive and invasive methods, including the use of remote sensing, geophysical prospection, pedestrian survey, coring, and excavation. Digital aspects of the workflow, including GIS, spatial analysis, and Artificial Intelligence, are also welcomed. Reflections concerning the theoretical and technical application of non-invasive methods are invited, as well as insights and considerations regarding methodology, potentially aligning with broader efforts to standardise methodologies and datasets across projects and regions. We encourage the evaluation of both successful and unsuccessful outcomes.

ABSTRACTS

1 STALAG VIII B (344) LAMSDORF IN THE LIGHT OF INTEGRATED ARCHAEOLOGICAL RESEARCH. THE CASE OF 60 ITALIAN POWS FROM LAMSDORF

Pawleta, Michal (Adam Mickiewicz University) - Kobińska, Dawid (University of Łódź)

The Site of National Remembrance in Łambinowice, Poland is an area of former prisoner of war and resettlement camps that operated near the village at various times. Only in the years 1939-1945, as can be generally estimated, 300,000 soldiers of the anti-Nazi coalition passed through the Lamsdorf camps. Several thousand of them did not survive the time of captivity. In 2022, the Central Museum of Prisoners of War begun the implementation of an interdisciplinary project “Science for society, society for science at the Site of National Remembrance in Łambinowice”. Its main idea was to use non-invasive and invasive archaeological research methods to map and inventory the material remains of the camps that have survived in the local, mostly forested, landscape to the present day. One of the goals was an attempt to find unknown and unmarked burials of prisoners who died during captivity in Lamsdorf.

In our paper, we present the implemented project methodology, which allowed us to locate an unknown and unmarked graves. Remote sensing data were the basic and main category of sources that were acquired and analysed. These included historical maps and plans, German, English and Polish aerial photos from various years, LiDAR data and testimonies of the prisoners captivated in Lamsdorf. None of these sources provided obvious answers about the location of unknown PoW burials. However, their processing and integration in QGIS software allowed the selection of locations for GPR research. The interpretation of all the data obtained was the basis for choosing a location for test trenches. The excavations carried out confirmed that this is the final resting place of Italian soldiers interned in Lamsdorf at the end of the Second World War. The found dog tags allowed for the identification of the deceased soldiers by name. They were Giovanni Paravidino and Luigi Norcia.

2 MINERAL AND METALLURGICAL LANDSCAPE OF MOUNT AMIATA (TUSCANY, ITALY)

Dalle Vedove, Letizia (University of Siena) - Dallai, Luisa (University of Siena)

The volcanic origin of the territory of Mount Amiata (Tuscany, Italy) has contributed to generate a landscape characterized by a wide variety of mineral resources, mercury in particular, which has determined an extractive activity extended in a long durée and culminated in the most recent, intensive extraction between 19th and 20th centuries. The careful identification of well-defined areas of long-term exploitation provided the basis for investigating and reconstructing the mining and metallurgical landscape of Mount Amiata, without chronological limits, ranging from the Neolithic period until present day, and through a multidisciplinary approach. This has made it possible to delineate the mining and metallurgical landscape in different historical phases, localizing the main mining areas and metallurgical workshops. Moreover, through the support of archaeological field surveys, iconographic, cartographic (like land registries) and photographic sources (mainly historical aerial photographs taken by the Military Geographical Institute in 1954), it has been possible to measure the impact of the most recent mining activities on the landscape. The reconstruction of some mine plans has also allowed to follow the recent industrial development through an accurate reconstruction of the underground works and to localize with precision the most ancient archaeological finds retrieved during the reopening of the tunnels in 19th and 20th centuries.

3 FROM NON-INVASIVE SURVEY METHODS TO EXCAVATION: EXPLORING IRON AGE HILLFORTS AND ROMAN SETTLEMENTS IN THE ALISTE RIVER VALLEY, ZAMORA, SPAIN

Soler Rocha, Rafael (AOC Archaeology; Universidad de Granada; Zamora Protohistórica) - Rodríguez Monterrubio, Óscar (Zamora Protohistórica) - González de la Fuente, Francisco (Zamora Protohistórica) - Eguilleor Carmona, Xabier (Zamora Protohistórica; Universidad de Salamanca) - Álvarez Cano, Óscar (Zamora Protohistórica)

The Aliste River Valley (Zamora, Spain) presents a high concentration of archaeological sites, especially hillforts, often defined as “Castros” and attributed to the Iron Age without having been extensively studied. In fact, this area has remained largely unnoticed by archaeological research, and systematic studies have scarcely been carried out since the 1970s.

Since 2018, the Research Group Zamora Protohistórica has been conducting a Landscape Archaeology Project, which initially consisted of two major LiDAR Programmes. The first of these focused on characterising the Castro de La Encarnación – 7.3 hectares – (Rabanales, Zamora, Spain), defining the outer ditched and walled enclosures, as well as the internal structures. This programme was also complemented by a GPR geophysics survey on two areas potentially containing internal structures. Finally, the site was excavated between 2018-2020 through the execution of several small and medium-sized open areas. The results have revealed the existence of a massive settlement from the second Iron Age to Roman times.

The second LiDAR programme focused on the municipality of Rabanales and was complemented by the photogrammetric survey of the hillforts Castro de La Encarnación, San Juan, Gallinera, Fradellos, and El Castrico. The uniqueness of the latter led to an archaeological walkover survey in 2019, which along with a third LiDAR programme, defined a series of areas that were further surveyed using GPR. The results showed the existence of a series of linear structures, in line with some patterns of Roman urbanism, and in correlation with the results obtained in the walkover survey. Since 2021, three excavation seasons have been carried out at El Castrico, revealing the existence of a Roman settlement, previously unknown at a spatial level.

The preliminary results of both excavations provide us with sufficient knowledge to discuss the benefits and limitations of the application of non-invasive methods in Archaeology.

4 NEW EXCAVATIONS AT CRESWELL CRAGS: A LANDSCAPE APPROACH USING GPR

Perez Arana, Andres (University of Sheffield) - Kuykendall, Kevin (University of Sheffield) - Cockrell, Timothy (University of Sheffield) - Jones, Angharad (Creswell Crags)

Creswell Crags is a gorge located in the Magnesian limestone on the Derbyshire/ Nottinghamshire border with a long history of archaeological and palaeontological excavation (late 19th - early 21st century). These excavations have produced a wealth of archaeological and osteological material that is important for our current understanding of hominin presence, absence, and adaptation during the Middle to Late Upper Palaeolithic in Britain. However, different field methodologies and excavation strategies used over the years and the distribution and loss of important artefact collections have been problematic.

We began new excavations at Creswell Crags in 2019, aiming to recover Middle and Upper Palaeolithic archaeology from non-cave localities in the Creswell gorge and the surrounding landscape. We have recovered artefacts representative of the Middle Palaeolithic to historic periods, but most of these are derived from highly disturbed and mixed contexts inhibiting use for archaeological interpretation. Over the past two seasons, our field strategy includes the use of ground penetrating radar (GPR) and UAV-SfM survey (Unmanned Aerial Vehicles - Structure from Motion)

to locate productive contexts for test pit excavations in the Creswell gorge and surrounding landscape. During July 2023, we undertook a geophysical survey over two areas (0.21 - 0.33 ha) in the landscape surrounding Creswell Crags. The aim was to identify geological features in the buried bedrock limestone with the potential to preserve intact pre-glacial deposits with the potential to recover archaeological materials, and to identify specific areas for future excavation.

Our excavations at Creswell Crags demonstrate that new Middle and Upper Palaeolithic archaeological materials can be recovered from non-cave contexts in the Creswell Crags landscape, and the use of GPR has strong potential to identify additional productive contexts for future excavation, both at Creswell Crags and at other geologically similar regions where a similar field approach can be applied.

5 INVESTIGATING THE BIOGRAPHY, LAYOUT AND FUNCTION OF A NEOLITHIC ENCLOSURE. CASE STUDY FROM DZIELNICA (SW POLAND)

Furmanek, Miroslaw (University of Wroclaw, Institute of Archaeology)

The aim of the presentation is to discuss the comprehensive archaeological study of a Neolithic enclosure at Dzielnica, south-west Poland. This research integrates non-invasive archaeological methods, including geochemical (phosphate analysis) and magnetic gradiometry prospection, aerial photography and excavation. The primary aim of the project was to reconstruct the biography, layout and functional aspects of past activity in the prehistoric landscape. The results from Dzielnica have revealed a complex, multi-phase palimpsest of different traces of practices of Neolithic and Bronze Age societies, tracing complex phenomena of continuation and transformation of socio-economic and ritual functions over time. The geochemical signatures and magnetic anomalies have outlined the extent of the enclosure and provided insights into the structural composition and activities that took place on the site. This includes evidence for settlement areas, potential ritual and funerary spaces, highlighting the site's role as a focal point in a regional and inter-regional network.

The integration of excavation, environmental and non-invasive data has allowed for a nuanced understanding of the interaction between Neolithic and Bronze Age communities and their landscape. This has allowed a key to the interpretation of non-invasive datasets to be built, outlining their possibilities and limitations in the documentation and revealing of past activities.

The Dzielnica case study exemplifies how interdisciplinary methods can reveal the complex narratives of prehistoric enclosures and contribute to our knowledge of the spatial organisation, social structures, and cultural practices of the Neolithic and Bronze Age societies.

The work is supported by the programme entitled “Excellence Initiative – Research University” (IDUB) for the years 2020-2026 for the University of Wroclaw, internal grant no BPIDUB.28.2024.

6 THE UNUSED POSSIBILITIES OF NON-INVASIVE PEDESTRIAN SURVEYS IN THE NETHERLANDS. A VERIFIED BUT UNUSED METHOD WITHIN THE DUTCH QUALITY STANDARD

de Raad, Jesper (Leiden University)

The archaeological sector in the Netherlands works with legislation for all institutions. More specifically, an institution needs to be certified to be able to execute scientific archaeological research. Every invasive archaeological intervention, including archaeological coring, needs to be executed by such a certified institution.

Non-invasive pedestrian surveys are embedded in the quality standard of Dutch archaeology (KNA), but they are not always useful in commercial archaeology. The reasons for this are: (1) the method depends on various natural phenomena, which are not always present; (2) the commercial labour prices are too high; (3) the season of the archaeological research is not ideal for the specific field survey. However, executing an archaeological pedestrian survey, or rather a full systematic archaeological regional description (Landesaufnahme), is a useful method. Specifically, around archaeological monuments, in extensive areas, or near areas with high archaeological expectations.

Additionally, the method of non-invasive pedestrian survey is very useful as a citizen science project. Archaeological volunteers can execute the necessary pedestrian surveys, accompanied by an archaeologist, and finalise a scientific archaeological research project without any forbidden invasive damage to the soil. The volunteer is incorporated into the scientific system and the local/regional archaeologist gains more information of the in-situ archaeology and landscape.

7 ARCFIELDLAB – STIMULATING NETWORKS, KNOWLEDGE EXCHANGE, AND EXPERIMENTATION IN APPLIED SENSOR ARCHAEOLOGY FOR DUTCH FIELD RESEARCH

Scholte, Mason (4D Research Lab, Universiteit van Amsterdam) - Waagen, Jitte (Amsterdam Centre for Ancient Studies and Archaeology / 4D Research Lab, Universiteit van Amsterdam)

In Dutch archaeological fieldwork there are increasingly innovative applications of new technology, ranging from drones with various sensors, new geophysical instruments, automated auguring tools and so on and so forth. Funded by the European E-RIHS initiative, the 4D Research Lab leads the ARCFIELDLAB project consortium in The Netherlands to provide archaeological professionals with insights into the possibilities and limitations of these novel techniques.

The aims of ARCFIELDLAB are to stimulate networks of archaeologists and specialists, facilitate knowledge exchange and promote experimentation with cutting-edge technology, all in the field of sensor archaeology for terrestrial and maritime contexts. These are addressed by organizing expert meetings, creating a central website to share community-generated knowledge on the applicability of the various techniques, funding case studies, and creating and sharing best practices. One of the additional aims that has been formulated in the course of the first expert meeting is to establish so-called 'benchmark sites' – a series of sites on different soils and with different types of archaeological contexts that should be researched using different sensors in a comparative and integrative multitemporal approach.

This presentation aims to share the progress so far, discuss the potential of benchmark sites, and explore the possibility to do this in an international context.

8 IDENTIFICATION OF ARCHAEOLOGICAL ELEMENTS WITH GROUND-PENETRATING RADAR (GPR): LABORATORY PRACTICES AND COMPARISON WITH REALITY

Oliveira, Rui (Instituto de Ciências da Terra, Universidade de Évora, Évora, Portugal; Departamento de Física, Universidade de Évora, Évora, Portugal; Earslab - Earth Remote Sensing Laboratory, Universidade de Évora, Évora, Portugal) - Traperó, Pedro (Área de Historia Antigua, Departamento de Historia, Geografía y Filosofía, Universidad de Cádiz, Spain; Earth Remote Sensing Laboratory (EaRSLab), Universidade de Évora, Portugal; Centro de História da Arte e Investigação Artística (CHAIA), Universidade de Évora, Portugal) - Caldeira, Bento (Instituto de Ciências da Terra, Universidade de Évora, Évora, Portugal; Departamento de Física, Universidade de Évora, Évora, Portugal; Earslab - Earth Remote Sensing Laboratory, Universidade de Évora, Évora, Portugal)

The application of non-invasive and non-destructive techniques in geophysical prospection, has become a common practice in the search for archaeological elements without resorting to excavation. The interaction between archaeologists and geophysicists has not always been ideal, with archaeologists possessing the tools to process and understand the data, while geophysicists face their own set of challenges. The complexity of the process increases further when seeking a historical interpretation, such as the reconstruction of a site's layout or the interpretation of its elements. Recognizing the need for improved collaboration, we present a series of experimental case studies wherein various scenarios that may arise in an archaeological context are reproduced using idealized laboratory conditions. The study involves a comparative analysis between archaeological remains on a small scale, buried within a uniform medium composed by coarse sand, and data obtained by ground-penetrating radar (GPR) using a 1600 MHz antenna. The obtained results are then compared with the geometry of the buried objects, and a discussion ensues regarding the feasibility of addressing typical historical and archaeological questions based on this analysis.

Acknowledgment: The work was supported by the Portuguese Foundation for Science and Technology (FCT) project UIDB/04683/2020 - ICT (Institute of Earth Sciences).

9 THE GOOD, THE BAD AND THE UGLY- DUTCH DESK-BASED ARCHAEOLOGICAL RESEARCH AN EXAMPLE OF MULTIDISCIPLINARY APPROACH. CHANCE OR WASTED RESOURCE?

Durczak, Kinga (Antea Group)

In Dutch commercial archaeology, desk-based research initiates a multi-step process to assess archaeological potential, including survey drilling, trial trenching, and definitive excavation. In most cases, the desk-based research leads directly to or is combined with survey drilling. Researchers investigate various aspects such as geology, geomorphology, LIDAR, aerial images and additional data like paleogeography and groundwater levels in GIS environment. Integrating archaeological and historical information theoretically aids in identifying potential of the site.

However, discrepancies between intended outcomes and data quality persist. The requirements for the use of data (lidar, aerial photos, geological, legacy data etc. usually an open-source) do not always leads to the correct conclusions and understanding of the potential of the landscape. The Dutch archaeological expectation model primarily employs an inductive approach, with occasional instances of a deductive system, resulting in data incompleteness and inconsistencies. Furthermore, challenges arise from the diverse landscapes and their archaeological potential, while varying models across municipalities exacerbate gaps and weak links between data, modelling, and assessment outcomes.

Archaeological prospection ideally serves as a robust cornerstone for subsequent research endeavours. However, its efficacy significantly depends on the proficiency of researchers, the experience of reviewers, and the accessibility of relevant data. Unfortunately, there is often a lack of comprehensive resources explaining the models used to assess archaeological potential and establish connections with geomorphological data. Moreover, there is currently no push from the archaeological companies, municipalities, and government to create an appropriate resource. This shortage of explanatory materials poses challenges and impedes the seamless integration of diverse datasets crucial for informed decision-making in archaeological investigations.

Despite the potential of desk-based research, it is frequently underutilized. Addressing systemic errors and theoretical gaps requires collective effort, yet responsibility allocation remains unclear. These challenges must be tackled to maximize archaeological data usage and prevent resource waste.

10 COMPARATIVE NON-DESTRUCTIVE SURVEYS ON CENTURIATED ROMAN LANDSCAPE

Bödöcs, András (Eötvös Loránd Tudományegyetem) - Márkus, Gábor (Archaeodata 1998 Ltd.)

To understand the former territory and Roman land use of Savaria, the first Roman colony of Pannonia, a research programme was launched in 2022. The main objective was to identify the land allotted to the veterans settled on the land of the former colonia, to map the land use traces and the relationship between the veteran estates. Traces of land distribution previously we reconstructed using a GIS predictive model and then identified from aerial photographs. Although we have been able previously to identify concrete traces of this, we still do not know exactly the main aspects of the land allocation. We would like to understand and identify features that can be compared with the texts of ancient sources. For example, how many veterans shared a centuria, a Roman centuria unit (ca. 710×710m).

Therefore, we aimed at surveying large areas with non-destructive methods. So we arrived to the other main objective of our project: to investigate the potential of using multispectral drones in archaeological research, especially in landscape archaeology. We therefore started to survey the elements of the Roman centuriatio allocation. For this work we acquired a DJI P4 MultiSpectral drone, with which we started monitoring several pre-selected areas. These areas were assumed to be complete Roman centuria units (>50ha). We tried to compare the data obtained from these flights with the results of 16 channel fulxgate magnetometer surveys of the same areas. In our presentation we would like to illustrate with examples the pitfalls, possibilities, positive and negative aspects of the surveys and the comparison of the results.

11 COMPARISON OF LARGE-SCALE MAGNETOMETRY MEASUREMENTS WITH EXCAVATION DATASETS IN EASTERN HUNGARY. FEATURE DETECTABILITY AND IDENTIFICATION POSSIBILITIES

Mesterházy, Gábor (Hungarian National Museum - National Institute of Archaeology) - Pethe, Mihály (Hungarian National Museum - National Institute of Archaeology)

In 2009, David Jordan highlighted the half-century track record of archaeological geophysics' effectiveness. Since then, the adoption of non-invasive geophysical methods in scientific and development-led archaeological research in Europe has gradually increased. Despite the widespread use of geophysical measurements for various archaeological objectives. Many studies often focus solely on processing and interpreting data without adequately addressing feature detection probabilities, identifiable feature types, and undetectable archaeological features.

This study examines two sections of motorway in Jász-Nagykun-Szolnok county, Eastern Hungary: the 19 km M4 section between Abony and Fegyvernek, and the 33 km M44 section between Tiszaug and Szarvas. Geophysical surveys, conducted in 2013 and 2014 across 67 hectares using magnetometry, were complemented by trial trenching and full-scale excavations in subsequent years, yielding a significant dataset for comparison. The presentation aims to analyze the physical and cultural properties of archaeological phenomena by comparing features from magnetometry, survey interpretation, and excavation. Each method has its limitations and biases: magnetometer surveys are influenced by measurement settings and soil properties; survey interpretation depends on the expertise of the interpreter; and the success of excavations is impacted by the archaeologists' skills.

Our approach not only offers an overview of detection rates but also delves into the analysis of detection and misinterpretation rates by feature type, chronological categories, and properties (size, depth, topsoil depth). Through this comprehensive examination of large-scale datasets, we have enhanced our understanding of regional feature detection capabilities.

1119 CRAFTS IN THE ROMAN WORLD: PRODUCTION, DISTRIBUTION, AND PEDAGOGY

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Stemberger Flegar, Kaja (PJP d.o.o.) - Lundock, Jason (Full Sail University)

Session format: Regular session

Whether for private use within the household or to create surplus product for trade, the production of crafts would have been a pervasive part of life for many of the inhabitants of the pre-modern world. With a mix of household production, small scale communal workshops, as well as industrial scale factories and warehouses, the Roman world provides a rich and diverse environment to examine crafting in its many forms. This panel seeks to examine all stages of craft production, ranging from the dissemination of the skill sets required and the process of procuring materials to the ways in which craftspeople laboured to produce their goods and how these products were distributed. There will also be interest in the place of craftspeople within wider society, their status and identities, both from the perspective of household production as well as industrial scale operations. This panel seeks to develop a conversation on how the lived experience of craft production shaped the lives and wider society of those involved and offer new perspective into life during the Roman period.

ABSTRACTS

1 UNRAVELING TESSERAEE ARRANGEMENT TECHNIQUES IN LARGE-AREA PLAIN MOSAICS OF HERCULANEUM

Lim, YongBing (Faculty of Human-Environment Studies, Kyushu University, Japan) - Hori, Yoshiki (Faculty of Human-Environment Studies, Kyushu University, Japan)

Mosaics involve the arrangement of tesserae to create a uniform surface, and proper alignment is essential, especially in the plain sections of mosaics. In Pompeii, some early mosaics arranged tesserae randomly but later mostly in rows with varying directions. Figurative mosaics followed composition; plain mosaics arranged tesserae rows obliquely or parallel to the border.

As the discussion focuses primarily on figurative mosaics, the existence of plain mosaics is often ignored. Not only are there floors of all-white plain mosaics, but large-area plain mosaics may also be used in the background or within the spaces of patterned mosaics, as in the background of mosaic of street musicians in Villa of Cicero and mosaic of dog in Casa di L.Cecilio Giocondo (V.1.26Pompeii). Here at Pompeii and Herculaneum, where the existing figurative mosaics were situated in the absolute center for any such development, techniques more in accordance with making-up practice would not have seemed out of place. Historically before covering entire floors, opus tessellatum plain mosaics were used in the 2nd century BC to fill large spaces around the central panel of emblemata. These early applications of opus tessellatum to entire floors in Pompeii in the 1st century BC were plain mosaics and continued until the end of that city.

This study aims to investigate the laying techniques of large-area plain mosaics of House of Mosaic atrium and Central Baths Herculaneum. We examine the chronological and spatial characteristics of the use of oblique and parallel arrangement of tesserae rows. Using laser scanning and photogrammetry, the specific rules and practices for arranging tesserae in these large-area rows are revealed. Through this research, we identify the working methods applied by craftsmen for laying large-area plain mosaics effectively and beautifully, providing insight into the nuances of craftsmanship during this period in mosaic history.

2 COARSE WARE TRANSFORMATIONS

Wenn, Camilla Cecilie (Museum of Cultural History, University of Oslo)

The paper presents a case study of pottery production from the Latin site Ficana, some 20 km southwest of Rome. The study investigates primarily coarse ware pottery from zone 6b, excavated 1978-1981. The majority of the pottery stems from what appears to be pottery dumps and dates from ca. 650 to 300 BC. An overview of various traits found within the material and how they change over time will be presented and discussed. In general, the changes relate to increased standardisation and efficiency. It will be argued that the organisation of the production transformed, and that pottery production developed from a more occasional craft with shared ideas that were executed more or less similarly, to a specialised production with notably less variation. The transformation of production modes has been documented in much of Etruria and Latium and thus places the material and the site into a larger context. The implications of the changes for the population will also be touched upon.

3 LEATHER INDUSTRY IN ROMAN PANNONIA: WHAT CAN WE TELL WITH LIMITED EVIDENCE

Lenár, Vilmos (Eötvös Loránd University)

Leather industry in the Roman Empire is a fairly well researched field, with world famous sites, abundance of leather items, evidence of workshops or even the tanning infrastructure. But what can we look for, when the environment is not kind to the organic material, where are (seemingly) none of the easily identifiable features of the leatherworking process? This paper focuses on offering alternatives in terms of the findmaterial from Pannonia, where a thorough (re)investigation is more than necessary. From skinning- and a tanning knives to a house in Aquincum, which could be the place for auxiliary processes of leatherworking. The author argues, there is evidence for various processes of the leather industry to have taken place in Pannonia, just these were overlooked by the academic conversation in the past regarding the province. With growing focus on not just leatherworking as a whole, but a series of particular and different processes we might be able to better understand the tools and their usage, while examining the sites that provide these finds could help us better understand the people, who were involved in leatherworking in a province on the border of the Empire.

4 COPPER ALLOY SPINDLE AND SPINDLE-WHORL FROM SERMIN

Jančar, Mojca (Independent researcher) - Kovacic, Ana (Independent researcher)

In this paper I address the copper alloy spindle and its corresponding spindle whorl found in 2020 on the Roman road in Sermin (coastal settlement near Koper in modern day Slovenia). This relatively large site was excavated during motorway construction works and includes a Roman road, as well as a handful of Roman period cremations and a burial plot that could be dated to the 3rd century AD.

The purpose of this paper is twofold. Firstly it presents the spindle in relation to other objects that can be connected to the Roman period manufacture of textiles in this region of Slovenia. Additionally it discusses how this object may have been used due to its uncharacteristic slimness, and if the shape influenced the quality of the thread. The second, ultimate aim is to ascertain the role and extent of fabric production for this area in the Roman times. The sites lies in relative proximity to Aquileia, one of the biggest import centres in the region.

5 RECYCLING AND REUSING POTTERY AND GLASS IN THE CONTEXT OF CRAFTS: CASE STUDY COLONIA ULPIATRAIANA POETOVIO

Stemberger Flegar, Kaja (PJP d.o.o.)

This paper addresses the recycled objects found at the pottery kiln site in Roman Colonia Ulpia Traiana Poetovio (modern day Ptuj, Slovenia). While processing the finds, certain types of reused objects stood out. Several broken pieces of glass and, to a lesser degree, pottery sherds had been re-touched into functional tools. In Roman archaeology, such objects are not frequently studied, but when found, they are usually related to pottery production and leather crafting. The analysis of tools made from glass shards was relatively straight forward when they were examined with the same methodology as prehistoric stone tools. The glass objects could be predominantly classified as scrapers, blades, and drills. More intriguing were objects made from retouched terra sigillata vessels and other pottery. Some of the bottoms had been reshaped so they could serve as lids, while others had been sanded down to form geometric shapes. In the context of the Roman kiln complex, these could be interpreted as potter's ribs.

1120 HUMAN ENVIRONMENT INTERACTIONS IN THE EURASIAN STEPPES FROM PREHISTORY TO THE EARLY HISTORICAL PERIODS

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Cromartie, Amy (Cornell University; Cultures et Environnements Préhistoire, Antiquité, Moyen Âge (CEPAM)) - Joannin, Sébastien (CNRS, UMR 5554 Institut des Sciences de l'Evolution de Montpellier (ISEM)) - Lhuillier, Johanna (CNRS, UMR 5133 Archéorient, Maison de l'Orient et de la Méditerranée) - Ricci, Andrea (Cluster of Excellence Roots, Christian-Albrechts-Universität zu Kiel)

Session format: Session with keynote presentation and discussion

Today's climate crisis is causing aridification and desertification across the world. In the mid-latitudes, semi-arid and arid steppe biomes are under the most severe constraints. These biomes have seen their distribution expand (already more than 40% of the earth's surface) to the detriment of forested environments. As aridification continues, populations across these regions will be required to seek adaptation strategies to sustain their agro-pastoral and food production strategies, adaptations that have the potential to disrupt the steppe ecology.

The session focuses our inquiry on the past to find solutions to the complex challenges of living in and adapting to Eurasia's changing arid and semi-arid environments. Geographically, the mid-latitudes zones of Eurasia are an expansive continental zone characterized by a semi-arid climate dominated by steppes and desert biomes. These environments

have been the backdrop of human populations across the Holocene, from nomadic to complex societies, and were home to the historic Silk Road.

For this session, we intend to gather papers that develop an interdisciplinary approach between archaeology, palaeoecology, and paleoclimatology to answer questions regarding sustainability, resilience, and adaptations between humans and their ecology across this vast geographic region. We welcome papers from archeology, paleoclimatology, paleoecology, archaeobotany, geoarchaeology, hydrology, landscape archeology, zooarchaeology, and related disciplines from local to regional scales. These papers can chronologically span prehistory to the early historical periods.

ABSTRACTS

1 HUMAN RESPONSES TO ENVIRONMENTAL CHANGE ON THE SOUTHERN COASTAL PLAIN OF THE CASPIAN SEA DURING THE MESOLITHIC AND NEOLITHIC PERIODS

Leroy, Suzanne (Aix-Marseille University) - Amini, Arash (Golestan University) - Gregg, Michael W. (University of British Columbia) - Marinova, Elena (Cultural Heritage Baden-Württemberg) - Bendrey, Robin (University of Edinburgh) - Fasel Nashli, Hasan (University of Tehran)

This paper presents results of a multidisciplinary research initiative examining human responses to environmental change at the intersection of the southern coastal plain of the Caspian Sea and the foothills of the Alborz Mountains during the terminal Pleistocene and early Holocene. Our palaeoenvironmental analysis of two sedimentary cores obtained from a lagoon in close proximity to four caves, occupied by human groups during the transition from hunting and gathering to food-producing ways of life in this region, confirms Charles McBurney's 1968 hypothesis that when Caspian Sea levels were high, Mesolithic hunters were reliant on seal and deer, but as water levels receded and a wide coastal plain emerged, hunters consumed a different range of herbivorous mammalian species.

Palynological evidence obtained from these two cores also demonstrates that the cool and dry climatic conditions often associated with the Younger Dryas stadial do not appear to have been extreme in this region. Thus, increasingly sedentary hunting and gathering groups could have drawn on plant and animal resources from multiple ecological niches without suffering significant resource stress or reduced population levels that may have been encountered in neighbouring regions. Our analyses of botanical, faunal and archaeological remains from a recently-discovered open-air Mesolithic and aceramic Neolithic site also shows an early process of Neolithization in the southern Caspian basin, which was a very gradual, low-cost adaptation to new ways of life, with neither the abandonment of hunting and gathering, nor a climatic trigger event for the emergence of a low-level, food-producing society.

2 INTERDISCIPLINARY ARCHAEO-ENVIRONMENTAL STUDIES AT KIMIREK-KUM 1, UZBEKISTAN: THE PALAEO-ECOLOGY OF A 2ND MILLENNIUM BC DELTA SYSTEM

Rouse, Lynne (Eurasia Dept, DAI) - Castellano, Lorenzo (New York University) - Hubbard, Eric (University of Pennsylvania) - Hunter, Sydney (The Ohio State University) - Jürcke, Friederike (University of Cambridge) - Müller, Daniela (University of Liverpool) - Pini, Roberta (CNR - Istituto di Geologia Ambientale e Geoingegneria) - Stark, Sören (ISAW - New York University)

The archaeological site of Kimirek-kum 1 (KK1) provides a key opportunity to investigate the interconnections of environmental change and human adaptation in proto-historic Central Asia. Dated to the second half of the 2nd millennium BC, KK1 sits at the interface of broad environmental and social changes that mark the regional Bronze to Iron Age transition. In this presentation, drawing on a variety of paleo-ecological data, we lay the groundwork for characterizing the local environment at the time of KK1's occupation. We examine this data in light of the site's location in a now-arid former delta of the lower Zerafshan River, 60 km northwest of the city of Bukhara (Uzbekistan) and well beyond the historical boundaries of the agricultural zone. Excavations at KK1 in 2022 and 2023 provided a wealth of charred plant material and wood charcoal from stratigraphic contexts; numerous sediment samples from the same contexts provide the basis for pollen and phytolith studies. Analyses of these various datasets are being carried out through early 2024, and together will provide firm insight into this deltaic palaeo-environment in the late 2nd millennium BC, and how diversified plant use by KK1's inhabitants may have mitigated (or exacerbated) subsistence risks in a possibly volatile river delta ecosystem. Alongside these plant-based analyses, advanced modeling of the ancient delta system based on Multi-Scale Relief Model (MSRM) algorithms fine-tuned for this area are enhancing our understanding of the hydrological network on which KK1's inhabitants relied. Interweaving KK1's archaeobotanical, anthracological, palynological, and geo-hydrological analyses provides a robust foundation for detailing the palaeo-ecology of the lower Zerafshan during the region-wide reconfigurations of Bronze-Iron Age transition. Our collective work is also a critical step towards building interdisciplinary approaches to investigate Central Asia's incredibly long history of human adaptation to unique and ever-changing local environments.

3 STEPPE SUSTAINABILITY IN A CHANGING WORLD

Joannin, Sebastien (CNRS - ISEM) - Palumbi, Giulio (CNRS - CEPAM) - Colombié, Claude (Université Lyon1 - LGL TPE) - Ollivier, Vincent (CNRS - LAMPEA) - Peyron, Odile (CNRS - ISEM) - Cromartie, Amy (CNRS - CEPAM) - Dugerdil, Lucas (Université de Montpellier - ISEM; ENS Lyon) - Lhuillier, Johanna (CNRS - Archéorient) - Consortium, Stepability (ANR - France)

The arid steppe ecosystems characteristic of the Arid Circum-Caspian Zone (ACC) are favoured by current and future climate change. It is therefore essential to better understand the ecosystem services that they are able to provide on a sustainable basis, in particular for human societies, particularly nomadic or semi-nomadic and pastoral.

In the ACC, socio-anthropological interpretations of burial sites or settlements show the cohabitation in the Bronze Age of nomadic pastoralism, associated to highly developed wheeled transport and interregional trade, with proto-urban societies. If these practices are determined by steppe environments, then the study of the sustainability of these poorly documented ecosystems needs to include both archaeological and paleo-ecology.

Within the Stepability project, interdisciplinary approaches are gathered to test, depending on several types of agrarian, cultural and societal developments, the vulnerability or resilience of steppe ecosystems with a view to sustainable exploitation. To do this, the interaction between researchers from different disciplinary fields (from archaeology to paleoecology / paleoclimatology) is necessary. Several study areas are targeted: Caucasus countries (Azerbaijan, Armenia) and Central Asia countries (Uzbekistan and Turkmenistan). In these workshop zones, the history of domestication, of the agro-pastoral impact and then of intensive livestock farming will make it possible to establish a scale of impact of agro-pastoral practices on the resilience of steppe ecosystems since the Bronze Age.

4 ARCHEOLOGICAL STRUCTURES AS POTENTIAL ENVIRONMENTAL ARCHIVES; FIRST NON-DESTRUCTIVE STUDY FROM SOUTHERN KYRGYZSTAN

Vatanev, Atilla (Department of Archaeology, Faculty of Arts, University of West Bohemia) - Vařeka, Pavel (Department of Archaeology, Faculty of Arts, University of West Bohemia) - Kočár, Petr (Department of Archaeology, Faculty of Arts, University of West Bohemia) - Chajbullin Košťál, Jozef (Department of Archaeology, Faculty of Arts, University of West Bohemia) - Lisá, Lenka (Institute of Geology, Academy of Sciences of the Czech Republic) - Petr, Libor (Department of Botany and Zoology, Faculty of Science, Masaryk University) - Šůvová, Zdeňka (Department of Archaeology, Faculty of Arts, University of West Bohemia) - Bajer, Aleš (Department of Geology and Soil Science, Faculty of Forestry and Wood Technology, Mendel University in Brno) - Sultanov, Emil (National Academy of Sciences of the Kyrgyz Republic, Department of Archaeology of the Institute of History, Archeology and Ethnology named after B. Džamgyrčinov) - Osmonova, Samara (Faculty of History and Social Work, Osh State University)

The environmental and geoarchaeological interpretation of settlement hill structures interpreted as tepe at locality Ak-Jar in southwestern Kyrgyzstan are the main aim of the study. The fact that these structures are located on one of the Silk road branches at the eastern edge of Fergana Basin make the study important not only from the point of climatic changes, but also from the point of understanding the settlement and subsistence strategies in that time.

Approximately 1 km long linear structure, composed of six settlement hills, located at the eastern edge of village Ak-Jar, were in the first stage of archaeological research studied only non-destructively. It generally means they were studied on the basis of surface research observations and aerial documentation. The edges of eroded tepe 2 were the subject of more detailed geoarchaeological approaches. In case of tepe 2 the sedimentology, micromorphology, geochemistry, archaeobotany, palynology, malacology, zoology, C14 and OSL dating was applied. The chronology of tepe structures was studied by C14 dating.

The C14 dates show the timespan of the tepe settlement between 250 BC to 400 AD. The well-developed calcisols (russ.: "sierozems") with significantly bioturbated horizon are buried under the tepe's structures. These soils developed under arid climate and high bioturbation reflect the movement of larvae into deeper horizons to survive the hottest part of the season. In one part of the eroded tepe were documented sediments of the water reservoir. The sedimentation inside the structure lasted not more than 150 years and represents the environmental archive from the main phase of the tepe function. The spectra of crops reflect arable agriculture, probably including the crop of grapes. Sheep pastoralism was probably the main source of the meat, but there is also evidence of turtle consumption.

5 RODENT'S AS PALAEOECOLOGICAL PROXIES TO RECONSTRUCT PAST ENVIRONMENTS OF EURASIA

Rey-Rodriguez, Ivan (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili) - López-García, Juan Manuel (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Universitat Rovira i Virgili)

Eurasia, the westernmost subregion of Asia, constitutes a significant passage between Africa, Asia, and Europe. Over the last decade, there has been a notable increase in small vertebrate studies in this region, primarily due to their utility in palaeoenvironmental and palaeoclimatic reconstructions.

Considering this background, this communication aims to present the reconstruction of past environmental and climatic conditions using rodent assemblages, focusing on the archaeological sites of Azokh 1 Cave and Kaldar Cave, to enhance our understanding of human evolution within archaeological, paleontological, environmental, and ecological contexts. A taphonomic study was conducted to identify the nature and origin of the assemblage. Paleocological conditions were reconstructed using Habitat Weighting and the Bioclimatic model.

Results from the Azokh 1 Middle to Late Pleistocene layers suggest a relatively warm-temperate climate and an environment mainly composed of shrubland and steppe. Minimal changes were observed between the studied layers, indicating favorable conditions for human populations.

Furthermore, paleocological analysis of Kaldar Cave revealed lower temperatures and precipitation compared to present-day conditions during the Late Pleistocene, suggesting that hominin populations inhabited an environment mainly consisting of dry steppes with patches of forested areas.

In summary, the different methodologies used facilitated the identification of predators at the origins of the assemblages and the recovery of important palaeoenvironmental and palaeoclimatic information in Eurasia, especially in the Zagros Mountains of Iran and the Caucasus region. Additionally, regarding the paleobiogeography of our identified rodent species, which are mainly composed of taxa of Asiatic origin, it suggests that the Zagros and Caucasus mountains likely acted as a barrier for small mammals coming from Africa.

6 CENTERING THE PERIPHERY: NEW PERSPECTIVES ON THE CENTRALITY OF ARID ENVIRONMENTS IN THE ECONOMY OF CENTRAL EURASIA

Castro, Mariana (New York University (Institute for the Study of the Ancient World))

In Near Eastern and Central Asian archaeology, deserts have often been perceived as hostile environments unfit for human presence. This view promoted the development of various racist and inaccurate narratives concerning desert dwellers. In Central Asia, for example, Dependency Theory argued for the incapacity of mobile-pastoralists to thrive in their homelands while successfully maintaining sustainable and independent forms of subsistence, craftsmanship, and resource extraction. Taking the Kyzylkum desert in modern Uzbekistan as an example, this paper contests the view that deserts have been peripheral or remote places in the economy of regional and interregional exchanges, particularly in relation to settled, cosmopolitan areas of the pre-modern world. In reality, the Kyzylkum was an essential source of mineral resources to the surrounding oasis regions, especially copper and turquoise.

A perspective centering deserts and their peoples fits within the recent academic wave of scholarship focused on returning agency to nomadic and semi-nomadic groups in the archaeological record, and opens the dialogue for a more inclusive and complete view of past societies. It also challenges the core-periphery models often applied in Landscape Archaeology and highlights the role and resilience of mobile-pastoralists in shaping regional and interregional history. Pursuing a better understanding of these various issues within the arid landscapes of the former Soviet Union is particularly timely, especially if we consider the ancient and modern development of the so-called "Silk Roads" and the increasingly fundamental place of Central Asia in global historical narratives.

7 AGRO-PASTORAL LANDSCAPE FIRE SUPPRESSION IN THE STEPPES OF THE BRONZE AND IRON AGE SOUTHERN CAUCASUS

Cromartie, Amy (Cultures et Environnements. Préhistoire, Antiquité, Moyen Âge (CEPAM); Cornell University) - Khatchadourian, Lori (Cornell University) - Ménot, Guillemette (LGL-TPE, ENS Lyon) - Peyron, Odile (Institut Des Sciences De L'évolution De Montpellier (ISEM)) - Smith, Adam (Cornell University) - Badalyan, Ruben (Institute of Archaeology and Ethnography NAS Republic of Armenia) - Lindsay, Ian (Purdue University) - Palumbi, Giulio (Cultures et Environnements. Préhistoire, Antiquité, Moyen Âge (CEPAM)) - Joannin, Sébastien (Institut Des Sciences De L'évolution De Montpellier (ISEM))

Fire is a natural, frequently occurring disturbance in steppe grasslands and is essential for ecosystem maintenance. Today, humans living in the steppe grasslands of the Kasakh valley, Armenia, contribute to suppressing this natural fire regime through vegetation management practices like grazing, controlled burns, and haymaking. Holocene fire re-

conds from this region also record an active natural fire regime throughout the Holocene, which stops between 5500 and 2500 cal. BP (3500 - 500 BC) when Bronze and Iron Age communities moved into this region (Cromartie et al. 2020), raising questions about the role of past communities in fire suppression.

In this paper, we present new work completed from a wetland core taken from the Kasakh valley dating from 8500 cal. BP to the present to shed light on this phenomenon. We run a combination of proxies, including macro-charcoal, pollen, non-pollen palynomorphs, and paleotemperature biomarkers (brGDGTs), to reconstruct the fire, vegetation, agro-pastoral land-use, and climate history and compare the results to the settlement history. Together, we find that these communities utilized various vegetation management strategies to suppress the fire regime, including animal browsing/grazing, which may have begun as early as the Chalcolithic. However, humans did not act alone, with climate also significantly affecting vegetation turnover. Our paper highlights the need for historical contingent landscape histories that integrate the paleo- and archaeological sciences to understand the role of humans over time in fire-regime maintenance.

Cromartie, Amy, et al. "The vegetation, climate, and fire history of a mountain steppe: A Holocene reconstruction from the South Caucasus, Shenkani, Armenia." *Quaternary Science Reviews* 246 (2020): 106485.

8 SURVIVING IN THE SEMI-ARID REGION: THE HITTITES RESILIENCE PRACTICES IN ANATOLIA AT 2ND MILLENNIUM BC

Saskara, Agit (Protohistory and Near Eastern Archaeology)

Anatolia is a geography where the semi-arid climate and plateaus have existed in almost every period throughout history. It is known throughout history that very serious droughts have occurred in this geography. We can say that drought is a historical phenomenon of Anatolian geography. Founded in 1650 BC in the semi-arid Anatolian geography, the Hittites' ability to survive in this semi-arid geography for approximately 500 years should be perceived as a historical success in terms of human history. In this context, the Hittites implemented some practices to survive in the geography they existed in.

As a result of these practices, dams representing the earliest examples in the world were built for the first time in Anatolian geography 3500 years ago. Apart from the dams, water reservoirs-pools and silos, that is, grain storages, were built. The main question of the study: How did the Hittites survive in the semi-arid Anatolian geography with the techniques they developed thousands of years ago? What are these techniques? Finding answer(s) to these questions in the light of archaeological remains is the aim of the study. In this context, the human-environment and climate relationship are discussed with a historical example and aims to present a projection from today to the past.

9 DEMIC EXPANSION OF THE AGROPASTORAL SAKA AND WUSUN CONFEDERACIES/STATE (800 BCE TO 400 CE) IN SOUTHEASTERN KAZAKHSTAN

Chang, Claudia (Independent scholar) - Tourtellotte, Perry (INDEPENDENT SCHOLAR)

For the past 30 years we have in collaboration with our local Kazakhstani colleagues have directed surveys and excavations of Iron Age burial sites on the Talgar alluvial fan (535 sq km). We have recorded 1000 Iron Age burial mounds and 70+ settlements. Three Iron Age sites of hamlets, small and large villages from 0.3 sq hectares to 10 hectares have been excavated. Specialist studies in paleo-ethnobotany (phytolith and macro-seed recovery), zooarchaeology, and geomorphology. Hydrological and geomorphological studies indicate the use of stream channeling and check dams, possibly larger scale irrigation originating by at least 400 BCE and possibly earlier. We test the hypothesis that the spread of agropastoralism and pastoral transhumance took place across many alluvial fans along the Northern Tian Shan Mountains. This population spread across a series of alluvial fans may be similar to the "wave and advance model" proposed by Ammerman and Cavalli-Sforza (1984) for the Neolithic transition in Europe.

In contrast the Iron Age period in Eurasia has been characterized by the formation of the Saka state and nomadic confederacies based primarily on mobile pastoralism. The environmental conditions of rich chernozem soils on the alluvial fans served as ideal pockets suitable for rainfall, check dam, and larger-scale irrigation systems. Climatic conditions of warm and wet phases contributed to the growth of agropastoralism. The early nomadic states produces surplus agricultural and pastoral resources which served as a backbone for an aristocratic elite of nomads, apparent from the burial inventories found at kurgans such as the Issyk Golden Warrior. The economy of mixed farming and animal husbandry led to the rapid socio-political expansion of the nomadic Saka and Wusun states in the Semirechye (Zhetisu) region.

10 POPULATIONS OF THE CENTRAL ASIAN STEPPES AND REED BEDS OF THE AMU DARYA IN THE EARLY CENTURIES OF ISLAM

Rhoné-Quer, Camille (Aix-Marseille University; CeRMI; IREMAM)

The Amu Darya flows through vast areas of steppe and desert (Kara Kum and Kizil Kum). On its banks, the only naturally available vegetation are tugai and reeds. We will be looking at how the neighbouring populations have managed to make the most of the reed beds' resources (flora, fauna, etc.) to live and survive in this difficult environment. We will be focusing on the early Islamic period. Using data from written sources (Arabic and Persian texts from the medieval period, travellers' accounts from the 19th century), archaeology, palaeoecology, botany and archaeobotany, we will look at the adaptability of reeds to Central Asian climatic conditions (aridity, salinity, floods/droughts). We will also look at the uses to which reeds are put, both for wildlife (habitations/buildings, food) and for humans (location of reedbeds, consumption, construction, transport). The aim of this paper is to provide a better understanding of the role of reeds as an essential resource for agropastoral societies, whether sedentary or nomadic.

1123 TRANSIENT TRACES: UNEARTHING THE HIDDEN MATERIAL DIMENSIONS OF CONTEMPORARY MIGRATION

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Jungfleisch, Johannes (Ruhr University Bochum; Leibniz ScienceCampus "ReForm" Bochum) - Raeymaekers, Timothy (University of Bologna)

Session format: Regular session

In 2015 and 2016, the European 'migration crisis' saw the active involvement of journalists, scholars, and activists in documenting the border repression that characterized migratory journeys on the continent. Iconic images come to mind, such as people arriving by inflatable dinghies and living in makeshift camps, alongside the deployment of increasingly complex bordering infrastructures. Over time, these images have gradually faded, and media attention has shifted from the Mediterranean to other crises.

Nevertheless, migration from the Global South to Europe persists until today. This ongoing process gives rise to distinct material manifestations and traces, ranging from highly militarized border infrastructures to objects left behind on migration journeys and the life worlds of illegalized migrants residing in Europe and so-called 'transit countries.' Despite the growing scholarly interest in the social, political, and cultural sciences, the materiality of this phenomenon still tends to be under-researched, even in archaeology.

Therefore, this panel foregrounds the often-hidden material dimensions of illegalized migration through a transdisciplinary lens. The aim is to explore and discuss the multifaceted material realities faced and produced by migrants as they engage with territorial borders and various economic sectors while seeking refuge and a way to subsist. Our inquiry necessarily crosses formal-informal boundaries, such as between official refugee camps and informal settlements, as we seek to highlight the (material) infrastructures through which migrants' presences are actively differentiated, bounded, and governed.

For this purpose, the session will bring together scholars from diverse disciplines, addressing less visible stages of contemporary migration from a material perspective. On the one hand, we invite case studies examining the material manifestations of contemporary migration. On the other hand, we look for methodological and theoretical contributions, fostering discussions and ethical reflections on the complexities of studying lived material cultures from an inter- and transdisciplinary perspective.

ABSTRACTS

1 WALLING OUT ON THE U.S. - MÉXICO BORDER

McGuire, Randall (Binghamton University)

National borders disrupt things. They do not, however, do so simply as lines on a map. Lines on a map create the illusion of borders but they only become disruptive when nation states materialize the web of social relations and meanings that borders entail. In the 21st century, nation states have increasingly chosen to materialize their borders with walls. Nations have raised barricades of barbed wire, steel, brick, and concrete to provide security, control movement and deny agency to multiple transgressors including terrorists, smugglers and undocumented migrants. Walls, however, enable agency that the builders did not imagine or desire, and crossers continually create new ways to transgress and disrupt the purpose of the wall. In this on-going dialectic of fortification and transgression, both nation states and the transgressors rematerialize the border. We see this dialectic of disruption on the fortified U.S. - México border. Here the U.S. has constructed hundreds of miles of walls, fences and vehicle barriers and backed these up with armed officers, dogs, helicopters, drones, observation towers, and vehicle checkpoints. This material border forces migrants

into "hostile terrain" where they would be at "mortal danger" in the desert, and crossing the Rio Grande. In the cities the walls break bodies and assassinate crossers. Despite these efforts, transgressors make the border a fluid space of crossing that disrupts the tidy schemes of nation states.

2 "418 BOATS SENT = 20,900,000 \$": TRACING BORDERING AND BORDER-CROSSING PRACTICES IN THE EASTERN MEDITERRANEAN

Jungfleisch, Johannes (Ruhr University Bochum)

The Turkish west coast, overlooking the Aegean Island of Lesbos, is renowned for its stunning natural scenery. Centuries-old olive groves, interspersed with the characteristic Mediterranean macchia vegetation of evergreen bushes, adorn the rocky coastline, occasionally featuring small pebble bays. This picturesque coastal landscape plays a central role in the contemporary migration movement from various countries of the Global South to Europe.

Situated just a few kilometres from the Aegean islands, the Turkish west coast has long served as a departure point for migrant boats embarking on their journey to Europe. People on the move rely on different items during their travels, which they sometimes abandon for several reasons. Therefore, the ongoing migration has materially manifested in heterogeneous assemblages of objects left behind along Turkey's shores. These mundane objects and material remnants, often perceived and categorised as mere rubbish, may contain valuable information shedding light on lesser-explored stages of migratory journeys, such as the period of forced waiting on the Turkish west coast.

Despite their fragmentary and incomplete nature, the material remains of clandestine migration document the complex interactions between different actors as traces in their physicality. In this context, contemporary archaeology plays an important part: This discipline has developed a unique set of research techniques enabling researchers to analyse human behaviour based on the materials left behind. Consequently, in contemporary settings, the object-focused methodology of archaeology allows us to reconstruct past processes and events while maintaining an ethical distance from their occurrence.

Drawing on fieldwork conducted in Turkey and Greece in 2017 and 2023, this paper conceptualises migrant materials left behind on the Turkish and Greek coastlines as material traces of bordering and border-crossing practices. Through this analysis, I aim to unearth the undocumented histories entangled in the material remnants of migration.

3 ARCHEOLOGICAL INVESTIGATION OF REFUGEEBOATS AT LAMPEDUA

Wilts, Gesche (www.miss-jones.de)

Since 3 decades, Lampedusa is well known for being the goal of Refugees. Mainly African and Arabic people try to escape with boats and cross the Mediterranean Sea. On September 12, 2023, the mayor of Lampedusa declared a state of emergency. That day, 5.000 Refugees made their way to Lampedusa. Too much to handle on that little Island. At the same time the Archeological investigation team, Gesche Wilts and Jonthan Kündiger, was at Lampedusa. The project was about documenting the Boats of the Refugees with archaeological methods. This documentation shows the circumstances under which Refugees are coming to Italy. These circumstances did Change in Summer 2023. Since 2022 there is a new Form of Boat made out of metal, which has sometimes been used. In the middle of September 2023 when 10.000 People arrived at Lampedusa in just three days, these Metal boats, only built for escape, has been the most used Type of Boat.

The Documentation of these Boats show that they have Similarities and differences. Sometimes, it seems, that they are self-build. The boats are made of 1 mm thin metal plates welded together. The internal stiffeners are usually only attached with spot welds. These boats are life-threatening. Poorly made welds can break quickly. The boats are often overcrowded, so one wave can capsize a boat.

Sometimes saver wooden boats are still reaching Lampedusa. Based on the documentation, the question of status differences during the escape arises. Further investigations are planned: shipwreck research methods to investigate the safety of these boats and the analysis of the Objects found on Board, for example to research the drinking water supply on the escape.

4 ASSEMBLAGES, NOT OBJECTS: SURVEY METHODS AND THE ARCHAEOLOGY OF CONTEMPORARY MIGRANT JOURNEYS IN WESTERN SICILY

Schon, Robert (University of Arizona) - Blake, Emma (University of Arizona) - Wigodner, Alena (Princeton University)

In this paper we prioritize assemblages over individual artifacts as units of study in an archaeology of contemporary migrant journeys. In the summers of 2018-2019, a team of archaeologists from the Arizona Sicily Project conducted an intensive archaeological survey documenting traces of migrant landings along the coastline of Capo Feto, the closest point in Sicily to Tunisia. These traces included, among other things, discarded seawater-soaked clothes, Tunisian water and medicine bottles, and even an abandoned boat. Importantly, they clustered in discrete units that we

documented as “assemblages” each representing a single event: a successful landing. The entangled objects in these assemblages divulge aspects of the lives of the invisible and anonymous travelers in powerful ways. In contrast, a subsequent collection of the material on a sandy stretch of Capo Feto beach yielded further North African material – this time, though, in the form of isolates found among debris of all kinds, local and otherwise. These individual items, many of the same type as we found grouped together in the assemblages, were evidence of connection across the Sicilian Channel but not much else. They yielded no insights into the people who brought them, if indeed people brought them at all. What, then, do the assemblages we documented reveal? In contrast to the tragic stories of dangerously overcrowded ships, the content and topographic position of migrant assemblages reflect a specific type of journey – one that is targeted, and that relies on an intimate familiarity with the passage, the coastline, and the shallow marine shelf that all require expertise to navigate safely. Our results contribute to new understandings of how to interpret contemporary material culture in open mutable settings while at the same time humanizing the actors who left those material traces behind.

5 EFFACED AFFECTS: TRACING LESSER MATERIALS IN THE MIGRANT TRAIL

Simeonidis, Phevos (Durham University)

As multiple ‘crises’ of displacement and movement still spread across scholarly, journalistic, and activist work, so do spread the materials left behind by those crossing the borders, or die trying to. Living or dead, disappeared or recovered, bodies often carry with them the personal items of the persons on the move, or the materials they produced or used along the way. The notion of the “migrant trail”, as De Leon (2015) sets it in both temporal and spatial coordinates, is often brimming with these objects. Yet many remain unaccounted for.

In this paper, I wish to trace some of these materials, both of the living and the dead, that are deemed less important for public discourses on migration – or its management –. Using the materials as a method themselves, I will argue that their existence, or destruction, the effacing of their affective nature, greatly alters the realities of those that were once in proximity to them.

Drawing from activist and scholarly fieldwork in the island of Lesbos, Greece, and the river border of Evros/Meriç between Turkey and Greece, the physical or digital materials that the paper examines, are the ones that are often left behind, unassociated with the crossing.

In doing so, I wish not only to highlight the ethical complexities of studying these materials, as per the panel’s call, and their corresponding scholarly or activist culture that they allow, but also question how our perception of said materials is often limiting or enabling further research through their inclusion or exclusion from our gaze.

Finally, in dialogue with the notion of disappearability (Laakkonen 2022, 2023) the paper will enquire as to how we can trace back those materialities that are now effaced, and work towards a renewed sense-making of the realities of which they bore witness.

6 THEGAME PROJECT. ARCHAEOLOGICAL APPROACHES TO HOMING STRATEGIES IN MAKESHIFT CAMPS ALONG THE BALKAN ROUTE

Farina, Emma (University of Bologna)

The Balkan Route is the main overland migration corridor into Europe; stretching from the eastern Greek islands to western EU countries, each year thousands of refugees travers the route or ‘try the game’, as they refer to their journeys, constantly reshaping the route itself. Along the route refugees establish makeshift camps, informal and temporary settlements located in urban squats, isolated rural areas, or adjacent to official refugee camps; here refugees can rest, exchange information, and make arrangements to continue their journey. The interdisciplinary ERC research project ‘TheGame: Counter-mapping informal refugee mobilities along the Balkan Route’ aims at theorizing makeshift camps along the route as an ‘archipelago’ of interconnected settlements with a unique social and political life and at creating an ‘archive-in-progress’ documenting refugees’ experiences of the everchanging corridor. Within the project, archaeological methodologies are to be employed to investigate the material and spatial dimensions of the camps and contribute to the archive.

Makeshift camps are composed of recycled and re-adapted materials, thus yielding a specific material culture, and refugees often record their presence with graffiti. As the camps undergo phases of use and abandonment due to cyclical population fluctuation and can permanently be evicted by law enforcement, the documentation of the camps is a pressing issue to contrast the State-enforced obliteration. These are fundamental spaces to understand informal mobilities and refugees’ agency, as makeshift camps are born out of refugees’ appropriation and reshaping of spaces. This research aims at documenting and studying makeshift camps along the Balkan Route in their different phases of use and abandonment, investigating how during their journeys, refugees can ‘home themselves’, to recreate a familiar environment, through material culture and the spatial dimension, simultaneously affirming their agency and marking their presence in the landscape.

7 MIGRANT LABOUR DORMITORIES IN GREECE: TRACING MATERIAL TRANSFORMATION FROM ABJECTNESS TO RESISTANCE

Kukreja, Reena (Queen’s University)

It is estimated that over 90 percent of labour in Greek agriculture is done by migrant workers. A majority of South Asian migrant men, the focus of my presentation, are “undocumented. Greece’s migration and temporary labour regimes forces them to labour precarity that is defined by harsh labour conditions, low and withheld wages, and unregulated hours of work (Kukreja 2019, 2021, 2023b). The migrant workers are forced to live in makeshift or repurposed housing – recycled plastic and cardboard tents (barangas) or farm sheds and abandoned warehouses – these lack the basics of sanitation and other amenities of life.

This paper focusses on the lived material culture of migrant housing by focussing on the barangas in Manolada. Instead of discussing, in length, the much acknowledged dehumanized materiality of migrant existence evident through the recycled plastic and cardboard housing that nearly 15, 000 Bangladeshi migrants are forced to live in during the strawberry growing season in Manolada, the paper examines the role of memory and imagination in shaping migrant engagement with material objects and spaces. Intertwining the concept of “travelling memory” (Erell 2011) with resistance theory, I argue that the migrant workers, placed on the margins of Greek society, articulate their resistance by “humanizing” spaces of alienation and abjectness. Through individual and collective creative acts, their living memory and nostalgia for home and communal existence infuses new meaning to material objects and spaces. I illustrate this by using examples of memory objects that appear mundane and everyday but are suffused with memories of life elsewhere. By transforming physical spaces with vegetable gardens, swings, and ethnic markets, or as spaces for leisure and communal joy such as Sufi singing, the Bangladeshi migrants resist the forced invisibilization and abjectness that bordering regimes seek to enforce on their racialized and “illegal” bodies.

8 FAKE BRANDS, PRAYER CARPETS, AND STREET FOOD: TOURIST SPACES AS SITES OF MIGRANT’S BORDER RESISTANCE

Traber, Janine (University of Cologne)

Tourism provides migrants from African countries with varied ways of making an income. After arriving “irregularly” in Europe, formal employment is usually not an option. Tourism on the other hand relies heavily on undocumented labor, from construction work, hotel cleaning, beach souvenir vending, to sex work in and in front of nightclubs. In this talk, I argue that tourist spaces become amplifiers of otherwise erased materiality. Regarding them as hybrid and cosmopolitan non-places, in which by their nature nothing is authentic or abnormal, they produce both discursive and material manifestations of the border as well as subversive material contestations of it. The things that are usually kept secret or made invisible to veil the migrant status before the public eye can become a valuable currency in competitive attention economies of mass tourist sites. The large numbers of people passing through and the fleeting and quirky nature of the encounters seemingly grant security while at the same time producing the exploitative capitalist economic conditions that form the base of migration incentives. While on the one hand, the intersection of tourism and migration often produces problematic tourist performances against the migrants, they may on the other hand also lead to the formation of politically engaged civil communities. In several examples from a multi-sited research on Senegalese migration to Europe, I am going to discuss the potential of archaeological methods to uncover and document how migrants from Senegal negotiate and counter the bordering strategies of European tourists.

9 (FORCED) MIGRATION AND AMASSED DISPOSSESSIONS: CONDITIONS AND CONSEQUENCES

Yi-Neumann, Friedemann (University of Helsinki)

As people move away from devastated places, they leave behind tons of debris from their former properties. As one crosses borders without paper, it may be likely that it is necessary to discard further personal items. As people are kept in protracted limbos by border regimes, this regularly causes a series of disposessions (Hicks & Mallet, 2019; Khosravi, 2018). Some migration anthropologists have unearthed the relevance of material culture. (Levin, 2019; Dudley, 2010; Basu & Coleman 2008). The perspective proposed in this contribution broadens classic takes on things by focussing on disposessions as a material phenomenon.

First, this paper demonstrates how disposessions as a material phenomenon negate the means of social reproduction in the broadest during (forced) migrations and in protracted displacement (see, e.g., Stein, 2015; Kiddey, 2017; Holmes & Ehgartner, 2020). Second, the author shows that disposessions can take effect in various ways, direct and indirect ways, from the blunt violence in warzones to subtle decisions on asylum and illegalization and that the more indirect disposessions are less likely to be considered disposessions. Third, this contribution will elucidate how repeated exposure to dispossession violence causes destructive accumulations and will provide ethnographic examples of how disposessions cause chronic ‘all-taking’ threats to people’s existence and their political economies of being.

DISCUSSING DISPLACEMENT: MATERIAL CULTURES OF REFUGE IN THE PITT RIVERS MUSEUM

Khan, Hadiqa (University College London; Pitt Rivers Museum)

European museums have actively participated in discussions surrounding displacement, particularly in light of the on-going migration from the Global South to Europe. Despite their engagement with Europe's refugee 'crisis', displaced populations are often framed solely within the context of crisis, with discussions and exhibits being temporary and fleeting. More often than not, material culture from forced migrants and refugees is collected, displayed in temporary exhibitions, and then largely forgotten in over-packed museum store-rooms.

This paper applies an archaeological lens to examine the Pitt River Museum's interactions with displaced individuals and objects, viewing the museum as an archaeological site and its collections as assemblages. Through an analysis of 35 years of collecting practices, recent exhibits, and community-led initiatives, this paper explores how the museum has approached its engagement with refugees and forcibly displaced communities.

Using three case studies from the Pitt River Museum's collections (a thob from Palestine, token 'currency' from the Katsikas Refugee Camp in Greece, and a piece of the Calais border fence), this paper argues that studying objects collected from sites of displacement and displaced individuals not only sheds light on the latter's treatment, but also serves as a means to scrutinize broader inequalities. The paper emphasizes the need for museums to move beyond transient discussions and foster sustained engagement, contributing to a deeper understanding of displacement, its socio-cultural implications, and the multifaceted narratives embedded in the artifacts of forcibly displaced populations.

1124 CHANGING LAND USE STRATEGIES AT HIGH MOUNTAIN AREAS IN EUROPE SINCE THE NEOLITHIC

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Gassiot Ballbè, Ermengol (Departament of Prehistory. Universitat Autònoma de Barcelona) - Antolin, Ferran (German Archaeological Institute; Prähistorische und Naturwissenschaftliche Archäologie (IPNA), Universität Basel) - Clemente Conte, Ignacio (Departament d'Arqueologia i Antropologia, IMF-CSIC)

Session format: Regular session

In the last 2 decades archaeology in European high and middle mountain areas has undergone a remarkable development. Numerous research projects have provided information regarding new sites and have uncovered long occupation sequences, often in areas where virtually no archaeological evidence was known. Despite these advances, the understanding of the processes of occupation of these high and medium mountain areas is generally based on a fixed premise, namely that the main purpose of the frequentation of these territories from the Neolithic onwards was their exploitation as pastures for livestock.

Numerous indications indeed confirm the presence of various forms of livestock farming in these areas. However, the progress of archaeological research also shows possible indications of other activities, such as agricultural practices, from the Neolithic onwards in altitudinal belts located at and above the current higher altitude villages in various European mountain ranges. Some excavations have yielded a considerable volume of carpological remains, together with evidence of processing and storage. Others have documented, through microbotanical remains, residues or traces of cereal exploitation. In some sedimentary cores, e.g. from lakes and peat bogs, the sign of possible cultivation is also worth of consideration. In some contexts, traces of terraces and even ancient cultivation fields are being documented using geoarchaeological techniques.

This evidence invites us to rethink the changing forms of occupation of medium and high mountain environments and to what extent, beyond an almost exclusively livestock specialisation, agriculture played a role in these processes in some periods. Papers presenting case studies or regional approaches either with new data or modelled scenarios are welcome, as well as ethnographic or more theoretical papers on human-mountain interactions through time.

ABSTRACTS

1 GEARCHAEOLOGICAL TEST PITS: A MULTIPROXY METHODOLOGY BASED ON A PALEOSOILS STUDY APPLIED TO THE RECONSTRUCTION OF CULTURAL LANDSCAPES IN MOUNTAINS

Rodríguez Antón, David (Autonomous University of Barcelona) - Revelles, Jordi (Catalan Institute of Human Palaeoecology and Social Evolution) - Andreaki, Vasiliki (Autonomous University of Barcelona) - García Álvarez, Salvia (Polytechnic University of Madrid) - Cunill, Raquel (Autonomous University of Barcelona) - Obea, Laura (Autonomous University of Barcelona) - Bonet, Anna (Autonomous University of Barcelona) - Gassiot Ballbè, Ermengol (Autonomous University of Barcelona)

During the last decade, a multiproxy methodology focused on the identification of different human actions and activities documented in mountain paleosoils has been developed. This methodology is based on the characterization of ancient paleosoils formed during the Holocene in mountain valleys, usually, in terraces from alluvial plains located in glacial basins.

The test pits methodology integrates three complementary approaches: (1) Chronometry: which is based on the taxonomical identification of stable sedimentary woody charcoals dated using the ¹⁴C AMS technique; (2) Geoarchaeology: which involves the identification and characterization of palaeosoils and stratigraphy through the study of thin sections with a petrographic microscope, FT-IR spectrometry, geochemical quantification of organic matter, phosphorus and others items; (3) Archaeobotany: that is focused in the reconstruction of paleolandscapes and human actions based in the quantification of different and complementary plants and algae micro-remains such as pollen, NPP, phytolith, diatoms, and micro-charcoals; and plants macro remains such as carbonized woods, seeds, leaves, and pedosedimentary charcoals.

The method was tested in the National Parc of Aigüestortes and Estany de Sant Maurici, located in the axial central Pyrenees ranges of Lleida (Spain). Specifically, it has been applied in Aigüestortes' wetlands from the glacial basin of Sant Nicolau valley, in a fir forest of the subalpine stage around 1800 m a.s.l.

The study of the Aigüestortes test pit indicates that the paleosol formed in the mid-Holocene, dated between 7.200 and 6.800 calBP, was the result of recurrent human activity in the area based on firing, grazing, and possibly some cultivation practices.

2 FROM HIGH SOILS TO HIGH GROUND - POTENTIALS OF SOIL GEOCHEMISTRY IN RECONSTRUCTING PAST HUMAN-ENVIRONMENTAL RELATIONSHIP IN HIGH MOUNTAINOUS AREAS

Laaha, Valentina (Department of Prehistoric and Historical Archaeology - University of Vienna) - Kowarik, Kerstin (Austrian Archaeological Institute - Austrian Academy of Sciences) - Brandner, Daniel (Natural History Museum Vienna) - Scholz, Roman (Romano-Germanic Commission of the German Archaeological Institute) - Reschreiter, Hans (Independent Researcher) - Hofmann, Kerstin (Romano-Germanic Commission of the German Archaeological Institute)

By dwelling, farming, herding, crafting, and generally living people have left elemental traces in the ground. These chemical fingerprints conversely hold the potential of identification and reconstruction of human activity. Based on their ability to hold such information ('soil memory') soils over the last years became continuously more recognised as valuable archives of human presence and action.

However, so far little is known of the potentials of soil geochemistry studies regarding the reconstruction of past (land) use and spatial analysis of high mountainous areas in the Alps. To build a basic understanding of the chemical composition of alpine meadow soil and 'memorised' human impact on it, a pilot study was carried out on the Dachstein plateau near Hallstatt (Austria).

This landscape has seen diverse human activity at least since the early Bronze Age. So, most recently we conducted geoarchaeological investigations in the microregion of the Grafenbergalm. A coring raster was established on the basis of former characterisations and preceding geomagnetic measurements. The sampling area thereby included the remains of an alpine hut and its near-site area. Soil samples were extracted with a hand corer and analysed for qualitative and quantitative elemental composition using energy dispersive X-ray fluorescence spectrometry (ED-XRF). Data analysis included interpolated elemental mapping and multivariate modelling. This will provide a baseline for future geochemical work on the Dachstein plateau, the Alps, and mountainous areas in general. Further, it will contribute to the creation of a (geo)archaeological toolbox to identify and reconstruct human activity and human-environmental interaction over time in medium and high alpine areas.

The geochemical work is part of a wider research programme focused on the complex human-environment interactions in this fragile landscape. It thereby brings together data from lake sediments, bogs, keyhole excavations, and further geoarchaeological analysis.

3 THE NEOLITHISATION OF THE DOLOMITES (EASTERN ITALIAN ALPS): THE CASE STUDY OF VALLE DI LAMEN (FELTRE, VENETO)

Carrer, Francesco (Newcastle University) - Cavulli, Fabio (Universita' degli Studi di Napoli Federico II)

Valle di Lamen is a narrow and steep valley in the Southern Dolomites of the Belluno province (Eastern Italian Alps), that connects broad valley of Feltre to the uplands (around 2000 m). Despite its fairly inhospitable look, this valley has provided solid evidence of human occupation throughout history. Surveys and excavations in the 1990s showed that large rockshelters near the valley bottom, few hundred meters above the sea level, were used by agropastoral groups since the 5th millennium BC. Recent research carried out by the authors of this paper shows that even more remote rockshelters, located above 1000 m of elevation and known as "Ripari Alti" ("High Shelters") were occupied in the same period. Faunal assemblages indicate the presence of domestic and wild animals, and grindstones might suggest plant processing activities at the site. The excavation of Ripari Alti, alongside the other archaeological evidence available for Valle di Lamen, provide interesting data to understand neolithisation process in this area of the Dolomites. On the other hand, a lot of questions remain unanswered: What was the function of the Ripari Alti? What type of activities were carried out? Was it a seasonal or a permanent site? What was its relationship with the lower rockshelters and the other late-neolithic sites of the valley of Feltre? The continuation of the archaeological excavation and the analysis of the finds will shed new light on early farming practices in this marginal sector of the Eastern Alps.

4 UNDERSTANDING LAND USE CHANGE IN THE NEOLITHIC OF THE CENTRAL PYRENEES (5600-2100 CAL BCE). SPATIAL MODELLING OF BIOCLIMATIC BELTS

Salvador-Baiges, Guillem (Universitat Autònoma de Barcelona) - Gassiot-Ballbè, Ermengol (Universitat Autònoma de Barcelona)

The climate of high mountain areas is not only markedly seasonal, but it also changes with altitude. This fact causes changes in vegetation and habitats and, consequently, it can affect the potential uses and resources of the territory.

It has not been until a few decades ago that the Central Pyrenees have attracted the attention of archaeological research. Due to its biogeographical conditions, this region was usually considered a marginal and unsuitable area for habitation during most of the Prehistory times and, exceptionally, a Summer grazing area. However, in the last decades several Neolithic settlements (5600-2100 cal BCE) have been found and documented along the mountain range and nowadays, the economic strategies followed by human groups in this period in the Central Pyrenees are under debate. There are two main hypotheses: one of them suggests that the Pyrenees were occupied on a seasonal basis in Summer by groups with long-distance mobility from the beginning of the period; the other one proposes that early Neolithic communities practised a diversified economy, combining both small-scale agriculture and pastoralism.

This paper addresses this debate by analysing the settlement pattern of Pyrenean Neolithic sites in different chronological phases taking into account their location in different altitudinal belts and landforms; our final goal is to be able to relate the results of the analysis to the possible strategies and economic activities practised by these groups.

The Rivas-Martínez bioclimatic classification, combined with palaeoclimatic data, has been used to spatially model altitudinal belts at different times during the mid-Holocene. This approach provides a more precise understanding of which areas were used by early agro-pastoral groups and helps to detect changes over time. Together with orography, it is used to understand variations in the location of sites over time and to infer possible changes in the land-use.

5 PLANT FOOD ECONOMY IN MONTANE ZONES DURING PREHISTORY: NEW ARCHAEOBOTANICAL DATA FROM THE CENTRAL PYRENEES

Antolin, Ferran (Deutsches Archäologisches Institut; University of Basel) - Obea, Laura (Universitat Autònoma de Barcelona)

Human settlement in the eastern and central Pyrenees during prehistory, as well as in historical times, has been systematically investigated in several areas. This has led to novel and rich datasets including the location of new settlements, animal sheds, hunting sites, etc., and to a better understanding of the use of different mountain zones over time. Despite these advances, the methodology used in each study area within the Pyrenees differ slightly between teams, leading to different interpretations of the nature of the settlements. While agricultural practices in the Neolithic in the eastern Pyrenees seem well documented, there is some discussion on the use of settlements by early farming societies in the central Pyrenees, either seen as purely herding sites or longer-lasting occupations with mixed economies.

Botanical macroremains from a test trench excavated in 2013 in Coro Trasito confirmed that also in the central Pyrenees, evidence for local agriculture above 1500 m a.s.l. for the 5th millennium cal. BC was worth considering. For this talk, the analyses of the test trench will be complemented with the study of intensive surface sampling at the same site in later campaigns, as well as new data coming from Obagues de Ratera. Our goal is to discuss plant economy in

the area through time, considering the different chronological periods identified at both sites, from the Mesolithic to the Bronze Age.

6 A SEASONAL OR PERMANENT SETTLEMENT? STUDY OF LIVESTOCK MANAGEMENT STRATEGIES IN THE PYRENEES OF THE EARLY NEOLITHIC AND BRONZE AGE

Mata Ferrer, Sergi (Department of Prehistory, Autonomous University of Barcelona) - Sierra, Alejandro (Department of Prehistory, Autonomous University of Barcelona) - Rey Lanaspá, Javier (Departamento de Presidencia, Interior y Cultura, Gobierno de Aragón) - McGrath, Krista (Institut de Ciència i Tecnologia Ambientals (ICTA - UAB), Autonomous University of Barcelona) - Saña Seguí, Maria (Department of Prehistory, Autonomous University of Barcelona)

The acceptance of agricultural activities in the Pyrenean communities dates back to the second half of the 6th-millennium cal. BC., when the first signs of agriculture and livestock began to appear, especially in caves and shelters strategically located along the mountain range. An example is the cave of Coro Trasito (Tella-Sin, Huesca), a key site in studying the beginnings of animal livestock in the Pyrenees and the incipient livestock farming in the high mountains.

To continue the archaeozoological study developed previously, carrying out biomolecular studies using stable isotopes on teeth will allow us to know the livestock management strategies from the study of the patterns of mobility, reproduction and feeding of the animals of these first herds of the Early Neolithic and Bronze age. Also, taking into account the morphological similarity of sheep and goats, the application of the ZooMS methodology (method developed in the framework of paleoproteomics - Zooarchaeology by Mass Spectrometry) will allow expanding the resolution of the taxonomic classification, permitting us to consider the composition of the herds and the different animal productions in the high mountains. This will allow a more exhaustive study of the repercussions that animal management had on Early Neolithic and Bronze communities, shedding light on aspects such as the characterisation of settlement dynamics, the subsistence patterns and the role of livestock.

Based on these analytical approaches, it will be possible to conclude what type of livestock farming was carried out during the Early Neolithic in the Pyrenees and, consequently, what type of occupation took place in the cave.

7 LANDSCAPES OF POWER: CAPRINES IN THE PASTORAL STRATEGIES OF LOCAL ELITES IN MEDIEVAL PROVENCE

Unsain, Dianne (Stockholm University) - Hegarty-Morrish, Patrick (Trinity College, University of Oxford)

The importance of domestic caprines in the subsistence economy of the medieval Mediterranean, particularly in southern France (10th-15th centuries), is well established. Historical and zooarchaeological research places them as the main source of meat in the cities and towns of the region from the 13th century onward. However, little is known about the role of the ruling elites in this specialisation, especially their motivations and strategies for exploiting and controlling not only herds but also pastoral areas.

This paper is based on two complementary approaches: a zooarchaeological study of a series of sites in south-eastern France, occupied from the 10th to the 14th century. The sites include peasant settlements, garrisons, castles and towns. The diversity of socio-economic and chronological contexts allows a synthetic approach on a regional scale.

The second approach is based on the analysis of local textual archives. These include the town customaries and legal documents in communal archives, notary records, and the accounts of local officials. Here, domestic caprines appear among the animals kept by local elites, and the same time, this village-level elite sought new rights to formalise their rights to pasture caprine and extract revenue in caprine or sheep and goat's cheese from peasant neighbours.

This research highlights a radical change in the economic strategies of the Provençal elite towards caprine herding from the 13th-14th centuries onwards, with major repercussions for the entire community. These changes had a lasting impact on the economic relationships between town and country, the strategies by which village communities regulated pastoral activities on their territories, and on the increasingly caprine-shaped environment.

8 BASQUE PASTORAL SITES IN MODERN AND CONTEMPORARY TIMES: BETWEEN ARCHAEOLOGY, HISTORY AND ART HISTORY

Le Couedic, Melanie (Universite de Pau et des pays de l'Adour ITEM UR 3002) - Rozier, Hadrien (Centre d'Études Supérieures de la Renaissance UMR 7323) - Champagne, Alain (Universite de Pau et des pays de l'Adour ITEM UR 3002) - Heiniger-Casteret, Patricia (Universite de Pau et des pays de l'Adour ITEM UR 3002)

The aim of this paper is to characterise the materiality of pastoral sites in the Basque and Béarn regions in order to shed light on the way in which agropastoral societies in the Pyrenees appropriated the mountains over the long term. At the crossroads of archaeology, art history and anthropology, the aim is to analyse the results of inventories and excavations in order to establish a chrono-typology of the assemblages studied for recent periods. Particular attention

will be paid to the construction methods used to build the dwellings - frame and roofing - and to the way in which they were assembled with the structures used for parking. Written sources will also be used to examine the huts mentioned in land grants, sales and inheritances from the late Middle Ages onwards. Looking beyond the site, an ethnoarchaeological study of the routes taken will look at the space between sites, the space used, travelled and limited. Finally, comparisons will be made with a view to highlighting the specific features or common traits of these Basque and Bearn buildings with the rest of the pastoral corpus in the Pyrenees, and more widely in the south.

9 FROM GRAND NARRATIVES AND DOWN TO EARTH - AND BACK AGAIN? HISTORICAL AND ARCHAEOLOGICAL APPROACHES TO TRANSHUMANCE IN WESTERN NORWAY

Dahle, Kristoffer (Møre & Romsdal County Council; NTNU University Museum)

The origin and development of the Norwegian shieling system has been widely debated, both within history, ethnography, archaeology and place name studies.

In 1989, the French geographer Michel Cabouret suggested a relative chronology. Based on three commonly used terms for these pastoral sites, and the spatial distribution various place names, he suggested a stepwise and evolutionary development. From open and temporarily used milking sites (støl) in the outlands, some were used more regularly, with dwellings (sel) and dairy production, and finally evolved into more complex and farm-like settlement (seter). Today, 35 years later, numerous shieling sites across Western Norway have been surveyed archaeologically, but few are yet excavated.

In my current PHD, I have employed a range of methods to try to understand the origin and development of this transhumant system, including quantitative studies of both onomastic, historical and archaeological material, geophysical and archaeological fieldwork, and geoarchaeological methods such as paleobotany, entomology, micromorphology, pOSL, pXRF, aDNA and isotope analyses. Could Cabouret's suggestion still be holding water?

10 PREHISTORIC LAND USE IN SOUTHERN CENTRAL PYRENEES HIGH MOUNTAIN AREAS: CHANGING OUR PERSPECTIVE?

Gassiot Ballbè, Ermengol (Department of Prehistory, Universitat Autònoma de Barcelona) - Barba Pérez, Marcos (Department of Prehistory, Universitat Autònoma de Barcelona) - Clemente Conte, Ignacio (Institución Milà y Fontanals. Consejo Superior de Investigaciones Científicas) - Díaz Bonilla, Sara (Department of Prehistory, Universitat Autònoma de Barcelona) - Garcia Casas, David (Instituto de Ciencias del Patrimonio, Consejo Superior de Investigaciones Científicas) - Mata Ferrer, Sergi (Department of Prehistory, Universitat Autònoma de Barcelona) - Obea Gómez, Laura (Department of Prehistory, Universitat Autònoma de Barcelona) - Rodríguez Antón, David (Department of Prehistory, Universitat Autònoma de Barcelona) - Salvador Baiges, Guillem (Department of Prehistory, Universitat Autònoma de Barcelona) - Sierra Aja, Alejandro (Department of Prehistory, Universitat Autònoma de Barcelona)

In recent years, archaeological research has confirmed the uninterrupted human occupation of the mid and high mountain areas in the Pyrenees since the Mesolithic period. Successive surface surveys and non-invasive archaeology have made it possible to define extensive archaeological sequences and maps of the geographical dispersion of archaeological sites. In addition, the excavation of some of these sites has provided increasingly detailed intra-site information. In several cases, research in Pyrenean mountain areas integrates archaeology into broader interdisciplinary projects with palaeoenvironmental sciences.

As a result of all this, we now have a considerable amount of data which allows us to review the archaeological view of the human occupation of the high mountains over time and to reconsider is the development of the first livestock farming communities. From an archaeological point of view, we usually assume that the mountains, and especially the high mountains, were almost exclusively livestock areas and, at most, suppliers of raw materials. The continuity in the occupations of some sites and the confluence of sites in certain places could support this premise: same occupied spaces, same activities done. In this way, it would even be possible to trace back to the Neolithic the origin of some practices present up to the 20th century, such as transhumant farming.

However, the reality is much more complex. A detailed analysis shows that the locations of archaeological sites vary over time, for example, in relation to optimal paths or grazing areas. In parallel, intra-site studies show increasing evidences that point, for example, in the Neolithic and Bronze Age, to the possible existence of agricultural practices in these spaces. This presentation presents a brief synthesis of recent information on recent Prehistory in the southern central Pyrenees analyzing to what extent this data challenged the traditional paradigm on the land use during these periods.

1127 PLACES OF THE LIVING AND PLACES OF THE DEAD: THE RELATIONSHIP BETWEEN SETTLEMENTS AND BURIAL SITES IN CENTRAL ASIA

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Stanco, Ladislav (Charles University, Prague) - Lhuillier, Johanna (CNRS, Lyon)

Session format: Regular session

In the archaeology of Central Asia, careful attention has traditionally been paid to the research of important settlements and, more recently, to their interrelation and settlement dynamics. The sites of the living are thus very well known. To a large extent, this is also true for the places of the dead, at least in some historical periods. What is lacking for the moment is the linking of these two worlds, the understanding of the reciprocal spatial and ideological relationship between burial sites and settlements. All this is further complicated by the different patterns of behaviour and customs of sedentary and (semi-)nomadic societies, which met and changed regularly throughout prehistory and history in Central Asia.

In this session, then, we would like to ask how the living dealt with their dead, how significantly they sought to separate their space from their own, and also how and why these customs have changed throughout history. The key here is the meeting of steppe and sedentary, local and newcomer, near and far cultures in a mix that has no parallel in other regions.

We would therefore like to stimulate reflection and provoke discussion on the following questions:

How were the burial grounds organized in relation to the settlements?

In what cases, on the contrary, and why, is there no separation between the two spaces?

What is the spatial relationship of burial or funerary sites to the surrounding landscape?

What are the methodological possibilities and limits of understanding the spatial organization of burial sites?

How is this type of archaeological record affected by human interventions in the cultural landscape?

We also welcome partial reflection and problematization of phenomena such as the so-called kurgans and Zoroastrian dachmas in archaeology of Central Asia.

ABSTRACTS

1 RECONSTRUCTION OF THE EVOLUTION OF GONUR DEPE'S MAIN NECROPOLIS DURING THE MIDDLE AND FINAL BRONZE AGE (2250 - 1500 BC)

Hut, Camille (Université Paris 1 Panthéon-Sorbonne)

The Bronze Age in southern Central Asia inaugurated a significant change in the funerary landscape of proto-urban settlements. The topographical distinction introduced by the appearance of 'extramural' funerary spaces, as opposed to burial grounds within settlements attested since the Chalcolithic, raises the question of the structural, social, and ideological evolution of this society, reflected in the distinction between a world of the living and a world of the dead. Regarded as the capital of Margiana, and possibly of the Oxus Civilization, Gonur Depe is an emblematic site of the new funerary system prevailing during the Middle and Final Bronze Age (Namazga V - VI).

Located 200 meters west of the Palace of Gonur Depe, the city's Main Necropolis is one of the few known 'extramural' burial grounds, constituting a world of the dead distinct from that of the living. Analysis of almost 3,000 graves from the necropolis reveals an internal organization and spatialization of funerary practices that reflect the evolution of the symbolic system, as well as the socio-cultural and economic changes of the NMG V and VI periods. Over 700 years of occupation of this necropolis have provided a chronological record of the use of this sepulchral area by the community of the living of Gonur Depe.

The reconstruction of the necropolis and the practices associated with it, based on data from the excavations and the archives of the Margiana Archaeological Expedition, lays the methodological foundations, objectives, and biases for the spatial reconstitution of the relationship between the living and their dead.

2 ALWAYS WATCHING OVER US. BURIALS IN THE TAZABAG'YAB CULTURE AND THEIR INTERACTION WITH THE LANDSCAPE

Schreiber, Finn (Independent, Berlin)

Funeral monuments such as kurgans are not only a visible sign of commemoration and the (implied) significance of the deceased, but also a symbol of a community and its presence in the landscape. In order to be visible, they were often built on elevated ground or along ancient pathways. Graves are therefore part of the cultural landscape and can often provide insights into the structure of a microregion.

Ancient Khwarazm in the Late Bronze Age was a borderland between northern steppe-based Andronovo-Srubnaya groups and southern "oasis cultures". The local sites are part of the Tazabag'yab culture. Kokcha 3 (Turtkul district, Uzbekistan) is the only excavated burial site of this culture. It is a large cemetery with similar-looking graves on a small plateau opposite a contemporary settlement. Different body postures for males and females have been documented as well as two types of double burials. There was also a very limited number of grave goods.

Analyses of the Kokcha 3 burial site revealed a unique pattern of gender zones: Men were buried at the edge and women in the center of the cemetery. Between them there were double graves. Although grave goods were minimal, different social roles can be seen in the cemetery, which are expressed in the spatial position of the grave.

The men's burials close to the plateau's edges were probably marked and visible from some distance. They could have had a representative function for the community. Since male burials are mostly found on the eastern edge facing a small valley, we can reconstruct a path leading to the nearby settlement. Male burials should therefore be seen primarily by visitors. The results reveal a unique way of interacting between the burial site and its surroundings and even provide insight into the internal structure of its community.

3 THE DEAD AMONG THE LIVING: HUMAN REMAINS IN IRON AGE SETTLEMENTS IN CENTRAL ASIA

Lhuillier, Johanna (CNRS)

While Iron Age settlements are now well known in Central Asia, the same cannot be said for burial sites. No necropolis has been identified, and excarnation seems to have become the predominant practice. Both recent excavations and older publications show, however, the presence of human bones at the very heart of settlements throughout the Iron Age sequence (ca. 1500-300 BCE). In this paper, we will review the different types of deposits identified: scattered bones, sometimes showing traces of excarnation, body parts still in connection, isolated and atypical burials. We will question their location and their meaning for the inhabitants of the sites as well as whether these are simple fortuitous deposits or whether they demonstrate some intentionality.

In the foothills of the Kugitang mountains in southern Uzbekistan, recent discoveries of pseudo-kurgans in the immediate vicinity of Early Iron Age sites might suggest the existence of places dedicated to the open-air exposure of the dead. We will examine this possibility, taking a step aside from the widespread hypothesis of the development of Zoroastrianism.

4 BURIALS IN THE FOOTHILLS: NEW BARROW SITES NORTH OF THE AHANGARAN VALLEY AND A PLAN FOR THEIR STUDY

Leloch, Michal (University of Warsaw)

Due to their difficult, specific conditions, mountain areas are still only marginally recognised as archaeological sites throughout the world. The study of mountainous areas requires complex work logistics and brings disproportionate results. In order to understand the dynamics of how human communities functioned in the past in such a unique environment, it seems essential to first recognise the settlement of the foothills.

More than a dozen years of research by the Warsaw University expedition in the foothills of the Tien Shan, north of the Ahangaran valley in Uzbekistan, have yielded numerous finds that are not chronologically related to the purpose of the projects carried out so far. Excavations at Palaeolithic sites have revealed many burials dated from the Bronze Age to the Middle Ages. At the same time, surface surveys have revealed numerous barrows that stand out in the landscape. The picture of the area as we know it today is completed by sites with petroglyphs few kilometres away in the high mountains.

We believe that these accidental discoveries offer a perspective for understanding the patterns of use of the foothills and, in the longer term, their links with the high mountain sites. The paper presents a plan for an interdisciplinary project as a first step in the search for these connections. The work to be carried out aims to identify, excavate and date as many burial sites as possible in the area of several valleys. The aim of the presentation is to stimulate discussion on the planned methods and the validity of the project.

5 RIVERS FOR THE LIVING AND HILLS FOR THE DEAD? RE-EVALUATING THE KURGAN MOUNDS OCCURRENCE IN THE EASTERN KUGITANG PIEDMOUNTS, UZBEKISTAN

Havlík, Jakub (Institute of Classical Archaeology, Charles University)

Since 2014 the Czech-Uzbekistani archaeological mission has been systematically mapping and investigating kurgan mounds in the eastern Kugitang piedmonts, southern Uzbekistan. Up to 2022 more than four hundred of stone- and earth-made mounds were mapped, showing the significance of this phenomenon in the formation of the local cultural landscape. Predominantly by means of location analysis, this paper attempts to evaluate the occurrence of the kurgan

mounds in relation to both the characteristic natural environment of the piedmont steppe and features of the cultural topography (i.e., settlements and pathway network). The analysis shows a specific choice of the location of the kurgan mounds, giving a clear preference for flat river terraces at middle altitudes. The location of the kurgan mounds does not appear to be significantly conditioned by the proximity of a settlement of any particular dating. On the other hand, the kurgan mounds tend to occur in the vicinity of the (traditional?) pathways recorded in the Soviet period. Therefore, this study proposes the relationship to mobility as a determinative factor in the location choice. Together with the study of mound morphology and data from excavations of selected individuals, this analysis suggests that the emergence of kurgans in the eastern Kugitang piedmonts was not related to a single chronological horizon. Instead, the formation of the recorded mound landscape probably covered a wider period stretching between the Early Iron Age and the Early Middle Ages.

6 FUNERARY PRACTICES IN THE SAMARKAND OASIS: CHALLENGES AND NEW METHODS IN THE STUDY OF KURGANS FROM THE SAMARKAND OASIS, UZBEKISTAN

Facciani, Sara (Sapienza Università di Roma, Dipartimento di Scienze dell'Antichità; Alma Mater Studiorum Università di Bologna, Dipartimento di Beni Culturali) - Orrù, Valentina (Alma Mater Studiorum Università di Bologna, Dipartimento di Storia Culture e Civiltà) - Serrone, Eleonora (Alma Mater Studiorum Università di Bologna, Dipartimento di Storia Culture e Civiltà) - Suyunov, Samaretdin (Agency for Cultural Heritage, Samarkand Institute of Archaeology) - Bortolini, Eugenio (Alma Mater Studiorum Università di Bologna, Dipartimento di Beni Culturali) - Benazzi, Stefano (Alma Mater Studiorum Università di Bologna, Dipartimento di Beni Culturali) - Mantellini, Simone (Alma Mater Studiorum Università di Bologna, Dipartimento di Storia Culture e Civiltà)

The intensive investigation conducted by the Uzbek-Italian Archaeological Project in Samarkand, Uzbekistan, has revealed a high density of groups of mounded burials (kurgans) along the Karatyube foothills. On the contrary, the number of tepa (artificial mounds), usually associated with permanent settlement, are limited and their little number cannot justify such a large presence of burials. It is therefore arguable that the choice of the foothills as a burial place was not a prerogative of the communities who lived in this area, but also of the agricultural villages located in the lower irrigated plain, where settlements abound while the necropolises are few or absent. Moreover, the absence of archaeological record between the piedmont villages and the kurgan necropolis suggests this area was exploited for grazing. Although the development of rural villages partially changed the funerary practices in this area, as well the stones of the ancient kurgans reused for building purposes, many modern graves recall the small ancient ones.

Kurgans vary in location, size, orientation, and number of burials, and the lack or limited artefacts on the surface rarely makes it possible their dating. Thanks to an approach combining new stratigraphic excavations, high-resolution mapping, and ethnographic research, this paper aims to shed light on these issues.

7 SIX FEET UNDER IN THE STEPPE: SPATIAL RELATION OF THE SETTLEMENTS AND BURIAL GROUNDS IN PROTOHISTORIC SOUTH CENTRAL ASIA

Stanco, Ladislav (Filozofická fakulta, Univerzita Karlova)

The problem of burial sites and their spatial relationships to settlements in the protohistoric periods (the so-called Hellenistic, Transitional and Kushan periods) has been addressed to various degrees and with differing results in different parts of South Central Asia. While in southern Tajikistan large necropolises have been archaeologically investigated, especially in the Bishkent Valley, but for which it is not easy to find the corresponding settlements, in southern Uzbekistan the necropolises investigated so far are considerably smaller in number of graves, but usually have a clear spatial link to specific ancient settlements. The aim of this paper is to evaluate and attempt to generalize the spatial links between settlements and burial sites of the given period, while trying again to answer the question of whether a particular type of burial site can be clearly assigned to a specific type of landscape, and hence to a nomadic or settled community population. To answer this question, data from new excavations in recent years will be used, especially the Czech-Uzbek excavations at the site of Iskandar Tepa in the Sherabad district (southern Uzbekistan), but of course also data from older excavations in that area.

8 FROM SETTLEMENT TO BURIAL GROUND: TRANSFORMATION OF A MEDIEVAL SITE IN NORTHERN TOKHARISTAN

Damašek, Ladislav (Charles University)

From 2019 to 2022 several settlement sites dated to the Medieval period were excavated by the Czech-Uzbek expedition in the Kugitang and Baysantau piedmonts (Southern Uzbekistan, Surxondaryo Province, Sherobod and Baysun districts). At two of these sites, Lungi Tepa and Sabir Archa, a widespread phenomenon related to their changing function was encountered. Both settlements were used as a burial grounds after the abandonment of the settlement. This phenomenon was observed on many sites in the Surxondaryo Province alone and until today a lot of archeological

sites are used as burial grounds by contemporary village communities (e. g. Kurgan Tepa in Karabag or Mazarat Tepa in Kofrun). The burial grounds tend to be located atop of tell settlements. Both studied sites are tell settlements and were inhabited during the Early and High Medieval periods (5th–13th century CE). In the Late Medieval period, though, both were extensively used as burial grounds. In case of Lungi tepa, graves are dated by radiocarbon method to 15th–17th century CE. Graves at Sabir Archa can be attributed to same period based on analogies. However, later origin (18th–20th century CE) cannot be excluded by now. We may hypothesize about a possible pattern in this secondary burial use of these Medieval settlement sites in the oases of the Kugitang and Baysantau piedmonts. Moreover, this obvious change in sites function within the oases seems to be happening only after the Mongol invasion in 13th century CE. Previously settled sites were abandoned and later they were reused as places for burying the dead by the communities living at new locations in the neighbourhood. Thus origins of this custom that persists to this day can be traced at least to Late Medieval period. The reason for the usage of the earlier settlements as burial grounds is yet unknown.

1128 ROUNDTABLE OF THE COMMUNITY FOR TEACHING AND TRAINING OF ARCHAEOLOGISTS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Geary, Kate (Chartered Institute for Archaeologists) - Karl, Raimund (Universität Wien) - Scheyhing, Nicola (Independent Researcher; Kulturbetriebe Burgenlandkreis GmbH/Arche Nebra) - Preda, Bianca (Department of Cultures, University of Helsinki) - de Raad, Jesper (Independent Archaeologist)

Session format: Round table (without formal abstracts)

The skills we need as archaeologists have always been varied and the skillset seems to be constantly evolving. From digging to data, scientific techniques to storytelling, project management to professional ethics, how can we help archaeologists, their teachers and their employers keep knowledge and skills up to date when skills needs are expanding faster than ever before and the potential of new techniques and technology keeps increasing what is possible? This session will explore how universities, training providers, employers and professional organisations are rising to the skills challenges of advancing technology and techniques, AI and big data, widening access and diversity and the delivery of value to society amongst many other things. Are teaching and training methodologies innovating or struggling to keep up? How can they harness new technologies themselves? In a world that is rapidly changing and a sector that is often under-resourced, how are we bridging the gaps? This session, jointly organized by the Early Career Archaeologists (ECA) Community of the EAA, will also address questions early-career archaeologists may have regarding career paths, both inside and beyond academia. It will also touch upon issues of 'professionalisation' and what it means to be a professional archaeologist in the 2020s.

1129 INCLUSIVE ARCHAEOLOGY: PRACTICAL APPROACHES TO HERITAGE PARTICIPATION

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Spangen, Marte (Museum of Cultural History, University of Oslo) - Ratier, Pascal (French national institute for preventive archaeological research) - Falcone, Annalisa (Central Institute for Archaeology - Ministry of Culture, Italy)

Session format: Regular session

Preservation, dissemination and understanding of archaeological heritage among non-professionals represents both opportunities and challenges across Europe. The theme of opening the discipline to non-expert audiences has consequently become a priority within cultural policies of European countries. This session will explore how an inclusive archaeology can shape our professional practices to enhance our constructive contributions to society.

This session builds on pan-European initiatives like the Medieval Europe Research Community Manifesto (<https://mercmanifesto.org/merc-manifesto/>) and European Archaeology Days (<https://journees-archeologie.eu/>) which are intended to enhance awareness and engagement with archaeology and heritage across Europe.

We aim to explore why we wish for an inclusive archaeology as well as how we can deliver it. We welcome critical discussion of practical examples of projects that have led to an improved level of inclusivity, knowledge exchange, and the use of archaeological endeavours to promote social change. Specifically, we would seek to address these questions:

- How can a diverse and socially engaged archaeology contribute to improving well-being and a sense of belonging?
- How to attract new audiences who are not used to visiting archaeology sites?
- How to promote knowledge exchange between archaeology professionals and European citizens?
- How can we involve local residents in archaeological digs in their neighbourhoods?

- What can we do to raise public awareness of archaeological looting?
- How can we make European citizens aware of the entire archaeological process from the production of knowledge and to the management of heritage resources?

ABSTRACTS

1 EUROPEAN ARCHAEOLOGY DAYS: SHARING ARCHAEOLOGICAL HERITAGE

Ratier, Pascal (INRAP - National Institute for Preventive Archaeological Research)

In 2023, the EADs had their fifth edition with great success. More than 30 European countries participated in the event on the third weekend of June. Despite the health crisis, the EADs have continued to grow, attracting more public support, new countries and new organisers with each edition. How can the EADs develop by making an event a place where the public can meet the entire archaeological chain of operations? The event can only find its audience through the intersection of national communication, driven by a national and public actor, and communication developed by the local organisers to their usual networks. Another of the fundamental missions at national level is to mobilise all the archaeological actors in the country, "from the excavation to the museum", so that the public can have access to the diversity of the entire archaeological process. It is therefore essential that the national authorities managing archaeology in each European country be able to coordinate the event on their territory, in order to integrate it into their overall policy of sharing the archaeological heritage. The creation of a network of coordinated organisers at national level in each country is therefore an essential challenge.

A major topic for discussion will concern the ways these EADs can contribute to the development of a common identity, while also preserving the cultural diversities that characterise a plural Europe.

- What audience(s) and communication policies are best suited for EADs?
- How can these EADs be used to acquaint European citizens with the entire archaeological process concerning both the production of knowledge and the management of the past?
- How can we make these days a genuinely European event in spite of the diversity of archaeology practices and policies across the countries of Europe?

2 ARCHAEOLOGY DAYS NETHERLANDS, ENGAGING AND CONNECTING A YOUNGER AUDIENCE BY BUILDING UP & INSPIRING A NETWORK OF 250 PARTNERS

Berkelbach, Janneke (Nationale Archeologiedagen)

The 'National Archaeology Days' in the Netherlands have been organizing annual events for the past 8 years. The primary goal is to enhance public engagement with archaeology throughout the country. We are dedicated to making Dutch archaeology accessible and interesting for a diverse, inclusive audience.

The Archaeology Days span three days each year, providing the general public with the opportunity to explore the fascinating and enjoyable aspects of archaeology. These days bring the past to life, offering a unique chance for people to witness what lies hidden in the Dutch soil.

All entities involved in Dutch archaeology, including museums and volunteer organizations, are encouraged to open their doors and guide the public into the captivating world of archaeology. Activities range from pottery determination workshops, participation in real excavations, and archaeological hiking trips to plays and lectures.

The presentation will reflect on how we have established a network of over 250 organizations in the Netherlands to develop and organize these events.

Particularly noteworthy is our inclusive approach to engaging a younger audience. Through our network of young archaeologists, the Young Underground Professionals (YUPs), our think tank of young professionals, and the resulting ArchaeoNight organized and programmed by the YUPs; the recently formed young archaeologists' club; our platform "Archaeology Lives!" and the Grand Archaeology Show. Our emphasis is on embracing the diverse and inclusive audience of tomorrow.

Examples of inspiring public activities involving archaeology, often realized in close cooperation with other cultural disciplines such as fashion, technology, arts & crafts, and design, will be presented.

3 EXPERIENCES OF POPULARISATION OF ARCHAEOLOGY IN THE FRAMEWORK OF THE EADS: THE CONTRIBUTION OF THE CENTRAL INSTITUTE FOR ARCHAEOLOGY (ICA)

Falcone, Annalisa (Istituto Centrale per l'Archeologia)

The world of archaeology exerts two contrasting reactions in the collective imagination: love for the discipline ("as a child I wanted to be an archaeologist") or total disinterest ("enough with these shards and stones!"). The objection that

is often raised by this disinterested public is that “archaeologists only talk to archaeologists”, as if the archaeological discipline, in itself, is closed to the non-expert public. That’s why, The Central Institute for archaeology (ICA), part of the Italian Ministry of Culture, fulfilling its mission of promoting archeology in its broadest sense, also at an international level, has enthusiastically joined the initiative of the European Archeology Days (EADs), promoted by INRAP since 2019 on a European scale. At each edition, the ICA has offered the opportunity to delve into topics related to the diffusion of the discipline to a non-expert audience, involving scholars in addressing topics of interest to the general public or reflecting on the communication strategies of the archaeologist’s actions.

This contribution will focus especially on the experience achieved in collaboration with the Special Superintendency of Rome for the 2024 edition of the EADs.

4 NATIONAL ARCHAEOLOGICAL INSTITUTE WITH MUSEUM AT THE BULGARIAN ACADEMY OF SCIENCES. SOCIALIZATION OF ARCHAEOLOGICAL HERITAGE: CURRENT METHODS AND PERSPECTIVES.

Pramatarov, Kaloyan (National Archaeological Institute with Museum at Bulgarian Academy of Sciences)

The National Archaeological Institute with Museum at the Bulgarian Academy of Sciences is a national center for comprehensive research, promoting and socialization of the material and the spiritual culture of the tribes and the people that have inhabited the present-day Bulgarian lands from remote prehistory to the 18th century AD. As a social and educational space, the National Archaeological Museum has elaborated a series of dynamic analogous and digital methods for working with the broad public. The present report describes the models for the development of educational programs and active socialization of the cultural-historical heritage, applied within the context of pan-European initiatives such as the European Archaeology Days, The European Night of Museums, and European Researchers Night. The participation in them has been predetermined by the desire to establish a persistent professional network for mutual aid and to apprehend foreign museum concepts and methods. By describing the problems and perspectives in front of Bulgarian Museology, the report seeks to provoke international discussion and exchange of experience.

5 NEW TECHNOLOGIES TO ENHANCE HERITAGE PARTICIPATION. EXPLORING AND COMMUNICATING ARTISANAL PRACTICES AT THE ARCHAEOLOGICAL PARK OF URBISAGLIA

Xavier de Silva, Ludovica (University of Macerata) - Cingolani, Sofia (Direzione Regionale Musei Marche)

Communicating the cultural heritage, making it accessible, and generating audience engagement are among the objectives that the Regional Directorate of Museums in Marche envisages for its museums and archaeological sites. These goals, as well as sharing knowledge concerning the results of recent digs in archaeological parks, can be challenging but, at the same time, essential to promote the park as a dynamic place where ongoing research can always add new elements to the understanding of the past and communities can learn about local cultural heritage and strengthen their sense of belonging to the territory.

The work recently carried out within the European Adrion TRANSFER Project and led by the University of Macerata focused on the application of new technologies to the enhancement of cultural heritage and resulted in the development of a Virtual Reality (VR) experience about the Republican kilns of Pollentia-Urbs Salvia and their environment. The project has been carried out with the constant involvement and participation of the Park in order to take into account the effectiveness of the technology in terms of usability and accessibility as well as its best integration with the existing dynamics of the site.

With this contribution, we would like to share how the involvement of different actors and professionals has improved the local awareness and commitment towards the Park’s activities and its potential as a centre capable of driving cultural development. We would also like to share the first phases of implementation of the VR experience in the Park and its use outside the archaeological site in order to explore the possibilities that Information and Communication Technologies (ICTs) can provide in view of promoting knowledge exchange between archaeology professionals and citizens, raising awareness about archaeological heritage in local communities, and spreading knowledge among young people through the involvement of education institutions.

6 THE UNEXPLOITED POTENTIAL OF GRAPHIC NARRATIVES IN ARCHAEOLOGY

Gerberg Høstrup, Sebastian (Aarhus University) - Foresi, Federica (Museum Vestsjælland)

This paper focuses on making archaeology attractive to the public as well as the reluctance towards using comics for scientific and historical dissemination, since they are often associated with a low cultural value. We have difficulty thinking of comics as a suitable academic tool and this is especially evident in scientific publications.

The attempt to express meaning through images is inherent in human nature and can be traced from the earliest known cave paintings more than 40,000 years ago to IKEA assembly instructions. Despite permeating every sphere of modern society, the diverse toolbox of visual language is still largely being ignored by archaeology.

The use of comics for communicating archaeological knowledge and scientific interpretation is not new but it is far from common practice. We will showcase varied uses of comics with examples from France, Italy, the UK and Denmark.

The impact that graphic novels based on historical events can have on the public is already clear with publications such as Maus (1980-1991), Footnotes in Gaza (2009), Kobane Calling (2015-2020) and Sapiens (2020-2021). They address phases of our history, ranging from contemporary events to the beginning of human prehistory. If we make this form of public engagement a common practice for projects instead of remarkable single cases, we will build a stronger relation between the public and its interest in archaeology to generate an increased social value to our research.

In addition to incorporating the visual language of comics in academia, this paper also suggests comics as a way of “merchandising” archaeology, by making complex ideas and convoluted topics more accessible to a wider part of the population. An integral part of achieving this will be to balance the negotiation between scientific knowledge and creative storytelling so as to produce a product which possesses the strengths of both.

7 HISTORYTELLING: ENGAGING PEOPLE AND TELLING THE HISTORY OF YESTERDAY USING TODAY’S MEDIA

D’Eredità, Astrid (Italian Ministry of Culture)

Since digital and social media became established as customary tools of communication in archaeology, after an initial diffident approach on the part of institutions, there has been a progressive rapid evolution in the syntax and semantics of their use. In parallel, the growing need to quickly adapt to the new communication standards has been a driving force for the development of hybrid professional figures who are both experts in algorithms and in iconography and stratigraphy.

Videos, web series, reels, podcasts, memes, wikipedia entries are today the main means of disseminating historical archaeological stories and information; irony and extemporaneity (real or constructed in post production) are among the most frequently used storytelling keys to bring already known archaeological contexts and new discoveries to the general public.

At the end of an excursus on the most interesting case studies from the Italian scenario, this contribution focuses in particular on the experience gained in the digital communication projects of the Colosseum Archaeological Park and on the main topics and tools used for online and offline audience engagement.

8 ARCHAEOLOGICAL EXHIBITIONS IN THE MUSEUMS OF MONTENEGRO TODAY: THE STRENGTH OF TRADITION AND THE ABSENCE OF INNOVATION

Medin, Dušan (Faculty of Culture and Tourism University of Donja Gorica)

In this work, the author deals with the presentation of the current situation of archaeology in Montenegro, with a focus on public cultural institutions that own archaeological collections (public museums and galleries). The discussion examines problematic aspects of existing settings, including methods of installation, traditional approaches, the continued display of old and outdated exhibitions, inadequate labelling, bland displays of objects, the lack of adequate internet presentations. The discussion will also explore the social networks of museum institutions and their elitist approach, as reflected in inadequate communication with the community and a non-participative approach to their collections. The museums of Montenegro today do not meet current expectations about social inclusivity, nor do they conform to the concept of definition of museums as defined by ICOM, with the Convention on the Value of Cultural Heritage for Society (Faro Convention). In recent years a few archaeological exhibitions in Montenegro have been modernized, using new technology and adopting an innovative, inclusive and participatory approach. The success of these new displays will also be examined in the presentation.

9 ENHANCING INCLUSION IN THE HUNGARIAN NATIONAL MUSEUM

Pásztor, Eszter (Hungarian National Museum National Institute of Archaeology) - Bedő, Valér (Hungarian National Museum National Institute of Archaeology)

National Institute of Archaeology (NIA), a member institution of the Hungarian National Museum (HNM), launched an independent initiative to boost involvement of persons with disabilities in the dissemination of knowledge. Our aim is not only to improve access to culture and science, but also to create the opportunity to make reception easier to enhance the experience. Therefore, we invited Péter Straub, a blind archaeologist who produces audio narrations (a mode of audiovisual translation providing access to audiovisual texts to viewers excluded from the visual codes) to show

archaeological artefacts, to lead guided tours of the exhibition and to take part in working out the methods. Straub led a special tour for blind and visually impaired people to share his experiences, where they had the opportunity to sense and touch copies of artefacts, thus gaining peculiar experience. Special tour for the deaf and hard-of-hearing visitors are held as regular ones in the exhibition, during which sign language interpreters support the tour leader.

By integrating synergies deriving from the representatives of concerned organisations, we aim to develop a secure ambience for disabled people, where they can encounter beauties of our profession. Besides adopting good practices, we consider it important to show that our inclusive methods are considered when preparing exhibitions.

We are aiming to synthesise our experience of working with the special needs community, particularly in the early phases of planning exhibitions. For this to be a success we will also need to hold sensitisation trainings for those employees who directly work with visitors.

10 **ARCHAEOLOGY AND HERITAGE IN SCHOOL - NEW APPROACHES FOR AN INCLUSIVE ARCHAEOLOGY**

Synnestvedt, Anita (University of Gothenburg/Department of Historical studies)

Crucial questions within the field of public archaeology are how to reach new audiences not used to different perspectives of archaeology. If we want to develop the field of public archaeology and build an inclusive archeology for the future, the first step is to start with the children. I therefore considered it important to write a book addressing teachers and teacher students about teaching and learning archaeology and heritage (Archeology and Heritage in schools, 2024). These target groups often have quite limited (as well as rather old) knowledge about archeology and heritage, and on the other hand, their task is to teach new generations about these subjects. Consequently, questions discussed are what heritage and archaeology means and how it can be used in schools in order to enrich several subjects within the curriculum except history. Another important aspect is to problematize and highlight how archaeology and heritage are part of contemporary society. Within primary and secondary schools archaeology is mainly considered a subject related to prehistory. My aim is to change these perspectives. I will present some examples to you of how this can be implemented in practice. The examples discuss how teachers and pupils can conduct small archaeological excavations by their own, how to conduct the exercise called “the heritage bag” which means filling a bag of your own heritage and how to make sense of place and belonging.

11 **BUILDING AN COMMUNITY AT THE ARCHAEOLOGICAL INSTITUTE OF AMERICA THAT WELCOMES NON-PROFESSIONALS**

Langlitz, Meredith (Archaeological Institute of America)

This paper seeks to demonstrate the advantages of serving both professional and public audiences and explore how this affects program delivery for an archaeological organization.

Founded in 1879, the Archaeological Institute of America (AIA) is North America’s oldest and largest archaeological organization. The Institute has a dual mission to serve both professional archaeologists as well as the public. For 75 years the AIA has published ARCHAEOLOGY magazine, a popular general interest publication sent to approximately 200,000 subscribers every other month that fosters an appreciation of archaeology among the largest portion of our base. The AIA also provides additional opportunities for community building and greater public involvement in archaeology. This includes a smaller subset of supporting members grouped into over one hundred local Societies throughout North America that offer community programming and Institute sponsored outreach programming such as International Archaeology Day, the AIA National Lecture Program, and an online ArchaeoCon event.

The results are an intentional community dedicated to archaeology that provides support for the Institute’s mission, archaeological research, and advocacy efforts to protect cultural heritage. This paper will discuss the synergies of the AIA’s “Excavate, Educate, Advocate” mission with a focus on public programs such as the AIA National Lecture Program and International Archaeology Day; how the AIA connects its audiences in support of archaeological research; and rallying stakeholders during advocacy campaigns to secure international agreements to protect cultural property.

12 **THE ART OF WELL-BEING, WITH ART, ARCHAEOLOGY AND LANDSCAPE**

Boldrighini, Francesca (MiC - Parco archeologico del Colosseo) - Costa, Silvio (Mic- Parco archeologico del Colosseo) - D’Offizi, Silvia (Mic - Parco archeologico del Colosseo) - Ferrari, Elena (Mic- Parco archeologico del Colosseo) - Schiappelli, Andrea (Mic- Parco archeologico del Colosseo) - Lamonaca, Federica (Freelancer archaeologist) - Ioppi, Francesca (Mic- Parco archeologico del Colosseo)

Visiting cultural sites is good for everyone. No doubt. But certain categories of visitors can gain particular benefits from the observation of works of art and from the participation in activities performed in contexts where archaeology and landscape blend

admirably, revealing the fascination of the ancient world and triggering intellectual inputs. This is not a recent discovery, but combined benefits of art and landscape for wellbeing, have recently gathered greater recognition in Italy and abroad, not least under the banner of Care, Culture and Beauty. This wider recognition is thanks to the efforts of MiC (Ministero della Cultura), institutions, medical doctors and Third Sector associations.

This paper will focus on the Salus per Artem and PArco Green programmes, at the Parco Archeologico del Colosseo. Since its foundation PArCo is convinced that art, in all its forms, including dance, theatre, and music, contributes to well-being. Beauty provokes emotions capable of acting on the mind better than medicines, as many neurologists have affirmed within scientific studies.

Studies into the health benefits of cultural activities have grown exponentially in recent years and have been recognised by WHO under the term Cultural Welfare in their Health Evidence Network Synthesis Report 67, the largest review on the subject. The lexicon of the sector has also been enriched: we speak now of ‘exposure to cultural heritage’ as a source of wellbeing.

We can now speak of a reciprocity between the two spheres: producing health through culture and supporting culture through health.

Also with regard to the conservation and enhancement of landscape in all its forms, PArCo has initiated many different activities with the common aim of reducing environmental impact, decreasing pollution, preserving the ecosystem and enhancing biodiversity. In short, activities to promote a way of life which is ‘in tune’ with our natural environment.

13 **EMPOWERING COMMUNITIES THROUGH ARCHAEOLOGY: THE TERRA LEVIS APPROACH IN ÁVILA, SPAIN**

López García, Juan Pablo (MASAV; Terra Levis. Arqueología en Comunidad)

“Terra Levis, Arqueología en Comunidad” -Ávila, Spain, emerges as a pioneering initiative in community archaeology, embracing the principles of collaboration, participation, and empowerment in archaeological research. Our proposal focuses on breaking away from the traditional paradigm of archaeology, where experts dominate decision-making and the local community plays a passive role.

At Terra Levis, we adopt an inclusive approach that actively involves the community in all stages of the archaeological process. From identifying potential sites to interpreting findings, we work hand in hand with local residents, recognizing and valuing their traditional knowledge and emotional connection to cultural heritage.

Our methodology is based on training and empowering community members in archaeological techniques, thus fostering a sense of ownership and shared responsibility towards their environment’s past. Additionally, we promote the creation of dialogue and reflection spaces where academic and local knowledge intertwine, mutually enriching the understanding of the past.

The outcomes of our project go beyond mere archaeological research, contributing to the social and cultural development of local communities. By empowering residents to become active guardians of their heritage, we foster a sense of identity and belonging that transcends temporal boundaries.

In our presentation, we will share the experiences, challenges, and achievements of Terra Levis, highlighting the transformative potential of community archaeology to build bridges between the past and present, academia and society, and individuals and their heritage.

14 **CITIZEN SCIENCE AT THE NATIONAL TRUST UK- INCLUSIVE ARCHAEOLOGY FOR EVER FOR EVERYONE?**

Caroli, Viviana (The National Trust) - Young, Janine (The National Trust)

Working with volunteers is well established in British and International Archaeology, with significant benefits for participants and very real public benefit flowing from such experiences. Traditionally the focus on volunteer participation has been in supporting archaeological excavation, but with increasing complexity and costs associated with such activity, the enhanced access to advanced technologies and the increased need to find solutions for nature and climate, it is imperative to think about how we can broaden the opportunities we offer to support our understanding of the archaeological resource and how we care for it in a world experiencing significant and rapid change. The National Trust looks after in excess of 98,000 recorded heritage assets – from Bronze Age burial mounds and Medieval monastic ruins to Iron Age hill forts and Second World War pillboxes. It is fundamental that we understand the condition of our sites in order to effectively manage them and to do so we deliver a programme of condition monitoring through the provision of training and resources to volunteers, working closely with property teams.

This paper will introduce and share the benefits derived from the National Trust HART (Heritage and Archaeology Rangers Team) monitoring programme. It aims to present the impact that public participation has brought to our heritage capital and resources by regularly monitoring archaeological sites and contributing to their effective management, while highlighting the wellbeing and public benefits derived from engaging with the historic environment.

By setting the framework of a replicable process we are hoping to aid other international organisations and bodies to deploy a model which can significantly contribute to direct conservation activity, prioritise conservation work, monitor for the impacts of environmental change and plan for land use change for the benefits of present and future generations.

15 THE COMMUNITY ARCHAEOLOGY PROGRAMME NORTHERN IRELAND (CAPNI)

Donnelly, Colm (Queen's University Belfast) - Murphy, Eileen (Queen's University Belfast)

The paper will provide an overview of the Community Archaeology Programme Northern Ireland (CAPNI) which was launched in February 2024. CAPNI is a structured programme of community archaeology to be undertaken across Northern Ireland over the three-year period from 2024 to 2026. Supported by the National Lottery Heritage Fund and based within Queen's University Belfast, the programme will enable CAPNI's archaeologists to facilitate and support local communities to examine their past through direct participation in co-designed activities, including excavation, survey, experimental archaeology and walking tours. The programme will also include regional School Hub events where the CAPNI team to introduce children to the work of archaeologists, archaeological sites in their locality and the importance of our archaeological heritage. CAPNI has its origins in the work conducted by the Centre for Community Archaeology since 2017 and will call upon the established relationships that the unit has with a wide range of partner organisations – community groups, local councils, and historical societies – across Northern Ireland. Hosted within a post-conflict society with significant well-being issues, CAPNI will also work with groups within the local health sector – such as Macmillan Cancer Support and AwareNI – to develop community archaeology as a means to improve quality of life through participation.

16 AN EXPERIENCE OF COLLABORATIVE ACTION BETWEEN RESEARCHERS, EDUCATIONAL CENTRES AND SOCIAL ACTORS: CONCIENCIA HISTÓRICA PROJECT

Fernández Mier, Margarita (University of Oviedo) - Sánchez-Broch, Paloma (University of Oviedo)

We present the experience of the project ConCiencia Histórica. Archaeology as a tool for scientific dissemination in rural areas, an educational proposal of the research group LLABOR (University of Oviedo) to stimulate citizen participation in science and technology through archaeology and heritage. It is aimed at children and young people in rural areas of Asturias (Spain) that seeks to promote greater knowledge of the territory in which students live, discover the heritage values of their environment and encourage the creation of identity elements that prevent migration to the urban world.

The aim of this educational proposal is to connect the scientific research carried out by the LLABOR group with the local communities in the territories where it is carried out, promoting the exchange of knowledge. The rural environment is currently facing a series of problems - depopulation and ageing of its inhabitants, crisis of production models, etc. - which urgently require the involvement of scientific agents. Training and dissemination actions are needed to balance the opportunities of rural and urban inhabitants. Among other objectives, the aim is to stimulate scientific vocations, generate interest in archaeology and heritage, and contribute from the scientific sphere to the analysis and management of current problems.

ConCiencia Histórica began in 2014 in the municipality of Belmonte de Miranda, growing and extending to other municipalities such as Grau/Grado. It is currently working with four schools and more than 200 kindergarten and primary school students. The project is funded by the Spanish Foundation for Science and Technology (FECYT) (where it has been recognised in 2018 as one of the most innovative initiatives of this call), as well as by local administrations which actively participate and collaborate.

17 A ROAD TO CONNECTION: CREATING A CROSS-BORDER NARRATIVE THROUGH COMMUNITY ARCHAEOLOGY IN THE WESTERN PYRENEES

Edeso Egia, Mikel (Aranzadi Science Society) - Mendizabal-Sandonís, Oihane (University of the Basque Country (UPV/EHU); Aranzadi Science Society) - Aiestaran, Mattin (University of the Basque Country (UPV/EHU); Aranzadi Science Society) - Narbarte, Josu (University of the Basque Country (UPV/EHU); Aranzadi Science Society) - Ruiz-González, Daniel (Aranzadi Science Society) - Conde-Egia, Eider (Aranzadi Science Society) - Agirre-Mauleon, Juantxo (Aranzadi Science Society)

Over the last decade, a group of archaeologists have located the Iler XXXIV Pyrenean Roman road and several Roman-period sites linked to it, such as the Zaldua settlement (Auritz/Burguete), Donazaharre (Saint-Jean-Le-Vieux) or Artzi (Valley of Artzi).

Little archaeological study of this rural and mountainous territory has been carried out until now. Nevertheless, since 2022, archaeologists from Aranzadi Science Society have developed a research and dissemination project that aims to connect both sides of the Pyrenees (Spanish and French) by researching the road that crossed this area, linking Roman sites in both countries under a community-based archaeology model.

For that purpose, a common plan is proposed where excavations feature local population and archaeology students that partake on the research and management of the sites. Besides, the project seeks to foster collaboration and mutual knowledge between Pyrenean municipalities with Roman sites, creating common resources and promoting joint dissemination activities. The ultimate goal of the project, supported by the Eurorregion Nouvelle Aquitaine-Euskadi-Navarra programme, is to involve local communities in the valorisation of their heritage, create new cultural resources to attract visitors and build bridges between rural municipalities that face common demographic challenges across borders.

18 PARTICIPANT OBSERVATION AS A MODEL FOR COLLABORATIVE ARCHAEOLOGY: INSIGHTS FROM INISHBOFIN ISLAND, IRELAND

Lash, Ryan (University of Notre Dame) - Burke, Tommy (Inishbofin Island Archaeological Walking Tours)

Participant observation is the principal, if not defining methodology of social anthropology. It is a method premised on living attentively with others, observing while participating in the practices of the people among whom one seeks to learn. This paper will explore how participant observation can provide a model for collaborative archaeology and public heritage projects, in which both archaeologists and community members act as participant observers.

Since 2007 the Cultural Landscapes of the Irish Coast (CLIC) Project has undertaken community-based archaeological and ethnographic research on the west coast of Ireland, particularly on Inishbofin, a small island of 184 residents with a bustling summer tourist market. Collaborative work here has included public presentations of research, artefact show-and-tells, open excavations for primary school students, co-produced publications and presentations, experimental archaeology demonstrations, and ethnographic participant observation focused on contemporary engagements with local heritage.

We argue that some of the most productive activities – in terms of both public impact and academic insight – have emerged from the reciprocal exchange of experience and expertise between academics and local people. In this paper, the co-authors will discuss their respective experiences of collaboration as participant observation: Lash's participation in contemporary farming and ritual practices and Burke's participation in archaeological excavation, analysis, and dissemination. These experiences have generated greater mutual understanding of the processes of knowledge production in the domains of both local oral history and archaeological research. The result has been greater public impact through collaborative outputs in a variety of media (i.e. tourist guide book, heritage festivals, podcast) and an enhanced capacity to synthesise new archaeological data with local traditional knowledge.

1132 FROM CHAOS TO COHERENCE. THE SCIENTIFIC VALUE AND PERSPECTIVE ON COMMINGLED AND FRAGMENTARY HUMAN REMAINS

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: László-Mateovics, Orsolya (ARDIG-Archaeological Service GesmbH) - Seppänen, Liisa (University of Turku; University of Helsinki) - Dec, Olga (Adam Mickiewicz University | UAM · Faculty of Archaeology Master of Arts)

Session format: Regular session

Human skeletons provide valuable insights into the lives of individuals, including their life quality, activities, and various biosocial factors they may have experienced. On a larger scale, they can help understand mortuary patterns, population dynamics, and the distribution of diseases. However, if human remains are comingled and fragmentary,

they can create significant challenges both for archaeologists and anthropologists. Human remains can form into such conditions due to various processes, including secondary burials, post-depositional processes such as human interactions and diagenesis which can disturb the original contexts of interments. In the past, graves may have also been disturbed by robbery, while modern agricultural or construction activities can also lead to disturbances. All of these can lead to an accumulation of partially or completely decomposed disarticulated elements. Contrary to these, it is still possible to gain important insights into past behaviors by assessing the taphonomic parameters and funerary behavior, and researchers can cross-reference anthropological data with spatial and stratigraphic information.

Our session aims to bring together researchers from the fields of archaeology, anthropology, and forensic anthropology to share their expertise on this special bioarchaeological source, with a focus on methodological solutions and ethical considerations.

Through case studies, we seek to evaluate possible methodological solutions that can help us fully explore the nature and processes that lead to the formation of these chaotic and complicated contexts. We aim to answer questions such as: How can we work with these remains? How much information can we obtain from them? Ultimately (in some cases), we need to reason why their preservation and maintenance is important not only from scientific, but also from ethical perspectives. Hence, these remains can have different scientific values and therefore deserve our attention.

ABSTRACTS

1 HEANING WOOD: THE IMPORTANCE OF INTERDISCIPLINARY APPROACHES IN UNDERSTANDING FRAGMENTED, MULTI-PHASE CAVE BURIALS IN NORTH WEST ENGLAND

Warburton, Keziah (University of Central Lancashire) - Peterson, Richard (University of Central Lancashire)

Caves have long been recognised as an important aspect of Neolithic burial practice and our understanding around such practices has been supported by taphonomic analysis and re-analysis of original excavations. These environments, however, often lead to fragmentation, commingling, and destruction and historically smaller parts may have been ignored.

Heaning Wood was selected as one site for analysis and offers an excellent example of the depth of information available from fragmented assemblages. An MNI of nine was established from an assemblage initially commingled with large amounts of faunal material. A Geographic Information System (QGIS) was used as a tool for exploring taphonomy at multiscale levels. Through the understanding of taphonomic patterns at a fragment, element, body and stratigraphic level, burial narratives and sequences were reconstructed.

Subsequent radiocarbon dating and aDNA highlighted the significance of these burials, with one individual dating to the Early Mesolithic, currently the oldest date for human burial in the North of England. Dating shows successive use of the cave between the Mesolithic and Early Bronze Age, with long hiatus between periods. Preliminary aDNA results have shown genetic sex for three individuals, and potential sex for another three. Two individuals, both dated to the Early Neolithic, show promise for deeper genetic sequencing.

Through a combination of osteological profiling, taphonomic and spatial analysis with GIS, and techniques such as radiocarbon dating and aDNA, we have garnered a detailed understanding of a complex cave assemblage. This shows the inherent value contained in fragmentary and commingled human remains.

2 RECORDING COMMINGLED ARCHAEOLOGICAL HUMAN SKELETAL REMAINS USING LIDAR: A CASE STUDY FROM LATE BRONZE AGE HALA SULTAN TEKKE, CYPRUS

Casa, Bianca (The Cyprus Institute) - Vassallo, Valentina (The Cyprus Institute) - Orabi, Rahaf (The Cyprus Institute) - Hermon, Sorin (The Cyprus Institute) - Fischer, Peter (University of Gothenburg)

Complex mortuary contexts, including disarticulated and commingled archaeological skeletal remains, can pose a great challenge for archaeologists to record and excavate. During excavations at Late Bronze Age Hala Sultan Tekke, Cyprus, a two-tiered approach was used for the detailed recording of disarticulated, commingled skeletal remains as part of an archaeothanatology approach. Firstly, individual bones were manually identified and assigned an identification label (i.e. bone letter) in situ by specialist human bioarchaeologists. Secondly, iPad Pro LiDAR and the application Polycam were used to stratigraphically document tomb mortuary contexts and archaeological human skeletal remains in situ. Manual recording enabled the assessment of possible articulations, funerary taphonomy, repeated cases of primary and secondary burial, and the differentiation of anthropogenic and environmental agents that acted upon the archaeological human skeletal remains. LiDAR facilitated the rapid 3D data capture of the mortuary context in minutes, capturing a combination of geometry and texture through a photogrammetric technique. This technique generated a mesh that was able to be combined, scaled and layered into a single 3D model. The resulting 3D models of mortuary context are of high resolution and display fine details including bone articulations and positioning, with an error margin of less than 1cm accuracy. The 3D models may be used for virtual taphonomy and the assessment of

site formation processes. The models may be viewed layer by layer and from all axes, and can be metrically measured. In the case of Hala Sultan Tekke (and Cyprus in general) where archaeological skeletal remains are of poor preservation and fragmentary nature, this two-tiered approach using manual recording in combination with the creation of 3D models enabled the detailed recording of disarticulated and commingled archaeological skeletal remains in situ, whilst simultaneously creating a digital stratigraphic record of the archaeological deposits that can be preserved and restudied.

3 OSTEOLICAL CHAOS - AN INTEGRATIVE METHODOLOGICAL APPROACH TO THE STUDY OF HUMAN REMAINS FROM THE MAS ROUGE COLLECTIVE BURIAL (FRANCE)

Monier, Emma (LAMPEA UMR 7269, CNRS, Aix-Marseille Université, Ministère de la Culture) - Donat, Richard (INRAP Midi-Pyrénées, CAGT UMR 5288, CNRS)

The Mas Rouge collective burial, located near Montpellier, France (3200-3000 BC), initially served as a domestic cellar before transforming into a resting place for nearly 200 individuals, is a well representation of a site that could appear chaotic. The first deposit of corpses in connections, probably linked to a still unknown mortality accident, is followed in time by ossuary spaces of commingled bones, until a condemnation fire sealed the site, distinguishing it from other collective burials (Y. Tchérémissinoff, dir.). This unique grave, associated with its habitat, presents an intriguing feature with an equal representation of children and adults, a rarity in Neolithic contexts.

Our primary challenge, through a comprehensive anthropological inquiry, is to reconstruct the recruitment profiles and demographic dynamics of the Neolithic village population utilizing this grave. Despite encountering significant challenges due to the prevalence of fragmented and isolated bones at Mas Rouge, influenced by various taphonomic factors like human activities and post-depositional biases including fire, sediment compaction or chemical agents, we've embraced these hurdles as opportunities for innovative exploration. These conditions have inspired us to develop a systematic approach for studying human remains in this intricate context, thereby unravelling the complex of events and their spatiotemporal succession. Complementing our anthropological methods, we employed forensic and archaeozoological tools for the conservation study, including observation and coding systems for fractures and surface modifications (with an experimental repository), all integrated into GIS.

Preliminary findings from our stimulating investigation of one ossuary space reveal compelling insights, including the identification of two distinct fire alteration patterns, late fractures, and evidence of carnivore activity impacting select bones, likely belonging to a canid-like species.

In conclusion, our multidisciplinary taphonomic approach offers captivating insights into the operations and the history of collective burials, thereby enhancing our understanding of Neolithic populations.

4 UNRAVELLING THE MYSTERY. THE CASE OF THE PARTIALLY COMMINGLED 3RD MASS GRAVE FROM THE MOHÁCS MEMORIAL PARK (HUNGARY)

De Andrés Montero, Marcos (Department of Biological Anthropology, University of Szeged) - Kocsmár, Réka (Department of Biological Anthropology, University of Szeged) - Vig, Viktor (Department of Biological Anthropology, University of Szeged) - Molnár, Erika (Department of Biological Anthropology, University of Szeged) - Tihanyi, Balázs (Department of Biological Anthropology, University of Szeged; Department of Archaeogenetics, Institute of Hungarian Research) - Bereczki, Zsolt (Department of Biological Anthropology, University of Szeged) - Pálfi, György (Department of Biological Anthropology, University of Szeged)

In 1526 took place one of the most relevant, and yet unknown, battles in the history of Central and Eastern Europe. The Battle of Mohács, where the Hungarian army was defeated by the Ottoman imperial army is still regarded by Hungarian historiography as one of the most relevant moments in their history, and one that would have a great influence in the future of the Carpathian region. In order to gain more knowledge about that historical event, a mass grave containing the remains of approximately 300 individuals was excavated in the surroundings of the presumed battlefield between 2020 and 2022. Although originally thought to be a primary burial, the remains found inside the grave were partially disarticulated and commingled. For the purpose of solving the main bioarchaeological questions related to this burial (namely the role of the people buried in it and whether they were killed in action or executed in the aftermath of the battle), rearranging these disarticulated remains to the fullest extent is imperative. To achieve that aim, a set of tools and working protocols have been developed and adapted to be employed in this project. First, a geographical information system software was used to record the position of the different skeletal elements within the grave, including the distance between them. Various osteometric formulae were applied to narrow down the number of potential matches for each element. In addition, a new anatomical coding system proved useful to discriminate skeletons based on the level of completeness. A series of preliminary results obtained after using these tools are to be presented.

5 HIGHLY COMMINGLED BONE SERIES FROM ALCALAR (PORTUGAL): PAST FUNERARY GESTURES DURING THE 3RD TO THE 2ND MILLENNIUM B.C. CAL. TRANSITION

Neves, Maria João (Universidade de Coimbra; CIAS - Research Centre for Anthropology and Health - Life Sciences Department of the University of Coimbra; Institute of Interdisciplinary Research - University of Coimbra) - Ferreira, Maria (University of Coimbra; Laboratory of Forensic Anthropology, Centre of Funcional Ecology - Life Sciences Department of the University of Coimbra; CIAS - Research Centre for Anthropology and Health - Life Sciences Department of the University of Coimbra) - Silva, Ana (University of Coimbra; CIAS - Research Centre for Anthropology and Health - Life Sciences Department of the University of Coimbra; Centre of Funcional Ecology - Life Sciences Department of the University of Coimbra)

Late Prehistoric funerary sites have dynamic and complex biographies. These sites include many architectural solutions (passage graves, tholoi, hypogea, pits, etc.), housing fresh cadavers, skeletons, commingled bones, and various material culture items.

In the Portuguese classical archaeological region of Alcalar, the scientific exploitation of a considerable number of prehistoric funerary sites since the end of the 19th century, allowed the identification of an important set of highly commingled skeletal remains found in natural caves, artificial caves or hypogea, tholoi and dolmens, and even in pits.

The implementation of an archaeothanatological protocol coupled with GIS analysis and the obtention of radiocarbon dates from well-defined stratigraphic contexts provided a new understanding of the rhythm of funerary depositions, interruptions of use, reformulations, abandonment of the monuments, and how these assemblages were affected by taphonomic factors over the last millennia.

In this work, we will present the results of an archaeothanatological analysis of three sites, allowing the reconstruction of past funerary practices. The biological profile of the dead and the identification of bone changes compatible with pathological lesions were carried out with standard anthropological methods. The skeletal remains here were found in the Tholos of Alcalar 9 (Minimum Number of Individuals [NMI] = 6); the upper level of Monte Canelas Hypogeuum I (NMI = 24); and the Alcalar settlement (NMI = 2). Even though a small number of individuals were found, a large sample of highly fragmented and commingled bones has been recovered (> 1500 fragments), showing the contribution of highly commingled series to a better understanding of this Chalcolithic-Bronze Age transitional period. This work highlights how a reflexive methodological practice can shed light on past funerary practices with new inter- and transdisciplinary approaches, even from very "chaotic" bone assemblages.

6 ANIMAL ASSOCIATIONS IN HUMAN BURIALS: INSIGHTS FROM TELL MOZAN (MIDDLE BRONZE AGE, NORTHERN SYRIA)

Kharobi, Arwa (Masaryk University) - Buccellati, Federico (Freie Universität Berlin) - Kelly-Buccellati, Marilyn (California State University) - Buccellati, Giorgio (UCLA)

The funerary space at Tell Mozan, situated strategically in the northern Syrian foothills, offers valuable insights into the mortuary practices spanning four centuries from the early to late Khabur periods. Covering 1860 m², the burial ground within Urkesh's upper town reveals a diverse array of more than one hundred burials. Analysis integrating archaeological, anthropological, and archeothanatological data unveils a spectrum of funerary practices, suggesting connections to family, community, or religious affiliations.

Tombs at Urkesh delineate social ranks: the majority consist of single simple pits, potentially indicating common burial practices (61%), while uncommon tombs suggest higher social status, such as those associated with fireplaces or complete animal deposits. Notably, animal remains, like those of suidae and caprine, were deliberately interred alongside human remains, possibly serving as offerings for the deceased's journey to the Netherworld.

One exceptional discovery includes equid burials with accompanying valuable offerings, suggesting purposeful associations between human and animal burials. Such associations, observed in Tell Arbid, Mohammed Diyab and Chagar Bazar, and documented in cuneiform texts, indicate varied socio-cultural traditions or individual statuses governing burial practices. Analogous cases, such as those in Shiyukh Tahtani, reinforce the significance of these burial traditions across the Middle Bronze Age in Khabur.

The intentional placement of equidae alongside human burials underscores the symbolic and ritualistic nature of these practices. Such findings deepen our understanding of ancient burial customs, shedding light on the complexities of belief systems and social structures in Bronze Age societies in the region. The multifaceted analysis of funerary practices at Tell Mozan enriches our comprehension of the cultural and religious landscape of Urkesh, highlighting the intricate interplay between the living, the deceased, and the divine.

7 UNRAVELLING THE FUNERARY RITUAL OF THE PREHISTORIC HYPOGEUM OF CALAFORNO (GIARRATANA, SICILY) THROUGH THE STUDY OF ITS COMMINGLED HUMAN REMAINS

Varotto, Elena (Flinders University; Fapab Research Center) - Bello, Silvia (Natural History Museum, London) - Mitello, Pietro (DISUM, University of Catania) - Galassi, Francesco Maria (University of Lodz)

The present communication has its focus on the approaches utilised in the study of the commingled human remains retrieved in the prehistoric Hypogeuum of Calaforno (Giarratana, Ragusa, Sicily), a complex multi-function site built during the Late Copper Age (ca. 2600 BC) and used until the 11th century AD. In total 817 human bones, among more than a thousand animal ones, were found in 11 of the 35 chambers constituting the hypogea structure, with a calculated M.N.I. of 39 individuals. In order to analyse these remains and better identify the biological profile of the investigated individuals, various methodologies were adopted including anthropological and palaeopathological examinations, as well as palaeoradiological ones. Moreover, the remains were taphonomically investigated by evaluating the alterations caused by diagenetic processes and calculating quantitative and qualitative states of preservation.

Finally, thanks to stereomicroscopic analysis, cutmarks on some bones were detected, which leads to a discussion on the potential post mortem treatment of the cadavers in light of phenomena such as defleshing, disarticulation and cannibalism. The results suggest that the identified funerary ritual could be that of collective burials. The long human occupancy of the site with different purposes during the centuries (funerary, religious, sheltering), other taphonomical processes and looting in recent times are the main limitation in this study: these issues prevent us from determining whether also primary type burials were present. The depositions in the hypogeuum can be fully framed within the framework of collective burials - present in Italy and Sicily in the Eneolithic alongside with a great variety of other funerary rituals - some of them certainly of a secondary type, attested by the handling practices of some corpses and consistent with Eneolithic customs, perhaps evidence of specific treatment reserved only for certain individuals.

8 BOTH PARTIAL AND COMPLETE: EXCAVATIONS AND INTERPRETATIONS OF TAPHONOMICALLY COMMINGLED MUMMIFIED REMAINS FROM DIABLO WASI, PERU

Toyne, J. Marla (University of Central Florida) - Anzellini, Armando (Lehigh University)

Commingling of human remains in archaeological contexts does not just happen at the individual element level. Incomplete or partial commingling can result from original mass burial, reinterment, deliberate manipulation, or natural taphonomic processes. In any of these cases, the commingling can be only partial as remains of individuals can be found in close proximity with one another, allowing for at least a partial reassociation of the individuals included in the context. Interestingly, commingling is rarely linked with mummified remains as they are more likely to be complete individuals. However, at the site of Diablo Wasi, in the northern Peruvian highlands, this is exactly what we have recovered from open sepulchers. Sector 1 at the site consists of approximately 50 mausolea built on cliff faces. Approximately 30 and 50 individuals were deposited within two structures respectively, having undergone a process of body preparation and textile wrappings that partially and naturally mummified their remains, yet many of them were taphonomically partitioned into incomplete yet articulated skeletal materials rather than complete individuals. Within these excavated mausolea, we see two different processes leading to commingling, human-driven and natural taphonomy. Through the development of a system of excavation and documentation that maintains spatial associations between articulated and disarticulated remains we have been able to describe the taphonomic processes and gain a better understanding of potential re-association and original disposition of the remains.

9 "MOVING BONES": SPATIAL ANALYSIS OF COMMINGLED HUMAN REMAINS AT THEBAN NECROPOLIS, EGYPT AT THE AREA OF TT184

Mateovics-László, Orsolya (ARDIG Archäologischer GesmbH) - Fábian, Zoltán (Károli Gáspár University of the Reformed Church in Hungary, Department of Ancient History and Auxiliary Historical Sciences)

The investigation of Theban tombs is challenging for researchers due to their multiple usage and continuous looting, resulting in disarticulated skeletal and mummified commingled remains. However, these materials provide valuable information about the life of the ancient Egyptian elite and their funerary treatments.

Anthropological investigations of human bone material from the excavation of the Hungarian Archaeological Mission at the southern slope of el-Khoha Hill began in 2011. During the excavation, the finds were separated according to the characteristically different architectural units and the anthropological analysis followed these subdivisions.

Therefore, the assemblages were not only examined to gain information on the demographic and health profiles of the samples but also to evaluate the spatial distribution of skeletal and mummified remains. Establishing this methodological approach helped to estimate to what extent these materials are disturbed. It was intended to locate areas in the tombs where the human remains are less affected by the disturbing factors providing insight into the formation processes of the assemblages.

In this presentation, we provide an insight into how this research method could be potentially used for comparative investigations between these tombs and point at the value that such remains hold.

10 NOT ALL IS LOST. RETRIEVAL AND ANALYSIS OF A ROBBED COLLECTIVE BURIAL FROM THE AMPLERO VALLEY (ABRUZZI REGION, ITALY)

Sperduti, Alessandra (Museo delle Civiltà; Università degli Studi L'Orientale di Napoli) - Ceccaroni, Emanuela (Soprintendenza archeologia, belle arti e paesaggio per le province di L'Aquila e Teramo) - Alhaique, Francesca (Museo delle Civiltà) - Del Fattore, Francesca Romana (Soprintendenza archeologia, belle arti e paesaggio per le province di L'Aquila e Teramo) - D'Avino, Adele (Università degli Studi L'Orientale di Napoli) - Candilio, Francesca (Museo delle Civiltà) - Ceconi, Viola (Museo delle Civiltà)

In 2022, a speleological survey in the Amplero Valley led to the discovery of a "grotticella" (i.e. small cave) tomb with scattered human bones providing evidence of unauthorized excavations. The situation required the intervention of the Soprintendenza L'Aquila-Teramo in collaboration with the Museo delle Civiltà, Servizio di Bioarcheologia (Rome).

The typology of the tomb was similar to others in the same funerary area and the Abruzzi region. The excavation revealed a mixed deposit of hundreds of disarticulated and partially fragmented skeletal elements throughout the entire width and depth of the structure, likely resulting from the extreme disturbance of the burial. It also yielded dozens of faunal remains.

Osteological analyses were performed to reconstruct the primary setting of the burial as well as the subsequent post-depositional taphonomic processes. Several procedures and indexes were applied to assess the MNI, the MNE, and the BRI, followed by the reconstruction of the skeletal individualities to obtain the demographic and paleopathological profile of the individuals. The findings indicate the primary deposition of at least 11 individuals, ranging in age from 6-7 to 40+ years. Their bones exhibit varying degrees of diagenetic changes depending on the location of discovery; in particular, many skeletal elements retrieved on the surface of the deposit showed recent porcupine gnaw marks.

The few cultural artifacts retrieved in the tomb (pottery fragments, small shoe nails, and an earring), indicate a wide chronological span (1st century BCE – 7th century CE) with a possible reuse of the structure in the postclassical period. In this regard, for a better understanding of the utilization phases of the tomb, radiocarbon dating and aDNA analyses are currently underway.

The experience of Collelongo shows that when acting promptly with safeguarding actions and a well-planned multi-disciplinary study, it is still possible to reconstruct and valorize what seemed lost.

11 INSIGHTS INTO PREHISTORIC MULTIPLE BURIALS - A COMPREHENSIVE STUDY

Gémes, Anett (Department of Biological Anthropology, Eötvös Loránd University, Budapest, Hungary) - Dani, János (Department of Archaeology, University of Szeged, Hungary) - Mester, Edit (Kiss Pál Museum, Tiszafüred, Hungary) - Kiss, Viktória (HUN-REN Institute of Archaeology Research Centre for the Humanities, Budapest, Hungary) - Major, István (HUN-REN Institute for Nuclear Research, Debrecen, Hungary) - Szeverényi, Vajk (Déri Museum, Debrecen, Hungary) - Cavazzuti, Claudio (Department of History and Cultures, University of Bologna, Ravenna, Italy) - Kiss, Krisztián (Institute of Practical Methodology and Diagnostics, Faculty of Health Sciences, University of Miskolc, Miskolc, Hungary; Department of Biological Anthropology, Eötvös Loránd University, Budapest, Hungary; HUN-REN Research Centre for the Humanities, Institute of Archaeogenomics, Budapest, Hungary; Department of Anthropology, Hungarian Natural History Museum, Budapest, Hungary) - Szeniczey, Tamás (Department of Biological Anthropology, Eötvös Loránd University, Budapest, Hungary) - Hajdu, Tamás (Department of Biological Anthropology, Eötvös Loránd University, Budapest, Hungary)

The Middle Bronze Age (MBA) communities (2000-1500 BC) of the Carpathian Basin (CB) adhered to strict burial rites, even segregating individuals by gender in graves, including children. However, the discovery of a mass grave challenges these established practices, prompting questions about the underlying motivations.

In 2020, during the excavation at the site Tiszafüred-Majoroshalom III, a pit with human remains associated with the Otomani-Füzesabony cultural complex was unearthed. The estimation of the minimum number of individuals and the analysis of age and gender distributions within multiple burials were pivotal in uncovering the reasons behind the collective burial practices. To achieve this, a unified methodological review was conducted, integrating data from the contemporary cemetery and utilizing advanced anthropological and paleopathological techniques commonly employed in multiple burial analyses.

This comprehensive approach aimed to determine whether factors such as intergroup conflict or intragroup violence, or the prevalence of epidemic diseases, influenced the adoption of multiple burial practices within these community. In addition to traditional anthropological examination methods, stable isotope analyses were employed to provide insights into diet and potential migration trends, further enriching our understanding of this special burial context.

By shedding light on the complexity of MBA multiple burials, this study contributes to our knowledge of the social and cultural dynamics of Bronze Age communities in the CB.

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12 FROM FLESH TO MESS: DISENTANGLING COMMINGLED AND FRAGMENTED HUMAN REMAINS AT THE NEOLITHIC/CHALCOLITHIC BURIAL OF CUEVA DEL CABALLO, SOUTHWESTERN IBERIA

García-Domínguez, Celia (Universidad de Valladolid; Fundación Extremeña de la Cultura) - Fernández-Crespo, Teresa (Universidad de Valladolid; University of Oxford (United Kingdom)) - Collado Giraldo, Hipólito (DG de Bibliotecas, Archivos y Patrimonio Cultural. Junta de Extremadura)

Commingled and fragmented skeletal remains are challenging components of many anthropological analyses. This is particularly problematic in the Neolithic and Chalcolithic, where cumulative funerary practices often result in chaotic and poorly preserved skeletal assemblages. Analytically, the state of preservation of the remains is tied to the complexity of the methodological approach required to obtain valuable anthropological information. The poorer the former, the more complex the latter.

This is the case of Cueva del Caballo site, located in southwestern Iberia. The cave has been used for burial from the Early Neolithic to the Early Bronze Age. However, here we focus on the Neolithic/Chalcolithic funerary deposit, dated around 3611-2662 cal. BC. Here, we present the methodological approach used to explore the funerary practices and reconstruct the lifeways of those buried at the site. This includes a number of conventional analyses not only on human remains (Anthropologie de terrain, human osteology, taphonomy, radiocarbon dating), but also on their archaeological context through the study of associated materials (grave goods, macro- and micro-faunal remains, sediments...). We also present future prospects for exploring Cueva del Caballo through molecular methodologies such as isotope and DNA analyses as promising means that can provide a deeper and more detailed understanding of the community buried. This proposal may serve as a key example of how an optimized methodology can challenge ideas of the limited informative value of commingled and fragmented human remains and reveal significant aspects of our ancestral history.

13 THE MEGALITHIC SIEVE: SEX ESTIMATION IN FRAGMENTARY HUMAN REMAINS OF MEGALITHIC TOMBS FROM THE SPANISH NORTHERN PLATEAU THROUGH PROTEOMIC ANALYSIS

Santa Cruz, Angelica (Universidad de Salamanca. Dept. de Prehistoria, Historia Antigua y Arqueología.; Universidad de Valladolid. Dept. de Prehistoria, Arqueología, Antropología Social y CC. TT. Historiográficas.) - Fernández-Crespo, Teresa (Universidad de Valladolid. Dept. de Prehistoria, Arqueología, Antropología Social y CC. TT. Historiográficas.; University of Oxford. School of Archaeology.) - Casas-Ferreira, Ana María (Universidad de Salamanca. Dept. de Química Analítica, Nutrición y Bromatología.) - del Nogal-Sánchez, Miguel (Universidad de Salamanca. Dept. de Química Analítica, Nutrición y Bromatología.) - Pérez Pavón, José Luis (Universidad de Salamanca. Dept. de Química Analítica, Nutrición y Bromatología.) - Villalobos García, Rodrigo (Universidad de Valladolid. Dept. de Prehistoria, Arqueología, Antropología Social y CC. TT. Historiográficas.) - Moreno Gallo, Miguel (Universidad de Burgos. Dept. de Historia, Geografía y Comunicación.) - Basconillos Arce, Javier (Asociación Geocientífica de Burgos.) - Delibes de Castro, Germán (Universidad de Valladolid. Dept. de Prehistoria, Arqueología, Antropología Social y CC. TT. Historiográficas.)

Sex estimation of individuals recovered from contexts of commingled and fragmentary human remains usually faces many methodological difficulties and practical limitations. These features often affect skeletal assemblages from Late Neolithic and Chalcolithic collective burials. Despite the aforementioned constraints, in the megalithic tombs of northern Spain, some sex-related demographic anomalies favouring adult males have been detected through osteological analysis, which has been interpreted as evidence of selective burial practices. However, the representativity of the data is unclear due to poor bone representation and the impossibility of estimating the sex in non-adults.

Recent studies have demonstrated the accuracy of mass spectrometry-based peptide analysis in dental enamel for biological sex determination. This study is pioneer in applying a new fast method based on dimorphic peptide analysis to a megalithic collection. A total of 85 individuals from five tombs of the megalithic group of La Lora (Spanish northern plateau), representing all age groups, were analysed. The molecular assignment of biological sex has allowed a reliable approach to the sex ratio. This study confirms a general predominance of males, although variations in sex

ratios linked to the temporal use of the graves should be considered. This fact seems to reflect previously unknown diachronic changes in the politics of the death.

14 **THE VALUE OF SCATTERED AND FRAGMENTARY HUMAN REMAINS: CASE STUDIES FROM NEOLITHIC SETTLEMENT MOUNDS ON THE GREAT HUNGARIAN PLAIN**

Anders, Alexandra (Eötvös Loránd University, Institute of Archaeological Science) - Füzesi, András (Hungarian National Museum) - Hajdu, Tamás (Eötvös Loránd University, Department of Biological Anthropology) - Köhler, Kitti (Hungarian Natural History Museum) - Raczy, Pál (Eötvös Loránd University, Institute of Archaeological Science)

Fragmentary human remains have rarely attracted the attention of either archaeologists or osteoarchaeologists: the former generally tend to focus mainly on complete burials. Thus, the study and discussion of disarticulated human bones are usually omitted from their analyses, and we are often left without any information even about their occurrence on a particular site since they are often treated as stray, unstratified, worthless and uninteresting finds.

Presented and discussed here as case studies are the fragmentary human remains from three remarkable Late Neolithic (5th millennium BC) settlement mounds: Polgár-Csőszhalom, Polgár-Bosnyákdomb and Öcsöd-Kováshalom. All three sites yielded human remains, either wholly intact or articulated, as well as in the form of scattered fragments. Fortunately, the latter were also submitted to an osteoarchaeological examination and we thus have information on the type of bones and, in several cases, a rough estimate of the age at death. In some cases, peri- and post-mortem cut marks were observed on the bones. We collated this information with the contexts and exact findspots of the fragmented human bones as well as with their spatial scatter.

These data offered valuable insights into the mortuary rituals of the given communities and of their attitudes to human bodily parts after the disintegration of the body. Were the remains of their ancestors deposited intentionally or was it coincidental? These practices differed on the three sites, highlighting the need for undertaking the examination of finds of this type on all sites in future research because they offer fresh information that shed entirely new light on human remains, and contribute to a better understanding of past societies. A close collaboration and dialogue between archaeologists and osteoarchaeologists is therefore indispensable in future studies.

The archaeological assessment of the Polgár-Csőszhalom site is funded by a grant from the NRD Fund (Grant K124326).

15 **PERI-MORTEM TRAUMA, POST-MORTEM DAMAGE AND THE IN-BETWEEN: EXPLORING PATTERNS OF FRAGMENTATION IN IRON AGE BRITAIN**

Castells Navarro, Laura (University of York) - Armit, Ian (University of York)

In the analysis of archaeological human remains, fragmentation is often considered to be the result of random post-mortem events happening when bone was already dry. But is it always so?

This paper presents the results of the analysis of the human remains from two British Iron Age sites, analysed as part of the COMMIOS Project: Applecross, northwest Scotland, and Danebury, southern England. At Applecross, at least seven adult individuals were buried within and below a low mound of beach cobbles. The analysis of the fragmented and commingled remains revealed repeated (fragmented) skeletal elements, breaks with intermediate peri-post-mortem characteristics, and the presence of impact and chisel scars. These findings suggest that (at least part of) the fragmentation observed in the remains was intentional or guided. In contrast, at Danebury hillfort human remains were deposited in pits in what are recognised to be over 400 individual deposits. The analysis of all the deposits reveals a possible differential peri-mortem and post-mortem treatment and manipulation of the human remains deposited as complete bodies, a partial individual, or single skeletal elements.

In both cases, it is possible that intentional fragmentation or processes which increased the likelihood of bone breakage were part of protracted funerary practices and points to complex interactions between the living and the dead.

16 **FRAGMENTED RITUAL: THE POTENTIAL OF DISARTICULATED HUMAN REMAINS FOR UNDERSTANDING MINORITY MORTUARY TREATMENT IN ROMAN BRITAIN**

Green, Ellen (University of Reading)

Disarticulated human remains are often dismissed as a poor source of osteological information, as problems with individuation severely limit the effectiveness of many types of analysis. This is particularly notable within Romano-British contexts, where the “un-Roman” nature of the material often leads to it being interpreted as an isolated oddity, disturbance of earlier graves, or a hold-over from Iron Age practices. As a result, disarticulated material from this period is often not analyzed or reported on in any detail, despite it being relatively common throughout the entire Roman period.

This paper will present a case study of a large assemblage (NISP=672, MNI=20) to show the potential of disarticulated human remains for recognizing and understanding complex mortuary practices. Micro and macro taphonomic analysis of an assemblage of disarticulated human remains from a first century A.D. quarry from the Nescot Former Animal Husbandry Centre in Ewell, Surrey showed evidence of multi-stage post-mortem processing. This included decomposition of the remains within a protected environment followed by removal of certain skeletal elements. This level of interaction with the dead is previously unrecognised within the Romano-British archaeological record, and shows the potential of disarticulated remains for identifying and understanding mortuary ritual.

17 **SCATTERED AND COMMINGLED HUMAN REMAINS AS A SIGN OF CARE AND BELONGING**

Gramsch, Alexander (RGK - Romano-Germanic Commission DAI)

Features containing single human bones or fragmented and commingled body remains are quite common in the archaeological record for all periods. Based on our project on “The Itinerary of the Human Body” focusing on examples of continued interaction with the body, this contribution brings together a variety of evidence to consider the social role of the human body as well as the social practices that resulted in fragmented bodies and intermingled body parts. Rather than assuming a disturbance of an original context of interment, many features can be understood as resulting from a deliberate and recurring engagement with the body. Since our investigation draws on the phenomenology and sociology of the human body, we approach the body as both a physical ‘thing’ and as a social phenomenon with which individuals and groups must engage; the individual acts through the body and, in turn, the body is acted upon, beyond the death of the individual. Much of the current research considers human remains as a passive container of information on nutrition, health, mobility, and ancestry; however, beyond this, the human body needs to be understood as a medium of social relations and a means of maintaining and transforming relationships. This is also enabled by the general partibility of the body. Thus, scattered and commingled human remains can be a sign of body-related practices linked to coping with loss and the need to (re-)organise social relationships over time, and to care and the wish to create bonds both between the deceased and the bereaved as well as among the living.

18 **BARCZEWKO: UNCOVERING AN ABANDONED MEDIEVAL TOWN THROUGH ARCHAEOOMETRY AND MORTUARY ARCHAEOLOGY**

Cuello del Pozo, Paloma (Texas A&M University) - Koperkiewicz, Arek (University of Gdansk)

Barczewko is a town situated in Poland’s Warmia region, where Prussian tribes dwelled until its occupation by the Teutonic Order. According to medieval chronicles, the town, initially named Wartenberg and established by a bishop, primarily attracted settlers from the German area of Silesia. Its demise came tragically when Lithuanian invaders destroyed it. Since 2014, field research has uncovered compelling evidence including layers of burned structures akin to the archaeological “Pompeian case,” indicating a sudden assault as retold by ethnohistorical sources. A cemetery dating from 1330-1354, potentially containing the remains of indigenous groups and German settlers, further enriches our understanding of the populations and religious syncretism that took place during the merging of distant peoples. With the collaboration of interdisciplinary teams, our research explores migration trends to better understand the settlement patterns that occupied Medieval Barczewko. We analyze stable isotopes of strontium (87Sr/86Sr), oxygen (d18O), and carbon (d13C) from human bone and tooth remains from Barczewko burials. We also compare human data to biologically available 87Sr/86Sr measurements from zooarchaeological remains. Preliminary 87Sr/86Sr results suggest that a portion of the population was local, implying a cultural blending upon the establishment of Wartenberg by German settlers. This cultural amalgamation is further evidenced in the funerary practices excavated, with individuals interred by traditional Christian burial customs, along with ceramic offerings perhaps indicating the identity of neophytes. In our effort to deepen our comprehension of the cultural milieu in Warmia during the Teutonic Order era, our presentation will provide new stable isotope findings. These results will also significantly enhance the existing dataset for isoscapes in the region, offering valuable insights into its historical and cultural landscape.

Research funded by the National Science Center, project 2021/41/B/HS3/01694 titled “Barczewko – A History Written by Fire. The Medieval Lost City and Urbanization of the Galindian Forest” 2022-2024.

19 **AN ANALYSIS OF COMMINGLED HUMAN REMAINS FROM TWO BRONZE TO IRON AGE SITES IN WEST TIBET**

Cao, Doudou (Department of Archaeology, University of Cambridge, United Kingdom) - Pomeroy, Emma (Department of Archaeology, University of Cambridge, United Kingdom) - Lu, Hongliang (School of Archaeology and Museology, Sichuan University, P.R. China) - Yuan, Haibing (School of Archaeology and Museology, Sichuan University, P.R. China) - Yang, Feng (School of Archaeology and Museology, Sichuan University, P.R. China) - Li, Shuai (School of Archaeology and Museology, Sichuan University, P.R. China)

The limited study of ancient Tibetan populations at high altitude leaves significant gaps in our understanding of their growth and adaptation to such challenging environments. This investigation is further complicated by the presence of

commingled remains in archaeological sites, requiring careful analytical approaches. This study examines commingled remains from two Bronze-Iron Age sites in west Tibet, Piyangdungkar and Sdingchung, with the former featuring discrete graves and the latter a mass cave burial. It involves the analysis of demographic data and dental pathology, together with the reconstruction of stature, body mass, and limb proportions to explore the body form of ancient Tibetans. Anatomical stature (ASTA) and morphometric body mass (MPBM) were also built as the benchmark for testing the applicability of existing equations.

Results indicated an MNI of 68 in 49 burials at Piyangdungkar and of 54 at Sdingchung. The Piyangdongkar adults displayed a lower tooth caries rate (4.4%) but significant dental wear and frequent antemortem tooth loss (AMTL) compared to other ancient Chinese, while Sdingchung remains showed no dental caries but prevalent AMTL. The individuals exhibited a small body size, with a mean stature of 145 cm and body mass of 47 kg for females, and 158 cm and 70 kg for males. Previous stature equations for Northern European and North American Arctic populations better predicted the ASTA than other methods, as did the European body mass equation in predicting the MPBM. Although the sample size is limited, these findings align with body proportions (relatively short lower limb and tibia lengths and wider bodies) in study remains, resembling those of Northern European and Arctic populations.

Despite challenges inherent to commingled remains, this study is informative regarding analytical approaches and provides valuable insights into the health and growth of past populations within the distinctive setting of the Tibetan Plateau.

20

THE VALUE OF FRAGMENTS – ETHICAL VIEWS ON THE CURATION AND RESEARCH OF PROBLEMATIC HUMAN REMAINS

Seppanen, Liisa (University of Turku; University of Helsinki) - Ermala, Jenna (University of Oulu)

The curation and research of fragmentary and commingled human remains involve various ethical questions that are widely understood and considered in archaeology and bioanthropology and manifested in various guidelines. However, practical challenges often present ethical dilemmas. Ethical views need to be weighed against limited resources, unequal treatment of research materials, and research potential for future scientific inquiry.

This presentation roots into the ethical considerations arising from pragmatic challenges to preserve and study fragmented and commingled human remains in Finland. Notably, when the remains date from historical periods. With few examples and studies we are addressing the questions of value and ethics while acknowledging our limited possibilities as researchers to affect the prevailing practices defining future studies. We must critically examine the reasonings, ethics and implications of prioritizing certain human remains over the others, particularly when fragmentary and commingled bones are sidelined due to limited resources or perceived of minor scientific value and research interest.

Since the decisions – starting from collection policies and often justified by ethics – are based on the comprehended values of the remains and views on the research potential, we are calling for open and deeper discussions about the value judgement and ethical aspects entwined in this issue and on the other hand encouraging the experts to develop advanced methodologies for studying fragmented remains. By encouraging dialogue to improve equitable curation processes, raising awareness of methodological challenges, and acknowledging the complexities of fragmented and commingled materials, we aim to promote ethical accountability. This advocates for more inclusive and ethically informed approaches to fragmented human remains research and curation processes.

1133 EVERYTHING COUNTS IN LARGE AMOUNTS? THE EMERGENCE OF TRADE NETWORKS IN MEDIEVAL EASTERN EUROPE. THE ARCHAEOLOGICAL AND ARCHAEOMETRIC EVIDENCE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Khamaiko, Natalia (The Leibniz Institute for the History and Culture of Eastern Europe (GWZO); The Institute of Archaeology, National Academy of Science of Ukraine) - Woloszyn, Marcin (The Leibniz Institute for the History and Culture of Eastern Europe (GWZO); University of Rzeszow) - Komar, Oleksii (The Institute of Archaeology, National Academy of Science of Ukraine)

Session format: Regular session

The scarcity of written records from East Central and Eastern Europe in the early Middle Ages means that archaeological and archaeometric research is becoming increasingly important in the study of trade relations. Today, science offers opportunities to enter into broader fields of research. Petrographic, isotopic and material science research can shed light on the origin of objects. Furthermore, aDNA studies can prove the migration of animals or goods. Our aim is to discuss the state of the art of trade research for pre-Mongol East Central and Eastern Europe. In the case of some commodities, we have evidence of their mass circulation. They prove that the medieval world was more open than we thought until recently.

We would like to consider both special and mass finds, those that united the elite (e.g. jewellery, ivory, gemstones, silk, amphorae) and the common people (ceramic, glass, Ovruch slate).

We will discuss methods of identifying imported products and mechanisms of exchange, and ask to what extent they can be taken as evidence of medieval globalisation.

ABSTRACTS

1 LONG-DISTANCE CONTACTS THAT PASSED THROUGH BOHEMIA IN THE 7TH - 9TH CENTURIES

Profantová, Nadezda (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic)

In the 7th century, Bohemia was mainly connected to the Silk Road to Eastern Europe and the Caucasian area. There were also important connections to the southeast – to the Carpathian Basin and the Balkans. The Frankish merchants as well as the armed conflict with the Frankish Empire (631/2) are better documented by written sources than by archaeology. Archaeology then proved the contact with Crimea and less noticeably with Baltic countries (amber). In the 8th century, the ties to the Carpathian Basin and South Europe (Dalmatia, Byzantine Empire) became more pronounced and at the end of the century the significance of the Carolingian Empire in the network of contacts changed – that is when the Carolingian coins began to circulate. At the same time, there were Carolingian campaigns into Bohemia (805, 806, 847-9) and Regensburg's importance as the closest western metropolis had increased. Sporadically, even Arabian coins made it to Bohemia (from north or northwest?). From the last third of the 9th century, we have evidence of the interconnectedness of Bohemian and Great Moravian elites (Kolín, Kourim, Želénky, Praha). This corresponds with a short-term political connection to the Great Moravian Empire. At the end of the 9th century, the close connection with Regensburg was restored.

2 THE PLACE AND ROLE OF THE CARPATHIAN BASIN AND EARLY HUNGARIANS IN THE RESURGENT LONG-DISTANCE TRADE OF EURASIA (9TH-10TH CENTURY)

Harangi, Flórián (Hungarian National Museum, National Institute of Archaeology) - Jancsik, Balázs (HUN-REN Research Centre of Humanities, Early Hungarians Research Team; Pázmány Péter Catholic University, Institute of Archaeology) - Türk, Attila (HUN-REN Research Centre of Humanities, Early Hungarians Research Team; Pázmány Péter Catholic University, Institute of Archaeology)

The Avar Khaganate were able to join the re-emerging European commerce from the 8th century onwards, but in the middle of the 9th century, the political power of the Avars ceased. The Carpathian basin at the beginning of the 10th century was reunified by the early Hungarians. Their graves are bound in precious metal objects and luxury goods. The parallels of these metal fittings occur in Scandinavia and the Rus, but these are concentrated in the Volga-Ural region, where we can assume the former settlements of the early Hungarians and their groups, who remained in the East. The connection between these groups is also confirmed by aDNA studies. The demand for products of Hungarian-style toreutics was high in the period, these objects appeared in the Trans-Urals region too.

In addition to silver objects, silks are often found in the old Hungarian graves. Some of these silks may have been acquired as part of the booty of the Western European campaigns, other parts of them may have been commercial products. Eastern Hungarian communities may also have played a role in the mediation of silk from the Muslim world.

The ray skin on the handle of 10th-century sabres could also have been an important product of the trade, which came from the East. The custom of covering the handle of weapons with ray skin can be traced to the Far East.

In addition to the import objects, we must also pay attention to the exports flowing from the Carpathian Basin to the East, which on the one hand consisted of the already mentioned precious metal objects. Based on the written sources and later parallels, we can count on the export of live animals and possibly salt.

The dirhams also draw attention to the importance of eastward commercial connections of the Carpathian Basin.

3 MEDIEVAL GLOBALISATION? FOLLOWING THE AMBER TRADE BETWEEN THE BALTIC, RUS' AND CENTRAL ASIA

Damm, Carina (University of Silesia)

Contrary to the well-researched long-distance trade of the Bronze Age and the Roman period, trade in amber during the Viking Age (c. 750-1050) and the high Middle Ages (c. 1000-1300) has hitherto received less focus. Aiming to bridge this gap, this paper investigates the circulation of amber in three core regions that formed part of an interconnected medieval world. Firstly, Scandinavian and Slavic emporia on the Baltic and North seas, such as Wolin (where about 100 kg of amber artefacts and raw material have been found) or Ribe (where more than 10,000 finds were unearthed). Secondly, in medieval Rus', beads from the Baltic, but also Byzantium and the Islamic countries, reveal further insights into medieval trading connections, illustrated by the find of over a thousand pieces of amber

in Novgorod. A final area of study will be Central Asia where aristocratic burials of the Liao dynasty from the early eleventh century contained numerous amber items. Infrared spectroscopy could identify their Baltic provenance from where it was imported as far as to China via Khwārizm and Volga Bulgaria by the Turkic Qarakhanids. What then made the material so desired both in the Baltic and far beyond? In which context do the objects stand to other trading commodities such as furs, silver dirhams, or slaves? Drawing upon both archaeological and historical methods, the paper thus explores the provenance of amber and its circulation, aiming to expand our knowledge on mobility of people, ideas, and goods in a globalised medieval world.

4 THE MORE YOU GET - THE BETTER - THE CONTRIBUTION OF AMPHORAE TO STUDYING TRADE NETWORKS IN MEDIEVAL EASTERN EUROPE

Todorova, Evelina (National Archaeological Institute with Museum, BAS)

Amphorae were ceramic containers that were used for the long-distance transport by ships of bulk agricultural goods such as wine and olive oil. They are considered as an evidence of economic contacts between different regions and can be used in the reconstruction of trade relations. During the 7th -14th c. amphorae were mainly produced in territories that made part of the Byzantine Empire. Since the 10th c. amphorae typologically belonging to different classes and production centers appear in large quantities in present-day North-Eastern Bulgaria, the Northern Black sea coast area and in the territories of the newly established Kievan Rus'state, reaching as north as southern Sweden, following the course of larger and smaller rivers such as the Dnieper, Dniester, etc. Using mapping amphora finding spots as a method for extracting important information will allow to outlining distribution networks and making conclusions about the nature of the commercial contacts (direct, indirect, state, private, etc.).

5 AMPHORAE IN RUS'. APPROACH TO EXCHANGE PATTERNS THROUGH THE PETROFABRIC DISTRIBUTION

Korokhina, Anastasiia (Leibniz Institute for the History and Culture of Eastern Europe (GWZO), Leipzig, Germany; Institute of Archaeology, National Academy of Sciences of Ukraine, Kyiv, Ukraine) - Khamaiko, Natalia (Leibniz Institute for the History and Culture of Eastern Europe (GWZO), Leipzig, Germany; Institute of Archaeology, National Academy of Sciences of Ukraine, Kyiv, Ukraine) - Wołoszyn, Marcin (Leibniz Institute for the History and Culture of Eastern Europe (GWZO), Leipzig, Germany; University of Rzeszów, Poland) - Waksman, Sylvie Yona (CNRS UMR5138, laboratory "Archaeology and Archaeometry", Lyon, France) - Trzeciecki, Maciej (Institute of Archaeology and Ethnology Polish Academy of Sciences, Warsaw, Poland) - Tymoshenko, Mariia (Museum of Kyiv History, Kyiv, Ukraine) - Auch, Michał (Institute of Archaeology and Ethnology Polish Academy of Sciences, Warsaw, Poland) - Chernenko, Olena (University of Warsaw, Poland; Chernihiv Taras Shevchenko National Teachers' Training University, Chernihiv, Ukraine) - Baiuk, Viktor (Subsidiary Research Centre "Security Archaeological Service of Ukraine" of the Institute of Archaeology of the National Academy of Sciences of Ukraine, Kyiv, Ukraine) - Kolybenko, Oleksandr (National Historical and Ethnographic Reserve "Pereiaslav", Pereiaslav, Kyiv region, Ukraine)

Amphora finds are one of the sensitive and mass indicators of cultural, economic and political links within Medieval Europe. In the 10th – early 13th century they appeared massively in the cities and rural settlements of Kyivan (Early) Rus' as a result of Rus' adoption of orthodox Christianity and intensified contacts with the Byzantine Empire.

This study presents the first generalisation of a petrographic investigation of amphorae dating back to the 10th – early 13th century from several urban centres of Rus' – Kyiv, Chernihiv, Pereiaslav, Volodymyr, Cherven'/Chermno, as well as Kraków, the capital of Piast Kingdom in Poland. The initial systematisation of petrographic data allowed a preliminary assessment of the intensity of imports, the identification of regional distribution patterns and, in conjunction with chemical analysis data, the association of some of the petrogroups with Mediterranean centres of amphora production.

The amount of material and diversity of petrofabrics (i.e. groups united by common features of raw materials and technology), allow us to assess the role of the sites in the system of the Mediterranean-Black Sea trade, which varies from a major trading hub (Kyiv) to peripheral centres (Cherven'/Chermno). The petrogroup associated with the production of amphorae of types Günsenin IV, and of Günsenin I from Ganos is the most widespread so far; the participation of Chalcis and other, undetermined, centres has also been noted. The origin of a large number of petrographic groups needs to be clarified.

6 EASTERN CURIOSITIES AND WESTERN NOVELTIES. IMPORTED POTTERY IN EARLY MEDIEVAL POLAND – AN OVERVIEW

Trzeciecki, Maciej (Institute of Archaeology and Ethnology, Polish Academy of Sciences) - Auch, Michał (Institute of Archaeology and Ethnology, Polish Academy of Sciences)

Clay vessels were rarely the subject of long-distance trade in pre-modern Europe. This was primarily due to their physical properties – fired clay is not very resistant to long-term transport conditions. The only exception here are amphorae – clay containers for wine and olive oil, widely distributed throughout the Byzantine Commonwealth. Hence, finds of imported pottery can be considered significant evidence in the studies of trans-regional connections of early medieval East-Central European communities.

This paper raises the issue of early medieval ceramic imports in Poland (9th-13th centuries). The territory in question covers not only the core area of the Piast state but also the western border of Kyiv Rus' and the independent polities of the southern Baltic coast. Such an approach puts investigated phenomena in a broader East-Central European context. Issues discussed will include categories of finds (amphorae, Islamic tableware, Rhineland wine jugs, graphite pots, etc.), their distribution (Baltic sea emporia, power centers, strongholds, villages), identification of imports (stylistic analyses, archaeometric research). Interpretive frames of the imported pottery is also of great importance here. Most often, we regard the presence of imports as evidence of trade. However, attention should also be paid to other types of mobility (migrations, travels, pilgrimages) and the political sphere (diplomatic gifts).

Given the current state of the research, the observations presented here are only preliminary, but they set out the great, although still not recognized, cognitive potential of this category of finds.

7 TO THE ELITE TASTE: BEYOND THE COSTS AND AESTHETICS. GLAZED TABLEWARE IMPORTS FROM MEDIEVAL KYIV

Tymoshenko, Mariia (Museum of Kyiv History (Kyiv, Ukraine))

In the period of 10-13th centuries, Kyiv obtained an exceptional role in the political and economic system of the Early (Kyivan) Rus'. Due to the geographical location on the Dnipro waterway, the medieval city served as a transit hub for Byzantine imports and the dominant center of consumption for elite products. While numerous amphorae were delivered to the urban and even rural centers of Rus', the glazed pottery constituted insignificant quantity and were unlikely to have economic relevance by means of merchandise goods in the framework of certain trade relations. The paper presents an overview of the corpus of Byzantine glazed pottery retrieved from the archaeological deposits of princely Kyiv and aims to consider it as a case data set in the context of cross-cultural and long-distance contacts of Rus', in particular with Constantinople and besides that to determine it in terms of socio-cultural space, specific features of historical topography and daily life of the medieval city.

8 MEDIEVAL AND MODERN GLAZED ITALIAN WARE IN THE NORTHERN BLACK SEA REGION

Teslenko, Iryna (Institute of Archaeology NAS of Ukraine, Kyiv; Philipps University Marburg)

The earliest finds of Italian glazed ceramics in the Northern Black Sea region date back to the second half of the 13th century which quite coincides with the rise of activity of Italian merchants in this area.

However, despite the dominance of Italians in the maritime trade of the following two centuries, ceramic imports from their homelands never became numerous. Finds of Italian ceramic are quite rare even in large commercial cities such as Azak (modern Azov), Sugdeya (Sudak), Kaffa (Theodosia), Cembalo (Balaclava), Moncastro (Bilhorod-Dnistrovskiy).

The late 13th and 14th century finds include Graffita Arcaica Tirenica, Roulette Ware; Maioliche Arcaiche; RMR, etc. It seems that all of them were more personal belongings than commercial goods.

This may seem surprising, but the number of Italian ceramics on the Northern Black Sea coast increased after the Ottoman conquests of the region in the last quarter of the 15th century, despite Italians having lost their former advantages there. There were mainly Renaissance majolica and Renaissance sgraffito of various types and origins. For this time, it seems that besides personal belongings, they could already be a trade item or a special gift.

My presentation focuses on a detailed analysis of Italian ceramics of the 13th–17th centuries from the Northern Black Sea area. I will also address the issue of the dynamics of their arrival to the region and the reasons for its fluctuations.

9 BEHIND BLUE GLASS: A HISTORY OF BYZANTINE IMPORT IN MEDIEVAL KYIV (ACCORDING TO ARCHAEOLOGICAL DATA)

Zhurukhina, Olena (The Museum of History of the Desiatynna (Tithe) Church (Kyiv, Ukraine))

During the Middle Ages Kyiv, as the administrative, political, cultural, and economic centre of Rus', accumulated processes that contributed to the development of internal and external trade relations and was also known for the

trade routes that passed through it. Kyiv medieval glass is quite diverse and represented by a wide range of products (vessels, jewellery, items for decorating religious building's interior – mosaic tesserae, lamps, window glass). Imported glass finds are not widespread, but they are informative, and promising for further study. Such objects usually arrived as part of ambassadorial gifts, diplomatic missions, or trade agreements.

The earliest imported objects are few and unique and were found exclusively in rich burials of the late 10th and early 11th centuries, associated with the elite, sometimes warriors and merchants. The turn of the 10th and 11th centuries is marked by the predominance of jewellery made in glass workshops in the Middle East and Egypt, but there is a gradual tendency to replace them with Byzantine products. From the 11th century, the range of products diversified, with a marked increase in imported glassware, beads, and bangles. They were made of high quality, mostly blue cobalt glass, sometimes richly decorated (for example, cups of high artistic level for ceremonial feasts). Most of the objects are recorded in the cultural layers of the 11th and 12th centuries, but in the 13th century they were still in use.

A comprehensive further study of glass with signs of Byzantine production, attention to workshops that arose in connection with the construction of churches for interior decoration according to Byzantine customs – all this can help to resolve the issue of the influence of Byzantine glassmaking traditions on the emergence and development of local crafts, the development and directions of trade, cultural and political processes, diplomatic relations, etc.

10 SLAVS AND EARRINGS IN THE HIGH MIDDLE AGES: SOCIO-ECONOMIC ASPECTS OF SO-CALLED VOLHYNIAN AND BEADED FILIGREE EARRINGS IN EASTERN EUROPE

Radišić, Milica (Institute of Archaeology, Belgrade)

In contrast to the Germanic peoples, for example, the practice of wearing earrings as headdress jewellery was particularly popular among the Slavs during the Early and High Middle Ages. Earrings represent one of the most numerous categories of metal finds in the archaeological material in Central, Eastern and South-Eastern Europe. Many types and variants of them have been described in archaeological literature since the beginning of the 20th century. The paper will discuss the finds of Volhynian raceme earrings and beaded filigree earrings which were widespread in the aforementioned regions between the 10th and the 12th century. Volhynian earrings were created in the workshops of Kievan Rus', while the origin of the second type is probably in the territory of West Slavs in Poland. Both types of earrings became popular, to a certain extent, in Pannonia and the central Balkans. We can assume that luxury jewellery was also produced in these territories, mostly inhabited by the Pannonian Slavs and South Slavs (along with the Hungarians and others), however, there are more reliable material data on the production of modest cast imitations. In this respect, we would like to address the following topics: problems of identification of imported and locally produced items, the nature of links between Kievan Rus' and Poland with the regions to the south and also the possibility of the existence of a peculiar identity of Slavic elites in a wider European context on the basis of jewellery.

11 KRIVICHS ON VIKING AGE TRADE ROUTES: FINDS OF THE SMOLENSK-POLACK LONG BARROWS CULTURE FEMALE ORNAMENTS AS MARKERS OF INTERREGIONAL EXCHANGE

Plavinski, Mikalai (University of Warsaw)

As markers of the formation and intensity of the functioning of transregional trade routes in Eastern Europe in the last centuries of the 1st millennium AD, either finds of Arabic silver coins or imported Eastern, Byzantine or Scandinavian artefacts are usually used. In turn, locally made items originating from the Slavic archaeological cultures of the forest zone of Eastern Europe are rarely used as evidence of interregional trade. Such neglect of Slavic material culture objects by researchers of early medieval trade is explained, first of all, by the very nature of Slavic material culture, which was characterised by exceptional inexpressiveness and poverty. Nevertheless, it seems that also objects of Slavic material culture, in particular, the Smolensk-Polack Long Barrows Culture (SPLBK) have a certain information potential for studying the issues of interregional trade.

SPLBK is associated with the Slavic tribe of Krivichs (Kryvichs), known from written sources. The formation of the SPLBK dates back to the middle of the 8th century, and the period of its existence covers the second half of the 8th, 9th and 10th centuries. In the western part of the area the population of the culture preserved its traditions until the beginning or the first half of the 11th century.

The most characteristic elements of SPLBK material culture are considered to be a certain type of handmade pottery and a set of female ornaments. Some of these ornaments (temple rings with sickle-shaped ends, three-hole chain holders and round ornamented plaques) were characteristic only for the SPLBK. Their finds outside the culture area can be regarded as Krivichs "exports". The paper is devoted to the study of the distribution and chronology of such ornaments outside the SPLBK area. The analysis of the finds allows us to determine the main directions of Krivichs contacts.

12 BONE OBJECTS IN THE CONTEXT OF CULTURAL AND TRADE CONNECTIONS OF EARLY RUS

Serhieieva, Maryna (Institute of Archaeology NAS Ukraine)

The study of bone objects in the context of trade and cultural relations of Rus' is one of the problems that need further analysis.

The issues for consideration are:

- The place of imported raw materials in the local bone-carving craft and their origin;
- Imported bone items or bone items made after imported models.

Valuable kinds of bone raw materials were considered to be ivory (walrus and elephant tusks), which could only be imported in Rus'. They were used only sporadically. Walrus tusks (fish tooth in Rus' chronicles), which were of Northern European origin, and a few objects made of them are known archaeologically. But elephant tusks were mentioned only in written sources as an indicator of luxury. These references are mainly related to originally Byzantine literature, so it is difficult to talk about the spread of this tradition among the Early Rus' social elite. It is possible that a small amount of ivory was supplied to Rus' for elite products, but we do not yet have specific materials to specify this assumption. Icons and other objects made of ivory found in the territory of Rus' are sporadic finds of non-local origin.

There are a few types of bone objects (e.g., buttons, supposedly fish-shaped needles and some other items) that may have been trade items, but in most cases bone products made out of local tradition were not numerous and do not fall under this definition. They could have come to Rus' as a result of cultural contacts. Such items came to Rus' with their owners, such as pilgrims, merchants, visiting priests, etc. Some of bone objects also could be products of itinerant craftsmen.

13 THE „HACKSILVER HOARDS“ IN THE CARPATHIAN BASIN OF THE 10TH-11TH CENTURIES

Langó, Péter (Institute of Archaeology HUN-REN Research Centre for the Humanities; Institute of Archaeological Sciences Pázmány Péter Catholic University, Faculty of Humanities and Social Sciences) - neválovits, Anna (Institute of Archaeological Sciences, Pázmány Péter Catholic University, Faculty of Humanities and Social Sciences)

The hacksilver (broken silver) treasure hoards are an important archaeological group of finds from the 10th to 13th centuries in Northern, Central, and Eastern Europe. These hoards are named after the notable feature of containing pieces of broken and unused precious metal items buried together with complete ones in the ground. In many cases, contemporary Muslim and Western as well as Eastern European coins, various wire jewellery, and fragments of costume fittings made of precious metals are found together in these hoards. In our presentation, we aim to present the current state of research on hoards in the Carpathian Basin. Currently, six important hoards from the 10th–13th centuries are known in the Carpathian Basin. These are the dirham hoard from Maramureş County, as well as the treasures from Zseny, Nagyarsány, "Királyföld" (Rom. "Pământul Crăiesc"), Darufalva (Aust. Draßburg), and Richárdpuszta. The finds are not only and exclusively silver objects or fragments as the gold hoard from Zseny clearly demonstrates. The presentation wants to bring to the horizon of research again the assemblage unearthed in the 19th century – the hoard of Darufalva/Draßburg, and to highlight what types of connections the 11th century Carpathian Basin had with the regions mentioned. This hoard reveals that they are related to the Rus in Kiev, the finds in modern-day Poland, and comparable artifacts found in the Scandinavian region. We would want to discuss our most recent research on the similarities and wider web of relationships surrounding the Darufalva hoard in our talk.

14 FIGHTERS OR MERCHANTS? CZERMNO/ CHERVEN' ON THE POLISH-RUS' MEDIEVAL BORDER AND OBJECTS RELATED TO COMMERCE

Florkiewicz, Iwona (University of Rzeszów, Institute of Archaeology)

The archaeological complex in Czeremo identifiable with the early medieval stronghold of Cherven' lies in eastern Poland in the middle reaches of the Bug River. The first written reference to this fortified town dates to the armed struggle between Poland and Rus' of the late 10th - early 11th-centuries; the last record in Rus' chronicles appears under the year 6797 (1289). The hillfort site in Czeremo (c. 190 x 120 m) is the focus of the settlement complex (total area, 150 hectares). Archaeological materials excavated on the hillfort date to the 10th-11th century reflect a cultural situation that was still in a state of flux. However, in the 12th-13th centuries Cherven' was definitely a Rus' city. This is confirmed by written records and the rich assemblage of archaeological objects excavated at Czeremo, some of which display Cyrillic inscriptions.

The results of the excavations (2010-2011 and later seasons) demonstrated the huge research potential of Czeremo and other sites in the Cherven' Towns region. In our presentation we report on an impressive assemblage of finds related to commercial activity, as small lead seals 'type Drohiczyn', fragments of weighing scales, weights and currency bars (grivna).

The presence in the assemblage from Czeremo of numerous devotional objects and magnificent personal ornaments identify the stronghold at Czeremo as a “gateway city” located on the border between two cultural zones, one that connected rather than separated their inhabitants.

15 STICK-SHAPED INGOTS OF THE OLD RUS’: STAGES OF CHANGE

Komar, Oleksii (Institute of Archaeology NASU)

Silver stick-shaped ingots have long been considered one of the main means of payment in Old Rus’ from the 11th till 14th centuries. However, there are very few such finds in the treasures of the time of the Mongol conquest of Rus’ 1237-1240 AD where hexagonal ingots of the “Kyiv type” completely dominate. The length of stick-shaped ingots in this group is always more than 16 cm. An XRF elemental analysis of the metal’s composition shows the similarity of their silver to ingots of the Kyiv type and stick-shaped ingots of the Lithuanian type. The latest of the treasures of this group is a hoard of ingots from Chersonesos, hidden during the events of 1278.

The second group of hoards consists of ingots 14-16 cm long with a higher silver content (98-99 %). The ligature of these ingots does not contain bismuth, which is typical for dirkham and Old Rus’ silver of the 10th-12th centuries. The metal’s composition revealed the Central European origin of the raw silver (except for Czech deposits). This change is most likely related to Novgorod’s treaty with Gothland and German cities in 1270.

Short curved ingots of the “Novgorod type” (length 12-14 cm) are characterized by two-stage casting and often lower silver content in one of the layers. The predominance of lead over copper in the ligature indicates a change in production technology and in silver sources. The deterioration in ingots quality occurred in sync with the decline in silver content of the European coins in the mid-14th century.

Our observations confirm N. Bauer’s opinion about the chronological significance of the length of Old Rus’ian ingots, but they also support the opinion of researchers who distinguish “long” stick-shaped ingots as a separate type. The change of the two types occurred no earlier than the 1340s.

16 PALEOPATHOLOGY OF CONTACT ZONES: MASS GRAVE ON BEREZAN ISLAND

Kozak, Alexandra (Institute of Archaeology, National Academy of Science of Ukraine, Kyiv)

Contact zones in medieval Eastern Europe are studied using archaeological and genetic methods. The morphological and pathological features of the human skeletons may indicate different types of cross-cultural or cross-population contacts.

Located in the Black Sea at the mouths of the Dnipro and Bug rivers, on the route from the Varangians to the Greeks, Berezan island was likely a site of cultural contacts during the Middle Ages. The island has yielded a wealth of archaeological finds, including foundries, Byzantine and Rus’ artifacts dating back to the early 2nd millennium AD, and burials from the same period.

In 2016 a shallow pit with the remains of 45 individuals dating back to the 11th-13th centuries was discovered on the island. Most of the individuals were young males and adolescents over the age of 12. There were ten children aged from three months to 12 years and three females.

The features of the bones and healed injuries suggest that the male individuals were physically active, possibly as warriors.

Perimortem injuries were found on the skulls and postcranial skeletons of 8 -14 of the 45 individuals. The partially healed injuries on the bones suggest that some of the males survived the battle for a few weeks before their deaths. Traces of a periosteal reaction on the limbs, scapulae, and pelvis could indicate pre-mortem torture. The frequency of inflammatory processes’ exacerbations in children and adolescence indicates a sharp decline in living conditions in the weeks preceding death.

The deceased may have been island residents or arrived here on ships sailing along the Dnipro River. The circumstances of their death can be inferred from the two arrowheads found in the grave and probably from the burial features.

1138 THE ANTI-HABI TOOLKIT: 2ND WORKSHOP ON SOLUTIONS AND MEASURES FOR PREVENTING AND ADDRESSING HARASSMENT, ASSAULT, BULLYING AND INTIMIDATION IN ARCHAEOLOGY

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Coltofean-Arizancu, Laura (EAA Education, Training and Professional Development Advisory Committee; EAA Appeal and Anti-Harassment Committee; Archaeology and Gender in Europe (AGE) Community of the EAA) - Gaydarska, Bisserka (Archaeology and Gender in Europe (AGE) Community of the EAA) - Hawkins, Kayt (Institute of Archaeology, University College London) - Hlad, Marta (Vrije Universiteit Brussel)

Session format: EAA Education, Training and Professional Development Advisory Committee

This interactive and collaborative workshop is part of a series of training events through which the European Association of Archaeologists (EAA) aims to provide a safe space for everyone attending its Annual Meetings. It follows up on to the first workshop organized with this scope at the 29th EAA Annual Meeting in Belfast, in 2023. It aims to equip participants with information and practical tools to identify, prevent and address situations of harassment, assault, bullying and intimidation (HABI) in their personal and professional life.

WORKSHOP STRUCTURE

PART 1

- A presentation on the current state of HABI in European archaeology based on the latest research.
- A training by the Active Bystander Training Company (United Kingdom) offering strategies for intervention in hostile situations (e.g. bullying, microaggression, discrimination).
- A training in which participants will learn to practice skills to safely use in HABI contexts both as targets and witnesses.

PART 2

- A presentation on the occurrence of HABI in Italian archaeology by the National Association of Archaeologists in Italy.
- A presentation of the educational package developed by the Swedish Ministry of Education for raising awareness about and preventing HABI by Petra Aldén Rudd, the initiator of the #metoo movement in Swedish archaeology.

PART 3

- A discussion in which participants can ask questions about HABI and share their feedback on the training.

The workshop is organized with the support of the EAA’s Education, Training, and Professional Development Advisory Committee, its Appeal and Anti-Harassment Committee and its Archaeology and Gender in Europe Community, in collaboration with the British Archaeological Job Resource’s RESPECT Campaign and Paye ta Truelle.

We understand individuals, particularly those who have experienced HABI, may wish to step out of the workshop at any point for a short period and a safe space will be made available.

1139 THEM AND US: INTERDISCIPLINARY APPROACHES TO IDENTITY, COMMUNITY, AND 'OTHERNESS' IN THE MEDIEVAL WORLD

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Diana, Annamaria (Independent researcher/Terra Ultra Silvam Archaeology) - Marcu Istrate, Daniela (Institutul de Arheologie ‘V. Parvan’, Bucharest) - Toso, Alice (Bonn Center for ArchaeoSciences (BoCAS), Institut für Archäologie und Kulturanthropologie, Rheinische Friedrich-Wilhelms-Universität)

Session format: Regular session

What is ‘identity’ and what gives an individual the sense of belonging to one human group or another? Is the perception of one’s identity a subjective or an objective matter, and what makes a group of people a ‘minority’? These questions, foundational to the study and understanding of human societies, often recur in archaeological debates but are also somewhat avoided by researchers because of their potentially controversial socio-political and cultural implications.

During the Middle Ages dramatic cultural, religious, political, genetic, and linguistic exchanges among populations across the globe led to the formation of collective identities, in concurrence with the retention, or persecution, of minorities. Such complex, multi-scalar biocultural processes, sometimes reflected, but, more often, not immediately apparent in the archaeological context, are the focus of this interdisciplinary session. We welcome case studies exploring the fascinating phenomenon of identity formation in the medieval period as the result of both conflicting and balancing forces. Advances in archaeological sciences and biomolecular technologies have undoubtedly facilitated the

identification of trends and patterns of cultural and biological diversity. However, today more than ever, cross- and inter-disciplinary cooperation, communication, and the contextual analysis of archaeological and biomolecular data are paramount to successful results.

We seek to bring together scholars, researchers, and professionals who have identified trends and new perspectives in the study of the medieval world through both traditional and ground-breaking approaches to the observation, recording, analysis, and interpretation of the archaeological context. The session will accept contributions investigating the following (but not limited to):

- Multi- and cross- disciplinary approaches to the study of biocultural diversity.
- The coexistence and co-dependency of socio-cultural groups as the result of non-linear power dynamics.
- Processes of identity formation and tools for the detection of pluralities.

ABSTRACTS

1 IDENTITY FROM FUNERARY SITES BETWEEN THE CARPATHIANS AND THE DANUBE IN THE MIDDLE AGES

Magureanu, Andrei (Institute of Archaeology "Vasile Parvan")

The Middle Ages are a very popularised and well-known historical period. The reconstruction of biocultural human identities and their formation in the region embedded between the Carpathian Mountains and the Danube River during this crucial historical period is, however, still at its dawn.

Archaeological academic discourse was based until recently on 1) cultural-historical-based analysis, 2) typo-chronological markers, and 3) on proving the validity/legitimacy of historical sources with archaeological discoveries. Preventive archaeology, however, has allowed researchers to change this picture by bringing to light significant amounts of new evidence with the discovery of important cemeteries, churches, and other funerary sites. Nevertheless, the recovery, analysis, and interpretation of large interdisciplinary datasets from those archaeological sites exceed the frame of a traditional scholarship and require the use of novel methods and techniques. In recent years, for example, anthropological research has increasingly resorted to the use of isotopic analysis, looking for, among others, dietary and migration patterns along with more 'traditional' demographic information.

With this paper, we intend to corroborate known archaeological evidence with data from other disciplines to try to reconstruct different identities between the 14th and the 18th century in the Lower Danube region.

2 BIOCULTURAL ANALYSIS OF THREE MEDIEVAL TRANSYLVANIA BURIALS ASSOCIATED WITH A MILLSTONE

Reinman, Lauren (Western Carolina University) - Zejdlik, Katie (Western Carolina University) - Nyárádi, Zsolt (Haáz Rezső Múzeum)

During the excavation of the Papdomb archaeological site located in Văleni, Romania (Patakfalva), three simultaneously buried individuals were uncovered from beneath a broken millstone within the walls of the church. Multi-person burials are not unusual at the site, however, the association of three adult burials underneath a broken millstone requires additional investigation. The site encompasses the remains of a medieval church and its associated cemetery (11th-18th century). Some 930 burials were recovered from the site. The literature regarding the use of millstones in the burial context is limited and only offers broad generalizations. Here, in contrast, we explore a range of specific possible interpretations, ranging from simple post-depositional movement of the millstone to considerations of the practical and religious importance of millstones through different cultures and time periods. By exploring the multiple meanings, symbolisms, and folklore associated with millstones, this work contributes to the reconstruction of mortuary symbolism from the Papdomb site and approaches to interpreting atypical or unique burial contexts in general.

3 THE ROLE OF THE GRAVE DIGGER: EVIDENCE OF VARIOUS BURIAL PRACTICES IN TRANSYLVANIAN, HUNGARIAN-SZEKLER COMMUNITIES (AD 1050-1800)

Privette, Cameron (Western Carolina University) - Carvalho, Carlos (University of Bradford) - Reinman, Lauren (Western Carolina University) - Zejdlik, Katie (Western Carolina University) - Nyárádi, Zsolt (Haáz Rezső Múzeum)

Parker-Pearson's (1999) oft cited phrase, "the dead do not bury themselves" has led to decades of broad investigation surrounding the created social perception of an individual in different contexts and at different scales (family, military, celebrity). However, little research exists on the last individual to physically place the dead. Gravediggers have an extended relationship with the deceased and the mortuary landscape through initial placement as well as secondary placement

when the initial grave is disturbed, as was common in medieval European cemeteries. This paper discusses the lived experience of gravediggers in medieval Europe through investigation of social expectations, folk accounts of the gravedigger experience, and bioarchaeological evidence of gravedigger actions. The Papdomb archaeological site in Transylvania, Romania (AD 1050-1800) acts as the archaeological case study and includes broad burial types (semi-disturbed graves, ossuary, grave shaft modifications) indicative of gravedigger choice and action. Correspondence analysis was run to compare burial type with age, sex, and location of each individual. The paper explores several possible interpretations ranging from the individual gravedigger's experience to community expectations in an attempt to highlight an important but overlooked step in medieval mortuary practices.

4 BUILDING GRAVES IN A PARTICULAR WAY: THE ANTHROPOMORPHIC CHOICE

Marcu Istrate, Daniela Veronica (Romanian Academy, "Vasile Pârvan" Institute of Archaeology, Bucharest)

This paper will explore a peculiar burial custom practiced by medieval communities of the eastern Carpathian Basin: the use of anthropomorphic graves.

Christian cemeteries, characterized by the uniformity of the ritual and the lack of inventory, rarely open opportunities to socio-culturally differentiate individuals. However, research on the early medieval cemeteries in the eastern Carpathian Basin offers a rare exception to this rule.

In Central-Eastern Europe, the formation of the Christian society was a process completed by 1200, largely with the help of important groups of settlers brought to this region from Western Europe, mainly from the Germanic territories. Starting around the year 1100, these people established settlements in Transylvania, and in the earliest layers of their cemeteries both simple graves with rectangular pits and anthropomorphic graves, dug or built according to the human body shape, have been recorded. The deceased were in most cases placed in the ground, but sometimes in a wooden, brick or stone coffin. Such cases have been recorded only in limited areas of the cemeteries, and completely disappeared around the year 1300. Anthropomorphic graves therefore represent a unique feature, marking a difference in the Christian funerary ritual. It is therefore important to ask, why did some members of the same community choose an anthropomorphic pit instead of a regular one? Was this a sign of a particular status, belief, personal taste, or, on the contrary, an arbitrary choice? There is no answer so far.

The present paper investigates this burial habit observing yet another pattern on several anthropomorphic graves uncovered in the episcopal cemetery from Alba Iulia. Archaeologically and historically interpreted as a multiethnic burial ground, this cemetery is exceptionally rich in inventory, thus providing new clues for the analysis of the identity of those who chose those burial receptacles.

5 TEXTILE TOOLS IN EARLY MEDIEVAL SLAVIC CEMETERIES. A WORKING INSTRUMENT, AN IDENTIFIER OF DIFFERENCE, OR A CLASSIFIER OF CULTURAL IDENTITY

Godlewska, Patrycja (Szkoła Doktorska Nauk Humanistycznych Teologicznych i Artystycznych AAH; Nicolaus Copernicus University in Toruń, EuroWeb)

Socio-cultural identification in archeology is possible when analyzing grave equipment or using biological sciences. The difference or uniqueness of the deceased was often evidenced by the abnormal arrangement of the skeleton or the uniqueness of the grave equipment. But what if the burial looks nothing special at first glance? Is archeology able to comment on excluded people and, for example, sexual minorities? Textile tools (spindle spindles, spindles, needles) are a recurring element in cemeteries around the world and various chronological periods. Culturally, they belong to women, but their presence is also recorded in male burials. Often as the only piece of equipment. Spinning and weaving in Slavic cultural circles had strong symbolic connotations of a midwife, doctor, or queer person who held a special place in society. Spinning and weaving have strong symbolic connotations with the midwife, doctor, or changeling, who held a special place in the community. A man who engaged in this or was forced to do so was perceived as unmanly, effeminate, or homosexual. Evidence can be seen, for example, in the Scandinavian sagas. In neighboring Slavic countries, spinning was seen as an undignified activity and reserved for economically dependent people or slaves. This is especially visible in barbaric law, including: at the Lombards. In this presentation, I will present research results from several selected cemeteries in Poland, from the early Middle Ages, relating them to the European context. Using the knowledge of archaeobotany and mnemonics, I try to explore the possibilities of using archeology in the study of people excluded and marginalized in society. In this case, an element that may indicate differences is the presence of a textile tool in the grave. Its relationship in the funeral space with other elements.

6 HEADS UP FOR IDENTITY: INTEGRATING ANTHROPOLOGICAL AND FORENSIC METHODS FOR THE ANALYSIS OF ISOLATED SKULL REMAINS FROM MEDIEVAL ROMANIAN CEMETERIES

Diana, Annamaria (Independent researcher/Terra Ultra Silvam Archaeology) - Garcia-Donas, Julieta (Centre for Anatomy and Human Identification, School of Science and Engineering, University of Dundee, UK)

Medieval burial grounds and parish cemeteries have provided researchers with the largest skeletal assemblages from any period of human history and are, therefore, a precious tool for wide-scale populations studies. Christian burial grounds generally present similar, predictable patterns, from grave orientation to standardised positioning of the body and ritual placement of personal items with the deceased. Quite often, however, excavators come across isolated (articulated or not) groups of bones, individual bones, or large groups of commingled skeletal remains. Although somewhat overlooked because they offer less demographic information than a complete, articulated burial, isolated and commingled bones are nevertheless evidence of differential burial practices and of the impact of human activities and taphonomic/post depositional events on the preservation of the archaeological context.

Among the anatomical elements of the skeleton, the skull is a key element to gather demographic information, with the facial portion offering insights on the living individual's facial features, proportions, and morphology. Moreover, the cranium is genetically and environmentally affected providing key information about biogeographical origin and sexual dimorphism. This paper presents the results of the anthropological assessment carried out by means of integrated osteological and forensic methods on a selection of crania and skulls from Romanian medieval cemeteries. The materials were singled out and chosen based on condition, morphological and paleopathological observations, and their recovery from unusual or decontextualised locations. The results obtained from this study have shown how the use of multidisciplinary techniques maximises the information obtained from skeletal remains poorly documented archaeologically and helps reconstructing the identity of otherwise 'forgotten' individuals, commonly lost in the piles of commingled remains in archaeological skeletal collections.

7 REGIONALISM, RURALITY, DYNAMICS AND FOODWAYS: EXPLORING TRANSITION AND IDENTITY THROUGH AN INTERDISCIPLINARY STUDY OF 3RD-8TH CENTURY NORTHAMPTONSHIRE

Ortega González, Alvaro Felipe (University of Leicester)

To understand the period of transition between Late Antiquity and the Early Middle Ages in Britain, scholars have proposed various models that attempt to explain the processes that gave rise to later medieval institutions and ultimately the multicultural origins of the English people. The academic debate that surrounds this contentious period has mostly formed its core either on the concept of ethnicity or emphasizing the economic collapse of the Western Roman Empire with singular models of causation proposed. Moreover, a metanarrative underlies the debate, which has been formed by ideas and perspectives that are based on sources that were written later than the period discussed. This has led many researchers to reproduce gaps of interpretation, and no matter how much information is involved, the source of the problem comes from its philosophical foundation.

In this paper I suggest looking for alternative explanations that go away from singular causation models that (usually) base their arguments in binary concepts of population dynamics. For this, I propose an approach that explores identity not only by using as a premise 'migration' but also the concepts of 'rurality', 'regionalization', and 'diet'. Moreover, I would like to stress the role of interdisciplinarity, philosophy and bioarchaeological perspectives to obtain a clearer image of the role of this transition.

A detailed bioarchaeological analysis of closely related rural settlements promises to provide information on an overlooked part of society, yet one potentially far more indicative of how this transformative period was experienced on the ground. For this presentation I will do an introduction to my PhD case study: the population of the middle Nene Valley, Northamptonshire, between the 3rd and the 7th centuries AD through an interdisciplinary perspective that joins stable isotope analyses for migration ($\delta^{18}O$, $87Sr/86Sr$, $\delta^{34}S$) and diet ($\delta^{13}C$, $\delta^{15}N$, $\delta^{34}S$) with osteoarchaeology and history.

8 BREASTFEEDING AND WEANING PRACTICES IN THE CARPATHIAN BASIN: A CASE STUDY FROM MEDIEVAL BRAȘOV

Toso, Alice (Bonn Center for ArchaeoScience (BoCAS), University of Bonn) - Diana, Annamaria (Independent researcher) - Marcu Istrate, Daniela (Romanian Academy, "Vasile Pârvan" Institute of Archaeology, Bucharest)

In recent decades, there has been a growing emphasis on the study of the archaeology and anthropology of childhood. Data on medieval populations from the Carpathian basin is, however, still scarce and understanding the dietary practices and nutritional status of non-adult individuals in Transylvania is essential for gaining insights into historical socio-cultural practices in this region. Specifically, the analysis of infant diets aids in reconstructing aspects of daily life among archaeological populations, offering insight into local dietary traditions from a socio-cultural perspective

and variations in childcare across socio-economic contexts. Medical texts detailed best practices for breastfeeding and introducing solid foods, often promoting nursing until the child is two years old.

In order to explore non-adult diets and wellbeing in this area, 20 permanent teeth have been sampled from the Brașov medieval assemblage recovered at St. Mary's church and the isotopic ratios of $\delta^{13}C$ and $\delta^{15}N$ have been measured in serial sections of dentine. Statistical modelling was then applied to calculate the most likely timing and duration of breastfeeding and weaning. Focusing on the following research inquiries, the aim of this paper is therefore twofold: reconstructing the primary diet for non-adults in Brașov, Romania, throughout different time periods; and to identify distinct weaning diet between sexes.

By integrating osteoarchaeological information from each skeleton with isotopic values from their teeth, we have been able to identify and better understand developmental patterns related to biological sex and different time periods, offering the first insight into medieval childrearing practices in Brașov.

9 MARGINALISED COMMUNITIES IN LATE MEDIEVAL LISBON: A MULTI-ISOTOPIC DIET AND MOBILITY STUDY OF THE RUA DAS LAGARES 74 NECROPOLISES

MacRoberts, Rebecca (Hercules Laboratory and IN2PAST, Universidade de Évora, Évora, Portugal) - Evangelista, Lucy (Era Arqueologia, S. A., Lisbon, Portugal; Interdisciplinary Center for Archaeology and Evolution of Human Behaviour (ICArEHB), University of Algarve, Faro, Portugal; Research Centre for Anthropology and Health, Department of Life Sciences, University of Coimbra, Coimbra, Portugal) - Lourenço, Marina (Centre for Functional Ecology, Laboratory of Forensic Anthropology, Department of Life Sciences, University of Coimbra, Coimbra, Portugal; Research Centre for Anthropology and Health, Department of Life Sciences, University of Coimbra, Coimbra, Portugal; Era Arqueologia, S. A., Lisbon, Portugal) - Barrocas Dias, Cristina (School of Technology Sciences, Department of Chemistry and Biochemistry, University of Évora, Évora, Portugal) - Vasconcelos Vilar, Herminia (Escola de Ciências Sociais - CIDEHUS, University of Évora, Évora, Portugal) - Schöne, Bernd (Institute of Geosciences, University of Mainz, Mainz, Germany) - Maurer, Anne-France (Hercules Laboratory and IN2PAST, Universidade de Évora, Évora, Portugal)

The site of Rua das Lagares 74 in Lisbon, Portugal, contained evidence of the non-continuous use of the space for the burial of at least two different Late Medieval communities/religious groups, likely to have been cultural and/or ethnic minorities. The earlier necropolis (I), which consisted of burials belonging to an apparent Jewish/Christian/'New' Christian cult, was abandoned and vandalised before the end of the 15th century, coinciding with the expulsion of Jewish communities from Portugal in 1497. Following a period of dereliction, the cemetery was again used for burials adhering to Islamic traditions (necropolis II) in the end of the 15th/early 16th century. Anthropological assessments of the skeletons have suggested that many individuals buried in necropolis II were exceptionally tall and had some osteological features consistent with African origins, generating the hypothesis that some of these individuals may have belonged to a Wolof community – a Senegambian ethnic group that arrived in Portugal during 16th century colonial expansion. In this study, multi-isotope analysis has been applied to skeletal material from necropolis I (30 individuals) and necropolis II (23 individuals) in order to elucidate dietary and mobility patterns between and within these communities. Our key considerations include: "What can dietary patterns, revealed through stable isotope analysis (C, N, S), infer about cultural/communal food choices as well as access to nutritional resources for minority groups in 15th/16th century Lisbon? and "What can mobility indicators (S, O, Sr) tell us about the locality/non-locality of the individuals, buried in necropolis I and necropolis II, who may have existed on the fringes of Christian society in Late Medieval/Early Modern Lisbon?"

10 FOOD AND GRAVE GOODS: EXPLORING COMMUNITY AND OTHERNESS IN EARLY MEDIEVAL IBERIA

García-Collado, Maite (University of the Basque Country (UPV/EHU))

Grave goods in Medieval cemeteries have often been used as an element of identity construction and, thus, material evidence of belonging to a certain community. But in Early Medieval Iberia (5th-10th c. CE) their distribution is very strongly determined by regional differences, being absent from large areas where community identities must have been expressed in alternative ways. This presentation will explore the potential and limitations of diet as inferred by carbon and nitrogen stable isotope ratios to infer collective identities, with an emphasis on the meaning of homogeneity and diversity of dietary patterns. We will reflect on the relationship between food and grave goods and the complementary role of these two proxies in the performance of social status and exclusion through examples from the Basque Country and central Iberia, where the relatively high frequency of grave goods constitutes a good laboratory to test these hypotheses. Later we will extrapolate the conclusions to other geographic contexts where grave goods and other material indicators of collective identities are less common in order to test if diet can be an effective proxy in the definition of past community membership.

1140 HEALTH AND DISEASE IN MEDIEVAL ISLAMIC POPULATIONS IN EUROPE

Session theme: 6. The Mediterranean from Within

Session organisers: Gijón, Ramón (Universidad de Granada) - Sarr-Marroco, Bilal (Universidad de Granada) - Gómez-Martínez, Susana (Universidade de Évora) - Jiménez-Brobeil, Sylvia (Universidad de Granada)

Session format: Regular session

The European Mediterranean coast was an area of Islamic expansion in the Middle Ages, which generated population mobility, socio-economic changes and the introduction of novel crops, establishing new contacts between East and West.

This rapid process of conflict, resilience and adaptation brought about changes in lifestyle, health and disease linked to the population influx and the impact of the new religion in transforming individual and social customs and behaviour.

The study of medieval European Islamic societies has been enriched by the adoption of bioarchaeological approaches, including molecular biology, palaeopathology, stable isotope study, paleoparasitology, carpology, archaeozoology, and climatology, among others. These complement traditional studies based on written sources and the material culture of the period.

The purpose of this session is to bring together different researchers for an update on their latest findings from a multidisciplinary and international perspective. Discussion will focus on Islamic populations in medieval Europe, based on general studies, case studies and methodological research in diverse geographical locations.

ABSTRACTS

1 ISLAMIZATION AND CHANGING HYGIENIC CONDITIONS IN THE WESTERN MEDITERRANEAN (7TH-15TH CENTURIES): THEORY, PRAXIS AND EVIDENCE IN THE ARCHAEOLOGICAL RECORD

Sarr-Marroco, Bilal (University of Granada) - Piñero Palacios, Juan Manuel (University of Granada)

"Al-naẓāfa min al-īmām", cleanliness is proper to faith. With these words (hadith ḍaʿīf attributed to the prophet Muhammad) summarizes the spirit that imbues Islam since its advent. Water, rituals, hygiene are part of the Islamic regulations, of the civic and rural norms, but also of the religious dogma. The Muslim man and woman must imperatively go to prayer in a state of purity, ritual and hygienic purity that can only be achieved with a washing that can be minor (al-wuḍūʿ) or minor (al-gusūl) depending on the degree of impurity.

In this paper, we intend to analyze those elements of Islamic regulation (law, norms and archaeological evidence) that affect both the individual and the collective and that impose changes in behavior with respect to hygiene treatment, consumption, time management, etc. The expulsion of polluting activities, the obligation to maintain minimum hygiene measures, to take care of one's appearance. In theory, all this has a theoretical impact on a lower incidence of the spread of contagious diseases, presence of bacteria and parasites that pass into the intestines of individuals and that biomedicine has been studying. The Islamization entails the respect of these norms, the influence of the Islamic communities on the other dominated ones as well as the appearance or multiplication of constructions (ḥammām) or of new objects for the care and the personal hygiene.

2 MÁGREG AL-AQṢÀ AND AL-ÁNDALUS: A SHARED HISTORY OF CLIMATE, FAMINE AND EPIDEMICS

Patarnello, Claudia (Instituto de Estudios Medievales y Renacentistas, y Humanidades Digitales (IEMYRhd); Universidad de Salamanca)

The links between the Maghreb al-Aqṣà and al-Andalus have been a constant throughout the centuries. And if they are approached from the perspective of palaeoclimatology, there is no exception. In this communication, the main objective will be to reconstruct those climatic anomalies, mainly droughts and storms, which have been detected in the texts of the chroniclers Ibn Abī Zarʿ and Ibn ʿIdārī during the time span defined as the "Medieval Warm Period", or rather "Medieval climatic anomaly", which dates from around the 10th-14th centuries. The direct consequences of a year of bad harvests or storms that destroy crop fields due to climatic fluctuations are basically twofold: periods of famine, and an increase in the price of grain, considered the main food of sustenance throughout the Islamic West. Thus, these consequences are also evident in the Arabic texts that provide data for both al-Andalus and the Maghreb al-Aqṣà. In this way, the relevance of climate in the historical-geographical analysis of a territory becomes visible. In addition to other factors usually considered relevant (political, religious, etc.), climatology had a very direct influence on the daily life of the population, and even on the political decisions of the rulers or dynasties, all of whom were subject to natural conditions and a physical environment beyond their control.

3 MALARIA IN AL-ANDALUS: FROM WRITTEN MEDICAL SOURCES TO A PROPOSAL FOR A PALAEOPARASITOLOGICAL STUDY

Duras, Salvatore (Università degli studi di Sassari) - López-Gijón, Ramón (Universidad de Granada)

Malaria is a parasitic disease caused by protozoa of the genus Plasmodium that is transmitted by the bite of the female mosquito Anopheles sp. It is notable for its high morbidity and mortality and its importance throughout human history.

References to this parasitosis can be traced back to ancient sources, especially in medical writings of different cultures. In the case of al-Andalus, thanks to the development of medicine, influenced by Greco-Latin and Oriental written sources, the presence of malaria can be inferred from the symptomatology in populations of the Iberian Peninsula.

This contribution proposes a journey through the possible attributions of malaria in medical texts from al-Andalus, as well as an innovative proposal for a palaeoparasitological study in areas prone to the discovery of this parasite in this cultural horizon, using the latest advances made in science to identify the presence of malaria from the skeletal remains of past populations.

4 HEALTH AND HYGIENE IN AL-ANDALUS. CONSIDERATIONS ON A PRIVATE BATH IN MÉRTOLA (PORTUGAL)

Palma, Maria de (Campo Arqueológico de Mértola; CEAACP/Centro de Estudos em Arqueologia, Artes e Ciências do património) - Martínez, Susana (Universidade de Évora; Campo Arqueológico de Mértola) - Fernandes, Marco (Campo Arqueológico de Mértola) - Rodrigues, Clara (Campo Arqueológico de Mértola) - Lopes, Virgílio (Campo Arqueológico de Mértola) - Rafael, Lígia (Câmara Municipal de Mértola)

In the Islamic world, bathing is a part of the rituals in the Koranic principles for purifying the body and spirit. Certain acts are considered impure and require ablutions. These are particularly needed before prayer in the mosque. Nevertheless, personal hygiene is also connected with its therapeutic virtues, following the greco-roman traditions, with Hippocrates as the most notorious exponent. Ever since Late Antiquity, people knew that some waters had particular healing powers. There were known and explored thermal springs, which, in some cases, led to the coining of the names of places such as Alhama in Spain and Alfama in Portugal.

Throughout Late Antiquity in the Iberian Peninsula, the collective bathing infrastructures (thermae) were abandoned, and it is impossible to determine if bathing was maintained as a private habit.

The discovery of baths (ḥammāmāt) from the twelfth century onwards in al-Andalus can be considered evidence of the recuperation of these hygienic practices. The discovery of a small private bath in a reasonably humble home on the slope of the Castle of Mértola is a study case for the personal hygiene habits in the small cities of Garb al-Andalus.

5 DIGGING IN THE PAST OF MEDIEVAL ISLAMIC POPULATION IN AL-ÁNDALUS. THE NECROPOLIS OF SAHL BEN MALIK (GRANADA, SPAIN)

Fernández Romero, Pablo (Universidad de Granada) - Suliman, Amjad (Independent archaeologist) - Ruiz Román, Francisco (Universidad de Granada) - López-Gijón, Ramón (Universidad de Granada)

The necropolis of Sahl ben Malik or of Bab Ilvira, with a chronology that spans from the 11th century to the 15th century AD, it is considered to be the main cemetery in Granada during the Nasrid period.

Given the importance of this necropolis, it is referenced by various authors, both contemporary and later. But, despite have been an object of study since de Early Modern period, it's because of the legal regulations developed during the last quarter of the XX century and thanks to the development of the Archaeology, that a great number of archaeological interventions have been carried out, providing us with a huge amount of new data, essential to take an approach to the ways of living and death in the muslim population of medieval Granada.

However, and in spite of several attempts, until nowadays it hasn't been made a synthesis that groups all these works and allow us a global vision of it. For that reason, it's presented a synthesis with the purpose of comprehend the reality of this period, from a multidisciplinary point of view, with the archaeology, history and geography as central axis, as well as with the geology and physical anthropology, focusing in the main cemetery of the medieval Granada.

6 OSTEOARCHEOLOGICAL STUDY OF A DIMMÍ FUNERAL SPACE IN MADINAT ILBIRA (MEDINA ELVIRA, GRANADA)

Piñero, Juan (University of Granada) - Sarr, Bilal (University of Granada)

The set of data that we present below comes from a space with a funerary nature that was found in 2008 during the course of an archaeological activity at the Medina Elvira site (Granada). The ritual arrangement shown by both the graves and the buried, placed in a supine position, added to the recent radiocarbon analysis of the remains, has allowed us to infer that this cemetery area was in use by an apparently non-Islamized sector of the population. Consequently,

this fact has provided valuable information for current studies that seek to address religious survival and resistance, whether Jewish or Christian, in al-Andalus contexts that have been Islamized since the 8th century. Furthermore, in conjunction with the above, the possibility of studying the bone remains from an anthropological perspective has allowed an approach to the physical characteristics of this dhimmi population that, during at least the 11th century, lived within the urban space of the historic city from Madinat Ilbira.

7 MUSLIM BURIALS IN NIMES : ELEMENTS OF HEALTH IN EARLY MEDIEVAL ISLAMIC POPULATIONS IN GAUL ?

Gleize, Yves (INRAP - National Institute for Preventive Archaeological Research) - Mion, Leia (Cardiff University) - Mendisco, Fanny (CNRS) - Deguilloux, Marie-France (University of Bordeaux) - Blunt, Sierra (IN) - Breuil, Jean-Yves (INRAP - National Institute for Preventive Archaeological Research)

Muslim burials excavated in Nimes (France, 8th c.) are the earliest Muslim graves discovered north of the Pyrenees. The three tombs identified, containing male subjects, are the only evidence to date of the presence of groups with Arab-Berber origin on the northern margins of the Islamic empire. Their study therefore constitutes a unique opportunity to document the biological features of these very specific populations of the early Middle Ages. New analyses (funded by the Fyssen foundation) were therefore conducted to complete our knowledge of the origin, lifestyle and health of these exceptional individuals. Paleogenomic analyses were first completed to identify the geographic origin of the male subjects. Then the combined analyses of classical palaeopathological markers (trauma and oral paleopathology), stable isotopes, microbial DNA from dental calculus and pathogen DNA were conducted to investigate the health and diet of these individuals. The new acquired data will be compared as far as possible with local populations while considering the difficulty of working with small samples. Finally, these results will be discussed in a broader historical approach to clarify whether they can provide data on Islamic populations in this part of Europe during the Early Middle Ages.

8 CRANIAL AND DENTAL NON-METRIC TRAITS FROM NORTH AFRICAN POPULATION IN AL-ANDALUS

Mena-Sánchez, Luis Alberto (University of Granada) - Maroto Benavides, Rosa (University of Granada) - Jiménez Brobeil, Sylvia (University of Granada)

The Islamic expansion in the Middle Ages produced human population mobility to Europe. In this sense, the arrival of new genetic groups from Africa to the Iberian Peninsula produces the implementation of changes in the lifestyle, health, and disease, linked to the new form of life of their cultural groups.

The bioarchaeological approach allows for new tools to enrich our knowledge about the Islamic groups in Al-Andalus, including the analysis of big data with new computer programs.

In this paper, we present a database analysis of Cranial and Dental non-metric traits of 400 Argaric (1900-1600 B.C.) and Medieval (XII-S.XIV c.) skeletal remains from the South of the Iberian Peninsula.

We apply MMD formulas that have allowed us to diverge between variables.

The programming language R and the statistical package AnthroMMD were used for the correct formulation.

These results show that other ethnic groups of the North African population exported cranial and dental non-metric traits to the population in the medieval period of the Kingdom of Granada in the 12th and 15th centuries in Al-Andalus.

9 TRAUMATIC INJURIES IN MEDIEVAL SILVES (SOUTHERN PORTUGAL): A BIOCULTURAL PERSPECTIVE

Gonzalez-Ruiz, Ana (Universidade de Coimbra; Centro de Investigação em Antropologia e Saúde (CIAS)) - Santos, Ana Luisa (Universidade de Coimbra; Centro de Investigação em Antropologia e Saúde (CIAS)) - Gonçalves, Maria José (Museu Municipal de Arqueologia de Silves)

The analysis of frequency and type of trauma in skeletal remains can provide information about interpersonal violence and the risks of daily life faced by the people who occupied different realms of society.

This work aims to explore how the people of medieval Silves experienced their lives by contrasting the evidence of bone trauma and exploring their possible linkage to battles taking place at that time. For this purpose, 51 individuals from an Islamic necropolis (9th-13th century) and 82 individuals buried in a Christian necropolis (13th-onwards) were examined. All the individuals are above 12 years old. The macroscopic and, when necessary, radiological analysis revealed similar frequencies of fractures: 12% (6/51) in Islamic and 18% (15/82) in Christians. However, the distribution of injuries by sex and age differs. In the first group, the fractures were all in adult males while in the Christian ten males and three females (one young and two adults) shown fractures. In addition to these individuals, three unsexed

Islamic adults and two Christians also presented fractures. Multiple fractures (ulna and ribs in one case and ulna and metacarpal in the other) were only found in two Christian individuals.

Individuals from the Islamic necropolis presented all different traumatic lesions varying from a nose fracture, fractures to the ribs, ulna, metacarpals or fibula. Rib fractures were the most common among the Christian sample, followed by ulnar, metacarpal, and humeral fractures. Interpersonal violence could have been the cause of certain fractures, either isolated (like the nasal fracture) or combined (like the ulnar fractures with the metacarpal or rib fractures). Most fractures seemed well-aligned and infection-free, suggesting possible medical treatment.

10 PALEODIET IN THE NASRID KINGDOM OF GRANADA: URBAN VS. RURAL POPULATIONS

Jiménez-Brobeil, Sylvia A. (University of Granada, Spain) - Martín-Alonso, José Francisco (Universidad de Granada) - Maroto Benavides, Rosa María (Universidad de Granada)

The Nasrid Kingdom is framed between the 13th and 15th centuries AD and was the last Muslim territory in the Iberian Peninsula. The aim of this work is to check if there are differences in the diet between urban and rural inhabitants from analysis of stable isotopes in bone collagen. We also want to find out if there are differences by sex that can be deduced distinctions by gender. We have analyzed 50 samples of individuals buried in the cemeteries of the cities of Granada and Baza and about 90 from the rural farms of La Torrecilla and Talará and we have obtained their isotopic values of $\delta^{13}C$ and $\delta^{15}N$. The $\delta^{13}C$ values show differences between cities and countryside with a higher consumption of C4 plants in the rural populations. The $\delta^{15}N$ values, however, are similar, although in the city of Granada they are lower than those found in other urban contexts of al-Andalus. The only differences by sex point to a higher consumption of C4 plants among urban women, which may indicate gender differences in access to certain foods.

11 CONCEALED ROLES. A PALAEOANTHROPOLOGICAL READING ON NOURISHMENT, HEALTH, AND CARE GIVING IN A PEASANT COMMUNITY IN THE SHARQ AL-ANDALUS

Negre, Joan (RomanIslam Center - Universität Hamburg) - García, Marcos (Universidad de Granada) - Sancho, Sheyla (Independent Researcher)

The Andalusi farmstead of Xaresa (Xeresa, Valencia) is one of the most thoroughly excavated rural sites of the period. As part of the urban development of the area, archaeological work has been carried out on a number of plots around the site. This revealed several houses, a small pottery workshop, a water wheel and a maqbara with around 200 inhumations. An initial study of this burial site has recently been undertaken on the basis of a random sample of 35 skeletal remains, which allowed a preliminary paleoanthropological study and several genetic profiles of this community. In addition, samples were taken from all individuals and fauna at this and other nearby sites for comparative carbon and nitrogen stable isotope analysis in bone collagen.

Thanks to these approaches, it is now possible to present a detailed health assessment of this peasant community. The objective is twofold in nature. On the one hand, to analyse various factors relevant to understanding the well-being of these people. These include their demographic profile, their diseases and pathologies, the markers of occupational stress or the quality of their diet, among others. On the other hand, to study the gender dimension and the roles of age in this community with regard to daily activities, which include family and community sustenance and welfare. In this sense, we are interested in the crucial role played by these activities in regulating social life and forging relational bonds in this rural settlement, which remained populated from the second half of the 10th century until the Christian conquest in 1239.

12 ZONOTIC PARASITE INFECTION FROM OSTEOARCHAEOLOGICAL RECORD IN AL-ANDALUS

Gijón, Ramón (Universidad de Granada) - Duras, Salvatore (Universidad de Granada) - Benavides, Rosa (Universidad de Granada) - Mena Sánchez, Luis (Universidad de Granada) - Camarós, Edgard (University of Santiago de Compostela) - Jiménez Brobeil, Sylvia (Universidad de Granada)

Certain parasitosis can be identified from the osteoarchaeological record, such as the case of *Echinococcus granulosus*, a zoonotic parasite that allows us to relate the existing interactions between man and canids, as a result of the reproductive cycle of the parasite (from canids to herbivores/man as an intermediate host), linked to agro-pastoral communities throughout history.

In this paper, we present the finding of two fragmented calcified formations associated with two individuals from medieval Islamic cemeteries in the Kingdom of Granada in al-Andalus, dated between the 12th and 15th centuries A.D. For their correct attribution, macroscopy, scanning electron microscopy and energy dispersive X-ray spectroscopy studies were carried out. These results were used in the subsequent differential diagnosis, showing that the calcifications are hydatid cysts caused by *E. granulosus*. This finding allows us a bioarchaeological approach to these populations, evidencing human-animal interactions and agropastoral practices in medieval period of the Kingdom of Granada in al-Andalus.

1144 NEW TRENDS IN MEDIEVAL AND MODERN GLASS: GLASS CENTRES, PRODUCTION AND TRADE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: De Juan, Jorge (Departamento de Prehistoria, Historia Antigua y Arqueología, Universidad Complutense de Madrid, Spain.); UNIARQ – Centre for Archaeology, School of Arts and Humanities, University of Lisbon, Portugal.) - Occari, Veronica (University College London, Institute of Archaeology, United Kingdom.) - Pactat, Inès (Université de Toulouse, Laboratoire TRACES, UMR 5608, France.) - Almenar, Luis (Departamento de Historia de América y Medieval y Ciencias Historiográficas, Universidad Complutense de Madrid, Spain.) - Capellà, Miquel Àngel (Departament de Ciències Històriques i Teoria de les Arts, Universitat de les Illes Balears, Spain.)

Session format: Session with precirculated papers

Over the past two decades, there have been noteworthy breakthroughs in the study of glass materials. These advancements enable recognition of long-distance exchange networks that go beyond the transfer of finished products like beads, vessels, mosaic tesserae, but also encompass raw materials, technological knowledge, shapes and decorations in glass working.

The aim of this session is to provide a forum to explore from a multidisciplinary approach the various aspects of recent medieval and modern glass research, encompassing glass centres, production, raw materials, trade routes, emerging applications, technological advancements, and evolving aesthetic preferences. The session will include pre-circulated papers that facilitate attendees to thoroughly engage with each presentation, fostering in-depth discussions during the EAA meeting. The discussions and findings of this seminar aim to make a significant contribution to the field, fostering collaborative synergies among researchers from diverse countries.

When investigating glass, it is crucial to acknowledge its widespread distribution over extended geographical areas and periods of time. Here, we will welcome submissions exploring this topic, regardless of geographical boundaries (Europe, Africa, Asia, América, Oceania), and covering a broad chronological spectrum that spans both the Middle Ages and the Modern era. After the congress, and a review process, the accepted papers will be published in both physical and digital formats (open access).

ABSTRACTS

1 TRACES OF ROMAN GLASS IN EARLY ISLAMIC PRODUCTION IN NORTH AFRICA

Kaviani, Kelsi (University College London, Institute of Archaeology, United Kingdom) - Fenwick, Corisande (University College London, Institute of Archaeology, United Kingdom) - Freestone, Ian (University College London, Institute of Archaeology, United Kingdom) - Charlton, Michael (University College London, Institute of Archaeology, United Kingdom) - Höpken, Constanze (Universität zu Köln, Archäologisches Institut, Germany) - Lepri, Barbara (Independent Researcher) - Chaouali, Moheddine (Institut National du Patrimoine, Tunis, Tunisia) - Fentress, Elizabeth (University College London, Institute of Archaeology, United Kingdom) - Limane, Hassan (Institut National des Sciences de l'Archéologie et du Patrimoine (INSAP), Rabat, Morocco) - von Rummel, Philipp (Deutsches Archäologisches Institut, Germany)

Natron glass, manufactured from sand and Egyptian mineral soda, was the dominant glass type produced and used in the 1st millennium CE until the 8th – 9th centuries when natron flux was displaced by plant ash. Recently published data from Spain and Sicily show plant ash glass in sole production by the 10th century. However, early Islamic North African glass technology is not well documented, and the processes around the natron-plant ash transition are unclear. This paper presents laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) data on early medieval glass from the site of Walīla (Roman Volubilis) in northern Morocco and the sites of Chimtou, Bulla Regia, and Sabra al-Mansūriya in northern Tunisia. An abundance of recycled Roman and late antique natron glass was found in the 8th – mid-9th century Walīla assemblage, although the presence of glass of the Bet Eli'ezer type suggests that fresh Levantine natron glass was reaching the site into the 8th century. Lead oxide at 2-12% in virtually all glass recovered from Walīla suggests that attempts were made to extend the available glass reservoir as far as possible. Plant ash compositions dominated the 10th – 11th century Tunisian glass, but antimony above background levels in over two-thirds of the glass highlights the presence of Roman glass and the continuity of recycling practices within North Africa beyond the transition from natron to plant ash glass. These results suggest that while freshly made glass was available in early Islamic North Africa, demand was such that a range of strategies were adopted to extend the available material. This paper concludes by providing a first in-depth look at the technological choices of glass workshops in North Africa and their relationship to the circulation of glass in the early medieval Mediterranean.

2 GLASS MANUFACTURE IN THE CAPITAL OF THE AL-ANDALUS CALIPHATE. NEW ARCHAEOLOGICAL EVIDENCES

Velo-Gala, Almudena (NOVA University of Lisbon) - Vilarigues, Márcia (NOVA University of Lisbon)

In recent years, research carried out by different international teams has demonstrated the importance of glassware consumption for the economic and social development of the Andalus population. Cordoba, capital of the Caliphate of al-Andalus, has been a site of great interest for the study of such productions and craftsmanship, primarily for two reasons: its significance as a centre of power at the time of the greatest splendour of the Islamic occupation of the Iberian Peninsula, and its exceptional archaeological context. Despite this, glass manufacture evidences have been, until now, scarce. However, in the absence of structures identified with glass furnaces, there are other remains that indicate the presence of this type of activity in the places near where they are documented. This is evidenced in this work, which presents the results of the study of a set of glasses related to this craft activity: crucibles, molten glass, manufacturing remains and production failures. All of them were documented during archaeological interventions that have been taking place since the beginning of the 21st century in the western part of the current urban centre, as a consequence of significant urban growth.

These materials indicate the possible existence of a glassmaking centre in the large north western suburb, a space traditionally associated with a population linked to the economic-administrative management of the nearby city of Madinat al-Zahra.

3 THE FLUX AND FLOW OF ISLAMIC GLASS BANGLES: FINDING FROM THE PRODUCTION SITE OF KAWD AM-SAILA IN YEMEN (C.14TH-16TH CENTURY)

Nash-Pye, Charlotte (University of Kent; British Museum) - Meek, Andrew (British Museum) - Schibille, Nadine (CNRS Orleans) - Simpson, St John (British Museum) - Richards, Liam (University College London) - Charlton, Mike (University College London)

Islamic glass bangles of the medieval to Ottoman periods are found in wide distribution across the Islamic world. Yet, when compared with glass vessels or beads, relatively little is known. Nonetheless, their unique chemical compositions may unlock wide distribution patterns, offering insights into trade, cultural transfer and Islamic female identity during these understudied periods. Combining traditional archaeological approaches with modern archaeochemical techniques has revealed new manufacturing techniques, typological styles and unique glass signatures. This has indicated likely origins, trade, trends, and other cultural insights regarding the periods and places of production during the medieval-early modern periods.

This paper presents key compositional results and typological distinctions for glass bangles produced at the known Yemeni workshop of Kawd am-Saila in Aden, currently in the Middle East Department of the British Museum. With the aid of esteemed colleagues world-wide, typological and archaeochemical (SEM-EDX and LA-ICP-MS) analysis was undertaken at the British Museum, CNRS Orleans and UCL Institute of Archaeology, producing exciting results. It discusses the typological and geochemical characteristics of the Yemeni bangles and their identification amongst other glass bangle collections studied. Analysis of the glass bangle collection from Somalia in the Africa, Oceania and the Americas Department at the British Museum reveals an aligning geochemical signature, as the initial typological assessment suggested. Therefore, it is now scientifically verified that such fragments were exported not only to the Persian Gulf but also into the Horn of Africa (HoA).

This research has opened a promising new field of potential research into the trade of Islamic glass bangles from the Middle East into east Africa and more specifically between the Aden region of Yemen and the HoA. Although only in its infancy, it is hoped that the success of this approach will encourage further future cross disciplined research into the dissemination of Islamic glass bangles.

4 LEAD GLASS AT THE TOP OF EUROPEAN CHURCHES IN THE HIGH MIDDLE AGES. ORIGIN AND DISTRIBUTION OF AN UNUSUAL PRODUCTION

Pactat, Inès (Université de Toulouse, Laboratoire TRACES (UMR 5608)) - Gratuze, Bernard (CNRS/IRAMAT (UMR 7065))

During rescue excavations in 2012 on the Place du Château in Strasbourg (France), which is bordered by the cathedral and the Palais Royan, a collection of stained glass windows was discovered in levels dating from the 11th to 19th centuries. Most of them date from different phases of the medieval cathedral's construction. Seven of these flat glasses are dark green, sometimes with grisaille, and are characterised by a wood-ash lead composition (13 to 37% PbO). Isotope analyses showed that the lead ore certainly originated from the Harz massif in Germany. This discovery provided the opportunity to investigate the distribution of these wood-ash lead glasses in Europe between the 11th and 13th centuries, from Iceland to Finland and from France to Austria. Although the glass workshops are not known, these artefacts testify to an original form of production that was limited to the Harz region, where a

number of fire crafts were located during the High Middle Ages. We therefore propose to explore the links between the development of silver metallurgy and glassmaking in order to understand how this unusual glass recipe was used. The elemental and isotopic compositions of this lead glass also allow us to consider its widespread use to decorate the major religious buildings, highlighting a connected medieval society.

5 **MEDIEVAL AND MODERN BLUE NOTES. COBALT BLUE GLASS FROM CENTRAL-WESTERN FRANCE : ARCHAEOLOGICAL AND ARCHAEOMETRIC PERSPECTIVES (13TH-18TH CENTURIES)**

Buisson, Mathilde (Université d'Orléans - IRAMAT (UMR 7065)) - Gratuze, Bernard (IRAMAT (UMR 7065))

"Cobalt oxide imparts to vitreous compositions a beautiful, very intense blue colour, which is very resistant to the most violent fires. It is widely used in glassmaking." This remark by Georges Bontemps (1799-1883) also applies to earlier centuries. Indeed, archaeological data show a concentration of medieval and modern cobalt blue glass among the finds from central-western France. Previous studies have shown that different ores were used to colour blue glass over the long term. In this corpus of consumption sites, we find a wide range of forms in archaeological contexts dating from the 13th to the mid-18th centuries. The colouring agent has been identified in both stained glass and tableware, and in the case of tableware, both in the base glass and in the decoration (enamels, fillets...).

Here we present the results of archaeometric analyses of cobalt blue samples and how they fit into the dynamics of the use of this pigment. As well as studying the raw materials used to make the objects, we will look at the technical aspects of how they were shaped by the glassmaker. Analyses sometimes reveal recycling practices. The archaeological context in which the glass was found will be considered, stimulating reflection on its function, the glassmaker's craft and trade flows in an area that is still little studied in terms of the archaeology and archaeometry of glass.

6 **THE CONTRIBUTION OF EXPERIMENTAL ARCHAEOLOGY AND ARCHAEOMETRY TO THE UNDERSTANDING OF EARLY MEDIEVAL GLASS RECIPES**

Van Ham-Meert, Alicia (CReA-Patrimoine, Université libre de Bruxelles, Avenue F.D. Roosevelt, 50 . CP 133/01, 1050 Bruxelles; 4MAT, Université libre de Bruxelles, Avenue F.D. Roosevelt, 50 . CP 165/63, 1050 Bruxelles) - Kail, Nathan (4MAT, Université libre de Bruxelles, Avenue F.D. Roosevelt, 50 . CP 165/63, 1050 Bruxelles) - Blary, François (CReA-Patrimoine, Université libre de Bruxelles, Avenue F.D. Roosevelt, 50 . CP 133/01, 1050 Bruxelles) - Bussienne, Géraldine (KIK-IRPA, 1 Parc du Cinquantenaire, 1000 Bruxelles) - Delplancke, Marie-Paule (4MAT, Université libre de Bruxelles, Avenue F.D. Roosevelt, 50 . CP 165/63, 1050 Bruxelles) - Lecocq, Isabelle (KIK-IRPA, 1 Parc du Cinquantenaire, 1000 Bruxelles) - Wouters, Helena (KIK-IRPA, 1 Parc du Cinquantenaire, 1000 Bruxelles) - Neuray, Brigitte (SPW, AWaP (Agence Wallone du Patrimoine), Direction opérationnelle Zone Est – Service de l'Archéologie, rue Montagne Sainte-Walburge 2, 4000 Liège, Belgium)

During the excavations of the Stavelot abbey large amounts of glass were recovered from various dates in different contexts. One corpus dating from before 881 is particularly interesting as it contains both natron glass and early wood ash glass. Thus, providing a unique window into the period where both recipes overlapped and wood ash glass recipes were developed and spread. The elemental analysis of the glass revealed a broad range of compositions, not entirely unexpected for a possible "experimental" phase (Van Wersch et al. 2014). Further elemental and isotopic analysis evidenced a higher-than-usual concentration in rare earth elements (Van Ham-Meert et al. 2021). These observations led us to investigate the possibility of local production, using local raw materials. This paper discusses the results of experimental trials of glassmaking using local bracken and wood to produce ash, and using local sand and quartz as silica source. The raw materials and the final glass were characterized in the same way as the original glass. Preliminary results show that the sands from local rivers are inappropriate for glass making due to their high concentration in aluminosilicates. The effect of plant maturity on ash composition was also evidenced, which might, in part, explain the high variability in the medieval glass pieces. Further elemental and isotopic analysis of the synthesized glass will help in further answering the question of provenance.

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Van Wersch, L., Biron, I., Neuray, B., Mathis, F., Chêne, G., Strivay, D., Sapin, C., 2014. Les vitraux alto-médiévaux de Stavelot (Belgique). *ArchéoSciences* 219–234.

7 **THE GLASS CENTRES PROJECT: DISCOVERING THE IBERIAN GLASS TRADE NETWORKS OF THE LATE MEDIEVAL AND EARLY MODERN ERA**

De Juan, Jorge (Universidad Complutense de Madrid; Universidad de Lisboa)

The GLASS CENTRES project, funded by the European H2020 program under the Marie Skłodowska-Curie actions, delves into the exploration of glass production and trade networks in the Iberian Peninsula from the 14th to the 16th century. This study aims to fill a significant gap in our understanding of the Iberian glass industry, which played a crucial role in global-scale trade. Despite its historical and economic significance, the knowledge of late medieval and early modern Iberian glass remains limited, with scant archaeological, typological studies, and chemical analyses conducted.

The project integrates analytical techniques, typological studies, archaeological records, and textual sources to provide a comprehensive understanding of the characteristics of Iberian glass production and its evolution over time. Given the geological diversity of the Iberian Peninsula, a central hypothesis of the project is that the chemical composition of the glass will reflect the variability of the geological substrates of the different glass centres.

To validate this hypothesis, glass samples, along with associated raw materials, have been collected from archaeological sites and workshops from the principal production areas identified in historical texts. These samples have been chemically analysed with Portable X-Ray Fluorescence (p-XRF) and Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) to ascertain their distinct properties and facilitate differentiation among the different productive regions.

Results from the GLASS CENTRES project reveals complex patterns of glass production, trade, and consumption, highlighting transregional connections and the significance of Iberian glass in the context of global trade networks. These findings not only enrich our understanding of European cultural and technological heritage but also lay the groundwork for future research on commercial interconnections between Europe, the Atlantic, and the Americas. Furthermore, the insights gained from this project will facilitate the accurate identification of Iberian-origin materials and collections currently dispersed across museums worldwide.

8 **GLASSMAKING IN THE KINGDOM OF VALENCIA. EMERGENCE, DEVELOPMENT, AND CONSOLIDATION OF A LATE MEDIEVAL CONSUMER INDUSTRY IN EASTERN IBERIA (C.1278-C.1500)**

Almenar Fernández, Luis (Universidad Complutense de Madrid)

This paper assembles recent evidence coming from a variety of monographic analysis undertaken in the last years on the glass industry in the late medieval kingdom of Valencia. A combination of sources (municipal, judicial, notarial, and tax records) is considered alongside recent published material evidence excavated in both rural and urban areas of the realm. This all leads us to pose three chronological phases in the history of the Valencian glass industry in the Later Middle Ages: Phase 1 ('Emergence'), characterised by the settlement of Christian glassmakers from Catalonia after the conquest of the Islamic taifa of Balansiya and the opening of glass furnaces; Phase 2 ('Development') consisted of the proliferation of these workers and the first regulation of the trade by municipal and royal institutions. Glass productions implied then mostly luxury products, which coexisted with glass imports from outside the kingdom; Phase 3 ('Consolidation') implied a rapid boom of this economic activity, when living standards of the population had increased and the demand for non-luxury glass pieces had exponentially grown. A Valencian luxury glass production was also important enough by then to supply collections in royal courts around Iberia. Functional, non-aesthetic or feeding-related glass typologies were also in the ascendance, as a result of new pharmaceutical knowledge, resulting in a professional demand coming from medical professionals. Altogether, this in-depth diachronic analysis is set within the scenario of European glass industries of the period, arguing that the Valencian case, alongside the nearby examples of Palma de Majorca and Barcelona, reveal the dynamism of this growing trade in the late medieval Mediterranean, which took off centuries earlier than the early modern glass development of the North of Europe.

9 **FROM WORKSHOP TO TABLE : 14TH CENTURY GLASSWARE IN THE NORTH-WEST MEDITERRANEAN, AN INVESTIGATION BASED ON THE NORTH CATALAN EXAMPLE**

Mach, Jordi (Université de Paris 8 Vincennes Saint-Denis; Laboratoire d'Archéologie Médiévale et Moderne en Méditerranée (Aix-en-Provence))

Hollow glass dating from the 14th century collected from consumption sites in northern Catalonia is part of the formal models typical of the "southern" productions defined by D. Foy and now well attested from Provence to the Balearic Islands and from Midi Toulousain to Franche-Comté. Aesthetically, these vessels are characterized by the use of two main categories of decorative techniques, sometimes combined. Blowing the pieces into molds create honeycombs or ribbed patterns on the walls. The use of colored glass, mainly dark blue, but also opaque white and red, allows the production of polychrome pieces. In the archaeological contexts of this period, in Roussillon and Ampurdan, two

types of glass appear almost systematically in the find assemblages and testify to these two aesthetic categories: bottles with mold-blown honeycombs decoration and bowls with concave rims decorated with blue trails. In this paper, I will propose an initial survey of the spatial distribution of finds of these two forms throughout the north-western Mediterranean. These areas of distribution, combined with the mapping of the workshops that produced the forms and with textual and archaeometric data, enable us to delineate technical territories within which manufacturers and skills circulated just as much as the glass already produced and marketed. Finally, I will return to the North Catalan situation to question the particular place of these two types of glass within archaeological assemblages. In the light of the region's written and iconographic sources, the ways in which this tableware was consumed seem to have been linked to the service of wine. The meeting and exchange with other specialists present at this session will enable us to discuss these initial results and envisage collective investigations to be carried out, including on other glass types and other territories.

10 THE GRALLA WORKSHOP: NEW EVIDENCE OF GLASS PRODUCTION IN 18TH CENTURY MALLORCA

Capella, Miquel Angel (Universitat de les Illes Balears) - Serra, Neus (Universitat de les Illes Balears) - Merino, Josep (Archaeologist)

The glass manufacturing in Palma de Mallorca is documented, both archaeologically and through written records, since the first third of the 14th century. Unfortunately, only material remains of a single workshop corresponding to the second half of the 17th century have been located. In this contribution, we present the study of the material remains of the glass kiln of the Gralla family established in Palma in the mid-18th century. These glassmakers, who arrived from Catalonia, were active in this location until the late 19th century. Thanks to written documentation, some of their activities to obtain raw materials are known, such as the soda coming from the nearby island of Cabrera, as well as some orders. The archaeological remains of the two kilns that appeared during the excavation process and other elements excavated on the site where they were located are analyzed.

In addition, the study of the recovered ceramics is presented, allowing for an approximate dating of the workshop's activity, the crucibles, and the glass remains from the last production of the kiln, probably from the late 19th century. Although it is a kiln of small dimensions, it provides information about the active structures in Palma and the island's construction tradition, which will be compared with that of other European workshops of the same chronology.

11 THE TECHNOLOGY OF MEDIEVAL VENETIAN GLASS AND THE LEVANTINE CONNECTION

Occari, Veronica (UCL) - Freestone, Ian (UCL) - Fenwick, Corisande (UCL) - Silvestri, Alberta (University of Padua) - Marcante, Alessandra (Independent Researcher) - Schibille, Nadine (CNRS-IRAMAT) - Barfod, Gry (Aarhus University)

The present paper seeks to understand the development of the medieval glassmaking industry in Venice, investigating the technological practices, the raw materials procurement, and the connection with the Levant. Major, trace element and isotopic data are presented for 181 glass samples from Venice and from the sites of Cividale, Asolo and Padova (12th -15th century). Other glass assemblages have been analysed for comparisons, including the famous Aldrevandin beakers and Mamluk enamelled vessels. The results identified the presence of six main compositional groups, consistent mainly with the use of different types of silica sources, which were both sourced in Italy and imported from the Levant, while Levantine plant ash as flux was consistently employed and was probably sourced in different regions in the Levant. Importantly, the largest group of glasses presents a distinctive trace element composition and provides the first compositional fingerprints for medieval Venetian glass made with pebbles from the Ticino River, which can be used to distinguish it from the technologically similar Islamic glass.

12 GLASSES FROM SAN FRUTTUOSO ABBEY OF CAPODIMONTE (CAMOGLI, GE): ARCHAEOLOGICAL AND ARCHAOMETRIC DATA

Bagnasco, Marta (Università degli studi di Genova) - Benente, Fabrizio (Università degli Studi di Genova) - Riccardi, Maria Pia (Università degli Studi di Pavia) - Campana, Nadia (Soprintendenza Archeologia Belle Arti e Paesaggio per la città metropolitana di Genova e la provincia di La Spezia)

The San Fruttuoso Abbey of Capodimonte complex (Camogli, GE), located in an inlet on the southern front of the Portofino promontory, was excavated for the first time in the 1980s, thanks to restorations promoted by the Fondo per l'Ambiente Italiano. The research, coordinated by the

Soprintendenze Archeologica e per i Beni Ambientali e Architettonici della Liguria, aimed at outlining precisely the life phases of the abbey. In landfill layers (Area D, 13th/late 14th century) tableware artifacts were found, such as a pottery kit showing notable contacts with Tyrrhenian

Italy and the Mediterranean, but also glasses and vitreous bottles. Furthermore, numerous fragments of glass lamps of the church's lighting equipment were found while archaeologists were digging the abbey and the complex liturgical rooms.

The intervention will focus on glass finds analysis, thanks to the multidisciplinary approach and the dialogue between archaeological and archaeometric data. The goal is to outline the main features of the table equipment and the living conditions of the medieval monastic community of San Fruttuoso. The San Fruttuoso glasses, typologically studied, will be analysed in electronic microanalysis and in LAM ICP MS to evaluate their compositional variability and possible chemical/geochemical comparisons, for verifying the use of local products and materials or

imports (of the finished objects or of the raw materials). Through the study of the table and the lighting equipment, therefore, we will attempt to clarify which were the commercial contacts and the economic power of the monastic community of San Fruttuoso.

13 RECENT RESEARCH ON UNIPARTITE LOW COUNTRIES' STAINED-GLASS PANELS FROM THE 15TH-17TH CENTURIES

Patin, Mathilde (Department of Applied Physics and Photonics, Brussels Photonics (B-PHOT), Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium) - Caen, Joost (Em. Professor of the Universiteit Antwerpen, and stained-glass expert, Hertendreef 6, 2900 Schoten, Belgium) - Lecocq, Isabelle (Royal Institute for Cultural Heritage (KIK-IRPA), Jubelpark 1, Parc du Cinquantenaire 1, 1000 Brussels, Belgium) - NYS, Karin (Department of Art Sciences and Archaeology, AMGC Research Group, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium) - Thienpont, Hugo (Department of Applied Physics and Photonics, Brussels Photonics (B-PHOT), Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium) - Meulebroeck, Wendy (Department of Applied Physics and Photonics, Brussels Photonics (B-PHOT), Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium)

Thanks to their position on early modern trade axes, the Low Countries benefitted from preferential access to window glass sheets coming from Northern France and the Rhineland region. Hence to the trade position and the wealth of the cities during the 15th and 16th centuries, the region became the main production centre of stained glass in Northern Europe.

Technical, visual, and artistic study of stained windows can be complemented by analytical investigation to answer questions of dating and authenticity. The combined application of portable X-ray fluorescence spectroscopy (p-XRF) and UV-Vis-NIR absorption spectroscopy allows the screening of a large set of glass panes in a short period. On the one hand, our previous research focused on distinguishing different glass types, including Roman soda-, industrial soda, K-rich glass, and Ca-glass. On the other hand, we explored the identification of the optical signatures to discern two High Lime-Low Alkali (HLLA or Ca-rich) glass subgroups in link with the dating.

This presentation will focus on the analytical results obtained for more than a hundred silver-stained panels from the Low Countries dating from the 15th to the 17th century. As a reference for further studies, we investigated objects belonging to the stained-glass collections of the Royal Museums of Art and History (Brussels), the Museum Aan de Stroom | Vleeshuis Collection (Antwerp), and the J.M.A. Caen private collection (Schoten).

The collaboration among researchers from diverse disciplines allows us to put in relation technical and artistic observations with analytical results. Thanks to the non-destructive analysis, we were able to make new hypotheses on the dating, authenticity, and provenance of the window panels. The results obtained are not only significant for the objects themselves but also contribute to the increase of our understanding of (stained-)glass production in the Low Countries.

1146 DISCOVERING THE ARCHAEOLOGISTS OF EUROPE, 10 YEARS LATER

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Pintucci, Alessandro (Confederazione Italiana Archeologi) - Almánsa Sanchez, Jaime (INCIP-IT-CSIC) - Gransard-Desmond, Jean-Olivier (Arkeotopia) - Scherzler, Diane (DGUF)

Session format: Round table (without formal abstracts)

In recent years, the long wake of the economic crisis that began in 2008, the consequences of Brexit and finally the Covid-19 pandemic have changed European archaeologies enormously: this is a sensation that any observer can relate to in any European country; In many cases, recent statistical data is missing and the last organic research on the working conditions of European archaeologists, on a continental scale, dates back to 2014, 10 years ago.

How archaeologists work in 2023? Where do they work? Who are they? How many of them are working now? These are only some of the questions asked by journalists, politicians or any other stakeholder involved in archaeologists work.

During this round-table discussion, the speakers will present their research carried out in recent years on the activity of archaeological research, and their advice for a new project on a European scale. With this session, we will try to compose an exhaustive picture of what is currently available on the topic and relaunching the urgency and need for new research at a continental level.

1147 **MEDITERRANEAN INTERACTION ?FROM WITHIN?: ISLAND AND COASTAL COMMUNITIES IN DIALOGUE**

Session theme: 6. The Mediterranean from Within

Session organisers: Galmes Alba, Alejandra (INCIPIIT - CSIC; ArqueoUIB research group, University of the Balearic Islands) - Dawson, Helen (Università di Bologna) - Calvo-Trias, Manuel (ArqueoUIB research group, University of the Balearic Islands) - Marino, Sara (Sapienza University of Rome) - Quondam, Francesco (Universität Wien)

Session format: Regular session

Recent advances in scientific methods have highlighted the extent of cultural interaction among island and coastal communities at a global scale and challenged long-held notions of islands as isolated cultural laboratories. Interaction has been increasingly traced from inland and coastal communities to smaller islands, indicating how connectivity networks reflect multiple expressions of identity. The current shift towards connectivity should encourage us to understand these networks in a new way, one that considers the active agency of coastal and island communities in the establishment and development of networks directed inland as well as towards the sea.

In this session, we seek to explore how changes in connectivity relate to identity, material culture, and practices over time and to discuss how the interplay between islands, coastal, and inland communities provides the opportunity to explore issues of cultural integration as well as phenomena of localism and resilience. From network analysis to landscape studies, through pottery, metalwork or nautical data, our goal is to understand how different scales and rhythms of connectivity are reflected in the archaeological record. We hope to open up a dialogue across a range of perspectives in the study of connectivity drawing on different theoretical and methodological approaches. Disciplinary, chronological, and geographical boundaries are deliberately avoided to generate discussions that widen our understanding of cultural interaction in the Mediterranean and beyond.

ABSTRACTS

1 **MATERIAL INTERCONNECTEDNESS IN AN ARCHIPELAGIC MARITIME LANDSCAPE: THE INNER IONIAN SEA ARCHIPELAGO**

Papoulia, Christina (University of Crete)

Bordered by larger islands and situated at a short distance from the mainland, the Inner Ionian Sea Archipelago consists of several land capsules inextricably connected to their neighbouring landmasses. Studying the isles and islets of such an enclosed archipelago offers a unique opportunity to investigate the diachronic interactions between land and sea of the different prehistoric communities that left material traces. This talk presents the research questions, methods and preliminary results of an investigation into the maritime cultural interactions and interconnectedness in a geographic area often regarded as 'peripheral'. It offers new data from cave and open-air sites and tackles upon the fluid boundaries between land and sea in order to explore aspects of connectivity and isolation based on material proxies. This work stems from the 2-year research project "Routes, tools and sea-vessels. A multi-proxy reconstruction of the reciprocally transformative relationship between Stone Age communities and the sea – SeaROOTS" funded by the Hellenic Foundation for Research and Innovation - H.F.R.I. (project number 7186).

2 **LONG-TERM OCCUPATION AND INTERACTION DYNAMICS IN THE CHANNEL ISLANDS: A COMMUNITY-BASED PERSPECTIVE**

Dawson, Helen (University of Tübingen; University of Bologna) - Dettman, Sean (Jersey International Centre of Advanced Studies) - Duval-Gatignol, Hervé (Société Jersiaise) - Pope, Matthew (University College London)

The Channel Islands comprise an archipelago of eight inhabited islands with smaller islets, of different sizes, distances to the mainland, rates of insularisation, and diverging and converging historic trajectories. Understanding how and when the islands were first settled and how their inhabitants adapted to the challenges of island life constitutes a classic case study in island archaeology. In this paper, we provide an overview of the archaeological research we've been carrying out since 2020 on the largest island, Jersey, as part of the Jersey International Centre of Advanced Studies archaeological field school. The results of this diachronic analysis span some 250,000 years of human habitation from the time when Jersey was still attached to mainland to its recolonisation following its gradual insularisation as a result of sea level rise. A key aspect of our work is to understand changes in the degree of isolation and connectivity

as well as the development of "small world networks" and islander identities over time, in dialogue with the island's present-day communities.

3 **BETWEEN ISLANDS, COAST AND INLANDS: RELATION DYNAMICS IN THE MESSINA STRAIT AT THE DAWN OF THE BRONZE AGE**

Marino, Sara (Sapienza University of Rome) - Quondam, Francesco (University of Vienna)

Located at the tip of the Italian peninsula, the area of the Messina Strait represents a privileged context for the analysis of the relationship dynamics between islands, coast and inland areas during Prehistory.

Ever since the Neolithic period, the peculiar geography of this area has favoured the emergence of articulated and multiscale relationships between the mainland and Sicily, radiating as much at the coastal areas as in the innermost sectors of the landscape; the presence of the Aeolian islands, a central junction in the prehistory of the central Mediterranean, inserts another relevant variable into the system, as also reflected in the abundant archaeometric data obtained on obsidian and pottery.

In this communication we intend to focus on the centuries between the end of the 3rd and the early 2nd millennium BCE, a period corresponding to the Italian Early and Middle Bronze Age. Indeed, this period captures a significant evolution in the relationship dynamics between the islands and the mainland, clearly testified to in the archaeological evidence. Though highly integrated, the Early Bronze Age communities of this system show a strong degree of autonomy and local identity. In the Middle Bronze Age, on the contrary, a substantial increase of homogeneity is witnessed; at the same time, however, the archaeological record reveals a certain degree of variability, implying forms of widespread integration as well as cases of localism and/or resilience. The re-examination of some key contexts and the presentation of new Calabrian sites will add new elements to this interesting picture.

4 **APPROACHING THE COAST(S): CROSS-CULTURAL INTERACTIONS BETWEEN CYCLADES AND CRETE DURING THE EARLY BRONZE AGE**

Vrettou, Aikaterini (University of Heidelberg)

During the long period of the Early Bronze Age multiple waves of transcultural interaction were generated in the Southern Aegean, and more specifically between Cyclades and Crete. The intensification of contacts resulted in the transmission of ideas and technologies, along with finished artefacts and raw materials to Crete. The latter should not be regarded as a cultural whole with a uniform material culture, and therefore the influence of the Cyclades on Crete varied significantly spatially, and chronologically as well. Some coastal sites on northern Crete functioned as "gate communities" and undertook the role of transferring imports further and through the various networks established inland on Crete these even reached more isolated sites in the South. While the imported artefacts became gradually integrated in the local codes of communication and practice, at the same time they triggered new ways of production on Crete. In other words, through a selective adoption of the off-island ideas and following the local preferences new forms of various materials were created, bearing similar or new meanings. In this framework through the constant communication between the different regions in the Southern Aegean, a wider space was created which enabled the emergence of new Aegean-wide and local cultural traits and technologies.

5 **ISLANDS FROM WITHIN. CONNECTIVITY STRATEGIES IN THE CONFORMATION OF ISLAND IDENTITIES ACROSS THE BALEARIC ISLANDS (C. 1400-850 BCE)**

Galmes Alba, Alejandra (INCIPIIT, CSIC) - Calvo-Trias, Manuel (ArqueoUIB research group, University of the Balearic Islands)

Did island inhabitants see themselves as such in the past? How did island identities conform and be recognised? From a case study in the Balearic Islands, we aim to reflect on how island identities might have been conformed through interaction, both within and beyond the island itself. With a focus on c.1400-850 BCE we aim to understand the conformation of island identities through two strategies.

First, the series of coastal sites that guided navigation around the island. Connectivity between the islands allowed for the development of a shared habitus, with shared technological praxis and social arenas across them. Secondly, the construction of monumental architecture across the island's allowed for an interconnected landscape within the island, where architecture can be understood as a conveyor for identity. The visual network that the architecture knitted allowed to give meaning and connection to the landscape at an island-level. By combining these two perspectives we aim to reflect on the strategies that island communities used to conform their own identity and recognise themselves as islanders through connectivity.

6 WORKING THE LANDSCAPES: CONNECTING COMMUNITY AND LABOUR IN BRONZE AGE CYPRUS

Gonzalez San Martin, Ana (Brown University)

Island communities in the Mediterranean have long been stereotyped as either intensely syncretic, commercial, and urban-centric in coastal settlements, or as inherently static, subsistence-based, and closed off inland. However, newer approaches in archaeology reveal a more dynamic and complex understanding of community relationality. Within this framework, I propose a labourscape approach as a lens through which to explore the interconnectedness of labour practices, cultural interaction, and connectivity through the landscape.

Focusing on the hinterland of Cyprus, this research delves into the intricate web of community-based decisions and negotiations, challenging traditional notions of rural communities' isolation, "backwardness" and rigid cultural identity. Labor, viewed not just as a utilitarian activity but as a complex social phenomenon, plays a central role in shaping and reflecting the cultural and physical aspects of the landscape. By examining how labour was organized and practiced within Bronze Age communities within the landscape, we can get a sense of how the mobility and interaction were at play in structuring the transmission of practices and technologies.

This approach highlights the active agency of communities in establishing and developing social ties directed both inland and towards the sea. Through the analysis of physical indicators of labour organization, we can expose intricate patterns of labour-based connectivity that facilitated the exchange of knowledge, skills, and resources. By challenging static interpretations of cultural identity and emphasizing the fluidity and adaptability of labour practices, this perspective contributes to a deeper understanding of collaboration, resilience, and the fluidity of identity in the Mediterranean and beyond.

7 BUILDING BRIDGES IN THE CENTRAL MEDITERRANEAN: A SOCIAL AND SPATIAL APPROACH ON BRONZE AGE INTERACTION NETWORKS

Michienzi, Giulia (Università degli studi di Bari Aldo Moro; CNR ISPC)

During the Early Bronze Age, the central Mediterranean saw the rise of insular and coastal centres located at strategic positions along expanding sea routes, as also attested by the growing number of common features in the material record of local communities. Previous research aimed to shed light on the dynamics of a maritime small world including Sicily, the surrounding archipelagos and the Tyrrhenian coast of southern Calabria, starting from the case study of Mursia. This was achieved through the creation of two pottery networks (Social Network Analysis) based on the stylistic motifs from Mursia's pottery repertoire, shared with other sites in the area, which were then exploited as nodes for the creation of a spatial network (Point Proximal Analysis). Although definable as an ego-network, the analysis gave back the reflection of an intricated pattern of influences, geographically widespread on the regional level. A final comparison of the three networks, using the betweenness centrality degree as common parameter, allowed to spot a significant match between the social and the geographic dimensions, with the identification of 17 hypothetical gateway communities. Further research will be developed by widening both the geographical and chronological horizons, analysing interaction networks in an area which also covers both sides of Calabria and the region of Apulia, from EBA to MBA. The choice of elements in the local material record eligible as proxies for economic, social and ideological processes, will lead to the definition of multiple case studies, whose connections will be investigated, once again, through a relational perspective (SNA). Secondly, anchorage opportunities will be evaluated on a GIS by looking at coastal morphology and by calculating their anchorage safety index. The assumed harbours will then be used to build a spatial network balanced through environmental parameters to assess travel duration (Least Coast Analysis combined with PPA).

8 INDIGENOUS IMITATION AND GLOBAL INTERACTION: UNDERSTANDING THE POTTERY OF THE POST-TALAYOTIC, LATE IRON AGE AT TORRE D'EN GALMÉS, MENORCA

Smith, Alexander (SUNY Brockport) - Pérez-Juez, Amalia (Boston University) - Torres Gomariz, Octavio (Universitat d'Alacant) - Patterson, Evelyn (SUNY Brockport)

From approximately 550 to the Roman conquest in 123 B.C.E., the island of Menorca (Spain) was home to a vibrant, Late Iron Age community known as the Post-Talayotic people. As the first millennium B.C.E. bore witness to a dramatic increase in trade, colonialism, and intercultural interaction across the Western Mediterranean, Menorca retained many aspects of its indigenous culture in the face of foreign influence. Nevertheless, certain types of material culture felt the effects of this increased interaction, particularly with Punic and Iberian actors.

Since 2020, the Menorca Archaeological Project has been excavating at the prehistoric site of Torre d'en Galmés. Our excavations have focused on a series of medieval Islamic houses that have excellently preserved the remains of a third century B.C.E., circular domestic structure. From 2021-2023, our excavations have revealed what appears to

be a storage area of the Post-Talayotic house, filled with various examples of pottery, including local indigenous wares and imports.

This assemblage notably exhibits indigenous vessels that are imitations of Punic forms, showcasing a hybrid material cultural practice, but also sustained foreign interaction more generally. What is also clear is a consistent usage of these ceramics for consumption of beverages or libations, in some cases possibly for ritual purposes. At the same time, we have many more indigenous vessels that retain traditional forms and still other imports from Ibiza and North Africa. Nevertheless, these forms serve a different functional purpose from the identified hybrid ceramics.

This paper will discuss the ceramic assemblages discovered by MAP from 2021-2023 in our Post-Talayotic structure, and the ramifications of these hybrid forms for understanding interaction and exchange on the island. Ultimately, we hope to shed light on a dynamic Post-Talayotic Menorca that experienced both cross-cultural interaction as well as indigenous evolution at the end of the Iron Age.

9 TYPOLOGICAL ANALYSIS OF NURAGIC POTTERY FROM CANNATELLO (SICILY): ASSESSING MEDITERRANEAN INTERCONNECTIONS DURING THE LATE BRONZE AGE

Talotta, Natalia (University of Rome "La Sapienza", Italy) - Gulli, Domenica (Soprintendenza BBCCAA, Agrigento, Italy) - Levi, Sara (Hunter College, NY, USA) - Vanzetti, Alessandro (University of Rome "La Sapienza", Italy)

Nuragic pottery is being increasingly recognized in different coastal sites across the Mediterranean during the Late bronze Age, with a specific intensity noted in LHIIIB-III C1. Cannatello (AG) is one of the most relevant sites that contribute to the debate regarding cultural connections and interactions among the major Mediterranean islands during the early phase of the Late Bronze Age. Research at this site has been spearheaded by the Soprintendenza BB.CC. AA of Agrigento, the University of Rome "La Sapienza", and Hunter College of New York. Through the typological analysis of ceramics, evidence of connections have been discerned with Crete, Malta, Cyprus and Sardinia, shedding light on existing relationships between the Western Mediterranean and Eastern Mediterranean. These studies delve into potential themes of transmission and typological/stylistic influences of the ceramics found within the settlement.

Based upon typological analysis of Nuragic pottery from Cannatello, this contribution aims to reconstruct the dissemination patterns of major Nuragic forms and to identify affinities or differences within the involved areas. Notably, there is a prevalence of open shapes, known as conche (currently evidenced in Sicily and Crete) and bowls with interior groove, the latter being attested in all considered sites.

Furthermore, the remarkable concentration of Nuragic-shaped vessel localized in specific areas of the site, the identification of forms produced locally, and the significant typological variability distinguish the site from others located in the eastern area, reinforcing the hypothesis of different types of interaction. Further studies on materials from Cannatello will not only elucidate its significance but also contribute to broadening our understanding of contacts among the major Mediterranean islands during the Bronze Age.

10 ZOOM IN ON CONTINENTAL TYRE: NEW DATA FROM THE LEBANESE-ITALIAN ARCHAEOLOGICAL PROJECT IN TYRE

Haider, May (Lebanese University) - Badawi, Ali (The Directorate General of Antiquities) - D'Andrea, Marta (Sapienza)

This paper will present preliminary data from the Lebanese-Italian Archaeological Project in the Region of Tyre. The project focuses both on archaeological research and cultural heritage protection and promotion in the areas to the east and south of the present-day Tyre peninsula. These regions are represented, respectively, by Tell Mashouk, Shawakeer, and Ras el-Ain. They are traditionally connected with the historical quest for Palaeo-Tyre and must have played an important role in the development of Tyre through the ages; however, little archaeological investigation has been carried out there in the past. Therefore, the Lebanese-Italian Archaeological Project in the Region of Tyre was envisioned to study patterns of human occupation, land and sea use, and water management in this unique maritime cultural landscape in the environs of Tyre. For this ambitious task, a multi-level analytical approach was conceived. The new data, brought by the project, is advancing both our current knowledge of archaeological periods, mainly prehistorical ones, at the Shawakeer and Ras el-Ain areas, while also validating the extraordinary importance of the two areas in understanding the prehistorical periods of the region and the direct role of the continental area in the development of the City of Tyre, the Island. In fact, the study of the regions of Shawakeer and Ras el-Ain provided important insights on the diverse periods with unprecedented discoveries from the Palaeolithic in our project's regions the time when different Homo species used the Levantine corridor to move towards and from Europe. The project was also able to confirm and elaborate previous hypotheses concerning Chalcolithic activities at Ras el-Ain and an Early Bronze Age presence at Shawakeer, and added new information on both areas from the fourth through the second millennium BC. This new data are crucial to reinterrogate patterns of island-coastal interactions in the Tyre area.

11 THE DIFFUSION AND ASSIMILATION OF THE ORNITHOMORPHIC MOTIF AS A CLUE TO THE CULTURAL INTERACTION IN THE PROTOHISTORIC MEDITERRANEAN

Amodio, Francesco (Stadt Zürich)

Regarding the ornithomorphic motif, it has been noted that, with the emergence, from the Middle Bronze Age onwards, of new dominant subjects within much more complex communities capable of spreading particular valuable products, the evidence provided by archaeological sources seems to record a sort of 'democratisation', if compared to the past, in the use of an ideological-religious symbolism originating, as ever, from the cultured areas of the south-eastern Mediterranean and the Near East, in which the ornithomorphic motif, especially that belonging to the Anatidae family, takes hold during the Late Bronze Age and, gradually but increasingly, even more so during the Iron Age. In fact, during the Late Bronze Age there was an epochal turning point in the intensification of cultural contacts and interactions, in which the Mediterranean appeared as a privileged area in which the new protagonists now played a leading role, and in which they spread products and, alongside them, ideas and cultural models often functional to the new socio-economic structures created in many European areas during this phase, which were then assimilated and reworked in a sort of ante litteram orientalisising process.

In its first phase, this took place in some areas of the Italian peninsula thanks to the increasing contacts between the indigenous and the Aegean world, and, in a second phase, thanks to the formation of a metallurgical koinè that united these two worlds within the Mediterranean, taking on the flavour of a revival of pre-existing cultural contents in contrast with the strongly elitist character inherent in the many manifestations documented in previous eras, opening thereby the path to a reciprocity of exchange between the peoples involved.

12 SAINTS' DEDICATIONS AND EARLY MEDIEVAL CROSS-MARKED STONES ON THE WEST COAST OF SCOTLAND

Kurzenkova, Alla (School of Humanities, University of Glasgow)

The West Coast of Scotland encompasses a diverse range set of early medieval cross-marked stones, with topographical settings, different types of stones, and chronologically distributed forms of crosses.

This paper results from the project funded by the British Academy's Researchers-at-Risk Scheme to investigate Early Medieval Cross-marked Stones on the West Coast of Scotland.

An essential basis for the cross form analysis in this paper has been provided by the redating of previously unrecorded cross type similarities on the West Coast of Scotland with other comparative crosses from volumes of the British Academy's Corpus of Anglo-Saxon Stone Sculpture series and the Corpus of Early Medieval Inscribed Stones and Stone Sculpture in Wales. Identifying links to the founders of the sites through dedications to Saints and datable cross type material brought together a picture of the importance of these sites, which developed differently between the 6th and 10th century AD.

Crucially, this configured an understanding of the links between cross forms and Saints, arguing that crosses either coexisted with Saints or were added to a site already made famous by a Saint.

13 ISLANDS OF TRANSFORMATION: INTERDISCIPLINARY PERSPECTIVES ON ADAPTION, RESILIENCE, AND SUSTAINABILITY

Scholten, Thomas (University of Tübingen) - Dawson, Helen (University of Tübingen) - Diaz-Zorita Bonilla, Marta (University of Tübingen) - Dierksmeier, Laura (University of Tübingen) - Rothenburg, Daniel (University of Konstanz) - Schön, Frerich (University of Tübingen)

This paper presents the preliminary results of a new joint project, "Islands of Transformation: An Interdisciplinary Study of Adaptation, Resilience, and Sustainability", hosted by the University of Tübingen (2024-2026). Our aim is to study the dynamics of human adaptation to socio-environmental change in past island societies on a global scale and to understand their strategies of resilience and sustainability. The regions under study comprise islands in the following regions: 1) Mediterranean (Aeolian Islands, Ustica, Pantelleria, Linosa; the Balearic Islands), 2) Southern Pacific (Vanuatu, New Caledonia, Tasmania and Bass Strait islands), 3) Eastern Atlantic (Channel Islands, Canary Islands) and Caribbean (Cuba, Haiti). Our work draws on geoarchaeological, bioarchaeological, archaeological, and historical archives to explore issues relating to colonisation, adaptation, resources, diet, exchange, and transmission of ideas and knowledge. The main goal of this project is to study islands within a global comparative framework and to investigate island communities and their cultural interaction. Through a collaboration between archaeologists, historians, and natural scientists with a broad geographic and chronological range, we challenge established and western-centric perspectives on entangled human-nature transformations in island archaeology and island studies more broadly.

1148 ON THE LIFE OF VOWS: MONASTIC ARCHEOLOGY AND BIOARCHAEOLOGY

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Janeš, Andrej (Croatian Conservation Institute, Department for Archaeology, Kožarska 5, 10000 Zagreb, Croatia,) - Šarkić, Nataša (Aita Bioarchaeology, Caporal Fradera 17, piso 02, Magrat del Mar 11060 (Barcelona), Spain,)

Session format: Regular session

Monasteries from the Early Christian to the Early Modern period held a special place in the Christian world. They represented the realization of the greatest virtues, both for those who wanted to live a good Christian life and for those who wanted to secure a place for themselves in the afterlife. The popularity of monastic life in the period from the 4th to the 18th century is confirmed by the large number of religious communities that arose in Europe. The high status of monasteries was often shown through architectural forms, with monasteries setting trends in different building styles.

This high status of some monasteries can be visible not only in written records, but also through remains of material goods of everyday commodities, from exotic food and drinks to luxury objects used to consume them. In addition, monastic spaces appealed to all the social strata of medieval and post-medieval societies as final resting places. Before the creation of hospitals, as we know them today, the care and treatment of elderly, disabled and sick was provided primarily in monasteries.

We invite papers discussing the visibility of different social groups interacting in various monastic environments, through analysis of everyday objects, foodstuff, architectural development, burial practices, osteological and botanical remains, and spatial organization of monastic complexes and estates.

ABSTRACTS

1 INSIGHTS INTO LIFESTYLE AND STATE OF HEALTH AMONG FRIARS AND LAY PEOPLE BURIED AT THE SANTA CATERINA FRIARY (BARCELONA, SPAIN)

Rissech, Carme (Rovira i Virgili University) - Sanz, Andrea (University of Barcelona) - Falcó, Andreu (University of Barcelona) - Cevallos, Antony (Rovira i Virgili University) - Trujillo, José (University of Barcelona) - García, Mireia (University of Barcelona) - Lloveras, Lluís (University of Barcelona)

Santa Caterina was one of the most important friaries in Barcelona (Spain) during the Medieval and post-Medieval periods (1243 to 1836). The community belonged to the Dominican Order, enabling both friars and lay people to be buried there. The aim of this study is to provide information on the lifestyle and state of health of the individuals buried in this friary, through bioanthropological analysis. We analysed a total of 36 funerary units located in the cloister courtyard (13th c.), cloister gallery (13th-15th c.), chapels inside and outside the church (13th-16th c.) and in the area outside the church behind the apse (13th-14th c.). Results indicate 8 males from the cloister courtyard; 8 males, 6 females, 3 indeterminates and 7 immatures from the cloister gallery; 39 males, 18 females and 33 immatures from the chapels, and 8 males, 6 females, 3 indeterminates and 3 immatures from outside the church behind the apse. The oldest females and males were in the cloister. In contrast, only young male and female adults were found in the other areas analysed. In the cloister gallery, immatures were always above the age of 8 years while outside the cloister immatures were above 0.5 year of age. The musculoskeletal markers and pathologies point to greater physical activity in the individuals from the cloister gallery, particularly in females. Results suggest that the group interred in the cloister correspond to monastic and lay people closely related to the friary. In contrast, individuals interred in the church and outside the church represented a lay cohort able to afford burial there. The highest social class lay individuals were buried inside the church (the higher their social status, the closer to the high altar), well-off people were interred in the chapels outside the church and less well-off people behind the apse.

2 LATE MEDIEVAL LIME BURIALS FROM THE FRANCISCAN MONASTERY IN SCHAFFHAUSEN, SWITZERLAND

Alterauge, Amelie (Department of Archaeology, Cantonal Heritage Service Schaffhausen) - Christen, Linda (Department of Archaeology, Cantonal Heritage Service Schaffhausen) - Haas, Cordula (Institute of Forensic Medicine, University of Zurich) - Lehn, Christine (Institute of Forensic Medicine, LMU Munich) - Schotsmans, Eline M.J. (Centre for Archaeological Science, University of Wollongong; PACEA-UMR 5199, University of Bordeaux) - Schäppi, Katharina (Department of Archaeology, Cantonal Heritage Service Schaffhausen)

The use of lime in burials and mass graves is a well-known phenomenon all over Europe, ranging from prehistory to modern times. It climaxed in the early modern period when burials congested the churches and encountered hygienic reasoning and sanitary control measures. Next to hygienic reasons, several other intentions are ascribed to this practice, such as to accelerate or impede the decomposition, to suppress decomposition odour and limit the spread

of bacteria. However, systematic research on this burial practice in the past is limited, with a few exceptions from forensic experimental studies.

Recent excavations in the church of the Franciscan monastery (c. 1250-1529 AD) of Schaffhausen (Switzerland) have revealed 27 burials in the church's perimeter, comprising single, double and multiple burials, as well as plain earth and coffin burials. The graves are believed to be those of noble and middle-class townspeople who hoped for prayers and salvation in the bosom of the Franciscan convent. According to stratigraphy and radiocarbon dating, the burials date predominantly to the 14th and 15th centuries AD. In 10 cases, the bodies have been treated with varying amounts of a white substance. Physico-chemical analyses characterized these white residues as lime. It was applied over the body in a liquid state or as a powder. Occasionally, the lime had created a cast over the deceased mirroring the body's shape, including imprints of clothing. It was not possible to differentiate whether they used hydrated lime or quicklime. The skeletons underwent a thorough anthropological examination, including morphology, paleopathology, stable isotope and DNA analysis in order to determine the composition, kinship relations and dietary status of the population.

The aim of this paper is to extend the corpus of lime burials in medieval churches for a better understanding of the intentions and chronological and geographical distribution of this burial practice.

3 **NON FUI, FUI, NON SUM, NON CURO: EXAMPLE OF ATYPICAL BURIAL PRACTICE FROM THE RAŠAŠKA - RAČEŠA (CROATIA), 13TH-16TH CENTURY**

Sarkic, Natasa (Aita Bioarchaeology) - Cighetti, Roberto (Aita Bioarchaeology; Osteoarc) - Schendzielorz, Sofie-Kristin (University of Dundee) - Mihaljevic, Marija (Nova Gradiska Town Museum)

The treatment of the deceased is a common practice across all human societies. Burial is a combination of social norms and how the deceased is perceived by those performing the burial. Atypical funerals may indicate that the deceased was considered a "deviant social person". To better understand this phenomenon, we must consider both funerary archaeology, which involves understanding typical burial practices in a given population and how the individual deviates from them, as well as bioarchaeology, which helps determine whether biological factors played a role in the deviation.

During an excavation, a grave numbered 157 was uncovered next to the southern wall of a church, in a layer below the floor. The individual buried there was positioned in an unusual manner, which caught the attention of the researchers. Upon further analysis, it was found that the individual had multiple injuries, some old and some fresh, which were caused by interpersonal violence.

Historical sources indicate that the property where the grave was found belonged to the Knights Hospitallers, who were primarily responsible for providing medical care. This may explain why the individual was buried there. However, it is still unclear why an intervention was performed on the body after death.

4 **POVERTY IN THE BONES. BIOARCHAEOLOGICAL STUDY OF MONASTIC LIFE IN THE COLLEGE DE MÍNIMOS OF ALCALÁ DE HENARES (MADRID, SPAIN)**

Hernández-Fernández, Judith (University of Alcalá) - Gallego-García, Mar (University of Alcalá) - Sánchez-Andrés, Ángeles (University of Alcalá)

The research carried out in the former College of "Mínimos de Santa Ana" (Alcalá de Henares, Madrid, Spain), has provided relevant information on the social and dietary characteristics of a group of religious between 16th and 19th century. The archaeological intervention carried out in 2007 focused on one of the lesser-known convent spaces: the "de profundis" room, a sacred space before the entrance to the refectory. The excavation documented a multi-layered burial space without a pre-established layout. The skeletal remains recovered correspond to sixteen individuals. Their study is providing valuable anthropological information, which together with the archaeological context has helped to better understand a community about which traditionally little information is available, as is the case of the Order of Minims. The first results suggest living conditions marked by significant food shortages, which may even have occurred as early as infancy. All this suggests that a significant part of the convent population was assembled from social contexts in which malnutrition and poverty could be two significant indicators.

5 **WHAT CAN NUNS TELL US? ARCHAEOLOGICAL AND ANTHROPOLOGICAL DATA REGARDING THE VĂRATEC MONASTERY CEMETERY (EASTERN ROMANIA)**

Diaconu, Vasile (Neamț National Museum Complex) - Simalcsik, Angela ("Olga Necrasov" Centre for Anthropological Research, Romanian Academy – Iași Branch, Romania; "Orheiul Vechi" Cultural-Natural Reserve, Republic of Moldova; Institute of Bioarchaeological and Ethnocultural Research, Chișinău, Republic of Moldova)

The Văratec Monastery was founded in the second part of the 18th century, and in the 19th century it became the largest community of nuns in Romania.

Located at the foot of the Eastern Carpathians, the monastery comprises three distinct churches: one built in the late 18th century and two more built in the mid-19th century.

In 2021, during the rehabilitation works of one of the churches dedicated to St. John (1844), preventive archaeological research was carried out, leading to the discovery of 72 burial complexes, accounting for burial graves and reburials, attributed to the late 18th-century and the first half of the 19th century. When the church was built, some of the old graves were moved to different areas of the cemetery, thus explaining the numerous reburials. The degree of preservation is different from one grave to another; some funerary complexes have well-preserved wooden funerary furniture. Given the monastic nature of the cemetery, the inventory is scarce (i.e., only four coins, two wooden crosses, and clothing accessories). A specific element for the graves of nuns is the engraved bricks placed next to the deceased. A few tombstones were also discovered.

Thus far, the burial space at the Văratec Monastery is the only cemetery of a community of nuns researched in Eastern Romania.

The anthropological analysis of the osteological material discovered in the Văratec cemetery, which belongs to a somewhat isolated community from a demographical perspective, provided exciting information consistent with the general anthropological picture of the late medieval and modern periods. On the skeletons, belonging especially to adults, was determinate numerous skeletal abnormalities and pathologies, reflecting this population segment's health status and occupational profile.

6 **THE ROLE OF MEAT IN THE DIET OF THE NUNS FROM THE CONVENT OF SANTA MARIA DE JERUSALEM (BARCELONA, SPAIN)**

Lloveras, Lluís (University of Barcelona) - Falcó, Andreu (University of Barcelona) - Mondejar, Oriol (University of Barcelona) - Nadal, Jordi (University of Barcelona)

The convent of Santa Maria de Jerusalem was located in the Raval neighbourhood in the center of Barcelona (Spain). It was founded in 1462 and was occupied by the Poor Clare Order, the female branch of the Order of St. Francis. The archaeological works conducted at the convent during 2005-2006 allowed the recovery of abundant waste deposits containing a large amount of faunal remains. In this paper we present the results obtained in the analysis of faunal assemblages recovered from two rubbish dumps dated between 15th and 17th centuries. Our aims are to provide new data on diet in monastic houses in Barcelona and to find out the importance of meat in the diet of the Poor Clares community of the convent.

Results indicate a low variety of taxa, being mammals the best represented and particularly caprines (mostly sheep, *Ovis aries*) followed at a distance by pigs (*Sus domesticus*) and cattle (*Bos taurus*). The age at death profile indicate that most animals were immature, slaughtered at the optimum point to provide a maximum meat yield. The parts of the skeleton found indicate a selection of the meaty portions. The avian taxa variety is also low and the domestic fowl (*Gallus gallus domesticus*) clearly dominate the assemblage. The age at death profile data suggest that chickens were preferably consumed.

Finally, our data is contrasted with the background provided by zooarchaeological studies conducted in other contemporaneous monastic houses from Barcelona.

7 **MEDIEVAL MONASTERIES AS ECONOMIC POWERHOUSES: INSIGHTS FROM NUMISMATIC EVIDENCE**

Štefan, Luka (Moneterra - the Money Museum of the Croatian National Bank)

This research examines the economic importance of medieval monasteries during the high and late medieval periods, spanning from around 1100 to 1500. It utilises numismatic data to determine the extent to which these monasteries acted as economic catalysts in their particular regions. The study centres on the examination of coins found in specific locations, namely the Dominican Monastery and the Church of St. Margaret in Gorjani, Croatia. These sites yielded a significant number of medieval coins, primarily of lower value and denominations. Comparable observations are obtained from discoveries made at the remains of the Pauline Monastery of the Blessed Virgin Mary (Bela Crkva) and the Benedictine Abbey of St. Michael the Archangel in Rudina. The presence of coins from external mints or other regions, states, and territories suggests that these religious institutions played a role in enabling wider economic connections and cultural interactions.

The study utilises a methodology that combines the analysis of coins with the assessment of historical sources, such as charters, financial statements, and contemporaneous narratives. This approach allows for the reconstruction of the economic environment in which these monasteries functioned over the specified time frame. The primary emphasis lies on the distribution and use of low-value coins inside these monastic communities, showcasing their intricate participation in regional and maybe global trade networks and highlighting their economic strength.

The findings indicate that monasteries served not only as religious and educational hubs but also as influential economic entities that had a substantial impact on the circulation of money, trade, land administration, and resource distribution throughout the high and late medieval eras. This, in turn, provides detailed knowledge of the economic elements of medieval monastic life, which goes against the prevailing focus on spiritual and cultural factors in conventional tales.

8 **"...WHAT IS ESSENTIAL IS INVISIBLE..." SOCIAL RELATIONS AND ESTATES OF THE PAULINE ORDER THROUGH GEOSPATIAL AND HISTORICAL FACTORS**

Peto, Zsuzsa (Hungarian National Museum) - Latos, Tamas (Hungarian National Museum)

The Order of St. Paul the First Hermit developed from different eremitic communities in 13th – century Hungary. The founders and donators of their monasteries represented most social classes from local, wealthy families to the King himself. The Pauline order was significant in Central Europe (including Rome) and gradually developed until the 16th century. Some of the monasteries have been preserved as ruins or have been located without any surface traces, but there are ones still to be located. Although their research started in the 19th century, in most cases only robbed and destroyed churches were partially excavated; this is why a rather scattered and limited bio/archaeological data is available from the monasteries and most features are still invisible or not even addressed by scholarship.

However, Pauline social connections and estate management can be explored through direct and indirect data by using the limited archaeological information, written sources (ca. 5000 charters) and non-destructive methods. Our aim is to present a brief outline of these, also reveal new data on Pauline monastic space, based on the recently conducted LiDAR surveys (Tamás Látos–Zsiga Zsolt), which are part of a long-term project aiming a complex digital database of the ca. 65 medieval monasteries, which operated on the territory of present-day Hungary.

Based on a variety of selected sites, representing different regions in Hungary and social interactions, the present paper addresses the following questions: what types of medieval Pauline monasteries were present in terms of location and further geospatial factors? What is the relation of these features with the Pauline estate management and social interactions? Were there any characteristics of the Pauline estate management in relation with their social interactions?

9 **HISTORY OF DECAY: POST-MEDIEVAL SMALL FINDS FROM THE BENEDICTINE MONASTERY OF ST. MARGARET IN BIJELA (CROATIA)**

Janeš, Andrej (Croatian Conservation Institute)

The monastery of St. Margaret in Bijela was one of the biggest ecclesiastical institutions of late medieval Slavonia, situated in the western slopes of Papuk hill. From its establishment during the 13th century monks and lay inhabitants interchanged as users of the abbey. By the mid-16th century and the Ottoman conquest the monastery changed hands between the monks and soldiers, since it was fortified and ideal for defensive purposes. During the Ottoman rule it was gradually abandoned with the church being burnt down during military operations of the Great Turkish war (1683-1699).

During the archaeological excavation 2012-2021 a substantial number of small finds have been found inside the church and northern cloister walk. Finds of dress accessories, horse and rider equipment, tools, weapons and book fittings are part of the assemblages found. Most of them were collected in layers of the last century before the complete abandonment of the monastic complex, from the second half of the 16th century onwards. The collection of finds is composed mostly of finds used by the soldiers occupying the fortified monastery during the wars with the Ottomans. Combined with the burials that continued in the church under Ottoman rule they are the evidence of habitation and every day life in the fortified monastery that was not known from contemporary written sources.

1149 **MODELLING AS COLLECTIVE UNDERTAKING: BEST PRACTICES IN BUILDING AN OPEN ACCESS LIBRARY FOR AGENT-BASED MODELLING IN ARCHAEOLOGY**

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Daems, Dries (KU Leuven) - Verhagen, Philip (VU Amsterdam)

Session format: Workshop

Archaeologists are increasingly relying on computer simulations to reconstruct and understand past societies. They are successfully building and running simulations of agrarian production, trade, settlement development and movement, to name a few. While methods such as agent-based modelling are increasingly carving out space, further integration with the broader discipline remains hampered due to limitations in technical skills and the lack of possibilities for modellers to cumulatively build on each other's work. This is predominantly due to the lack of appropriate tools and platforms enabling closer integration.

To remedy this situation, the NAS2A project (Network for Agent-based modelling of Socio-ecological Systems in Archaeology; <https://archaeology-abm.github.io/NASSA-hub/>) is developing an open library of model algorithms and code for modelling of socio-ecological systems in archaeology. It aims to redefine current practices in collaboration and synergy in modelling communities by developing an openly available and functional models library, offering a host of elements (modules, techniques, algorithms, how-to's/wikis etc.) as modular building blocks for elaborate and case-driven models and research questions. In this roundtable, we will present the project's first results towards developing the necessary infrastructure and standards, discuss and update current best practices, provide hands-on practice with creating and submitting modules to the open library, and stimulate general discussion centred around the following questions:

- 1) How can we ensure that model elements can be used for a wide range of research questions?
- 2) How can we facilitate interaction, comparison and testing of models across platforms and programming languages?
- 3) How can we achieve a sustainable infrastructure for this?
- 4) How can we teach modellers to submit their modules to the open library?
- 5) What more is needed to make simulation modelling accessible to a wider community of archaeologists?

1150 **CAVES AND ROCKSHELTERS AS ARCHIVES TO STUDY PROCESSES OF CHANGE**

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Bergsvik, Knut Andreas (University Museum, University of Bergen, Norway) - Boethius, Adam (Dpt of Archaeology and Ancient History, Lund University, Sweden) - Jørgensen, Erlend (Norwegian Institute for Cultural Heritage Research NIKU Tromsø)

Session format: Regular session

Caves and rockshelters possibly represent the most striking site type in the global archaeological record and showcase deep sequences of anthropogenic deposits covering every period of human prehistory and history. Contrary to open-air sites, where organic materials rarely preserve, rockshelter occupations frequently resulted in cultural deposits consisting of a wide range of organic remains, spanning artifacts, zoological and human osteological remains. Some sites have also been subject to re-use, resulting in otherwise unobtainable archives of materials spanning several millennia. Such sites are crucial for reconstructing past cultural and natural systems, as they offer opportunities to study changes, not only in human societies, but also in the natural environment.

In this session we welcome contributions on two specific topics:

- 1) To explore the wide scientific research potential offered by anthropogenic cave deposits, acting as proxies for the study of long-term change. Questions may include: How do such sites compare to the data from open-air sites? How "representative" are they of general economic, social, and ecological developments? How can analyses of artifacts, soil, bone, and shell contribute to the study of changes within these domains?
- 2) To investigate and help re-engage the rich legacy datasets from old cave and rockshelter excavations. Many of the richest sites were found and excavated already during the 19th century, leaving very little for later investigations. What is the status of this material today, and what is the potential for new laboratory investigations? How can we engage with the leftovers from the early archaeologists? Are there still intact deposits preserved at the old sites suitable for the study of long-term change? Do we know about all the important sites, or are there still rich caves or rockshelters waiting to be found and excavated? How can such sites be found, and what characterizes their site locations?

ABSTRACTS

1 **METHODS FOR RECONSTRUCTING DEPOSITIONAL HISTORIES OF ANTHROPOGENIC, SEDIMENTARY RECORDS: THE CASE OF THE HOLOCENE-DEEP KIRKHELLAREN CAVE DEPOSITS, COASTAL ARCTIC NORWAY**

Jørgensen, Erlend (NIKU - Norwegian Institute for Cultural Heritage Research) - Martens, Vibeke (NIKU - Norwegian Institute for Cultural Heritage Research) - Solem, Dag-Øyvind (NIKU - Norwegian Institute for Cultural Heritage Research) - Nau, Erich (NIKU - Norwegian Institute for Cultural Heritage Research)

Anthropogenic sedimentary records are increasingly recognized as key archives for archaeological and palaeoecological research, acting as time capsules for reconstructing past states of cultural and natural systems. In this paper, we present a novel methodology for reconstructing formation processes of archaeological depositional sequences by combining multidisciplinary analyses of unique, Holocene-wide cave deposits, located on a remote coastal island in Arctic Norway. The protocol comprises extensive GPR surveying that is correlated with geochemical analysis and

in-situ environmental monitoring for sedimentary fingerprinting and forecasting of future preservation conditions for invaluable post-glacial organic remains. Sub-surface deposit characteristics are then integrated with a high-precision, laser-based 3D-reconstruction of the cave, enabling triangulation with historic photos that facilitate modelling and quantification of erosional history since 1900. The results of the applied protocol showcase detrimental depletion of critical organic heritage that had been preserved for 10,000 years - accelerated by removal of protective and compacted surface layer in the 1930's - as well as sub-surface deposits are trending towards a critical threshold for accelerated in situ degradation. The results act as a direct validation of the methodology, which facilitate the joint spatial distribution and calculation of mass/volume loss following erosion. Measures for future protection of similar archaeological deposits are discussed, as well as outlining the general applicability of the protocol/methodology.

2 CAVES AND ROCK SHELTERS IN SOUTHEAST NORWAY - GIS-BASED ANALYSIS OF LOCATIONS

Gjerpe, Lars Erik (Museum of Cultural History University of Oslo)

More than 1000 caves and rock shelters are known in the South-Eastern region of Norway. This is probably just a part of all such geological formations, as the total number is not known. However, we know a good number of them have been used as living or working spaces during the past 10,000 years. Only a fraction of the sites have been examined for evidence of human activity, and an even smaller part have been subjected to archaeological excavations. Currently, there is no comprehensive review of the material or research on how their use changes over time, but the research potential is large, as will be demonstrated in this paper. Along with a first comprehensive presentation of the record, a systematic examination of the proximity of caves and rock shelters to resources such as grazing lands, arable land, big game, fish, etc., and how these changes over time, will be presented. This provides a potential understanding of both the function of the rock shelters and the use of the landscape. Through a GIS-based study I also point out how this potential can be further utilized.

3 IN SEARCH OF THE NORTHERN PIONEERS: INVESTIGATING THE POTENTIAL OF THE UNEXPLORED CAVES AND ROCK SHELTERS OF KULLABERG, SOUTHERN SWEDEN

Boethius, Adam (Department of Archaeology and Ancient History, Lund University) - Fauvelle, Mikael (Department of Archaeology and Ancient History, Lund University) - Jordan, Peter (Department of Archaeology and Ancient History, Lund University) - Jennbert, Kristina (Department of Archaeology and Ancient History, Lund University) - Fjellström, Markus (Department of Archaeology and Ancient History, Lund University) - Hammarlund, Dan (Department of Geology, Lund University) - Rundgren, Mats (Department of Geology, Lund University) - Heintzman, Peter (Department of Geological Sciences, Stockholm University) - Bennike, Ole (Geological Survey of Denmark and Greenland)

During the Last Glacial Maximum, Fennoscandia was devoid of human life and covered by a vast and thick ice sheet. With the onset of deglaciation, the first land to emerge from the ice in southern Fennoscandia was Kullaberg. Around 17,000 years ago it formed an exposed rocky island whose upper levels contained lakes and wetlands and its side had numerous caves and cliff overhangs. Kullaberg was rapidly colonised by plants and animals found in the Arctic today, evidenced by pollen and plant macrofossils preserved in lakes and peatlands and a bone from a polar bear, which would have been exploiting local seal populations.

The Kullaberg landscape offers a multi-period archaeological sequence, with a significant research history. Numerous lake-sediment and peat sequences and unique archaeological features such as caves and rock shelters are ideal for recovering organic materials and other archaeological and palaeoecological data from the earliest human presence in Fennoscandia. Kullaberg presents unique conditions for archaeological excavation and environmental sampling through geological coring. Furthermore, of 24 known caves only 3 have been excavated, with minor sampling of 2 more. This work has confirmed that the caves yield diverse assemblages that span the Holocene. Kullaberg's complex microtopography also includes multiple rock shelters associated with landing sites and access routes to the sea, none of which have been excavated.

With this paper, we want to address the area of Kullaberg and discuss the possible potential of the multitude of un-excavated caves and rock shelters in the area. We also want to discuss how to approach the uncertainties related to un-investigated potential sites within a natural reserve, where minimal modern encroachment is permitted, and how to correlate and link cave/rock shelter data to environmental data obtained from nearby wetlands.

4 A ROCK SHELTER LANDSCAPE - NEW DATINGS AND RESULTS FROM THE REINHÄUSER FOREST SOUTH OF GÖTTINGEN, LOWER SAXONY, GERMANY

Böckenförde, Tilman (Georg-August-Universität Göttingen) - Riede, Felix (Aarhus University) - Terberger, Thomas (Niedersächsisches Landesamt für Denkmalpflege; Georg-August-Universität Göttingen)

Rock shelters have had a significant impact on the research history of European Pleistocene archaeology. In central Germany, especially in the south of Lower Saxony, about 1600 sandstone rock shelters have been documented, many

of which are archaeological sites. Excavations by Klaus Grote in the 1980s in the Reinhäuser Forest south of Göttingen revealed rock shelters with well-preserved stratigraphies. Most important was the discovery of Laacher See tephra and archaeological layers of the Middle Palaeolithic, Late Upper Palaeolithic (LUP; Magdalenian), and Final Palaeolithic (Federmesser) at a few sites. There are other Magdalenian sites in the upland zone of Lower Saxony and northern Hesse. However, none of them exhibit a comparable quality of organic material preservation. In particular, the rock shelters of Bettenroder Berg IX, Allerberg, and Abri Stendel XVIII have yielded a variety of faunal taxa, including bones with cut marks that provide clear evidence of human activity. Among other things, the analysis of the microfauna has been effective in reconstructing regional climatic conditions. In 2023, re-analysis of the Magdalenian sites and new excavations at Abri Stendel XVIII started. The talk will summarize the new results and discuss the evidence on the background of the Magdalenian sites in the northern upland zone. The area represents the northern border of the Magdalenian territory ca. 15,500 years ago and is a bridge to the LUP sites of the northern lowlands (Hamburgian; GI 1e, ca. 14,700-14,000 calBP). The rock shelters of the Reinhäuser Forest provide an excellent opportunity to characterize the way of life of LUP hunter-gatherers and the climatic conditions of the region around 15,000 calBP and their role in the subsequent re-colonization of the northern lowlands.

5 INTEGRATED METHODOLOGY FOR THE DISENTANGLING OF A COMPLEX CAVE STRATIGRAPHY AT THE MIS-3 SITE OF GERMOLLES IN SOUTHERN BURGUNDY

Andrews, Robin (Early Prehistory and Quaternary Ecology, Department of Geosciences, University of Tübingen)

Cave sites pose a particular problem to archaeologists. On the one hand, they present as striking landmarks and natural shelters, that were often repeatedly used throughout time - but on the other hand they are subject to numerous interwoven site formation processes which produce complex stratigraphies. This is doubly the case for those cave sites which were recognized early in the history of our discipline as exceptional archives of the past and were thus subject to early excavation. The Grotte de la Verpillière I near Germolles in southern Burgundy is one such site. Discovered in 1868, it was already declared to be archaeologically exhausted less than ten years later. Nonetheless, it was repeatedly excavated until the mid-20th century and featured prominently in the contemporary scientific discourse. The site is particularly noteworthy for its exceptional record of the Middle to Upper Palaeolithic transition during MIS3. But its assemblages, while impressive, were perceived to be mixed and incohesive. Recent excavations by a team from the University of Tübingen have uncovered a complex picture of site formation, intercut by old trenches. Isolated pockets of intact sediment have been discovered, but their correlation and integration into a cohesive stratigraphy have proven difficult. Here we present the outline of a methodology to disentangle the complex stratigraphic situation at Germolles. This follows an integrated approach of three main investigations: geoarchaeological profiling of sedimentary processes and episodes of alteration, absolute dating of remains from sedimentary pockets, and comparative analysis of the material culture found within. The goal of the analysis is to reconstruct the sequence of occupations at the site, provide a chronological framework for the region, and allow us to tackle further questions about human actions and interactions during the transition from the Middle to the Upper Palaeolithic in eastern France.

6 LAVA TUBES AS UNTAPPED SOURCES OF NATURAL AND CULTURAL ARCHIVES: CASE STUDIES FROM ARABIA

Stewart, Mathew (Griffith University) - Groucutt, Huw (University of Malta, Malta) - Al Shdaifat, Ahmad (Al al-Bayt University, Jordan) - Richter, Tobias (University of Copenhagen, Denmark)

In recent years, archaeological research has spotlighted the key role that the deserts of Southwest Asia played in the emergence of the Neolithic. While discussions regarding Neolithization have traditionally centred on the Fertile Crescent, recent research points to key cultural developments in the arid regions to the south and east. Here, the Neolithic took on a unique form with subsistence economies centred around highly mobile cattle and caprid herding supplemented with hunting, foraging, and trading. This period also saw a drastic rise in anthropogenic impacts on dryland ecosystems. Human activities such as husbandry and overhunting are believed to have significantly reduced landscape stability and driven desertification, simultaneously diminishing vegetation, and reducing ecosystem productivity.

Despite these recent progresses, our understanding of the region remains constrained by the limited available palaeobiological and palaeoenvironmental records. This is particularly the case when contrasted to neighbouring areas like the Levant and eastern Africa where conditions for the preservation of organic materials are more favourable. There is therefore a desperate need to locate settings in these dryland ecosystems conducive to the preservation of organics. Here, we report on our preliminary work on lava tubes from two regions—Harrat Khaybar in Saudi Arabia, and Harrat al-Sham in eastern Jordan. Although these sites have long been known, none have been subjected to systematic archaeological survey or investigation. Our pilot work revealed that these protected cave sites contain copious amounts of exceptionally preserved faunal remains—as well as cultural materials—dating as far back as Neolithic. Lava tubes therefore have tremendous potential to fill in the large gaps in palaeobiological data in a region where the preservation of organic materials is otherwise remarkably poor.

7 DIFFERENTIATED USE OF ROCKSHELTERS RELATED TO CHANGES IN THE AGRICULTURAL SETTLEMENT DURING THE EARLY IRON AGE IN SOUTHWEST NORWAY

Meling, Trond (Museum of Archaeology, University of Stavanger)

There is consensus among archaeologists that rockshelters in the lowland of the southern part of Norway were occupied at a seasonal basis during the Early Iron Age by local farmers who had their main settlements within the agrarian landscape. However, the use and exploitation of rockshelters has been very diverse during this period. While some were visited sporadically and for short periods only, others have thick cultural layers and a variety of archeological and faunal remains revealing a wide range of activities and a more regular use.

During the Early Iron Age, there were also major changes in the agricultural settlement in this region, particularly in how farms were organized and structured in the landscape. In the Pre-Roman Iron Age existing farm areas expanded and new land was cleared to facilitate farming, grazing and the construction of settlements, while the farms became more fixed with a permanent location in the landscape during the Roman and Migration Periods.

In this paper, I discuss how the changing settlement structure may have influenced the occupation of rockshelters in Rogaland, Southwest Norway. The focus will be on why some rockshelters were abandoned during the Early Iron Age, while the use of others was taken up, changed character, or became more intensified.

8 REVISITING THE CAVE DOLLSTEINHOLA AT THE NORWEGIAN COAST

Bergsvik, Knut Andreas (University of Bergen, Norway) - Meijer, Hanneke (University of Bergen, Norway)

The cave Dollsteinhola at Sandsøya, Southern Sunnmøre is situated at the top of a steep talus slope facing the North Sea. It has been formed by sea-waves and a rockshelter in front was investigated during 1951-54 by the archaeologist Erik Hinsch. His excavations yielded a large faunal assemblage with shells and over 70.000 bones, as well as bone tools and stone artifacts. Radiocarbon dates performed during the 1980s and evaluations of the lithic tool assemblage has indicated an age range of the deposits spanning 6600-3600 cal BP. The site has, however, remained largely unpublished until now. We have therefore launched a new project where the first step is to re-date and evaluate the stratigraphy of the site. This is necessary because we cannot be sure about the precision of the 1950s excavations, and the character of the occupations. A second step is to perform a new analysis of the long-term human use of Dollsteinhola. The new and extended radiocarbon dating efforts has given good results, as the nineteen new dates from four units clearly indicate that the 1954 excavation was carried out with sufficient precision. This has prompted us to move forward with re-analyses of the osteological and artefactual materials. The new radiocarbon dates indicate that the faunal sequence of Dollsteinhola is much longer than previously thought and covers most of the Holocene. The faunal and archaeological data suggests that different accumulating agents were present within the Dollsteinhola assemblage at different time periods. Although the first evidence for humans along the Norwegian west coast coincides with our earliest dates, the first human activity at Dollsteinhola appears to start in the Neolithic phase. From then on, like many other caves and rockshelters along the Norwegian coast, it was used for short term occupations until the early Iron Age.

9 THE EARLY ARCHAEOLOGISTS AND THE ISSUE OF MEDIEVAL AND POST-MEDIEVAL RECORDS FROM THE CAVES OF THE CRACOW UPLAND (SOUTHERN POLAND)

Wojenka, Michal (Institute of Archaeology Jagiellonian University)

The Cracow Upland, a karstic-rich region situated in southern Poland, is a benchmark for Polish speleoarchaeology. The caves and rockshelters situated there have been attracting professional and amateur archaeologists since 1870s. In this area, as elsewhere in Central Europe, the first decades of scientific interest resulted in broad-scale excavations in caves. This early examination has brought to light a large number of finds. Apart from prehistoric objects, these include thousands of medieval and post-medieval artefacts.

The aim of this paper is twofold. First, I would like to focus on the actual state of preservation and examination of the finds representing historical periods, discovered during the early stages of archaeological excavations (1871-1918/1919). To see the scale of losses resulting from the methods then applied, the material in question will be compared with assemblages obtained from modern-era archaeological excavations in cave sites. Secondly, I would like to describe the current scientific potential of both the material unearthed and the sites explored by the pioneer archaeologists. As evidenced by the most recent studies, the informative potential of both in many cases is still high.

10 NEW EXCAVATION OF CAVES AND ROCKSHELTERS IN RUŽÍN (EASTERN SLOVAKIA): PRELIMINARY RESULTS OF MULTIDISCIPLINARY RESEARCH

Nemergut, Adrián (Institute of Archaeology, Slovak Academy of Sciences, Nitra) - Soják, Marián (Institute of Archaeology, Slovak Academy of Sciences, Spišská Nová Ves) - Lisá, Lenka (Institute of Geology, Czech Academy of Sciences, Praha) - Hajnalová, Mária (Constantine the Philosopher University in Nitra) - Orvošová, Monika (Slovak Museum of Nature Protection and Speleology, Liptovský Mikuláš) - Čejka, Tomáš (Institute of Botany, Slovak Academy of Sciences, Bratislava) - Popovičová, Lucia (Institute of Archaeology, Slovak Academy of Sciences, Nitra) - Mihályiová, Jana (Institute of Archaeology, Slovak Academy of Sciences, Nitra) - Čeklovský, Tomáš (Slovak Museum of Nature Protection and Speleology, Liptovský Mikuláš) - Obuch, Ján (Slovak Museum of Nature Protection and Speleology, Liptovský Mikuláš)

In the Ružín krast (Eastern Slovakia), several caves with evidence of prehistoric human presence were excavated during the 19th and 20th centuries. The most famous are the Veľká ružínska Cave, the Antonova Cave and the Medvedia Cave. The Palaeolithic occupation was identified in the Veľká ružínska Cave and the Mesolithic finds were found in Medvedia Cave. Veľká ružínska and Antonova Caves were intensively used in the Neolithic period.

The aims of the new excavations which started in 2022 at the Miriama rock-shelter and continued in 2023 at the Veľká ružínska Cave were to verify Palaeolithic and Mesolithic occupation, clarify the stratigraphy of the sites and obtain palaeoecological data for validation of existing hypotheses regarding the evolution of climate and environment and their impact on prehistoric human societies in the (micro)region.

Our results show that the sediment formation in the Miriama rock-shelter occurred between 9.3–4.7 ka uncal BP with the main occupation horizons during the Mesolithic, Neolithic and Eneolithic periods. New excavation in the Veľká ružínska Cave exposed deposits and artefacts associated with the Upper Palaeolithic (26-30 ka uncal BP) and the Neolithic (6.1 ka uncal BP) occupations.

In this paper, we present results of integrated analysis of stratigraphy, soil chemistry micromorphology, artefacts (lithics, pottery, an antler point artefact), ecofacts (faunal and floral remains) and their radiocarbon dating.

11 LEGACY EXCAVATION IN THE FRANCONIAN JURA. CHALLENGES AND OPPORTUNITIES

Burgdorf, Phil (University of Bamberg)

The Franconian Jura is a low mountain range located in southern Germany and one of the largest karst landscapes in the country. During four hundred years of research, artefacts from the Palaeolithic to post-medieval periods were discovered in over 300 caves. Over 600 research activities in caves resulted in a substantial amount of legacy data being held by local collections and institutions. There are several challenges associated with legacy data, including lack of documentation, fragmentary finds, and chronological issues. This combination often leads to challenges in the interpretation. Unfortunately, researchers often fail to recognize or take advantage of the potential of this legacy data. We challenged this data in a research project.

Human remains were deposited in many vertical caves of the Franconian Jura for an extended period of time. There is an ongoing discussion about whether these human remains are related to burials or other types of body rituals. Data from legacy excavations from the early 20th century are used to provide a valid database for evaluating a selection of sites with anthropogenic deposits, including human remains.

The outstanding preservation of bones provides ideal conditions for C14-samplings, analysis on Stable Isotopes and aDNA. A series of C14-datings sampled from human bones revealed much more deposition phases than represented by the enclosed finds. Some of the preserved floor plans illustrate the distribution of finds, providing the opportunity to create a simple distribution pattern. These patterns are mandatory to answer the question of how the human remains (bodies) and artefacts were deposited. Newly discovered caves, as well as well-known sites, have the potential for further excavations. However, legacy data will still be required for evaluating many cave sites. Therefore, it is important to create strategies that allow a comparison of legacy excavations from different areas.

1151 TIME FOR BIG CHANGES: TRANSFORMATIVE AND PERSISTENT IMPULSES IN THE 4TH AND 3RD MILLENNIA BC EUROPE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Diniz, Mariana (Centre for Archaeology - UNIARQ; School of Arts and Humanities; University of Lisbon) - Cerrillo, Enrique (Dpto. de Prehistoria, Historia Antigua y Arqueología; Facultad de Geografía e Historia; Universidad Complutense de Madrid) - Gottardi, Corina (University of Bern) - Schiess, Delphine (University of Bern) - Nordqvist, Kerkko (Helsinki Collegium for Advanced Studies)

Session format: Regular session

After the first agro-pastoralist societies spread throughout Europe, persistent features—such as agriculture, husbandry, and village life, among others—entered the landscape and became a main element of European prehistoric trajectories. These communities, first part of wider cultural entities, as the Linearbandkeramic or Impressa circles, developed into more regionalized groups, where, however, big trends as Megalithism reflect how deeply connected those societies were.

By the end of the 4th millennium and during the 3rd millennium BC, a Great Acceleration—similar, but at a different scale, to the one that characterizes the 3rd millennium AD—took place in diverse areas of Europe.

The archaeological record reflects an unprecedented demographic growth and complexification of economic, technological, pottery production, social, and symbolic aspects of life and death, strongly related to inter-regional and long-distance contacts.

This session welcomes all who want to debate the ways and scenarios in which the 4th and 3rd millennia BC Big Changes took place, from demographic growth to settlement patterns, exotic consumption, and social changes also paying attention to enduring features that, side by side with change, shaped prehistoric societies.

ABSTRACTS

1 THE INTENSIFICATION OF THE 4TH MILLENNIUM CAL BC IN SOUTHWESTERN IBERIAN PENINSULA: A COMPREHENSIVE EVALUATION FROM MULTIPROXY DATA

Cerrillo-Cuenca, Enrique (Dpt. of Prehistory, Ancient History and Archaeology, Complutense University, Madrid, Spain; GIAP - Grupo de Investigación en Arqueología Prehistórica, Complutense University, Madrid, Spain) - Almeida, Nelson (Department of History, University of Évora, Évora, Portugal; Uniarq, Centre for Archaeology, University of Lisbon, Lisbon, Portugal)

In the trajectory of the Late Prehistory in the Iberian Peninsula, the clearest processes of intensification apparently occur during the transition from the 5th to the 4th millennium cal BC and during the 3rd millennium cal BC. Various indicators from the archaeological record have been used to identify the nature, intensity, and significance of these processes of social, ideological, and technological transformation.

With the configuration of communities at the end of the Neolithic, exchanges of personal adornment items have been taken as indicators, but also the very entity and diversity of megalithic architectures. However, even with an archaeological record that is not very expressive and biased, it is necessary to evaluate this increase with indicators such as the intensity and variety of landscape occupation and the chronometric models, to which we can associate other evidence such as archaeozoological data, since the exploitation of other biotic resources is still scarcely characterized. This communication aims to present the still open questions and explore avenues that allow explaining the nature and scope of the transformations that occurred in the 4th millennium cal BC in southwestern Iberian Peninsula, especially the basins of the Tagus and Guadiana.

2 BETWEEN THE 4TH AND 3RD MILLENNIUM BC IN ALTO DOURO (NORTH OF PORTUGAL). WHAT HAPPENS IN THE LANDSCAPE

Muralha, João (FCSH / Universidade Nova; CHAM)

In the Portuguese Alto Douro region (North of Portugal), between the 4th and 3rd millennium BC, we witnessed major transformations in the archaeological record, especially in the type of geomorphological implantations of archaeological sites. While in the 4th millennium BC the settlement was of low density, small open-air settlements, and occupations in rock shelters, from the beginning of the 3rd millennium, there were changes. We will find them at the top of major geomorphological specificities, on ridges, in plain areas, on mid-slopes and at the bottom of valleys. There is also diversity in terms of the structures found, in the 3rd millennium BC they seem to become more complex. There also appears to be demographic growth if we look at the number of new archaeological stations and, among those that have been excavated, the quantity and diversity of objects is surprising. With this communication we intend to make

3 AGRA DO CASTRO. A CONTRIBUTION TO THE UNDERSTANDING OF THE 3RD MILLENNIUM BC IN BEIRA LITORAL (PORTUGAL)

Branco, Gertrudes (University of Évora/(CHAIA))

In the last two decades, Portuguese archaeology has been dominated by preventive and minimization actions, which account for around 95% of the work carried out, with a total of more than 1,800 authorizations granted each year (data from 2023).

This work has produced a growing amount of archaeological data which, unfortunately, does not translate into an exponential increase in the volume of knowledge, produced and shared, about the dynamics of occupation of territories, of life and death, during the different (pre)historical eras.

In this context, take place various interventions, since 2003, at the archaeological site of Agra do Crasto (Aveiro), located at one of the western extremes of the European continent, on the northwestern Atlantic coast, in the current lagoon environment of Aveiro (Aveiro, Portugal).

Preliminary studies show the existence of material and structural evidence documenting a temporary occupation, apparently discontinuous, from the Ancient Neolithic, Chalcolithic, Iron Age, medieval and subsequent historical periods.

Our contribution results from the analysis of the documentation produced, and the study of the materials collected, during the archaeological work carried out, which report an intervention, at different times and in different places, in three negative structures, interpreted as “ditches”, consistent with an occupation from the Chalcolithic period.

Could the archaeological site of Agra do Castro be the westernmost testimony to a phenomenon of cultural identity that extends from the Iberian Peninsula to northern Europe during recent prehistory, with “ditch enclosures” as one of its monumental expressions?

How can this site be integrated into the process of neolithization of Beira Litoral, which, according to some authors, was accompanied by the construction of ditch enclosures, walled enclosures and megalithic monuments?

What is the contribution of preventive and minimization archaeology to clarifying these questions regarding the knowledge and chrono-cultural integration of the Agra do Crasto archaeological site?

4 DIFFERENT FEATURES FOR DIFFERENT WORLDS? POSITIVE AND NEGATIVE ARCHITECTURES DURING THE CHALCOLITHIC IN CENTRAL AND SOUTHERN PORTUGAL

Ribeiro, Inês (CHAIA/Universidade de Évora) - Diniz, Antonio (CHAIA/Universidade de Évora) - Almeida, Nelson (CHAIA/Universidade de Évora) - Rocha, Leonor (CHAIA/Universidade de Évora)

The last decades were marked by the development of new techniques and areas of research that have also been applied to the 3rd millennium BCE European archaeological records. In Portugal, this development was accompanied by an empirical “revolution” due to the identification of numerous ditched enclosures. This, together with the previously known records of walled enclosures, makes Central and Southern Portugal an interesting and privileged scenario in which to discuss different dynamics related to the Chalcolithic.

The Chalcolithic archaeological record has been widely discussed, also concerning territorial occupation and exploitation dynamics. Within this topic, there has been a growth focused on the spatial and chronological evidence related to ditched and walled enclosures. These two realities tend to be separated by archaeologists, being mostly evidenced in different parts of the country, with walled sites in the Estremadura region but also occurring further South, and ditched enclosures concentrated in the latter areas. Nonetheless, as it happens elsewhere (e.g., San Blas, Cheles, Spain), these types of features can “coexist” in the archaeological records (e.g., Monte da Ponte, Évora, Portugal).

In this communication, we will sum up existing evidence concerning the location, typology, chronology and associated materials for enclosures in Central and Southern Portugal that were submitted to archaeological excavations. We aim to contribute to discussions on their paper in the broader spatial organization and distribution, their main similarities and differences.

5 BURIAL TAPHONOMY AND MEGALITHIC RITUAL PRACTICES IN IBERIA: THE PANORÍA CEMETERY

Vílchez Suárez, Miriam (University of Granada) - Aranda Jiménez, Gonzalo (University of Granada) - Díaz-Zorita Bonilla, Marta (University of Tübingen) - Robles Carrasco, Sonia (University of Granada) - Sánchez Romero, Margarita (University of Granada) - Milesi García, Lara (University of Málaga) - Becerra Fuelle, Paula (University of Granada)

The bioarchaeological study of collective tombs involves facing complex ritual practices determined by the special nature of these archaeological contexts. The frequent use and reuse of megalithic monuments has created multiple ritual deposits consisting of masses of stratified, fragmented and mixed human bone remains that are found piled on top of each other. Understanding the formation of these bone assemblages is essential to be able to construct accurate narratives about megalithic funerary rituals and possible differences in mortuary treatment between the 4th and 3rd millennia BC. The cemetery of Panoria (Darro, Granada) offers an excellent opportunity for exploring the ritual variability through the study of funerary taphonomy, as four of the nine recently excavated dolmens are in a remarkable state of preservation (Tombs 3, 10, 11 and 15). Based on a multi-proxy approach different variables such as the characteristics of the archaeological context, taphonomic agents, the application of statistical indices of bone representation and preservation, and radiocarbon dating were integrated and interrelated. From this approach, three main ritual practices have been outlined: i) Primary sequential inhumations followed by the differential in situ decomposition of skeletal remains; ii) The selective removal of crania and long bones; and iii) The curation of subadult bone remains. The use-life of tombs, the intensity of mortuary depositions and the intentional protection of specific bones appear as key aspects for understanding the variability in bone assemblage formation.

6 "I COULD BRING YOU JEWELS - HAD I A MIND TO". FROM "EXOTIC" GRAVE GOODS TO INTERREGIONAL CULTURAL INTERACTION

Corga, Mónica (UNIARQ - Centro de Arqueologia da Universidade de Lisboa. Faculdade de Letras de Lisboa; Morph | Grupo Dryas) - Almeida, Miguel (Morph | Grupo Dryas; UNIARQ - Centro de Arqueologia da Universidade de Lisboa. Faculdade de Letras de Lisboa) - Aubry, Thierry (Fundação Côa Parque; UNIARQ - Centro de Arqueologia da Universidade de Lisboa. Faculdade de Letras de Lisboa) - Aires, Sílvia (Fundação Côa Parque; Instituto de Ciências da Terra - Pólo da Universidade do Porto)

An important period for understanding European history, the 3rd millennium BC is characterised by the emergence of dominant centralities, progressive social stratification, geographic expansion of cultural, political, and symbolic interactions, intensification of natural resource exploitation, and the anthropization and monumentalization of landscapes.

The ditched enclosure of Porto Torrão (Ferreira do Alentejo, Portugal) is one of these Iberian central places, preserving a remarkable range of mortuary practices and contexts from the end of the 4th to the end of the 3rd millennium BC. Human remains are found both within and outside the enclosed area, in ditches, pits, or collective tombs, in clusters or isolated, as primary depositions or displaying intense manipulation.

In the tholos type tombs of Horta do João da Moura 1, located outside Porto Torrão, the existence of large-scale economic and social interaction networks is purposefully made visible during funerary performances through the introduction of foreign goods in greater quantities and variety than before. These include lithic tools, gold artifacts, cinnabar, limestone vessels, and marine shells, documenting interactions with different peninsular areas.

Considering the potential of mortuary behaviours to display, but also to create, and recreate social and political relations, we compare these "exotic" grave goods from Horta do João da Moura 1 to those from other funerary contexts in Porto Torrão, such as the rock-cut tombs of Monte do Carrascal 2, in order to discuss their ontological place in ritual performances, the persistence, disappearance, and change of their intentional and tangible outcomes that may shed light on the evolution of the attitudes towards death and the dead, as well as the underlying economic, social, and cosmological order.

1154 STONE AGE THEORY IN AN UNDEFINED PARADIGM: GEN-Y TO Z, THIRD SCIENCE REVOLUTIONS TO NEW MATERIALISMS

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Blaesild, Paulina (University of Gothenburg) - Kilhavn, Håvard (University of Stavanger) - Solfeldt, Erik (Stockholm University)

Session format: Workshop

The aim of the workshop is for Stone Age archaeologists to come together and discuss the positions of current theoretical perspectives within Stone Age archaeology. We are especially interested in the voices of early career Stone

Age archaeologists. Does it make sense to talk of a theoretical "mainstream" within Stone Age archaeology today, or has the field become so theoretically diffused that no such mainstream exists? Have we lost capacity to judge out mainstreams in today's discussion climate (or, were we ever capable?). What are the main theoretical "schools" we encounter in the current "PPP", "tech-individualist" or "representationalist" era, how do they relate to one another?

We experience increasing tendencies towards theoretical specialization and less engagement, dialogue across theoretical divides of the kind characterizing for the 1990s and early 2000s. We believe the implosion of previous theoretical jargon has restricted ways of interacting across discursive borders, where conflict is avoided through silenced dialogue. We also note increased tendencies towards focuses on practice and proxy rather than interpretative framework, maybe as a result of the so-called "third science revolution". This situation will not result in less interpretative archaeologies but instead, in obscured knowledge production and blurry narration of the past. We welcome a discussion about how contrasting theoretical approaches may enter into dialogue about commons and uncommons: to the benefit of both. The workshop will provide space for inclusive, friendly, and informal discussions, and we welcome participants with diverse backgrounds and interests. At the end of the workshop, our aim is that all participants will contribute to identifying central, theoretical issues in Stone Age narration. Using this framework, participants will also get an opportunity to connect with others equally interested in Stone Age archaeology and theory as well as the wide range of possible and strange combinations between the two.

1155 DOWN MEMORY LANE. RECURRENCES IN TRANSFORMING LANDSCAPES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: La Rosa, Lorenza (University of Oslo) - Campus, Antonio (University of Pisa) - Limina, Valentina (F.R.S - FNRS; Université catholique de Louvain)

Session format: Regular session

When tracing the history of a place, it is possible to notice how the same settlement choices can recur over time despite caesuras, changes, and transformations. Intentional and unintentional dynamics variably impact on landscape and the recurrence of scenarios can lead to question how strong the territorial vocation and the permeating memory are. Previous human actions might in fact orient following choices through long lasting transformations, creating new opportunities or imposing restrictions in new landscape arrangements.

In this session, we want to focus on how various agencies and their reciprocal interactions participate in the creation of landscapes; by emphasizing how choices can re-occur through time, we want to assess the role of memory in the construction of palimpsests. Memory is intended both as the collection of traces of previous actions embedded in a multi-layered landscape and the collective memory that engages a community of people in the social construction of a dwelt landscape.

Indeed, in a behavioral perspective, a landscape is a system defined and populated by the interactions that take place in it. This dialogic systemic view could help to highlight how recurrences and adaptations contribute in the development of a landscape and define a responsive path of choices, re-balancing a rigid dichotomy on positive and negative outcomes, and strengthening instead the repeated and prolonged efforts to negotiate with environmental features.

We welcome papers which investigate traces of change, mitigation or adaptation in landscapes, by highlighting relationships in various activities (i.e. productive, infrastructural, and settlement dynamics) and assessing how previous practices and traditions can affect forthcoming human reactions to environmental and socio-political transformations.

ABSTRACTS

1 MARGINAL MEMORIES. SOME REFLECTIONS ON MYTHS AND PERCEPTIONS OF GEOTHERMAL AND VOLCANIC LANDSCAPES IN THE ITALIAN PENINSULA

Lancini, Loredana (Université Catholique de Louvain) - Limina, Valentina (FNRS - Université Catholique de Louvain)

Studies investigating the relationship between landscape and memory within a combined anthropological and archaeological framework are still rare. Yet, this promising approach can shed new light on the perception of a given landscape not only as the sum of physical factors but as a space of shared experiences. Particular landforms can activate models of representations and peculiar narrative patterns to deal with environments merging in the collective memory. The paper focuses on two case studies (Sicily and Northern Tuscany) to reflect on the impact of landscapes featured by geothermal and volcanic phenomena in building local memory. Due to their peculiarities, these landscapes were considered marginal. Through a diachronic perspective, integrating literary sources, toponyms, archaeology, geomorphology, etc., the aim is to demonstrate these areas' centrality to the territory's historical development. In the territory of Volterra, which fascinated authors from antiquity to the contemporary era because of its peculiar land-

scapes, the toponyms in the areas of Larderello, Bagno a Morba, Bagno della Leccia, and the archaeological remains led us to reassess the importance of these 'fragile' and 'marginal' zones where myths and religion blurred with political control and management of resources. In Sicily, ancient authors recorded stories related to the volcanic landscape and the perception of its danger; later, Christian legends, tales of travelers of the Grand Tour, and contemporary folklore pick up on similar narrative patterns. These case studies will enhance our understanding of how oral histories constitute a common ground, strengthening the sense of territorial rootedness and contributing to the reaffirmation of identities. Moreover, by approaching the case studies with a flexible anthropological approach and considering modern oral sources, it would be possible to reflect on the recurrent topoi in perceiving those 'marginal' and still inhabited landscapes often central to local economies and identity.

2 EXSULTANTIBUS UNDIS. THE RIVER ACI AS LANDSCAPE MAKER, BETWEEN AFFORDANCE AND MEMORY.

La Rosa, Lorenza (University of Oslo)

A famous myth told by Ovid (*Metamorphoses* 12.750-897) recounts the tragic story of the young shepherd Aci killed out of jealousy by the Cyclops Polyphemus and transfigured into a river. The Aci River flowed in eastern Sicily, just north of Catania, and gave its name to the Greek-Roman settlement that developed near it. Although the river is no longer visible, its memory is still alive and persists in the place-names: every town it once streamed through retains the prefix Aci to its name, furthermore its river mouth is still called "u sangu di Jaci" (the blood of Aci).

The site of Santa Venera al Pozzo (Catania, Sicily, Italy), the ancient settlement of Acium, is an archaeological palimpsest, consisting of multi-temporal features dating from the Hellenistic age to the 17th century. The evidence of the long-lasting human presence in the area is constantly connected to water, not only in the form of the river, but also of a sulfurous water thermal spring. The early Hellenistic sanctuary and settlement, the Roman baths and mansio, then the Late Antique ceramic production district, and finally the medieval and modern church and hospital, all relates to the availability of water as a resource and to the symbolic and curative properties of thermal water.

This paper aims to explore the development of the site of Santa Venera al Pozzo and its surroundings: a focus on multi-temporal history has the potential to overcome the traditional narrative dominated by the monumental Roman remains, and to show how collective memories and past experiences can delineate continuity and cohesion in community choices and shape the identity of a place.

3 GINOSA PROJECT: THE SETTLEMENT CONTEXT OF MADONNA DATTOLI SITE BETWEEN OLD EXCAVATIONS, RECENT ACQUISITIONS AND RENEWED INTERPRETATIONS

Piccenna, Simona (University of Bari Aldo Moro) - Stasi, Virginia (University of Bari Aldo Moro) - Moro, Angelo (Freelance Archaeologist) - Fioriello, Custode (University of Bari Aldo Moro) - Cerri, Laura (Freelance Archaeologist) - Rotondo, Roberto (National Superintendency for Underwater Cultural Heritage)

The knowledge of the history of the human population during ancient time around Ginosa (Taranto-Puglia-Italy) has been enriched with evidence and reflections that contribute to review the historical profile and landscape framework.

This research is part of the 'Ginosa Project': Archaeology and Landscapes', launched in 2020 under the coordination of C.S. Fioriello, in collaboration with the National Superintendency for Underwater Cultural Heritage and in agreement with the local Municipality. The investigations included the systematic analysis of the context of Madonna Dattoli, located approximately 3.5 km SE of the urbanized area of Ginosa; geophysical prospecting was carried out in the area using a magnetometer technique that can deal with both field acquisitions and interpretative data processing.

The results obtained make it possible to identify numerous linear shape anomalies generated by buried masonry structures, probably to be associated with the distinct dynamics of occupation of the site, which occurred from Roman ages, until the Late Antique and early Medieval period at least.

The settlement of Madonna Dattoli is closely and traditionally linked to the presence of water, which has thus marked the entire context over time and determined both its functional use and its sacred and ritual significance. This is evidenced not only by the recognition of even minimal structural evidence dating back to Roman period (nymphaeum, underground aqueduct, rooms with waterproof floor and wall sheathings), but also by the rural church (founded in Paleochristian times, rebuilt by Benedictine monks, renovated in modern times and still in use today) linked to the presence of water to which popular tradition assigns health-giving and therapeutic properties.

This presentation serves as a preliminary glimpse into the rich archaeological landscape of Ginosa, presenting the first results of the 2023-2024 archaeological excavation campaign, and sets the stage for further exploration and scholarly inquiry into this significant site.

4 CROPS AND MARSHLANDS, LAND USE AND RECURSIVE SETTLEMENT CHOICES IN THE AGER PISANUS (TUSCANY, ITALY)

Campus, Antonio (University of Pisa)

In Roman times, the territory of Pisae (Tuscany, Italy) was considered particularly fertile (Strab. 5, 2, 5) and must have been widely cultivated if Pliny (N.H. 18.86-87 and 109) refers to its cereal production.

This fertile and economically advantageous representation of the Pisan territory seems to be confirmed by the demographic explosion that the area experienced during the 1st-2nd centuries CE when, as a result of colonial deduction (44-31 BCE), the agrarian complexes multiplied and the settlement pattern extended, reaching its maximum expansion.

The long-term perspective from the Hellenistic age to Late Antiquity adopted in this paper contributes to refine this picture, delineating a mutable environment and emphasizing the prolonged and continuous human effort to negotiate with environmental dynamics. The adaptive nature of human communities in response to environmental, economic and socio-political transformations is revealed by recursive settlement choices even in apparently counter-intuitive instances, such as iterated occupations of areas prone to swamping and the simultaneous abandonment of apparently more suitable neighboring areas.

Applying GIS and R-based analyses, the paper explores the multiple agencies involved in settlement and land use choices from a behavioral perspective. In this way, patterns of settlement growth, contraction and/or reorganization are examined in their environmental context in order to highlight, on the one hand, the human response to changing circumstances and, on the other, the tendency to maintain previous orders, even when changes appear to undermine their balance.

5 FROM CRAFTSMANSHIP DISTRICT TO CITY AND BACK AGAIN. THE CASE OF PISA BETWEEN THE LATE REPUBLICAN AND LATE ANTIQUE PERIODS

Caroti, Alberto (Sapienza Università di Roma) - Fabiani, Fabio (Università di Pisa) - Genovesi, Stefano (Università degli Studi di Napoli "Federico II")

The urban layout of Roman Pisa remains largely elusive today due to environmental transformations and the overwhelming monumentality of the medieval city. Archaeological investigations conducted by the University of Pisa are revealing the close interrelationship between the city and the suburban area and their changing dynamics over time, with mutual expansion or contraction under the influence of local processes and broader historical contexts. In particular, at Piazza Andrea del Sarto, near the famous Piazza del Duomo where the now-disappeared river Auser flowed, research has revealed that between the late Republican and Augustan periods, the city had expanded into this area with a quarter characterized by rich domus. Investigations have also revealed that both before and after the development of the residential quarter, the area had experienced similar uses. Initially, it was occupied by buildings used for agricultural and artisanal purposes, particularly for ironworking to supply tools destined for shipbuilding industry carried out near the river. Later, in the late antique period, when the domus structures disintegrated and the city underwent a process of becoming more village-like, the area reverted to being used for artisanal activities, with workshops once again dedicated to ironworking for tools destined for a local market. What emerges, therefore, is the close interconnection between urban and suburban areas, and the adaptive nature of the urban landscape over time.

6 FROM DESTRUCTION TO RENAISSANCE: CONTINUITY AND DISCONTINUITY IN LUCCA'S MEDIEVAL URBAN LANDSCAPE

D'Antoni, Francesco (Sapienza University of Rome)

The current layout of cities with a millennium-old history typically reveals a palimpsest of the human activities and natural events that have taken place within the urban centre.

Considering the destructive phenomenon as a point of connection rather than a break, the purpose of this paper is to analyse the transformations that have influenced Lucca's medieval appearance, emphasizing the functional continuities and discontinuities that occurred in remodelled spaces.

This work will develop considering archaeological records, written sources, and the persisting medieval buildings. To highlight the remaining aspects of the medieval city, firstly we will look at the medieval remnants in the urban centre. Subsequently, this study will outline an historical account of the events that transformed Lucca since the Early Middle Ages (construction or renovation of churches, construction of military infrastructures, construction of new districts, etc.).

Furthermore, the focus will be projected around four of Lucca's main squares that were investigated by archaeological excavations: Piazza San Michele, Piazza Napoleone, Piazzale Verdi, and Piazza dell'Anfiteatro. By examining the connections between the different structures that have succeeded one another over time, the study of these urban areas

will enable us to comprehend the various processes that took place inside and outside the medieval city. According to this viewpoint, archaeological data will not be viewed as isolated accounts of a particular historical era, but rather as evidence influenced by a process of change that has its origins in the destructive event.

This work is part of a PhD project that involves creating an archaeological dataset to investigate and evaluate the changes that occurred within the modern-era walls of Lucca from the sixth to the sixteenth centuries.

7 FRAGMENTS OF AGRARIAN LANDSCAPES IN VAL DI CORNIA: RECURRENCES AND CHANGES OF AGRICULTURAL SPACES BETWEEN 18TH AND 20TH CENTURIES

Plateroti, Francesca (University of Siena) - Zanini, Enrico (University of Siena)

The Val di Cornia is a plain located next to the Piombino promontory, in the northern part of Maremma, Tuscany. A vast lagoon – known as Falesia – characterized this peculiar environment, inhabited and exploited since prehistory. This long-term occupation is documented by the archaeological site of Vignale, a villa rustica attested from III century BC to IX century AD.

During the 18th century, the heritage of the ancient settlement was symbolically embraced by an extensive agricultural estate, the tenuta di Vignale. The estate would exert a profound influence on the shaping of a pastoral and agricultural landscape, while simultaneously stimulating an initial urbanization and the maintenance of certain road structure. Finally, during the 1950s, the estate was affected by the Riforma Agraria laws; many fields were expropriated and distributed to farmers, causing the parceling and the urbanization of the estate, but also a homogenization of the agrarian landscape.

This paper aims to show changes and recurrences in the exploitation of agricultural landscapes in Val di Cornia between the 18th and 20th centuries. This study – developed as part of the current research conducted by the University of Siena on the archaeological site of Vignale – focuses on three elements: road system, farmhouses, and wetlands management, investigated through an archaeological point of view. This research therefore involved consulting and collecting available archival and photographic data, which were compared with the evidence collected on the field and then processed through QGIS.

In conclusion, the study of an agrarian landscape of the recent past seems particularly fascinating in the perspective of understanding the most recent transformations of this area and in the attempt to connect the local population to its heritage, to be considered as a “group of resources inherited from the past” as suggested by Faro Convention.

8 COMMUNITY MEMORIES PAINTED ON FACTORY SILOS: THE SECOND LIFE OF AN ECO-MONSTER OUTSIDE ROME AND A NEW IDENTITY LANDSCAPE

Bernardi, Martina (Roma Tre University)

Some urban and rural landscapes are characterized by the remains of abandoned factories, now transformed into artifacts related to industrial archaeology. These structures in the past strongly defined the identity of communities, particularly of the working-class society that developed around the production centers.

A specific case study is the complex of the quarry and the cement factory ‘CIDI’ near the hamlet of Marcellina, located about 30 kilometers northeast of Rome. This site represents a unique example of landscape changes in a rural context, closely tied to the community it once served.

This entire area has served as a quarry for an extended period due to the presence of limestone and travertine stones, which have been excellent resources for the production of building materials and lime from the Roman period up to the present day.

The factory, abandoned in the 1970s, has been recently transformed into a landmark in the contemporary landscape thanks to a project of valorization culminating in the permanent exhibition of wall paintings realized on the disused silos and depicting the past workers of the factory. The deteriorating building acts now not only as a memory marker but also as a new identity symbol integrated within the landscape, thanks to the narration of the local community’s past in the painted images.

This paper aims to illustrate through an archaeological approach how abandoned industrial complexes can acquire new significance for the community. It explores how repurposing these structures through innovative solutions can integrate them as new placemaking in the landscape while keeping the memory of the previous history. This virtuous mechanism can also create connections between the building and the local population to provide new meanings for this anthropic element, transforming them from eco-monsters into identity symbols for the community.

9 WHEN THE PAST HITS THE HERDSMAN: DIACHRONIC ANALYSIS OF AN AGRO-PASTORAL BORDER LANDSCAPE IN MARCESINA PLAIN (NORTHERN ITALY)

Zecchinato, Sara (Department of History, Humanities and Formation – University of Sassari) - Azzalin, Giovanni (Department of History, Humanities and Formation – University of Sassari) - Magnini, Luigi (Department of Humanities – University of Venice) - De Guio, Armando (Department of Cultural Heritage: Archaeology, History of Art, Cinema and Music – University of Padova)

The Marcesina Plain, is a vast basin located in the northeastern part of the Asiago Plateau. Characterized by a vast environmental variety, this territory has always represented a strong pole of attraction for anthropic occupation. Mousterian lithic tools testify to the earliest occupations of the territory, while seasonal settlements from the Upper Palaeolithic and Mesolithic demonstrate an intense exploitation of the plain by Alpine hunter-gatherers. Among the best-known Epigravettian sites, Riparo Dalmeri offers an extraordinary reconstruction of the paleo-economic and functional organization of the seasonal mountain settlements.

In terms of historical occupation, fieldwork and remote sensing analysis has revealed a very high number of malghe (alpine huts) or buildings related to agro-pastoral activities. These structural traces find comparisons in archival data: since the 16th century, various conflicts and conciliations, mainly related to grazing rights, have marked the occupation of this territory, leaving visible evidence on the ground. The importance of these alpine structures is highlighted by the continuity of their use even in contemporary times: malghe still represents the economic, cultural and identity center of the plain. Since the 20th century, the area has been affected by the events of the First World War. During the second half of the 20th century, the Plain was used as a training center for artillery of the NATO contingents. The integration of non-invasive technologies with traditional methodologies allows to identify the main changes in the territory during the different chronological phases of occupation. Finally, the diachronic study of the landscape allows us to outline how the exploitation of resources results in a continuity, not only in the occupation of the land, but also in traditions and the formation of shared (and even contested) places of memory. The case of the ‘casonetti’, disputed between historical occupants and the municipality for over ten years, is emblematic.

1157 THEORETICAL AND METHODOLOGICAL DEFINITION OF THE ‘ARCHAEOLOGICAL POTENTIAL’ IN PREVENTIVE ARCHAEOLOGY. CHALLENGES AND OPPORTUNITIES

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Boi, Valeria (Istituto Centrale per l’Archeologia (Ministero della Cultura)) - Marino, Sara (Università la Sapienza di Roma) - Castiello, Maria (University of Bern; INCIPIT - CSIC) - Bouwmeester, Jeroen (Cultural Heritage Agency, the Netherlands) - Rensink, Eelco (Cultural Heritage Agency, the Netherlands)

Session format: Regular session

Archaeological potential is an intrinsic characteristic of a given area that is expressed by the quantity and nature of sites already known and by the possibility of undiscovered archaeological evidence being preserved underground. Its determination is based on the examination of multiple factors, including human-land relationships in the past and the dynamics responsible for the construction of the archaeological stratification over time, as well as its transformation and/or removal. The determination of archaeological potential is thus a study that, starting from the historical-archaeological and paleo-environmental characteristics of the area concerned, examines its entire diachronic evolution, up to the contemporary age.

Being a predictive tool, knowledge of the archaeological potential is important both in research contexts and, above all, in the field of cultural heritage protection in relation to infrastructural planning (CRM-Cultural Resource Management). The assessment of the archaeological potential is in fact the basis for quantifying archaeological risk, that is, the degree of impact affecting archaeological sites or deposits by the implementation of an urban or rural area transformation intervention.

The assessment of archaeological potential has been considered with heterogeneous approaches:

- attributing different weights to the various factors considered.
- adopting an approach based on expert judgement either through the development of mathematical-statistical models or using remote sensing technologies.
- focusing on specific chronological/cultural phases or specific portions of archaeological landscapes.

Another element of discussion is the scale of the maps and the way the archaeological potential is depicted: for limited areas (often on specific activities); for larger areas (land-use planning activities) up to very large-scale areas.

We aim to invite scholars and professionals from different backgrounds to share their experience and present their approaches and case studies, to establish the state of the art of the research, to address the main challenges and to identify the opportunities arising from such exchange.

1 ASSESSING THE ARCHAEOLOGICAL POTENTIAL OF MESOLITHIC LANDSCAPES. A CASE STUDY FROM THE MEUSE VALLEY IN THE NETHERLANDS

Rensink, Eelco (Cultural Heritage Agency of the Netherlands)

In the Netherlands excavations carried out in the context of spatial developments ('Malta archaeology') have provided new insights into the location, nature and preservation conditions of Mesolithic sites in different geological contexts. They are often represented by small concentrations of stone artifacts. In most cases these concentrations are part of larger stone age landscapes separated from each other by thin distributions or isolated occurrences of stone artifacts. Archaeological features associated with occupation (postholes etc.) are generally absent whereas (large clusters of) hearth pits are mainly found outside the settlement areas. Due to their low archaeological visibility, prospecting Mesolithic sites and landscapes is a time consuming task, and this certainly applies to geologically dynamic environments consisting of archaeological remains covered by thick layers of sediment. There is no doubt that low-density sites are often overlooked during borehole surveys or test pit investigations. As a result, we are often dealing with a biased (incomplete) picture of the full range of archaeological phenomena associated with Mesolithic landscapes in a given area.

Partly due to the above-mentioned situation, the assessment of (all archaeologically visible aspects of) Mesolithic human behavior in a specific area and in the context of academic research is often problematic. Moreover, working with incomplete datasets may also have an effect on practical tools specifically used in preventive archaeology, including predictive maps.

This paper examines the potential of buried Mesolithic landscapes in the Holocene Meuse valley in the southeastern part of the Netherlands. What are the characteristics of these landscapes and which criteria determine the archaeological potential? How do we adequately 'translate' this potential into predictive maps? The paper concludes with a short discussion about the role of predictive maps in Dutch preventive archaeology.

2 THE CONCEPT OF ARCHAEOLOGICAL POTENTIAL : AN ANALYSIS OF THE METHODOLOGIES IN ITALY AND ABROAD

Rizzitano, Filippo (Sapienza University of Rome) - Annamaria, Daniele (Sapienza University of Rome) - Fausti, Elena (Sapienza University of Rome)

The planning of public works or public utilities in Italy requires that a Preventive Evaluation of Archaeological Interest (VPIA) must be carried out by a specialist archaeologist. This document assesses the risk of encountering archaeological remains in the project area based on various parameters, defined by the Central Institute for Archaeology (ICA). A crucial factor of this evaluation is the "Archaeological Potential", a key point of the VPIA which indicates the probability of finding archaeological remains in an area, in relation to its geomorphological and historical characteristics. The Potential is expressed through predefined levels, ranging from High to Zero. The aim of this study is to analyze, reconstruct and compare the procedures employed in different countries concerning the Archaeological Potential. For this purpose, a Google Form was distributed to numerous archaeologists working in the field of Preventive Archaeology abroad. Emphasis was placed on identifying the concept of archaeological potential in their methodologies, aiming to discern similarities and differences compared to the Italian approach.

3 ARCHAEOLOGY THAT BURNS. THE DEGREES OF EVALUATION OF ARCHAEOLOGICAL POTENTIAL

Pedersoli, Stefano (University of Sassari) - Caloi, Luca (University of Sassari) - Venco, Veronica (University of Sassari) - Azzalin, Giovanni (University of Sassari) - Magnini, Luigi (Ca' Foscari University of Venice) - Milanese, Marco (University of Sassari)

The theoretical definition of 'Archaeological Potential and Risk' has lasted almost 40 years, at least as far as the Italian context is concerned. From Carver's definitions and theoretical elaborations in 1984 to the latest Ministerial Regulations of 2022, the evolution of the concept in Italy has been continuous and with multiple changes of perspective.

Starting from these theoretical and applicative concepts and based on our experience on three selected case studies (Siligo, Uri and Asinara Island), we propose to implement the quantitative evaluation in addition to the qualitative one. The weighting of information from different sources and methodologies to appropriate degrees of archaeological potential has in fact proved to be very promising in the evaluations of interventions. This has allowed a more detailed analysis of strongly diachronic contexts with a high degree of disturbance due to morphological, vegetational and climatic factors.

The three contexts analysed are part of a landscape characterised by a long occupational persistence, with frequentations from the Neolithic to the Post-Medieval period, including First World War. Through comparative Remote Sensing analysis and ground survey, the archaeological potential, evaluated according to strictly qualitative norms, tends to underestimate in the first instance the real informative scope of the deposit.

In this perspective, the archaeological potential cannot be defined only with the presence or absence of structures. When undertaking a contextual study, it is crucial to consider the density of the archaeological and natural features. To achieve this, we must consider the landscape's geomorphology, as well as the climatic and environmental conditions that have affected the site over time. At the same time, the implementation of archaeological and environmental parameters for the definition of ephemeral sites, such as access routes or seasonal settlements, is significant for the success of the evaluation.

4 CHALLENGES AND OPPORTUNITIES OF ASSESSING THE ARCHAEOLOGICAL POTENTIAL AND QUANTIFYING ARCHAEOLOGICAL RISK AT KHIRBAT ISKANDAR AND ITS ENVIRONS (JORDAN)

D'Andrea, Marta (Sapienza Università di Roma, Dipartimento di Scienze dell'Antichità) - Richard, Suzanne (Gannon University, Erie, PA) - Long Jr, Jesse (Lubbock Christian University) - Forti, Luca (Università degli Studi di Milano, Dipartimento di Scienze della Terra "Ardito Desio") - Zerboni, Andrea (Università degli Studi di Milano, Dipartimento di Scienze della Terra "Ardito Desio") - Deady, Tucker (University of Toronto) - Lanzaro, Nicola (Sapienza Università di Roma) - Cioffi, Carolina (Sapienza Università di Roma, Dipartimento di Scienze dell'Antichità)

Khirbat Iskandar is a mounded site in southern central Jordan. Since 1981, the Archaeological Expedition to Khirbat Iskandar and Its Environs has documented the occupational sequence from Early Bronze I through IV in the excavations on the tell, and evidence from the Palaeolithic, Chalcolithic/Early Bronze Age, the Iron Age, and the Nabatean, Roman and Byzantine Periods in surveys. However, during the past decades, the land around Khirbat Iskandar has been developed for agriculture, impacting the preservation of the archaeological landscape. A modern road likewise cuts through the site, destroying the stratigraphy and exposing ancient architecture, furthering threats of erosion and decay.

Therefore, the Expedition's most recent efforts concentrated on reassessing the archaeological potential of Khirbat Iskandar and its environs, and quantifying archaeological risk in the area with an approach combining: 1) remote sensing analysis and geomorphological survey for evaluating and monitoring landform evolution and changes in time; 2) geoarchaeological investigation to examine the tell-site formation processes and the occupational sequence; 3) pedestrian surveys; 4) urgent documentation and stratigraphic investigations including traditional techniques, photogrammetry, and 3D modelling privileging endangered areas; and 5) preventative measures to avoid further damage, including sustainable remedial conservation according to best practices.

It is of great importance for the sustainability of archaeological research to promote a wider understanding – from the general public to policy makers – that all sorts of archaeological evidence are of equal significance so as to enhance the protection of components that seem less engaging but have huge heuristic potential. It is also becoming increasingly necessary to reconcile research agendas and the need for site monitoring and protection. Moving from these insights, we report on the objectives, results, and opportunities offered by recent emergency activities undertaken at Khirbat Iskandar and discuss challenges in rescue archaeology actions in theory and practice.

5 THEORETICAL AND PRACTICAL DEFINITION OF THE ARCHAEOLOGICAL POTENTIAL OF SICILIAN LANDSCAPE AND PREVENTIVE ARCHAEOLOGY

Ianni', Filippo (Arkeos s.c.; Confederazione Italiana Archeologi - Sicilia) - Giannitrapani, Enrico (Arkeos s.c.; Confederazione Italiana Archeologi - Sicilia; Dipartimento Culture e Società, Università di Palermo)

Archaeological potential concerns the predictability of an area to have hosted past human activities, as well as the grade and quality of preservation of that evidence. It can be evaluated through a multi-proxy approach based on the known archaeological record or the paleoenvironmental and geoarchaeological features of the studied context. The archaeological potential has traditionally been a key issue for landscape studies; its relevance today is increasing within preventive archaeology, with a growing development in the accuracy and innovation of methods. The concept of potential in these two fields, which indeed share methodological and interpretative perspectives, takes on different contours, primarily connected to the scales of analysis. In landscape archaeology, the analysis area should be of medium to large size to acquire sufficient data to read settlement dynamics and the relationship between human communities and nature. In preventive archaeology, there is a reversal of the perspective whereby it is not the landscape at the centre of the analysis but rather the actual public work and its degree of invasiveness to the known cultural heritage and that 'potentially' yet to be discovered. For this reason, the scale of analysis must necessarily be limited, calibrated on the actual spatial dimension of the work subject to verification. Here, we discuss the theoretical and practical definition of the archaeological potential within the context of Sicily based on our direct experience as researchers actively involved in studying the island's prehistory and as professional archaeologists engaged in preventive

archaeology daily. Because of such a double role, we are well aware of the methodological and scientific backwardness affecting the current research on the island. These gaps can be filled only with greater awareness of the digital tools and cognitive processes available today, together with a greater level of multidisciplinary, open data and digitalisation of the archaeological evidence

6 DIFFERENCES AND SIMILARITIES IN THE DEFINITION OF THE ARCHAEOLOGICAL POTENTIAL BETWEEN PLAINS AND MOUNTAINS. TWO CASE STUDIES UNDER ANALYSIS

Fini, Antonio Maria (Sapienza università di Roma) - Sabbatini, Irene (Sapienza università di Roma)

This contribution will analyse the results of the study of archaeological potential applied in two different territories. In the first case, we are in Abruzzo, (Scontrone - L'Aquila, AQ), in a mountainous area heavily affected by modern quarries, which partially destroyed the archaeological palimpsest. In the second case, we are in southern Lazio, in the Agro Pontino (the Ager Pomptinus of the ancients) in the province of Latina, characterised by dunes and coastal lakes, behind which lies a densely populated and cultivated plain, the result of an imposing reclamation project carried out in the 1930s. The area has been subject to systematic territorial investigations over time.

The archaeological potential of an area, i.e. the possibility that it preserves archaeological structures or stratigraphic levels, is calculated through the analysis of a series of parameters applied to the context under study (from the presence of traces of frequentation in ancient times, conditioned by soil visibility, to geomorphological and environmental characteristics in ancient and post-antique times, anthropogenic actions) and constitutes a fundamental predictive tool both in the context of preventive archaeology sites (as in the case of Scontrone) and in the context of research (as in the case of Agro Pontino).

We report the results of our research not only describing the tools and evaluation parameters used but, above all, underlining their different weight in the study of the archaeological potential of the two contexts, also considering how man's action has affected over time.

7 PREVENTIVE ARCHEOLOGY AND DESIGN OF ELECTRICAL WORKS: THE CAPACITY FOR DESIGN MITIGATION OF CONSTRUCTION RISK

Frapporti Battiti Moretti, Michela (Terna SpA) - Calabria, Maria Elena (Terna SpA) - Cirrincione, Roberto (Terna SpA) - Consigli, Simona (Terna SpA) - Macerola, Fabiana (Terna SpA) - Vattimo, Elena (Terna SpA) - Vitale, Simone (Terna SpA)

During the risk assessment phase of the project, which is a crucial step in preparation for the VPIA screening procedure, challenges may arise due to technical and environmental limitations not previously taken into account and also to the lack of data (impossibility of access to the land, absence of archaeological data from bibliography and archives).

Enhancing evaluation and minimizing "construction risk" requires considering design elements that enable "flexibility" that is the ability to absorb changes in location or technology during various project phases. Identifying project indicators is a crucial step in this process.

The inclusion of this flexibility is an essential measure in mitigating design issues in archaeological analyses and evaluations. For each type of work, there are, in fact, a series of technical, technological, construction, and environmental factors, which direct and sometimes constrain the design, determining its location. These factors allow us to identify the so-called "project nodes" as those types of works, or parts of the intervention, that can rarely be modified or re-located due to the technical/technological complexities and/or the importance of an electrical and localization point of view.

These technical-constructive differences determine a different capacity for design optimization in the event of archaeological interferences and a different possibility of resolving them. For project nodes, the construction risk is considered high and must, therefore, be managed as best as possible right from the initial stages of localization and design.

The integrated approach between archeology and design allows us to define a differentiated action strategy for each type of work (overhead power lines, underground cables, or electrical stations), already during the embryonic phases of the design of strategic works.

8 LEVERAGING MACHINE LEARNING IN REMOTE SENSING FOR ENHANCING ARCHAEOLOGICAL IMPACT ASSESSMENT: THEORETICAL CONSIDERATIONS AND FUTURE PROSPECTS

Traviglia, Arianna (IIT) - Giovanelli, Riccardo (IIT) - Poggi, Giulio (IIT)

The integration of machine learning with remote sensing technologies presents a significant opportunity to advance the field of Preventive Archaeology, particularly the redaction of Archaeological Impact Assessment (AIA). Machine learning algorithms offer distinct advantages over visual inspection of the data, enabling the analysis of large datasets

efficiently and accurately. In addition, machine learning can manage complex datasets, which include near-infrared (NIR) and infrared (IR) bands, increasing the detection rate of subtle archaeological features that may elude human observation. Despite its potential benefits, the integration of machine learning needs robust training datasets that accurately represent the diversity of archaeological sites and landscapes. It also may require high specialisation and expensive computational resources. Additionally, the interpretability of such models remains a topic of discussion, as complex algorithms may obscure the rationale behind site identification and classification in archaeological practice.

This paper focuses on the theoretical framework surrounding the application of machine learning algorithms in AIA. In regions like Italy, where the analysis of remote sensing data for AIA is mandatory, machine learning holds immense potential in speeding up the identification and evaluation of archaeological sites. This paper examines the theoretical underpinnings of machine learning in remote sensing, emphasising its potential advantages, disadvantages, and bottlenecks. Presenting case studies and theoretical models, we aim to underline the efficacy of machine learning in boosting the accuracy and efficiency of archaeological impact assessments. Furthermore, we explore prospects for this integration, highlighting areas for further research and development. Thus, this presentation seeks to establish a comprehensive understanding of the theoretical and methodological implications of employing machine learning in AIA. By addressing the main challenges and opportunities associated with this approach, we aim to advance the state of the art in preventive archaeology and contribute to the sustainable management and preservation of cultural heritage resources.

9 THE ARTE PROJECT: FROM THE ARCHAEOLOGICAL MAP TO TERRITORIAL PLANNING

Tadolti, Matteo (Università di Macerata) - Perna, Roberto (Università di Macerata) - Uricchio, Tiberio (Università di Macerata) - Ciuccarelli, Maria Raffaella (Università di Macerata)

The ArTe project coordinated by the University of Macerata which involves numerous State and Regional Bodies, aims to identify new models and tools in order to integrate archaeological data into territorial and urban planning.

The archaeological map of the Province of Macerata, created with traditional methodologies, is the basis for developing, also thanks to the use of artificial intelligence, settlement forecast maps, vulnerability maps and other tools useful for reading the territory in ancient times. These tools, thanks to the collaboration between archaeologists, economists and planners, are the basis of the territorial development projects that the ArTe project aims to develop.

The objective is to provide archaeologists with useful tools and categories to deal with the processes of transformation of the territory, moving from passive protection to active protection, capable of making the needs of protection itself and valorisation interact with the transformation processes. of the territory, with the aim of growth.

10 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING APPLIED TO AERIAL PHOTOREADING: THE CASE STUDY OF TERNA SPA

Macerola, Fabiana (Terna SpA) - Cirrincione, Roberto (Terna SpA) - Di Palma, Maria Anna (NTT DATA Italia) - Di Tullio, Lorenzo (Terna SpA) - Ferrari, Veronica (Università del Salento) - Gugliandolo, Emanuele (Terna SpA) - Luzzi, Giuseppe (Terna SpA) - Parisella, Giuseppe (NTT DATA Italia) - Tarquini, Emanuele (Terna SpA)

In Italy, the VPIA feasibility assessment is a key aspect of the authorization process for a new infrastructure project, exerting a significant influence on the project's timeline and resource allocation.

One of the primary stages of this study involves analyzing aerial and satellite images to uncover any potential archaeological anomalies. However, this task can be complicated and time-consuming, requiring specialized expertise.

The experimentation conducted by the working group, under the leadership of Terna and with the support of Unisalento and NTT Data, was primarily focused on the engineering and training of an Artificial Intelligence tool, capable of identifying potential archaeological anomalies through the analysis of aerial images. The image analysis process was created and put into action to facilitate and predict the photoreading process, even during the initial stages of the planning, supporting experts in analyzing a specified area and identifying three types of anomalies: damp marks, crop marks, and soil marks.

The main steps of the experimentation were:

- dataset setup, with the acquisition of a large set of orthophotos, to train and evaluate the model validity;
- selection of the algorithm. Based on the type of input data used, a Deep Learning algorithm was selected for image analysis (Transformer-Based Ensemble Model);
- model training. Labels were associated with the images used in the test phase, i.e. information on the presence or absence of archaeological anomalies within the territory under examination. Their analysis allowed the machine to learn and make predictions on new images (supervised method). The outputs were checked and validated by archaeologists;
- model evaluation. The model trained with the test images was run with a new dataset to evaluate its validity.

11 DOES ARCHAEOLOGICAL POTENTIAL NECESSARILY BEGIN WITH POSITIVE DATA? THE WHARP APPROACH

De Davide, Claudia (Akhet srl) - Glarey, Massimiliano (Akhet srl) - Wicks, David (Akhet srl)

In recent years, the digitalization of territorial and archaeological data, and the increased availability of these types of information on-line, have made enormous leaps forward, leading the way to the creation of original new solutions with the help of 'latest generation' information technology.

In this contest it is fundamental to evaluate how these new opportunities can help to create progress in the calculation of archaeological potential as a tool to support not only research but, in particular, the protection of cultural heritage in relation to infrastructural planning.

We believe that, above all in the area of network infrastructure, it is appropriate to approach the specific questions of the maps of archaeological potential themselves and the scales of reference to adopt in their construction, taking in consideration both the type of work to undertake and the needs of the Customer/Client. In this way it would be possible to establish a common language, advantageous to the safeguarding of archaeology across the territory.

Created with this aim in mind, the WHARP project confronts the problem of mapping archaeological potential on a territorial-scale, giving value in particular to negative and landscape data, using archaeological information as a control-mechanism.

In this contribution we present some concrete examples developed in recent years in different territorial contexts in Northern-Italy.

12 CULTURAL RESOURCE MANAGEMENT PREDICTIVE MODELING - AVOIDING PITFALLS USING AI

Clivaz, Emmanuel (AnalyticBase; ArchoBase)

Verhagen (2009) highlighted the limitations of maps based on expert judgment and the need to move toward spatial predictive map. Spatial predictive modeling has nevertheless many pitfalls. Verhagen and Whitley (2020) mentioned the common pitfalls which are biased archaeological input data, predictor variables based on modern-day data sets, the absence of socio-cultural variables, the limitation of temporal resolution and testing done in haphazard ways.

With the archaeological service of the canton of Fribourg in Switzerland, we are currently working on a spatial predictive modeling workflow, using artificial intelligence (XGBoost). I will present the way we handle some of the pitfalls mentioned above and describe how we seek to automatize the whole process, from data entry to the production of predictive maps, in order to be able to retrain the models at constant intervals.

We have developed our models following the principle of increasing complexity, starting with a "Baseline Model" addressing the issue of presence/absence ratios and pseudo-absence ratios. Then moved towards a "Spatial Model" by incorporating the distance to other occupations. Then developed "Spatio-Temporal Models", by contrasting period models to a general model. Finally, developed an "Advanced feature model" that includes socio-cultural variables.

This is a work in progress. In this presentation, I will show how we solved some of the pitfalls along the way and mention the challenges we are still facing.

13 APPLICATION TO BE A DISCUSSANT: MAPPING ARCHAEOLOGICAL HERITAGE IN SOUTH ASIA (MAHSA) PROJECT

Petrie, Cameron (University of Cambridge) - Roberts, Rebecca (University of Cambridge) - GS, Abhayan (University of Kerala) - Hameed, Mohammad (University of the Punjab) - Mushtaq, M. Waqar (Islamic University Bahawalpur) - Prabhakar, VN (IIT Gandhinagar) - Samad, Abdul (Department of Archaeology and Museum, Khyber Paktunkhwa) - SV, Rajesh (University of Kerala) - Singh, Vikas (Banaras Hindu University) - Project, MAHSA (University of Cambridge)

The Mapping Archaeological Heritage (MAHSA) project is working alongside a range of stakeholders to not only document archaeological heritage, but also transform the way heritage is managed at both local and national levels. Pakistan and India each have a rich archaeological heritage due to their being the locus of one of the earliest instances of ancient urbanism. India currently has the largest population globally, and it is increasing at 0.99% per annum. Pakistan now has the fifth largest population globally, and it is increasing at 2.00% per annum, which is the highest rate in South Asia. Despite this rate of population growth, both India and Pakistan still have well under 50% of their populations living in cities, meaning growth is occurring in both urban and rural areas. Urban expansion and the need to engage in extensive and intensive farming creates conflicting pressures on land and essential natural resources.

Archaeological and cultural heritage are factors often overlooked in thinking and planning in discussions about sustainability, but they are often under acute threat due to the expansions of urban areas and agricultural land that accompany population growth. It is arguable that it is imperative that heritage must be thought of as a unique and finite resource that is worth of an equal level of importance in discussions of sustainability (UN SDG 11.4). Through

stakeholder consultations, MAHSA has been working to bring together professionals involved in urban planning agriculture, and heritage to explore current and future prospects for research, monitoring and collaboration within and between these areas of research and policy. As part of the discussions, we hope to develop staggered and realistic future research and policy intervention plans that will foster consideration of each of the three areas in policy and decision making in line with the UN Sustainable Development Goals.

1159 BC_BEFORE CHURCH. CULT BUILDINGS IN ANCIENT MEDITERRANEAN EUROPE. SESSION 1. BEYOND THE THRESHOLD: "INDOOR" CULT-PLACES IN MEDITERRANEAN EUROPE

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Guidi, Alessandro (Dipartimento di Studi Umanistici - Università degli Studi Roma Tre) - Nomi, Federico (Scuola Superiore Meridionale) - Saltini Semerari, Giulia (Department of Anthropology, University of Michigan) - Lehoërff, Anne (CY Cergy Paris Université)

Session format: Regular session

The study of the relationships between religion and archaeology - and specifically our ability to identify evidence for religious activity and associated places of worship in the archaeological record - has progressed considerably in recent decades, thanks not only to the advances in archaeological methodology, but also to the development of theoretical debates in papers and monographs (e.g. Bradley 2005, Fogelin 2007, Kyriakidis 2007).

Here, we will focus on a specific theme, a kind of 'fil rouge' that crosses space and time: the emergence and evolution of cult-places over the centuries in the context of Mediterranean Europe: the aim is to identify the lines of their development at different stages and in different areas of Mediterranean Europe.

Thanks to interdisciplinary research, many features can be identified, not only in terms of the type of structures or objects, but also in terms of organic offerings (seeds, meat portions, skeletons, etc.), with the aim of reconstructing the rituals performed in such places and their changes over time and space.

Papers will deal with the origins and early developments of "indoor" cult-places (natural caves, artificial hypogea, specific structures within inhabited areas, sanctuaries, etc.), conceived in the beginning (probably since Paleolithic) as a kind of chthonic world beyond cave entrances and then progressively realized in built structures. Contributions will range from the Neolithic to the Iron Age. The session will welcome papers addressing the following themes: the theoretical and methodological reflections on the topic of the session, the revision analysis of previous contexts using new methodologies and, finally, the latest discoveries from ongoing archaeological research.

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ABSTRACTS

1 NON-UTILITARIAN DEPOSIT PITS OF THE MIDDLE NEOLITHIC, FROM THE MEDITERRANEAN TO NORTHERN FRANCE: PROPITIATORY VOTIVE PRACTICES?

Emmanuel, Ghesquière (INRAP - National Institute for Preventive Archaeological Research)

Non-utilitarian deposits were observed under various forms during the Neolithic, from the Mediterranean coasts to Northern France. Their identification, on an archaeological level, is difficult and varies greatly between authors: the contexts are unclear, and the indications of votive practices are often suspected based on the characterization of inexplicable facts on a technical or functional level. We are not talking here of deposits which could be considered as stocks of valuable objects (large blades, daggers, axes), nor of deposits made in a funerary context (viaticum), but of practices observed in a less conventional framework, often isolated.

Those which have been highlighted present one or more complete ceramics and one or more fragments of grindstones. On the French Mediterranean coast, pits are often built with stones, a practice less used further north. On the other hand, the northwest quarter of France, often presents associations with charred seeds. The best represented period is the Middle Neolithic.

How can we interpret these deposits which do not seem to have any practical utility function? Is it a form of pit playing a supplementary role to these of the burial, in the absence of the body? Is this a form of propitiatory chthonic wor-

ship? And finally, can we compare these deposits to those of other objects, such as for example the pairs of buried overpolished axes cutting edge upwards?

2 THE EMERGENCE OF RITUAL PITS: A CASE FROM THE EPIPALAEOLITHIC CONTEXT OF GEDIKKAYA CAVE IN NORTHWESTERN TÜRKIYE

Sari, Deniz (Bilecik Seyh Edebali University)

The human being initially might not be able to see a chain of causation between the natural threats upcoming without knowing when or how, such as the thunderbolts, earthquakes, floods, volcano eruptions, or animal attacks. In times when environmental and cultural memory had not been formed yet, human beings from different areas reacting similarly in the face of the natural phenomena acknowledged those situations as “supernatural” and he related them to the “beyond” concept so that he has sought a solution through the spiritualism to handle the problems caused by these “supernatural” phenomena.

As the human increases his experience and his knowledge about the mechanism of nature, he might find a way to stand out against the unknown and he also developed various defense systems to handle his fears even though he learned how to get over them. At this very point, wall paintings, statues, cult monuments, burial rituals, and the treated bones of humans and animals become something. We can easily say that the biological fear starting to take a cultural course in time has transformed into a cultural case such as the Ancestral Cult and Shamanism in the latter phases.

This paper aims to discuss the causes and the consequences of the prehistoric rituals and what lies beneath considering the ritual pit been formed around a stalagmite and some group of artifacts from the pit and its context dated to 14500-11200 BC from Gedikkaya Cave in Northwestern Türkiye. Artifacts dating to the Epipalaeolithic suggest links between European Upper Palaeolithic cultural entities and the Pre-Pottery Neolithic of Southeastern Anatolia and Levant displaying a developed culture and complex structure with ritual practices containing symbolism.

3 THE ROLE OF NATURAL CAVES BETWEEN MARCHE AND ABRUZZO FROM NEOLITHIC TO IRON AGE

Pignocchi, Gaia (Scuola di Scienze e Tecnologie - Università degli Studi di Camerino -)

Although Marche and Abruzzo show strong similarities in the pottery production, in particular during the Neolithic (Impressed Ware, Ripoli, Fossacesia) and the Bronze Age (Apennine and Subapennine culture), the use of caves in these two regions is very different in reference to the known funerary and cult manifestations.

From the 1997 Imola exhibition “Waters, Caves and Gods. 3000 years of pre-Roman cults in Romagna, Marche and Abruzzo”, in which Nora Lucentini for the Marche and Vincenzo d’Ercole for Abruzzo had presented unpublished data on the frequentation of caves and their funerary and cultic use in the metal age, other data are added, in particular for the Marches.

In recent years, in fact, I have undertaken a review of the archaeological and stratigraphic complexes in the Frasassi caves (Marche region), which were excavated between the end of the 1800s and the first half of the 1900s, but which, thanks to modern interdisciplinary research and analytical approaches, are revealing data of great scientific interest.

A topic of great interest is the frequentation of natural caves for cultic and funerary purposes, practices that concern the ideological and immaterial sphere and are therefore difficult to identify and understand, but for which there are various clues to hypothesize different uses of caves over the millennia, from Neolithic.

Marche and Abruzzo natural caves are special places and played a particular role as meeting places for local communities or single individuals, but they could be also intercultural meeting places.

The information will be analysed in a diachronic but also synchronic way, to grasp, over time and in the different territorial areas, the specific uses of the single cavities, but also of some groups or “systems” of caves, such as those of Frasassi in the Marche or Fucino in Abruzzo.

4 NATURAL AND ARTIFICIAL CAVES IN CENTRAL TYRRHENIAN ITALY: METHODS OF FREQUENTATION BETWEEN THE ENEOLITHIC AND THE BRONZE AGE

Metta, Christian (Centro Studi di Preistoria e Archeologia)

The Tuscan-Lazian Maremma hosts several natural cavities that show traces of anthropic frequentation from the Eneolithic to the Bronze Age. Through the analysis of the single caves and the comparison among them, it was possible to detect three different uses: the first and most evident one is the funerary use, with the presence of collective burials and very few single burials, the second one is the housing use, meant as seasonal and/or occasional frequentation maybe related to pastoral activity, while the third one is the most difficult to determine, being represented by the cult use of caves, where various kinds of rituals are performed. Another interesting aspect regards the modes of frequen-

tation, showing temporal and spatial differentiation in the exploitation of the cavities: during the Eneolithic the most frequented caves are situated in Tuscany with only some sporadic use of the Lazian ones, while during the subsequent phase the use of the Lazian caves increases with the abandonment of the Tuscan ones.

In the Copper and Bronze Ages, both natural and artificial caves were used: funerary structures imitating caves (oven or chamber tombs) were created, but sometimes some of these underground structures were intended for ritual practice. Only in the Late Bronze Age did we witness a change, natural caves were no longer used, but places of worship were created within the settlements inside artificial caves, which reminded, at least conceptually, the natural ones. Some traits seem to characterize a process of “artificialization” and imitation of the natural sacred place in the Etruria of the metal age, from the natural sacred place (water source, mountains and caves for example) to the built one.

5 FROM CAVES TO HUTS... SACRED THRESHOLDS?

Nomi, Federico (Scuola Superiore Meridionale; Associazione ORTA) - Truffi, Michele (Dipartimento di Studi Umanistici - Università degli Studi Roma Tre; Associazione ORTA) - Militello, Pietro (Dipartimento di Scienze Umanistiche - Università di Catania) - Guidi, Alessandro (Dipartimento di Studi Umanistici - Università degli Studi Roma Tre)

During the Late Bronze Age in central and southern Italy, there is a discernible decline in the practice of utilizing natural caves for ritual purposes. This trend aligns with the concurrent emergence of open-air cult sites, indicating a shift in religious beliefs. Simultaneously, one can observe the existence of structures that appear to serve a purpose distinct from mere habitation.

In 2015, Charlotte Potts wrote an article with the evocative title ‘Sacred Huts’, wherein she precisely explored the distinguishing characteristics that could differentiate structures used for cult activities from typical dwellings. Her examination involved several case studies from the mid-Tyrrhenian area.

In this communication, we endeavour to address this issue by broadening the analysis to encompass the primary settlements of peninsular Italy and Sicily. Our aim is to meticulously identify potential cult huts or structures designed for similar purposes. Additionally, we seek to illuminate the parameters that could either substantiate or refute such attributions.

A varied panorama emerges from the study, with buildings that can be interpreted as places of worship and others in which there are only a few features indicative of the performance of activities of a ritual nature, and for which only further analysis will be able to provide clearer answers in the future.

6 PLACES OF WORSHIP IN LAND AND WATER. BRONZE AGE HOARDS IN THE MEDITERRANEAN IN THEIR EUROPEAN CONTEXT

Lehoerff, Anne (CY Cergy Paris University)

Does the act of religion require a particular place, a sacred space? And what form can this reality take? The notion of monument is often associated with the practice of worship. But what if we were to look at the question in a different way? Bronze Age hoards in the Mediterranean and the rest of Europe are now a recognized phenomenon. There are many different interpretations, depending on the number of objects, their nature and where they were found. Sometimes they are simply temporary “hiding places” for metalworking crafts. However, even in the case of fragments, internal logics suggest that these assemblages have a ritual and cultic dimension. The act of burial and engulfment also belongs to the repertoire of the religious gesture, embodied both by these carefully chosen objects and by the place where the ceremony takes place. This presentation will explore the possible perception of this religious dimension in the Bronze Age, using examples of Mediterranean hoards put into perspective on a European scale.

7 UNRAVELING THE BUNDLE: TRACING ANCIENT CULTS IN ITALY’S IRON AGE THROUGH CONTEXTUAL ANALYSIS OF RITE SPACES

Tirloni, Ilaria (independent researcher)

It is challenging to identify the traces of cults practiced by the peoples living in Italy during the Iron Age, particularly in the early Iron Age, due to the lack of evidence and written sources.

The focus of this paper is the analysis of certain cult places where chronological continuity can be discerned, especially in non-built ritual spaces that are clearly defined for cult purposes.

Starting from reflections on how to recognize ritual space, I sought to apply a new investigative method that begins with analyzing the entire context and extends it to the sphere of cults. Thus, I aimed to reevaluate the relationships among artifact classes and reinterpret some of them, following a line that demonstrates a diachronic development of certain elements identified as “cult markers.” This selection was made through the analysis of key studies that could be more representative, yet simultaneously encompass different typologies, ranging from caves (Rocchicella di Mineo,

Grotto Pertosa) to well-known cult places from the classical period (Megara Hyblaea, Saturo). Special attention was given to Sicily, which is replete with cult places dedicated to chthonic deities, Demeter, and Kore.

8 EXPLORING SACRED RITES ON THE CELTIC PERIPHERY: THE SANCTUARIES OF CASTREJÓN DE CAPOTE AND EL CERRÓN DE ILLESCAS

Ruano, Lucía (Universidad Complutense de Madrid) - Berrocal Rangel, Luis (Universidad Autónoma de Madrid) - Fernández-Götz, Manuel (University of Edinburgh) - Sánchez de Oro, Pablo (Universidad Autónoma de Madrid)

The hillfort of Castrejón de Capote stands out as one of the southernmost Celtic settlements in Europe. It served as a significant hub for the Celtici of the Beturia region, believed to have migrated to the area during the late 5th and early 4th centuries BC. Extensive excavations conducted at the site in the late 1980s and early 1990s unearthed domestic structures, the fortification system, and a central sanctuary. The latter is a rectangular structure open to the main street and elevated on a podium, in the centre of which a stone table was located. Numerous finds related to communal feasting were documented, including remnants of bonfires and animal bones, as well as a collection of over a thousand artefacts. The evidence suggests the practice of public ceremonies with meat offerings, alcoholic libations, and the burning of aromatic and psychotropic substances.

In this paper, we present an overview of these findings, enhanced by a collaborative research project launched in 2023 with the objective of re-examining the archaeological record using novel methodologies and theoretical frameworks. Through new archaeological interventions, this project also seeks to deepen our comprehension of the architecture, material culture, and spatial organisation within this site on the southern periphery of the Celtic world. Our focus lies in comparative analysis with other structures within the hillfort itself, as well as in exploring potential architectural parallels in other cultural contexts. In particular, we will focus on the comparison to the sanctuary documented in the Carpetanian settlement of El Cerrón de Illescas. The analysis not only enhances our understanding of religious practices during the Late Iron Age, but also sheds light on the dynamics and symbolic significance embedded within ritual spaces across diverse cultural landscapes.

9 PAGANISM IN PRACTICE: AN ETHNOARCHAEOLOGICAL EXPLORATION OF SACRED SITES, RITUALS, CEREMONIES, AND BELIEFS IN RURAL ALBANIA

Agolli, Esmeralda (Department of Archaeology and Culture Heritage, University of Tirana)

In Albania, despite the prevalent adherence to four monotheistic religious traditions, namely Sunni and Bektashi Islam, Roman Catholicism, and Eastern Orthodox Christianity, there exists a noteworthy presence and acceptance of alternative pagan rites, ceremonies, and cultic practices. These manifestations of pagan belief systems, characterized by their diverse forms and expressions, enjoy a considerable degree of popularity and participation among individuals, even those identifying with Islam or Christianity, who readily engage in such practices during times of exigency and disillusionment. Often, believers avail themselves of opportunities to partake in rituals within settings perceived as sacred, be they designated tombs, revered locations, or natural features endowed with sanctity.

This paper undertakes an analysis of empirical data sourced from various sacred structures situated across rural Albania, purposefully constructed to serve sacred functions. Through the utilization of oral narratives procured from local informants, the study delineates the typological classifications of these structures, delineating their origins, the associated miracles attributed to them, and the temporal expansion of their popularity. By means of site visits and participation in rituals enacted within these venues, individuals harbor sentiments of hope and anticipation, yearning for resolutions to life's tribulations.

The primary objective of this inquiry is to elucidate the behavioral tendencies intricately linked with paganism, manifesting in the form of rites, ceremonies, and tangible architectural features, thereby facilitating a comprehensive analysis of the multifaceted dimensions inherent within an active ethnographic context. The discernment of how human conduct intersects with diverse belief systems, encompassing spiritual entities and transcendent powers that traverse realms beyond human comprehension, holds considerable significance in unraveling the complexities underpinning societal dynamics.

1160 INTERCULTURAL CONTACTS WITHIN THE BALTIC SEA REGION FROM PREHISTORY TO THE EARLY MIDDLE AGES

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Niedziółka, Kamil (Institute of Archaeology, University of Gdańsk) - Pappmehl-Dufay, Ludvig (Linnaeus University)

Session format: Regular session

Archaeological data clearly confirm that people living on the Baltic coast have been crossing this sea and establishing contacts with those on the other side since the Mesolithic. This led to the formation of complex networks of supra-regional contacts centred around the Baltic Sea. Depending on the period under study, these contacts took on different forms and intensities, although they practically have never ceased completely.

Unfortunately, the current state of research on these issues is heavily deformed by contemporary and mundane factors such as national or linguistic borders. This is often due to a lack of awareness of the similarities between the areas on the other side of the Baltic Sea, as results from individual countries are traditionally published in national languages. Their range is thus considerably limited. The same applies to conferences, some of which also have a limited reach due to the lack of wider international research networks.

The aim of this session will be to bring together researchers involved in the study of the past of the societies inhabiting the Baltic Sea coasts and islands. We would like to discuss issues related with identifying and expanding our knowledge of trans-regional contacts between these areas. We would also like to establish a network of academic cooperation focused on this wide range of topics. Let's simply get to know each other!

ABSTRACTS

1 AROUND THE BALTIC AND BEYOND: TRANS-BALTIC CONTACTS THROUGHOUT PREHISTORY AND EARLY HISTORY

Niedziółka, Kamil (Institute of Archaeology, University of Gdansk)

Events along the Baltic coasts have repeatedly influenced the rest of Europe. One of the most significant examples is the migrations of the historical Gothic tribes, who moved from southern Scandinavia to the southern Baltic coasts at the beginning of our era. A few hundred years later, they contributed significantly to the collapse of the western part of the Roman Empire and a complete 'remaking' of the political, economic, and ethnic scene in then Europe. Moreover, this was not the only instance where events on the Baltic Sea later affected large parts of Europe in various periods. The system of long-distance contacts, associated with the influences of the Nordic Bronze Age elites, covered a large part of the Baltic Sea coast and extended well beyond this region during the Bronze Age. On the other hand, during the Early Iron Age, the phenomenon of Pomeranian facial urns emerged on the southern Baltic coasts, which later spread over extensive areas of Central Europe in a relatively short period of time. These and many other aspects dictate that the Baltic region should not be perceived as a remote and insignificant periphery but as an area where many very important processes had their origin.

From this perspective, it is high time to expand beyond the current research scheme of this region, which is based mainly on the analysis of the dispersion of specific groups of artifacts. It is also worthwhile to focus on analyses of past landscapes (using modern tools such as remote sensing and geophysics) as well as paleoenvironmental studies (paleontology). Here, however, cooperation between researchers from various countries bordering the Baltic Sea is crucial. This will help to remove political constraints (since most literature is still produced in national languages) and broaden our current perception of the past of the entire region.

2 ONE PLACE, DIFFERENT PRACTICES: POTTERY PRODUCTION IN ABORA I NEOLITHIC SETTLEMENT

Haferberga, Vanda (University of Latvia)

Abora I Neolithic settlement is one of the most known lake Lubāns wetland sites in the Eastern Baltic. During the archaeological excavations, which started in 1963 and periodically continued until today, besides the settlement context 62 burials within it was also discovered. Some of these burials were identified as ones from Corded Ware Culture. Traces from this culture were also discovered in the settlement context. Next to local pottery styles such as porous and Lubāns type, the non-local Corded ware was also distinguished. The aim of this paper is to distinguish techno-cultural aspects of Neolithic pottery craft in the Abora I settlement. In order to reach the aim several methods were used: macroscopic evaluation, ceramic petrography, Wavelength Dispersive X-Ray fluorescence spectroscopy.

The paper was prepared within the Latvian Council of Science funded project “The environment and early farming of the Abora Neolithic settlement in lake Lubāns wetlands” (project no. lzp-2022/1-0300).

3 NEW EVIDENCE OF LATE BRONZE AGE CIRCUM-BALTIC CONTACTS FROM KUKULIŠKIAI SITE, LITHUANIA

Urbonaitė-Ubė, Miglė (Klaipėda University) - Pranckėnaite, Elena (Klaipėda University) - Minkevičius, Karolis (Klaipėda University) - Ubis, Edvinas (Klaipėda University)

The hilltop settlement of Kukuliškiai (Klaipėda district) is the only single-layer Late Bronze Age settlement (883-403 cal BC) in the Lithuanian marine landscape, located only a few hundred metres from today's seashore. Systematic research has been carried out since 2017 and a large amount of material has already been collected. Thorough analyses of artefacts, ecofacts and palaeoenvironmental factors have revealed evidence of cultural contacts with distant places in the Baltic region. Interdisciplinary approaches have provided new insights into the internal and external structure of settlements and specific economic features.

The Late Bronze Age in the Baltic region is a period of great changes in social, cultural and economic fields, influenced by long-distance interactions between different areas. The influence can be seen in agricultural practices, pottery making, bronze smelting and the use of amber. This presentation aims to show the possible routes of cultural contacts and how they developed in different parts of the prehistoric community of Kukuliškiai during a Late Bronze Age.

4 WHITE SHORES, AND BEYOND... MATERIAL TRACES OF TRANS-BALTIC CONNECTIONS FROM MIGRATION PERIOD ÖLAND, SWEDEN

Papmehl-Dufay, Ludvig (Linnaeus University)

The Baltic island of Öland, located off the east coast in SE Sweden, is extremely rich in historical and archaeological monuments and finds. Remains from the Iron Age are especially numerous, including countless cemeteries, more than 1000 still visible stonehouse-foundations and at least 16 ringforts. A signature feature of the migration period (c. AD 400-550) on Öland are the numerous finds of 5th century Roman gold solidi, usually interpreted as testimony of mercenaries returning from expeditions to the Roman empire. While large efforts have been spent on understanding the solidi and their links to places and events on the continent, little is still known about the routes and networks enabling these travels. In this paper, the migration period archaeological record from Öland will be viewed in a trans-Baltic perspective, tracing evidence for contacts across the Baltic Sea and discussing some potential aspects of the travelling routes further to the south.

5 'BOTTOM-UP' OR 'TOP TO BOTTOM' - TRACKING VIKING AGE WHETSTONES FROM EIDSBORG, NORWAY IN THE BALTIC SEA REGION

Zawalska, Judyta (Museum of Cultural History, University of Oslo) - Loftsgarden, Kjetil (Museum of Cultural History, University of Oslo)

All through the Norwegian Viking Age (800-1050) large amounts of whetstones were extracted from quarries at Eidsborg in the inland of Norway and transported by local waterways towards the coast, where it set off on a journey over the North Sea, Baltic Sea and beyond. To sites like Ribe and Aggersborg, Denmark, Hedeby, Germany and Wolin, Poland, where large quantities of whetstones have been found. Our paper will explore material from selected sites along the Baltic Sea and its connection to the Eidsborg quarries. Finds, will be reflected upon, from the perspective of context (trading and burial sites, settlement areas), functionality (whetstones, touchstone), and symbolic use (pendants, sceptres). The main objective in tracking whetstones will be to explore the connection and dependencies between extraction structures (quarries, organized production), exchange structures (transportation, long distance distribution) and the beneficiaries of this exchange. Highlighting radiocarbon dates from selected sites will help in better understanding of the phases of production and export, from its beginning, throughout the peak and afterwards the decline. The recognition of Eidsborg whetstones at archaeological sites outside Norway was already confirmed by geochemical analysis in the 1980s. Since then, the number of sites with whetstones, many likely originating from Eidsborg, have increased. There is still, however, questions unanswered and knowledge unexplored about the people that stood behind this bold idea and took upon a task that contributed to expansions of Vikings far from their homeland. We will try to fill in some of those gaps.

6 NEW PERSPECTIVES ON IRON AGE RINGFORT LANDSCAPES IN ÖLAND, SWEDEN BASED ON UAV ALS/LIDAR APPROACHES

Marczewski, Maciej (GLESUM Archaeological Company, Poland) - Wroniecki, Piotr (Montefortino Prospection & Digitalisation, Switzerland) - Papmehl-Dufay, Ludvig (Linnaeus University, Sweden) - Niedziółka, Kamil (Institute of Archaeology, University of Gdańsk)

The results presented are part of the ongoing research program “Crisis, Conflict, and Climate: Societal Change in Scandinavia 300-700,” led by Stockholm University. The project focuses on Iron Age ringforts on the island of Öland in Sweden, constructed in the 4th and 5th centuries AD. These structures are notable examples of stone architecture in Northern Europe's Barbaricum, primarily consisting of circular defensive formations with densely packed buildings inside.

Most of these strongholds were abandoned around 600 AD for reasons yet unknown, with some undergoing redevelopment during the Middle Ages. The usage and abrupt cessation of these sites align closely with the cultural shifts of the Germanic Iron Age/Migration Period in the Baltic Sea region.

This presentation will highlight findings from surveys conducted at 14 ringfort sites in 2023 and 2024, employing Airborne Laser Scanning (ALS) technology and Unmanned Aerial Vehicles (UAV). The objective was to document and explore the complex earthworks identified as ringforts or potential ringforts, along with their immediate surroundings and related features. This effort laid the groundwork for future project phases, such as geophysical measurements, geoarchaeological surveys, and excavations by deploying novel capabilities of UAV-acquired 3D topographic data through archaeologically oriented field methodologies.

The processed data, including point cloud (georeferencing, noise removal, classification) and raster processing, resulted in the creation of archaeologically viable Digital Terrain Models and Digital Surface Models. A variety of visualization techniques, including Compviz, terrain and slope shading models, and 3D representations, aided in interpreting the results. Advanced algorithms helped identify anomalies, providing a comprehensive view of the landscape.

7 SAAREMAA AND ÖLAND - CONTACTS OVERLOOKED? 12TH-13TH-CENTURY STONE RINGFORTS ON BALTIC ISLANDS

Mägi, Marika (Foundation Osiliana / Tallinn University)

Prehistoric contacts between the biggest islands in the Baltic Sea – Gotland (Sweden) and Saaremaa (Estonia) – are recorded both in archaeological and historical sources. Much less is known about interaction between Saaremaa and Öland, a Swedish island further away when looking from the East. In the Viking Age, all three islands formed a part of an intensively used trade route over the Baltic Sea, which connected southern Scandinavia with Eastern European river systems.

The last years' archaeological research has pointed to intensive prehistoric and medieval communication not only between Saaremaa and Gotland, but also between Saaremaa and Öland. The speech here introduces the results of archaeological and geophysical studies at some of the biggest Saaremaa hillforts that possess remarkable similarities with their analogues on Öland. These were ringforts with 7-8 m high ramparts of limestone, re-built at the place of an earlier fortification in the 12th century, and staying in use throughout the 13th century. Ringforts on both islands had buildings inside and outside the main rampart, and additional stonewalls surrounding them. The best-known examples on Öland are Eketorp and Gråborg. From the five Saaremaa ringforts of this type, in this speech Valjala has been chosen as one of the currently best investigated examples.

The fortification structures, function and localisation of Saaremaa's ringforts will be discussed in comparison with similar fortifications on Öland. As indicated by the archaeological evidence along the eastern coast of the Baltic Sea, as well as by few medieval written sources, direct contacts between these two islands seem to have been greatly overlooked so far.

1161 HERITAGE TALES: PARTICIPATORY APPROACHES TO HERITAGE MANAGEMENT AND COMMUNITY ENGAGEMENT

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Fábíán, Szilvia (Hungarian National Museum, Budapest) - Hadji, Athena (DIKEMES - College Year in Athens) - Michelic, Sanjin (Museum of Arts and Crafts, Zagreb) - Pace, Giuseppe (CNR - Institute for Research on Innovation and Services for Development) - Pagano, Fabio (Archaeological Park of Campi Flegrei, Pozzuoli)

Session format: Regular session

ICOM's new 'Museum Definition' was issued in 2022. Although many key points remained seemingly the same, there is a significant change in the emphasis on social components, such as diversity, accessibility, and inclusivity, which is markedly different from the previous 2007 definition. This approach builds substantially on the aims and objectives put forward in the Faro Convention as a seminal document discussing the democratisation of appreciation, access and management of cultural heritage by promoting the idea of shared responsibility within a broader heritage community. Due to increased public activities, museums are increasingly committed to becoming more accessible, friendly and inspiring places, although several challenges may limit such efforts.

For instance, museum representations of cultural heritage may not accurately reflect the diversity and complexity of the local community due to a lack of representativeness or accessibility to the cultural life of certain groups. These problems require constant efforts by museum institutions to ensure that museums are genuinely inclusive and representative of their local communities.

The proposed session invites contributions that analyse theoretical concerns and, mostly, case studies of good practices in heritage management that demonstrate how these efforts contribute towards building local communities and supporting positive social change, focusing, among others, on the following:

- How can museums or other cultural institutions provide a context for developing community consciousness around specific archaeological sites and these networks /and thematic routes?
- Which methods can be used for community building for different target groups and stakeholders, and how do these efforts contribute towards supporting positive social change?
- The (in)adequacy of a conventional understanding of heritage for an increasingly challenging 21st century.
- Contested heritage: what happened to inclusivity?
- The priority of visual qualities: homogeneity vs. diversity in heritage interpretation.
- Cultural tourism in rural and urban areas: excluding residents.

ABSTRACTS

1 SHAPING NARRATIVES: BRIDGING SOCIETAL GAPS AND REDEFINING ARCHAEOLOGICAL RELEVANCE THROUGH VISITOR-CENTRIC APPROACHES

Frascella, Selene (University of Barcelona; Italian Institute of Technology)

The new museum definition (ICOM 2022) has officially recognised accessibility, inclusion and community participation as constituent elements of this institution. However, for museums, especially archaeological ones, making these aspects of their nature effective can be challenging as they are often perceived as elitist and distant places, lacking social relevance and function. But how can this situation change without understanding how the relationship between the audience and heritage develops through the mediation of the exhibition? To contribute to answering this question, this paper presents the results of a non-intrusive observational analysis conducted on the audience of the National Archaeological Museum of Taranto (Italy). The research aims not only to show visitors' real use of the museum and the tools provided but, above all, how these convey the transmission of archaeological messages and influence the visitor's experience and relationship with heritage and archaeology. The results suggest the need to consider the impact of architectural space on the visual perception of visitors, to find a balance in the number of objects on display, to adapt texts in form and content to the needs of a non-specialist audience, and to reward and emphasise visual communication. In conclusion, it will be seen that considering the visitor's perspective in defining these aspects can contribute to an effective transmission of the archaeological message, the development of community archaeological awareness, the redefinition of the social relevance of museums, and the fulfilment of their accessible and inclusive nature.

2 HERITAGE TAKEOVERS - DYNAMICS OF THE COMMUNITY INVOLVEMENT IN ARCHAEOLOGICAL HERITAGE OF STYRIA (AUSTRIA)

Mele, Marko (Universalmuseum Joanneum) - Porod, Barbara (Universalmuseum Joanneum) - Modl, Daniel (Universalmuseum Joanneum) - Kiszter, Sarah (Universalmuseum Joanneum) - Peitler, Karl (Universalmuseum Joanneum)

The archaeological research in Austrian Styria has a long tradition starting in the 19th century. While being mainly in the hands of local priests, teachers, entrepreneurs and other figures interested in local history for the better part of the 19th century many sites have been discovered that still feature prominently in regional history, like the Roman municipium of Flavia Solva. Others, like the Early Iron Age sites of Großklein and Strettweg, are well known in the scientific community to this day. When research institutions like the Universalmuseum Joanneum, the Natural History Museum Vienna, the Universities of Graz and Vienna, the Austrian Academy of Science, the Austrian Archaeological Institute and the Federal Monuments Authority took over in the last two decades of the 19th century those ties to the local population were severed. Only in recent decades have local museums as well as private firms and associations taken over many aspects of research, preservation and presentation of archaeological sites. Researchers from different institutions have acknowledged the significance of contact, relationships and cooperation with locals. While each site has different dynamics in community engagement it always depends on engaged persons interested in local archaeology and history. The prominence of the site, the history of research and presentation, and the economic capacities of the community are far less important in comparison. Two different regions of Styria, southern Styria and Upper Styria will be discussed in detail. The Joanneum was actively involved in research as well in the preservation and interpretation of archaeological heritage in the regions. Hand in hand with the research engagement the work with the communities was an essential part of the activities. This involvement of communities resulted in different levels of success in the management of heritage by communities and the quality of interactions between those communities and their museums.

3 TRANSFORMING VISIONS: A COMPARATIVE STUDY OF PREHISTORIC SITE MUSEUMS IN CHINA

Yang, Miao (University of Cambridge)

This study conducts a comparative analysis of the development and evolution of prehistoric site museums in China, in the context of the new 'Museum Definition' issued by the International Council of Museums (ICOM) in 2022. This definition underscores the importance of social components such as diversity, accessibility, and inclusivity, representing a significant departure from earlier museum conceptualizations. By examining three prehistoric site museums established from the 1950s to the present, this research aims to investigate their adaptation to changes in exhibition methods, community engagement, and socio-economic impacts, reflecting these evolving standards.

Using a mixed-methods approach that encompasses historical review, case study analysis, and comparative research, this study incorporates a literature review, field observations, and interviews to obtain comprehensive insights. It delves into the progression of exhibition designs, the incorporation of technological advancements, shifts in heritage interpretation strategies, and the introduction of interactive experiences. Furthermore, it scrutinizes the interaction of museums with local communities, their influence on cultural tourism and economic development, and the strategies devised to address challenges.

The expected outcomes are to uncover the ways in which prehistoric site museums in China have redirected their primary focus, thus becoming more diverse and responsive to public needs. By shedding light on the development trajectories of these institutions, the research seeks to contribute valuable recommendations for future practices in heritage management and museum studies. It aims to identify limitations and propose directions for further research, enhancing our understanding and approach to preserving and interpreting prehistoric sites.

4 EVALUATING COMMUNITY INTERACTIONS AND HERITAGE PERCEPTION BY COMPARING TWO ARCHAEOLOGICAL SITES IN MENORCA (BALEARIC ISLANDS)

Pastor Pérez, Ana (Grupo de Investigación Gestión del Patrimonio Cultural. Universidad Complutense de Madrid) - Castillo Mena, Alicia (Departamento de Prehistoria, Historia Antigua y Arqueología. Grupo de Investigación Gestión del Patrimonio Cultural. Universidad Complutense de Madrid) - Pérez González, Elena (Grupo de Investigación Gestión del Patrimonio Cultural. Universidad Complutense de Madrid) - Benítez de Lugo Enrich, Luis (Departamento de Prehistoria, Historia Antigua y Arqueología. Grupo de Investigación Gestión del Patrimonio Cultural. Universidad Complutense de Madrid) - Corpas, Nekbet (Grupo de Investigación Gestión del Patrimonio Cultural. Universidad Complutense de Madrid)

Archaeological heritage is one of the fundamental cultural resources of the Mediterranean and the island of Menorca (Spain), as well as a key element in the construction of local identities. There are numerous archaeological sites on the island, each with its own management and exploitation system that presents multiple models for analysis. However, there is a scarcity of perception studies that incorporate the viewpoints of different stakeholders and users. To address this gap, in 2023 we carried out a comprehensive contextual and ethnographic study of two iconic sites: Naveta des

Tudons and Torre d'en Galmés. The assessment of the site's museography focused on narratives and accessibility, and it was combined with a general public survey framed with visitors' impromptu interviews on site and local community and expert focus groups. In this communication we will discuss how the analysis of findings lead to specific outcomes related to better implementation of practices of social inclusion and the formulation of future sustainable-led initiatives aimed at improving the economic, scientific, and social aspects of heritage management and exploitation.

5 JOURNEY OR DESTINATION: HUNGARIAN NATIONAL MUSEUM'S ATTEMPTS AND GOOD EXAMPLES TO PROMOTE ARCHAEOLOGICAL HERITAGE VIA THEMATIC CULTURAL ROUTES

Pálinkás, Adrienn (Hungarian National Museum) - Fábíán, Szilvia (Hungarian National Museum) - Czifra, Szabolcs (Hungarian National Museum)

Besides the constant fight for public interest in museums, there is a long-lasting debate amongst museum professionals concerning the role of museums – whether they should be more education or leisure-oriented. The new 'Museum Definition' (finalised by ICOM in 2022) also changed the emphasis on social components, in line with the 2005 Faro Convention as a seminal document discussing the democratisation of appreciation, access, and management of cultural heritage by promoting the idea of shared responsibility within a broader heritage community.

These challenges require constant efforts by museum institutions to ensure that museums are genuinely inclusive and representative of their local communities. On the one hand, thematic cultural heritage routes can be good examples. They are connecting the objects (stored in the museums) with the archaeological sites where they come from. On the other hand, these cultural routes can stimulate scientific research, be a living part of the local communities and offer an economic and social break-out point for rural areas.

This paper presents solutions to the abovementioned challenges as examples of good practice by the Hungarian National Museum. As a case study, the Museum's presentation focuses on promoting the archaeological heritage on regional, national and transnational level. The presentation showcases all the attempts to connect HNM's exhibition places and surrounding communities through museum's pedagogical and andragogic programs, indoor guided tours and field trips, and workshops and conferences.

But this is not the destination; it is the start of a long journey towards the audience's involvement and finding more creative solutions for promoting archaeological heritage. These principles cannot be executed successfully without market research and identifying museum visitor expectations, which this paper attempts to do. To fulfil these expectations, thematic routes proved to be useful in creating a memorable experience.

6 THE BORDER AS THE "BASEMENT" OF THE IDENTIFICATION OF VALUE. THE CASE OF THE CAMPI FLEGREI ARCHAEOLOGICAL PARK (ITALY)

Pagano, Fabio (Archaeological Park of Campi Flegrei)

A particular role gives to the Archaeological Park of Campi Flegrei the responsibility of 26 sites spread across a large territory near Naples. The dimension of the Park is punctiform and widespread. It extends over the territory of five municipal administrations and is part of a unique context characterized by intense volcanic activity. The theme of the border, therefore, is crucial considering the heritage characterization given to the Park, not a single and well-defined territory, but different areas delimited by respective borders that separate and, at the same time, connect the places of the Park with the urban and social articulation of the territory.

The strategic plan of the Park tends towards the most concrete form of self-determination precisely in interaction with the territory and with the community. The Phlegraean landscape represents an environmental context with a precise anthropological/cultural typicality, the result of a social landscape also in search of an identity, after the disillusionment experienced in the aftermath of the crisis of the industrial sector on which development had been bet territory after the Second World War.

The archaeological remains represent a formidable tool for understanding the Phlegraean landscape, in its different and multifaceted components, starting from the submerged and emerged craters and the system of the highlands-acropolis. For this reason the Park has defined and is adopting its own strategy in working on material and immaterial interconnections, encouraging the perception of its own identity precisely in the dialectic of the border.

The development strategy and management model of the Park have tried to shape themselves on the territory (environmental and human) tending towards the inclusion and integration of projects, ideas, programs and activities, taking advantage of the interstitial spaces and trying to outline compatible directions and sustainable with and for local realities.

7 THE ARCHAEOLOGICAL MUSEUM "ARISTIDE GENTILONI SILVERJ" OF TOLENTINO: FROM THE 19TH CENTURY COLLECTION TO INCLUSEUM

Perna, Roberto (Università di Macerata) - Giaconi, Catia (Università di Macerata) - Spagnuolo, Michele (PlayMarche srl) - Xavier de Silva, Ludovica (Università di Macerata) - Del Bianco, Noemi (Università di Macerata) - D'angelo, Ilaria (Università di Macerata)

The Archaeological Museum of Tolentino is the result of the excavations and studies carried out by Count Aristide Gentiloni Silverj at the end of the 19th century. Despite the Count's pioneering approach to cultural heritage, until recently, the Museum has kept a traditional way of displaying its collection that mostly respected the founder's work.

The project carried out by the University of Macerata and PlayMarche in collaboration with the Municipality of Tolentino has aimed to improve the storytelling, inclusivity, and accessibility of the Museum.

While stressing the importance of Gentiloni Silverj's work for the knowledge of prehistoric and Picene Tolentino, we have worked on the storytelling of the collection, improving its contextualisation by implementing content to build a path through the Picene and Roman periods in Tolentino and adding illustrations and experimental archaeology reconstructions to shed a light on those aspects of the ancient culture and customs that were more difficult to communicate to non-experts.

In the same direction, we worked on the accessibility of information content through co-design activities with associations of people with disabilities. To this end, solutions have been implemented to improve the museum visit of people with intellectual disabilities and sensory disabilities through the design of an integrated system, enabling the different museum visitors to customise their visit, by selecting, even before entering, the tour best suited to their needs and interests.

8 LIBYAN PERSPECTIVES IN THE ARCHIVE OF THE BRITISH INSTITUTE FOR LIBYAN AND NORTHERN AFRICAN STUDIES

Vitale, Valeria (University of Sheffield) - Crowe, Felicity (British Institute for Libyan and Northern African Studies) - Furjani, Reem (Scene)

The British Institute of Libyan and Northern African Studies (BILNAS), in collaboration with the University of Sheffield and Libyan partners, is running an archive engagement project for people in Libya and the Libyan diaspora.

The BILNAS archive mainly comprises records generated by 20th century British archaeological expeditions in Libya, and it has many images showing Libyan archaeological sites and built heritage. But while Libyan antiquities have a prominent role in the archive, the stories of the people living in Libya around those antiquities are often excluded. When the archival material does glimpses of 20th century Libyan culture and everyday life, these often go undescribed in the archive catalogue.

As a first step to gaining a more inclusive view of Libyan heritage and to move towards a more participatory approach to curating the archive, we are delivering a series of remote sessions in Arabic and English, using digitised photographs from the archive to spark discussions with attendees. Before sessions, attendees are invited to annotate the images, adding personal memories and new interpretations. Session discussions then aim to explore the comments and stories in more depth. Each session has a different theme, for example Libyan clothing and its connotations, people's experience of archaeological sites, and identifying Libyan archaeologists in images. During these sessions we are also consulting on how we can make the archive and its catalogue more accessible for people in Libya, for example by adding new keywords and perspectives in English and Arabic. We will discuss the project, what worked and what didn't, and hope to hear feedback from others interested in making heritage more inclusive.

This project is funded by the British Academy and The National Archives.

9 CURATING COMMUNITIES' PAST: DIGITAL APPLICATIONS AND CROWDSOURCING

Lampada, Despoina (Time Heritage) - Kamara, Aphrodite (Time Heritage) - Papakonstantinou, Marietta (Time Heritage) - Pouloupoulos, Vasileios (University of the Peloponnese)

Heritage professionals have established that bottom-up approaches to heritage curation, interpretation and enhancement are usually more long-lasting, as local communities undertake the responsibility to protect their cultural heritage and pass it on to the generations to come. However, in countries like Greece, where top-down approach is prevalent due to a strong state-oriented heritage policy, local communities are left with only minor parts of their heritage to look after.

After a decade's experience in working with local and rural communities, Time Heritage attempts to systematize participatory approaches through specific tools, enabling local communities to undertake the curation of their tangible and intangible heritage, as well as to gain a deeper understanding of their collective memory and cultural trends as heritage assets.

This paper discusses experiences and insights about local communities' responses to participatory approaches and associated technologies, based on evidence from two recent interventions: the Digital Curator for Small Museums [DigiSmALL], and the Digital Storyteller for Refugees' Attica [DigiStoryteller].

DigiSmALL is a database platform, doubling as a network of small museums, aiming at resolving long-standing problems of small museums, such as lack of digitization, digital presence, audience development know-how and access to funding. An offspring of Time Heritage and FAB LAB, the University of the Peloponnese laboratory for Knowledge and Uncertainty, it empowers small museums and local agents to take digital ownership of their collections and assets.

DigiStoryteller is the result of a collective project led by the University of West Attica, aiming at enhancing the heritage of Asia Minor refugees who settled in Attica in the 1920s, through digital storytelling. Combining historically curated material with a crowdsourcing platform, it invited local communities to undertake and share community-based documentation of their local history.

10 EMBRACING MULTIVOCAL HERITAGE: INTRODUCING THE MEMORY LAB AS THE CORE CONCEPT OF THE HERITAGELAB INITIATIVE

Yalman, Nurcan (Istanbul Nisantasi University) - Cappalletto, NiccoloAcram (Graduate Student in Arts, Museology and Curatorship University of Bologna)

This presentation introduces the newly launched HeritageLab, a pioneering interactive online memory museum aimed at challenging traditional notions of heritage and fostering a more inclusive, community-based, and transnational approach to collective memory. Historically, heritage has been monopolized by those in power, leading to exclusionary narratives and the marginalization of diverse voices. The HeritageLab initiative challenges this paradigm by giving voice to the multifaceted nature of heritage that exists beyond the confines of official designations, traditional boundaries, and also geographical frontiers. Drawing on the insights shared in "We Question Heritage's Past" and "We Embrace Heritage's Future," we advocate through practice a reevaluation of what constitutes authentic and traditional heritage, prioritizing the importance of individual valuations and community narratives. Thus, an intersecting set of Memory Labs is at HeritageLab's core. Each Memory Lab includes an interactive digital map in which individuals from diverse backgrounds can collectively contribute to the preservation, recognition, and sharing of their heritage, empowering local communities as key stakeholders in the interpretation of their heritage. The HeritageLab's Digital Universe allows for these labs to intersect to explore shared heritage narratives spanning time, space, and identity. Additionally, these maps recognize the significance of diverse storytellers-- artists, scientists, and scholars-- in enriching our understanding of heritage, transcending disciplinary boundaries, and embracing multiple forms of knowledge production.

This presentation could also be considered as an invitation to envision a more inclusive and multivocal approach to heritage and digital museums, one that celebrates diversity, fosters dialogue, and promotes justice and equality in commemoration efforts worldwide.

11 MANAGING THE UNDERGROUND BUILT HERITAGE: THE HELLENISTIC NECROPOLIS IN NAPLES

Pace, Giuseppe (CNR - Institute for Research on Innovation and Services for Development) - Fatigati, Luisa (CNR - Institute for Research on Innovation and Services for Development) - Esposito, Gabriella (CNR - Institute for Research on Innovation and Services for Development)

This presentation explores the fascinating case of the Naples' Hellenistic Necropolis, through the study of three underground sites in the Vergini neighbourhood, a part of the Neapolitan territory included in the Sanità district. These sites, opened to visitors, are owned and managed by privates and no-profit associations. Through several interviews, the Authors define different management models for each site and analyse their performance. Sites are not fully sustainable, and their fragmented management reduces the sites' potential to become one of the most visited and studied sites in the World. Based on the results of the COST Action Underground4value, the presentation proposes an integrated approach to the heritage management, able to connect local authorities, national museums, state antiquity protection bodies, foundations, associations, and privates. Dialogue and strategic thinking could make each site part of an integrated system, the Hellenistic Naples, and attract the needed resources for the site's overall sustainability. Creating such a win-win situation could expand the attractiveness of participatory practices and cultural transitions in the field of heritage management.

12 TEACHING AND LEARNING OF CULTURAL HERITAGE. BRIEF EPISODES FROM THE ACTIVITY OF COMMUNITY ARCHAEOLOGY ASSOCIATION IN HUNGARY

Füredi, Ágnes (Hungarian National Museum) - Rácz, Tibor Ákos (Community Archaeology Association; Ferenczy Museum Centre)

Over the past 10 years, people passionate for the past increasingly sought active contact with archaeologists and archaeological research in Hungary. However, the need for day-to-day engagement with the public and authentic transmission of recent scientific findings often exceeds the capacity of research centres and museums. The Community Archaeology Association, founded in 2019, acts as an intermediary between heritage institutions and the civilian community, thus meeting a well-defined cultural need of the society. Our association carries out archaeological field activities in cooperation with heritage institutions with the help of non-professional volunteers to learn about and preserve archaeological heritage.

We wish to present two case studies, each of them exploring different aspects of the integration of civilians into heritage preservation and rescue work. A programme series comprising ten field events to research archaeological sites under special protection in Pest County using modern site diagnostics methods was carried out in spring 2022. Our programme focused on surveying the condition of sites. The work was done in inter-institutional cooperation merging the Cultural Heritage Studies Programme by the Central European University, archaeologists from the Ferenczy Museum Centre of Pest County and a research project by the Community Archaeology Association. It studied how local communities can be involved in protecting cultural heritage by raising awareness and developing the cultural heritage site at Pomáz for cultural tourism purposes.

Volunteers made spectacular contributions to data collection on prestige finds from the 10th century, a period of settlement and taking roots of Hungarian population in the Pannonian Plain and participated in a series of research excavations of cemeteries from the era. Our second case study highlights how concrete research results can be obtained with civilian help.

13 SHARING HISTORY AND INTERPRETATION FOR UNDERGROUND BUILT HERITAGE: THE CASE-STUDY OF THE PISCINA MIRABILIS

Lombardi, Giovanni (CNR) - Surla, Tamara (University of Novi-Sad) - Pace, Giuseppe (CNR - Institute for Research on Innovation and Services for Development)

The presentation delves into the relationship between historical research and community engagement, mainly in the context of the Underground Built Heritage (UBH). The work, result of the COST Action CA18110, uses the case study of "Piscina Mirabilis" in Bacoli (NA) to explore this dynamic. Historical research is not confined within its disciplinary boundaries. It must engage with theoretical and practical issues, often dealing with unforeseen matters and social involvements that shape the heritage characterisation. This necessitates an openness to local communities while maintaining objectivity. The presentation highlights the potential friction between history and community memory in interpreting UBH. It explores the demands historians often face, which involve confronting different perspectives and languages. This opens up interpretative issues on history/memory connections, handling the polysemy of sources, re-signification of places, and cultural transitions. The presentation underscores the importance of fostering an open dialogue among scholars, stakeholders, institutions, and local community. This dialogue, based on strategic transitions, serves as a means of local empowerment. It helps participants share old and new meanings, bringing places out of the shadow cone of no-value or misconception. The case study provides an opportunity to analyse how historians deal with participation and the ever-evolving signification of places. By merging history, traditions, meanings, and memories, the presentation offers a set of problems induced by tourism in terms of community identity and self-recognition. Finally, through semi-structured interviews with Piscina Mirabilis's stakeholders, it outlines potential development pathways, governance mechanisms, and current challenges for the site's development, reuse, and valorisation. Interaction with different local stakeholders, both public and private, aids in understanding their viewpoints. This is a crucial step towards a shared interpretation linking history with traditions and supporting multi-stakeholder engagement in the valorisation process. This approach underscores the importance of collaboration and inclusiveness to heritage preservation and valorisation.

14 OVERVIEW OF THE CULTURAL ROUTES OF THE COUNCIL OF EUROPE PROGRAMME IN HUNGARY. NATIONAL AND INTERNATIONAL NETWORKS, EXAMPLES OF GOOD PRACTICES

Tompos, Krisztina (Hungarian Open Air Museum (Szabadtéri Néprajzi Múzeum))

What kind of role can thematic routes across countries play in safeguarding heritage and making it accessible? Which opportunities are offered by the Cultural Routes Programme and its related scientific and civil networks? How can the benefits of the Programme be realised at national or even at local level?

In my presentation I would like to focus on the questions mentioned above and present the activities of the Cultural Routes Programme in Hungary and its widely applicable experiences, which can be used in raising awareness of archaeological heritage in the community.

The Directorate of Intangible Cultural Heritage of the Hungarian Open Air Museum has coordinated the Cultural Routes Programme in Hungary since 2019 on the mandate of the Minister responsible for the culture. The Hungarian Open Air Museum, established in 1965, has a significant professional knowledge basis in the safeguarding of cultural heritage, raising its visibility, involving visitors and making the heritage more accessible to the community. Since 2009, the Museum has also placed increasing attention on intangible cultural heritage through the Directorate of Intangible Cultural Heritage, which has been responsible for the professional coordination of the Cultural Routes Programme in Hungary since 2019 as well.

Hungary has already connected to 12 cultural routes, such as the Iron Age Danube Route, European Route of Historic Thermal Towns, Saint Martin of Tours Route, Roman Emperors and Danube Wine Route, etc. The associations which organise these routes connect academic and civil networks, international and local communities. As the Hungarian coordinator of the Cultural Routes Programme, the Hungarian Open Air Museum supports the cooperation of the routes within the country and encourages the exchange of professional experiences, the sharing of ideas and common planning.

15 MID-TERM STRATEGY FOR THE IRON AGE DANUBE ROUTE

Czifra, Szabolcs (Hungarian National Museum)

Four years ago, experts in archaeology, cultural heritage protection, and tourism, as well as local stakeholders, founded an international association aiming to raise public awareness of fragile Iron Age landscapes and offer sustainable strategies for their research, protection and management. The unique heritage tourism initiative Iron Age Danube Route achieved its primary goal in May 2021, when it became certified Cultural Route of the Council of Europe. This opened many new and exciting opportunities for its members and partners (including museums) to empower their cooperation and community engagement. This presentation will examine the cultural route in light of the interrelationship between archaeology, museums and tourism, using widely accepted planning tools to research the current state and design further steps in cooperation. A STEEPLE analysis helps to understand the route's macro-environment through political, technological, economic, environmental, political, legal and educational factors. Adopting Porter's model to the route, I identify and examine five competitive forces that shape the network and must be considered in order to better position our initiative in the marketplace. Finally, I assess internal and external factors and the current and future potentials of the route in a SWOT analysis, which helps to hammer a mid-term development plan in three key areas, especially highlighting museums' role in future actions.

16 MOVING TOWARDS THE ARCHAEOLOGICAL NATURAL PARC OF THE SINIS PENINSULA. THE ACTIVITIES OF THE FONDAZIONE MONT'E PRAMA

Mureddu, Maria (Fondazione Mont'e Prama) - Camedda, Nicoletta (Fondazione Mont'e Prama) - Orri, Ilaria (Fondazione Mont'e Prama) - Becciu, Marica (Fondazione Mont'e Prama) - Fadda, Sara (Fondazione Mont'e Prama) - Pitzalis, Matteo (Fondazione Mont'e Prama) - Murru, Giorgio Franco (Fondazione Mont'e Prama) - Muroni, Anthony (Fondazione Mont'e Prama)

The cultural heritage of the territory of Cabras, in the Sinis Peninsula, Central-West Sardinia (Italy), has recently passed under the charge of the Fondazione Mont'e Prama, instituted by the Ministry of Culture of Italy, the Sardinian Region and the Municipality of Cabras. At the moment the Foundation manages the Iron Age site of Mont'e Prama, a necropolis of the Nuragic civilization monumentalised around the 9th-8th c. BC with a unique statuary complex; the archaeological site of Tharros, with its Bronze Age Nuragic village and the Punic, Roman and Late Antiquity city; the palaeo-Christian church of San Giovanni; the hypogeum of San Salvatore, a sanctuary frequented from the IV c. AD; the Archaeological Museum of Cabras, which exhibits the findings from the cited sites and from other excavations and surveys held in the Peninsula and in underwater excavations near the Sinis coast. The Foundation operates to enhance and promote the fruition of the territory with an integrated approach, involving the archaeological sites altogether with all productive sectors correlated to the cultural aspects. The cultural-touristic development of the area of Cabras is taken into great account, and inserted in a broader regional and over-regional network. One of the other aims is the development of the research, either with activities conducted by the same Foundation or sustaining and collaborating with Universities and other institutes. Specific actions, as conferences for all types of public, didactic projects with schools, innovative partnerships with regional and international actors, together with renovations of the expositions and of the ways of communicating, are undertaken. The final objective is to contribute to the development of the community, to enhance its commitment thanks to the participatory approach, and its awareness of the value of the cultural heritage in general terms as well as in concrete situations of life and human interactions.

17 RESEARCH OF ROMAN VILLAS IN COUNTY VESZPRÉM - A COMMUNITY ARCHAEOLOGY PROJECT

Péterváry-Szanyi, Brigitta (Laczkó Dezso Múzeum)

Community archaeology in county Veszprém has its origins around 2015 when the first metal detectorists joined in the researches of the museum. Since then a scientific research plan was formed to provide a backbone for the investigation, focusing on the Roman road network and settlement pattern. During the years an experienced and very enthusiastic team has formed. The program provided training in theoretical and on-site knowledge, also in preparing the finds for further examination. The latest project focuses on the villa buildings of the Balaton uplands. It is a complex programme, running for two years. This is the first research of the museum, where the volunteers are participating not only in the fieldwork, but in every aspect of the project, from the desk-based research up to the publication and building an exhibition presenting the results. This presentation draws up the project plan, emphasising the detailed roles of the volunteers. Also presents the first phase of the research, completed until the summer of 2024. Finally a short analysis of the first experiences is included.

18 THE CRESWELL VOLUNTEER ARCHAEOLOGY PROJECT: INSIGHTS INTO INCLUDING RURAL COMMUNITY RESIDENTS IN ARCHAEOLOGY AND HERITAGE

Nelson, Theresa (Department of Archaeology, University of Sheffield; Creswell Heritage Trust, Creswell Craggs, UK) - Kuykendall, Kevin (Department of Archaeology, University of Sheffield, UK) - Jones, Angharad (Creswell Heritage Trust, Creswell Craggs, UK)

Creswell Heritage Trust (CHT), or Creswell Craggs, is an enclosed limestone gorge on the Derbyshire/Nottinghamshire border of England and includes caves occupied during the last Ice Age. Located in Creswell, England, which is within the top 10% to 20% of the most deprived areas in the country, this rural heritage site is striving to support local communities impacted by the aftermath of mining and deindustrialisation whilst repositioning itself as an 'archaeological park' inviting visitors to "walk in the footsteps of early humans and woolly mammoths. In 2023, the Creswell Volunteer Archaeology Project (CVAP), a collaboration between the University of Sheffield Department of Archaeology and CHT, successfully enacted a model of community-engaged archaeological fieldwork to understand how to mobilise public perceptions and better understand the role of archaeology for audience development and programming. CVAP successfully recruited a cohort of local community residents to participate in an excavation, implemented pre- and post-excavation interviews for participants to understand their views before and after excavation participation, and disseminated a public survey for community members to better understand and include views on archaeology and Creswell Craggs. At the end of the project, CVAP and its participants co-produced a free museum exhibit at CHT and a local cafe, "The Community Experience: Archaeology at the Craggs," which included a documentary created by and from the perspective of a local Creswell resident and Seasonal Service Assistant at CHT. Our 2023 work provides insights on good practices in heritage management for other rural, cultural tourism sites, including: interacting with socioeconomically deprived communities via social media engagement, physical flyers, and free, in-person events outside of heritage sites; methods of communication with local community members and heritage staff to include their voices and perspectives; and co-producing informative museum exhibits which are accessible both within and outside of rural heritage sites.

19 COMMUNITY ARCHAEOLOGY IN THE GÖCSEJ MUSEUM. ARCHAEOLOGICAL RESEARCH OF PAULINE MONASTERIES IN ZALA COUNTY, HUNGARY

Havasi, Balint (Directorate of Museums in Zalaegerszeg - Göcsej Museum) - Simmer, Livia (Directorate of Museums in Zalaegerszeg - Göcsej Museum)

Our presentation displays the programme "Community Excavation of the Pauline monasteries". The project, launched on a civil initiative in 2016, kept evolving and has reached the level of cooperation on the scale of social participation by today. Since the beginning, we have aimed at approaching and involving the widest possible range of stakeholders. The focus – the past of a particular settlement and the history of the Pauline order – attracted both people interested in archaeology, Christian volunteers, and archaeology students looking for a field practice opportunity. Besides, we also attempted to reach local governments and mayors, local tourism agents, local NGOs, higher education institutions, the Hungarian Pauline Order, and local businesspersons and companies.

The project received a grant from the National Cultural Fund in 2022. The support has enabled us to continue the recent community excavations and the non-destructive geophysical investigations. The grant also helped us to summarise the results of the archaeological and geoinformational research of the last years.

1163 COPING WITH CONFLICTS. INVESTIGATING DEESCALATION STRATEGIES IN PRE- AND EARLY-STATE COMMUNITIES

Session theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Session organisers: Loy, Anna (Christian-Albrechts-Universität zu Kiel (CAU); ROOTS Cluster of Excellence) - Gentile, Valerio (Leiden University) - Andersen, Anna-Theres (Christian-Albrechts-Universität zu Kiel (CAU); ROOTS Cluster of Excellence)

Session format: Regular session

The importance of de-escalation and peaceful resolution of conflicts is of tragic relevance nowadays. In Conflict Archaeology the material traces of primarily violent events have been the focus within the last decades. Consequently, despite their historical and political significance, the material evidence for de-escalation strategies has received limited attention in archaeological research and remains underrepresented.

De-escalation and resolution strategies can be considered an integral part of conflict dynamics, profoundly influencing the social consequences and economic costs for the communities involved.

Nevertheless, differing from the historical sciences, where the assessment of non-violent conflict resolutions relies on the availability of written records, archaeologists often contend that demonstrating de-escalation processes is challenging.

This session aims to stimulate a comprehensive discussion on the potential archaeological evidence that could shed light on de-escalation strategies. For example, recent archaeological studies have discussed fortification sites or weapon hoard finds as potential indicators for conflict resolution in past societies. Furthermore, it provides a well-rounded perspective on the multifaceted nature of conflict archaeology and the enduring relevance of de-escalating approaches in the quest for cooperation within human societies.

We invite contributions from diverse time spans (pre- and early-state communities), disciplines, and geographical perspectives.

ABSTRACTS

1 SYMBOLIC EXPRESSION AND HANDLING OF WEAPONS AS A DE-ESCALATING STRATEGY

Borake, Trine (Museum Vestsjælland, Denmark)

The discovery and investigation of weapon graves, magnate residences and defence systems, along with historical accounts of Viking plundering have fostered a general idea of a militarised society and martial social organisation in Scandinavia Iron Age (550 A.D. -1050 A.D.) However, studies of weapons from an accumulated body of detector material from Denmark demonstrate a complex composition. It is characterised by a majority of parade weapons, a dispersed distribution including rural and ritual sites and depositions, typology transformation and transgression, and deviating warrior symbolism. Furthermore, we see a symbolic destruction of weapons and few defence weapons. The reasons and arguments for this development are multiple. Here, I will propose that transforming the notion of weaponry as a means of aggression, violence, or threat of violence into a symbolic and ritualised expression served as a de-centralising and de-escalating strategy. This paper will present the development in weapon distribution and symbolism in the first millennium with a special focus on metal detector material from Denmark and discuss the expression and handling of weapons in the late Iron Age as a potential indicator for conflict resolution. The theoretical argument is based on an anarchistic perspective, where decentralisation in various forms is central.

2 DIS-ARMING THE PAST: DEPOSITING DELIBERATELY DESTROYED WEAPONS ON EARLY IRON AGE ÖLAND, SWEDEN, AS A CONFLICT RESOLUTION STRATEGY?

Nordin, André (Stockholm University)

In Conflict Archaeology, weapons constitute one of the key material indicators of prehistoric warfare. The presence and availability of weapons, as indicated by their material remains, are commonly seen as facilitating conflict in pre-history. While weapons have been central to understanding past conflicts, little attention has so far been given to the actual weapons themselves and the roles they might have played in de-escalating conflict. For example, in Early Iron Age Sweden, some weapons have been deposited in a damaged state in burials, wetlands, and on settlements. This is a phenomenon that has been observed since the 19th century. Previous research has recognised that some of this damage may have been directly inflicted on the weapons themselves, prior to deposition. By being damaged and deposited, weapons are effectively removed from circulation in society, possibly contributing to the disarming of society, whether directly or indirectly. In this paper, I will explore how the practice of deliberately damaging weapons and their subsequent depositions relate to conflict resolution strategies in the past. As a case study, I will examine the

weapons from two Early Iron Age sites from central Öland, Sweden: the cemetery of Sörby-Störlinge and the nearby wetland depositional site of Skedemosse. Both sites are more or less contemporary, and both sites feature deposited weapons that have been deliberately damaged. In order to further expand the archaeological analysis of deposited deliberately damaged weapons, I will also make use of anthropological theory relating to de-escalation and conflict resolution strategies.

3 DUELS & DEPOSITIONS. EXPLORING BRONZE AGE DE-ESCALATION STRATEGIES THROUGH EXPERIMENTATION AND MICRO-WEAR ANALYSIS

Gentile, Valerio (Leiden University; University of Göttingen)

It is common opinion among scholars that European Bronze Age had strong martial connotations. During this period, weapon technology underwent fast development and weaponry spread in large numbers across the continent. Weapons also played a role in the ceremonial sphere: thousands of swords and spears were intentionally removed from circulation and buried together in hoards or thrown into rivers. In many cases, these items were also deliberately bent and broken. On the other hand, conflict in the Bronze Age was also a harsh reality: in recent years, archaeological and osteological research has increasingly uncovered material evidence of violent conflicts among large groups of individuals.

How and to what extent was armed conflict sustainable for Bronze Age communities? What strategies could have been implemented by non-state groups in order to manage conflict and prevent it from constantly escalating?

This paper discusses the application of a combined approach - consisting of experimental investigation and analysis of use-wear traces - to the study of ceremonially deposited Late Bronze Age weaponry in the Low Countries. The ways and frequency in which these items were used provide precious information on how armed conflicts were conducted and on how casualties could have been mitigated. Furthermore, the steps that preceded how some of these weapons were discarded seem in-tune with de-escalation scenarios.

4 PLACES OF CONFLICT - PLACES OF COPING?

Loy, Anna (ROOTS Kiel)

Fortifications come in various kinds and forms - and locations. They constitute a longstanding element within the conflict-related practices of various communities. But what can they tell us about conflict management strategies?

Understood as tangible expressions of perceived conflict potentials each fortification follows its unique trajectory, yet certain common parameters can be discerned - Specific places within any given landscape afford different levels of defensibility. This paper delves into the discussion and presentation of measures of defensibility associated with different fortifications dating back to the first Millennium BC in the region surrounding the south-western Baltic Sea. Hence, how can an approach based in landscape archaeology enhance our understanding of these structures?

Additionally, the previously explained generalised method of defensibility inquiry is evaluated, examining its utility and potential scope for further archaeological research. By exploring the defensibility of fortifications, this research aims to contribute valuable insights into the broader understanding of conflict management strategies in past communities.

5 THE SINTASHTA PARADOX: A NON-WARRING WARRIOR CULTURE FROM THE BRONZE AGE?

Semyan, Ivan (Institute of Archaeology and Ethnography NAS RA)

The Sintashta archaeological emerged for a relatively short period during the end of 21st and 19th centuries BC in the foothills of Southern Urals and the adjacent Kazakhstan steppes. Today we know its 25 large settlements with impressive fortifications, yet none bears the signs of siege or attacks. The contemporaneous burial mounds yielded troves of bronze weapons, elaborate jewelry, massive remnants of animal sacrifices, luxuries delivered by long-distance trade (e.g. Badakhshani lapis-lazuli, cotton cloth from Indus Valley). But the greatest surprise so far were the chariot complex including harness details - cheekpieces, earliest known examples of spoked wheels and chariot horses. The Sintashta culture must have achieved significant breakthroughs in the techniques of metallurgy, monumental construction, and the use of animals. The evidence likely suggests a concentration of wealth in the hands of warrior elites. The puzzle is that we find no traces of organized violence in a culture marked by its innovations in chariots, fortifications, battle axes, spears and compound bows. By contrast, the signs of military disasters abounded in the "simpler" Bronze-age communities both before and after Sintashta epoch in the same landscapes. It appears that the Sintashta elites found an effective de-escalation strategy by monopolizing access to highly specialized, expensive weapons and creating impregnable fortifications in the times when siege tactics were not yet effective. But the trade-offs of vertical controls apparently proved unsustainable. Tentatively, I submit for discussion the hypothesis that the extraordinary concentrations of humans, metal-casting, as well as cattle and horses in the same fortified compounds resulted in the depletion of natural environments from overgrazing and pollution. The twin paradox of stationary pastoralism and a well-armed peace under elite control tended to last no longer perhaps a century and half.

POST-VIKING ERA POPULATION OF SAMBIA AND ITS CONTACTS IN THE MIRROR OF MODERN SETTLEMENT ARCHAEOLOGY

Prassolow, Jaroslaw Aleksei (Leibniz Zentrum für Archäologie (LEIZA-ZBSA)) - Skvortsov, Konstantin (independent researcher)

The archaeological legacy of the Post-Viking era Sambian Peninsula (modern Kaliningrad region of Russia and the former administrative district of Fischhausen/Samland in the German province of East Prussia) provides evidence of numerous and multifaceted relations between its medieval population and both close and remote contacts. Indications of trade, cultural exchange, migrations, cooperation and military confrontations with other tribes and peoples are richly present in the local burial monuments up to the end of the 13th century (colonization by the German Teutonic Order). Unfortunately, another essential category of data sources on the everyday life of the medieval Old Prussians – unfortified settlements, remains poorly investigated so far. This in turn limits the possibilities of modern archaeological research, in both the study of various aspects of the everyday life of Sambia's population and the reconstruction of the local medieval settlement structure. Some general knowledge of a few unfortified settlements, which were discovered before 1945, can be reconstructed by means of the comparative analysis of the partially preserved pre-war German archival records. Unfortunately, these archives as a rule neither shed light on the internal structure of the settlements in question nor provide detailed information on the material culture and chronological stratification of these archaeological sites. However, the situation has slowly started to change due to the field research campaigns of recent decades. These new and often unexpected investigation results allow a deeper insight into the current concept of the interregional communications of the Old Prussians in the 11th-13th centuries AD as well as the reviewing of it. We have firm material evidence that the settlements in question both profited from their integration into the wide-stretched, mutually enriching, communication network and suffered in the devastating local military conflicts.

1165 COLLECTING ACROSS BORDERS: HISTORIES OF COLLECTING AND CURRENT DEBATES ON COLLECTIONS

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Ojala, Carl-Gösta (Uppsala University) - Kato, Hirofumi (Hokkaido University)

Session format: Regular session

This session critically investigates interrelations between ideologies and practices of collecting, and concepts and constructions of borders. Today, there is a great need to address histories of colonial and imperial collecting, and the impact of collecting on the construction and understanding of borders and identities, in the past as well as the present. In many places in the world, local and Indigenous groups are today claiming the right to self-determination in heritage issues and demanding repatriation of museum collections. There is a need to deal with sensitive and traumatic histories, and to discuss how to handle contested collections in the future.

We invite papers dealing with, for instance, histories of collecting, concerning both material culture and human remains, histories of assembling collections, interrelations of ideologies and practices of collecting with various understandings of borders and identities, as well as protest and resistance from local and Indigenous communities against the collecting, excavation and plundering of material objects and ancestral remains. We welcome critical reflections on the politics and ethics of collecting over time, and encourage contributions that highlight critical current issues from different angles, from academic, heritage management and community perspectives.

We especially encourage contributions dealing with minority and Indigenous heritage. Papers might discuss specific case studies or more general and comparative themes. We also welcome papers dealing with networks of scholars and collectors, stretching across borders.

In the session, we would also like to address contemporary consequences of the histories of collecting and the importance of the collected heritage today. We invite contributions addressing present-day debates, collaborations and conflicts connected with histories of collecting across borders, and with current shifting borders and changing power dynamics, including decolonization, repatriation and reburial processes. We aim for an open and inclusive discussion in the session, with focus on possible constructive paths forward.

ABSTRACTS

1 COLLECTING ACROSS BORDERS IN SÁPMI: HISTORIES AND LEGACIES OF COLONIAL COLLECTING

Ojala, Carl-Gösta (Uppsala University)

In recent years, topics concerning histories and legacies of Nordic colonialism in Sápmi (the core areas of the Indigenous Sámi population) have been increasingly discussed by scholars. As part of this much needed broader examination of Nordic colonialism in Sápmi, there is also a need to recognize and critically examine legacies of colonial collecting. This paper discusses aspects of collecting across borders in Sápmi, and the importance of transnational networks of collectors – a theme that has been little examined in earlier research.

Histories of colonial collecting include, for example, the early modern collecting of Sámi material culture, such as the sacred Sámi drums that were confiscated and collected in the 17th and 18th centuries, and the collecting of Sámi human remains in the 19th and early 20th centuries, as part of racial science and the assembling of craniological collections in the Nordic countries and elsewhere. In recent years, Sámi individuals, groups and institutions have raised demands for greater self-determination in heritage issues and respect for Sámi cultural rights, which have included demands for repatriation and reburial.

This paper discusses some of the challenges for scholars and research and heritage institutions in this field of tension between past and present. The paper addresses the current situation concerning repatriation and reburial processes, and their wider implications and significance, in the Nordic countries, stressing the importance of examining the politics, ethics and power dynamics of archaeology and heritage management, as well as the importance of border politics, when discussing histories and legacies of colonial collecting.

2 CULTURAL HIERARCHIES, HIGHLIGHTING INDIGENOUS COLLECTIONS IN THE VATICAN MUSEUMS

Aigner, Katherine (The Australian National University)

The great Vatican Exhibition of 1925 was curated by the eminent missionary, ethnologist, and linguist Father Wilhelm Schmidt SVD (1868–1954). With networks of missionaries such as Paul Schebesta (in Africa and southeast Asia), Martin Gusinde for the Fuegini (South America), Franz Kirschbaum and also Georg Höltker in Papua New Guinea and Ernest Worms in Australia, Schmidt developed theories that challenged the separation of humankind, or the 'progression' from nature to culture, popular at the time, instead valuing indigenous knowledges and cultures. His work on archaeological and cultural collections, highlighted in the 1925 Exhibition, ushered in a new era of study of so-called 'hunters and gatherers'; he stressed their similarity and intelligence. But did Schmidt's work create another artificial separation of cultures? Through specific case studies, this talk looks at the interrelations between Schmidt's theories, the construction and understanding of identities in the Anima Mundi, Peoples, Arts and Cultures collection (Vatican Museums), and how collaborations with the indigenous communities have enhanced our understanding of tangible and intangible cultures.

3 SCATTERING EGYPTIAN COLLECTIONS: THE CASE STUDY OF PREDYNASTIC AND DYNASTIC LITHIC ARTEFACTS

Lombardi, Lorena (University of Pisa; National Research Council-Institute of Heritage Science (CNR-ISPC))

Many of the most important Egyptian collections in Italy and worldwide were acquired or donated between the end of the 19th and the beginning of the 20th century. Their full accessibility and understanding is limited by several factors, such as the paucity or lack of contextual information due to the nature of their acquisition as antiquarian markets or old archaeological practices, especially along the Nile Valley, and because many of them were originally part of unified collections, but are now scattered in different museums. At the same time, it is through these collections and their study that the magnificence of Pharaonic Egypt continues to impress the public. However, there is one important group of artefacts that is still little studied: the Predynastic and Dynastic lithic industries.

This presentation aims to highlight the potential of the study of ancient museum collections originally related to each other, and to reconnect the scattered artefacts of some important contexts, such as Wadi el-Sheikh, the Thebes area or Abydos cemetery, which are kept in different museums. Although much data on the original contexts has been lost due to urbanisation or lack of research in some areas, the combination of a techno-typological analysis of the lithic artefacts, the study of the available archival documentation and the comparison of the collection with other recently excavated contexts allows us to shed new light on these often dismissed collections. By cross-referencing data from different museums, it is possible not only to reconstruct the history of the collections and the people associated with them, but above all to recontextualise the artefacts and place them in their original context in Egypt.

4 PRE-COLUMBIAN MUMMIES IN EUROPEAN MUSEUMS - INTERDISCIPLINARY AND TRANSNATIONAL EXPERIENCES AND OBSERVATIONS FROM AN ONGOING RESEARCH PROJECT

Gerst, Robin (Goethe-Universität Frankfurt am Main)

This lecture presents the experiences I was able to gather in the course of my ongoing research project on pre-Columbian mummies. It is a kind of experience report on how different the handling and research can be. Thus, I see my results as personal experiences, but also as a basis for exchange for a selected group of this culturally sensitive material in archaeology, which, however, offers many opportunities for comparison.

South American human remains are represented in many museums and research institutions in Europe, in far more than one might expect at first glance.

These results were collected in more than 50 museums and research institutions in nine countries (more to follow). There is little comparative research on this, and there is no database or comprehensive catalogs. However, there are major differences within Europe in terms of distribution, research and museum presentation.

Human remains have special requirements: I will use examples to show how these mummies are cared for and exhibited in museums by the various scientific disciplines and, in particular, how these approaches differ.

This also concerns the ethical backgrounds that arise from this. There have recently been major changes in terms of sensitivity. Pre-Columbian remains, which originate from archaeological contexts but are often assigned to the ethnology departments of museums, have been particularly affected. This manifests itself in the current challenges in museum handling (focus on pre-Columbian mummies): Changes in exhibition/didactics, museum objects with a “colonial context”, dealing with concerns of communities of origin, provenance research, repatriation issues etc.) but also the day-to-day difficulties of conservation and research.

I would like to compare experiences and lessons learned on these points and discuss suggestions and examples of best practice.

5 THE NUBIAN SKELETAL COLLECTIONS CURATED AT UNIVERSIDAD COMPLUTENSE DE MADRID

Casquero Muñoz, Mar (Universidad Complutense de Madrid) - Ríos Frutos, Luis (Universidad Complutense de Madrid) - Saad, Mohamed (National Corporation for Antiquities and Museums (Sudan))

Archaeological work in present-day Sudan began during the British colonial administration, with large scale projects like the Archaeological Survey of Nubia, carried out by foreign archaeological missions that usually viewed Nubia as a cultural extension of Egypt. It wasn't until 1960 that Sudanese involvement in both archaeological work and legislation commenced, with the first Sudanese appointed Commissioner for Archaeology. Since then, various foreign teams have conducted joint archaeological excavations with the Service of Antiquities of Sudan (now National Corporation for Antiquities and Museums). Between 1978 and 1981, a Spanish archaeological team excavated the cemetery of Amir Abdallah (AAM), in northern Sudan. This collaboration allowed the discovery and characterization of a new archaeological culture known as Early Meroitic (III-I B.C.). The license granted by the NCAM permitted the export of the remains of around 380 individuals to the Universidad Complutense de Madrid (UCM) for its study.

In this work we discuss the Spanish archaeological missions to Sudan and Egypt, focusing on the importance and treatment of human remains, from the excavations of Meroitic and X-Group cemeteries in Argin under the UNESCO International Campaign, to the AAM cemetery. Half a century after its excavation, the collections curated at UCM present an unexplored resource. We discuss current avenues of research that could contribute to the better understanding of the social and cultural dynamics of ancient Nubia, and frame this discussion within broader issues of decolonization, better and more accurate representation of Nubian history, and involvement of Sudanese colleagues, a matter complicated by the current conflict.

6 CROSS BORDER EXCHANGE OF THE INDIGENOUS REMAINS

Kato, Hirofumi (Hokkaido University)

The Indigenous repatriation movement began in Japan in the 1980s, however, systematic repatriation was not implemented until the 2000s. At the request of the Ainu Association of Hokkaido and others, the Japanese Government surveyed ancestral remains of the Ainu stored in universities and museums in Japan. As a result, it was found that over 1,700 remains were stored at 12 universities and 18 public museums in Japan. Repatriation of the ancestral remains from the universities and museums to the local communities is progressing, however, there are remains whose repatriation destination has not been decided, and they are currently being kept at the National Resting Place.

On the other hand, it is obvious that the ancestral remains of the Ainu are stored in museums and research institutions abroad. The whole picture is unidentified and the collection history is unknown. However, during the process

of research into the repatriation from Australia in 2023, it became obvious that an exchange of ancestral remains of Indigenous peoples was taking place between scholars.

The purpose of this paper is to point out that an international network of collection exchanges existed in the background of the collection of Indigenous human remains. I would also like to mention that this international network was related to the flow of international researchers fostered in Europe in the 19th and early 20th centuries. I would also like to point out the importance of international collaboration in solving this issue.

1166 HISTORY WITHOUT CROSSROADS? CENTRING THE PERIPHERY OF THE MEDITERRANEAN

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Gheorghide, Paula (University of Helsinki) - Johal, Prabhjeet (University of Toronto)

Session format: Regular session

Crossroads are often considered emblematic representations of liminal spaces, places of passage rather than origin, often distinguished by their transient nature and multi-ethnic populations. Both Western and Classical epistemologies have produced a dichotomy between “crossroads” and “centres” for theoretical and heuristic purposes in describing many sites in the East. The adage “all roads lead to Rome” has served as a metaphor for the intrinsic link between “central hubs” and their periphery. This adage also highlights, however, how in western thought, that neither the centre nor its periphery could exist without the “crossroads” that connected multiscalar networks of interaction and so, demand reconsideration.

Still, scholarship has largely characterised places such as Palmyra or Hatra, as “in between” Rome and the Arsakid empire. Similarly, rooted in 18th to 20th century ideas of cultural and racial purity, crossroads in the Hellenistic world are often envisioned as “in between places” defined by their “hybrid” or “syncretic” material and linguistic culture. These “in between” places have also historically been utilized to define and distinguish what “Hellenistic” is from what it is not. Through frameworks such as the “Silk Roads,” the same could be said of Central Asian communities, largely defined by their position between China, India, and Persia and so, operate in Classical scholarship as a crucial hinge between the so-called “East” and the Eastern Mediterranean.

In this session, we welcome papers that explore the material culture of the Hellenistic to Roman periods from perspectives that challenge the historical framework of “crossroads. We hope to foster discussion with the aim of reimagining and re-centering “in between” places as fixed points of intersecting realities. Our goal is to undo the characterisation of “crossroads” as strictly points of transition in relation to and defined by “centres..

ABSTRACTS

1 CENTRING THE LOCAL IN GANDHĀRAN ART: THE MATERIAL EVIDENCE FROM SWAT

Elahi, Moizza (University of Toronto)

When it comes to ancient Gandharan art—the visual and material culture from the northwestern regions of the Indian Subcontinent—traditional scholarly practice provides a partial picture and does not, in many cases, adequately nuance the local, global, sociological, and material dimensions of the artistic and archaeological phenomena. Most approaches to this artistic tradition tend to cast it as a passive peripheral recipient of the active Hellenistic or Roman core cultures. To better understand and more effectively address the complexity of Gandharan art, it is imperative to highlight the local dynamics and agency embedded in the processes of production and use of Gandharan artefacts in tandem with the cross-cultural currents that characterize them. To this end, the present paper draws attention to the sculpture—statues, reliefs, and architectural elements—recovered from some of the early Buddhist monastic centers in the region of Swat in Greater Gandhara. By focusing on the materiality of these objects—the specificity of their material properties and the complexity of their entanglement with other objects and people—this paper aims to recover the significance and centrality of local action and agency in the making and unmaking of Gandharan cultural practice. In doing so it hopes to provoke discussion and dialogue beyond the usual Eurocentric originary debates and reductive discourses centred on artistic influences.

2 GLOBALISATION THEORY AS AN ALTERNATIVE TO ‘CROSSROADS’-THINKING: THE CASE OF DOLPHIN-AMPHORA EARRINGS FROM PASTORALIST BURIALS IN NORTHERN BACTRIA

Veltman, Merlijn (Leiden University)

Centre-periphery-crossroads thinking (CPCT) has undeniable effects upon how archaeologists and ancient historians investigate and categorise objects from ancient contexts in Central Asia. This approach leads inevitably towards attributing cultures to objects. By focusing on what objects are, objects become abstract and culturally representa-

tive. A vase with iconography stemming from the Hellenistic world becomes Greek, and a belt plaque with an animal combat scene becomes Saka or Xiongnu. By focusing on cultural connotations, the impact of the object, including its physical characteristics, is of little consequence. In CPCT, cultures are seen as homogeneous and static. Centres appear to contain the most homogeneous culture, peripheries less so, and crossroads a mix of various cultures. Does CPCT fit with evidence from the ancient world? Rome is arguably the 'centre' of the Roman Empire, yet is culturally profoundly heterogeneous, and not at all purely 'Roman'. It seems, a different approach is needed.

This paper proposes an alternative to thinking in centres, peripheries and crossroads, in the form of globalisation theory. This approach posits that connectivity and interaction are endemic to the ancient world, that objects are more-than-representative, and that cultures are flexible, shifting and locally conceived. In short, it focuses not on what objects are, but on what objects do. First, an examination of globalisation theory is given, and contrasted with previous approaches to cultural interaction. Second, a case study is presented to illustrate globalisation theory, focusing on the so-called 'Dolphin-amphora earrings' from several pastoralist burial sites in Northern Bactria (modern day Tajikistan). These earrings were conceived as evidence of Greek influence upon the identity of pastoralists in previous research. Globalisation theory, however, shifts the focus to what these earrings do in their context, illustrating the impact of these objects within the burial.

3 THE RELIGIOUS ECOSYSTEMS OF AI KHANOUM AND TAXILA AND THEIR RELATION TO HYBRIDISED ICONOGRAPHY

Nikolaou, Christos (University of Cambridge)

In this essay, I undertake a comparative analysis of the distribution of religious iconography in Hellenistic Bactria and Gandhara, using Ai Khanoum and Taxila respectively as proxies. I am using the reports of DaFA and John Marshall, as well as other relevant literature to construct accurate maps and databases of said iconography and comparing them to see different strategies of hybridity (Hoo, 2018). To do this, I am using GIS-based analysis (Laricella et al, 2017, Martinez-Seve, 2014), as well R, to identify the spread of religious structures and artefacts in the city. The article seeks to delineate a method for identifying how religious diversity manifests in Hellenistic urban landscapes. Specifically, the Hellenistic period in the region saw connectivity between the Greek, Indian and Iranian cultural spheres, and I hypothesize that these relationships were manifested differently under different regimes and in different regions (Hoo, 2018, 1-3). Through building a database which has all relevant material culture (so religious artefacts or artefacts with mythological iconography) as well as entries of all the buildings (or in the case of Sirkap mound, blocks as described by Marshall), which are all georeferenced for mapping purposes. I have organized columns which record information such as material of items, iconography, periodization etc. Using these columns, I produce Graphs in R and using the georeferenced coordinates, I make heatmaps of the distribution of specific categories of images and compare them in between the two cities. For instance, comparing the presence of terracotta figurines in domestic or ritual contexts, or where for instance Dionysiac imagery is present if at all in either site. In essence, I'm working on understanding how the religious ecosystems of either site were set up and how urban space allowed said ecosystems to manifest.

4 CULTURAL INTEGRATION ON THE "CROSSROAD": ICONOGRAPHY OF A CHINESE SILK JIN IN ROMAN PALMYRA

Zhou, Junjie (Ludwig-Maximilians-Universität München)

The caravan city of Palmyra in the first two centuries CE was not merely a peripheral frontier between Rome and the Arsacid Empire, but a hub of cultural contact and integration. Palmyra preserved nearly a hundred textiles of Chinese silk, one of the largest corpora ever survived from Antiquity. This paper will present a case study of one warp-faced compound tabby (jin in Chinese) to illustrate how cultural encounters in Palmyra actively generated a unique "hybrid" pattern. First, I shall introduce the geographic and historical background of Palmyra in the Roman era. Its critical position along the caravan routes promised its prosperity in the Syrian desert. The main part of this paper will focus on the jin discovered in a tower tomb. After a briefing of its material properties and weaving structures which confirmed its provenance from China, I shall draw emphasis to the iconography of naked figures within vine scrolls inhabited by various animals. I am going to argue that this pattern took inspiration from the classical "grape-picking Cupids" motif especially popular in the Eastern Mediterranean and Hellenistic Central Asia. Meanwhile, Chinese weavers accommodated the foreign motif with indigenous forms of mythical camels and felines. Together, they seemed to represent a picture of afterlife wonderland. Finally, the case study will lead to a discussion of changing methodologies to study ancient cultural contact, from "colonisation" to "hybridity" and lately "globalisation".

5 NAVIGATING CROSSROADS NARRATIVES IN THE ROMAN EAST THROUGH WHITE MARBLE PROVENANCE: THE STUDY OF FUNERARY MONUMENTS FROM THE STRYMON VALLEY

Anevlavi, Vasiliki (Austrian Archaeological Institute, Austrian Academy of Sciences) - Andreeva, Petya (National Archaeological Institute With Museum, Bulgarian Academy of Sciences) - Prochaska, Walter (Austrian Archaeological Institute, Austrian Academy of Sciences) - Ladstätter, Sabine (Austrian Archaeological Institute, Austrian Academy of Sciences)

The tie between extensive quarries and regional production yields a scientifically grounded framework, fostering heightened economic integration and advancing the systematic exploitation of local raw material sources. Inquiries arise on how geographic position and topography influence connected cities' pivotal roles at crossroads. Marble, as a compass, directs our exploration towards a deeper understanding of the material aspects. Geoarchaeological provenance studies reveal materials' origins, shedding light on objects, monuments, and socio-economic networks between diverse regions.

The current study examines the crucial connection between East and West through the Strymon Valley in Roman Macedonia and Thrace. It serves as a vital link, bridging the Aegean area and the Balkan hinterland. The valley's geographical position at the crossroads facilitates an in-depth exploration of this historical connection. The study's core lies in examining funerary monuments in Upper, Middle and Lower Strymon Valley regions, spanning present-day Bulgaria and Greece. A substantial array of objects, predominantly dating from the second and third century AD and crafted from white marble, undergoes comprehensive analysis. This examination encompasses petrography, stable isotopes, and chemical analysis to unravel the provenance of these artefacts. The results reveal a significant diversity in marble preferences, ranging from local to sub-regional and regional sources, highlighting the crucial role of the local marble sources in the Upper and Middle Strymon Valley in shaping the landscape of local production and economy. Notably, the utilisation of Thasian marble is confined to the lower part of the valley, and intriguingly, despite the abundance of local sources, supra-regional marble sources like Prokonnesos also make an appearance.

Study challenges trade boundaries, showing networks span regions, surpass provincial borders, and defy geographical limits. It emphasises the critical importance of an interdisciplinary approach in unravelling the complexities of ancient marble production, workshops, and socio-economic dynamics within the provinces.

6 BETWEEN THE SEA AND LAND: REGIONAL NARRATIVES ENCAPSULATING NORTHERN ALBANIAN ARCHAEOLOGY DURING THE EARLY AND MIDDLE BRONZE AGE

Mara, Anisa (University of Toronto)

The Bronze Age (BA) in Eurasia has been generally characterized as a crucial period of socioeconomic transformations. This portrayal of the BA, however, exhibits regional nuances. In the Mediterranean, these transformations are typically viewed as tripartite: a) urbanization, with major centers emerging, especially in the east; b) maritime trade; and c) a multitude of technological innovations, such as metal tool production or the adoption of the potter's wheel. There is also a distinctly 'continental' perspective on these processes, primarily in the eastern European territories, such as the Carpathian, here narratives of social change center specifically on the mobility characteristic of the Kurgan/Corded Ware/Bell Beaker phenomena.

The area under this study falls in one of the regions where these two stories meet: the western Balkans or eastern Adriatic. Positioned in this 'liminal' zone, one can adopt either a maritime and Mediterranean-oriented perspective on the BA or a more continental and Balkan-oriented one. This paper discusses the ways in which these narratives have affected our historical and current understanding of the west Balkan/ eastern Adriatic BA, and more specifically, the Early Bronze Age (EBA) and Middle Bronze Age (MBA) of one region, that of northern Albania. This analytical lens aims to provide an overarching understanding of how archaeological evidence is approached in the currents of thought that have led to a particular narrative holding sway – that of the 'Cetina phenomenon' – and what approaches are needed to redress the balance so that we are not immediately predisposed to look for inequality and trade no matter what, regardless of local patterns. My paper intends to emphasize the lifeways of local communities in northern Albania during the EBA/MBA and the extent of their interaction with the outside world to understand the composite picture of the region.

7 (RE)CENTERING THE AUGUSTAN TROPAEUM ALPIUM: A FEMINIST AND QUEER ANALYSIS OF THE 'IDEAL' FEMALE CAPTIVE

Madden, Kelsey (Institute of Classical Studies, School of Advanced Study, The University of London)

Constructed in 7/6 BCE within the Maritime Alps near Saint-Tropez, France (Gaul), the Augustan Tropaeum Alpium monument was dedicated by the Senate and people of Rome to celebrate Augustus' military achievements in Gaul. Positioned prominently, it commands attention both from land and sea, featuring an inscription on its western façade detailing the forty-five subdued "Alpine Tribes", framed by two striking friezes. These friezes depict a tropaeum, a

wooden trophy adorned with the arms of the conquered, accompanied by captive male and female figures, interpreted as stereotypical Gauls, chained at its base (Silberberg-Pierce 1986).

Within Roman conquest iconography, the portrayal of captive women serves as a potent symbol, signifying the dominance and expansion of Roman power while also implying the obliteration of 'barbarian' familial structures (Dillon 2006). Furthermore, these depictions often evoke the spectre of wartime sexual violence, exploitation, and human trafficking (Madden, in press). Notably, the depiction of these Gallic captive women does not accurately represent the multi-ethnic nature of the region (Mullen 2013). In essence, these depictions represent an "ideal captive..

Contrary to prevailing perspectives, such as those proposed by Ian Ferris (2000), which emphasise the monument's role as merely facilitating the convergence of cultural, political, and military concerns as a transitional space within the provincial road network, my examination suggests that the Tropaeum Alpium, with its gendered visual imagery, served as a fixed locus for the dissemination of Roman cultural ideals surrounding the "ideal" war-ravaged and trafficked captives while simultaneously intersecting with the lived experiences of the multi-ethnic local and regional communities who experienced such subjugation. This paper adopts a feminist and queer theoretical framework to deconstruct the bodily representation of captive women on the monument and its implications for understanding the intersecting dynamics of power and violence within the context of Roman predatory warfare in Southern Gaul.

1167 HISTORICAL ARCHAEOLOGIES OF THE COASTAL AND FLUVIAL ANTHROSPHERE ? LANDSCAPES AND STRUCTURES, COMBINING SETTLEMENT ARCHAEOLOGY AND GEOSCIENCES

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Ferenczi, Laszlo (Department of Archaeology, Charles University) - Bergamo, Martina (Ca' Foscari University of Venice) - Paiano, Jacopo (Ca' Foscari University of Venice) - van Lanen, Rowin (The Cultural Heritage Agency of the Netherlands) - Zatykó, Csilla (HUN-REN Institute of Archaeology, Research Centre for the Humanities)

Session format: Regular session

As highlighted in a recent position paper (Werther-Mehler 2021), fluvial landscapes/floodplain environments are global hotspots, particularly sensitive to socioenvironmental changes. Similarly, littoral landscapes, lagoonscapes, shallow shorelines, extensive coastal marshes, with their constantly changing morphology and different resources, proved to be particularly appealing places for human settlement and represent critical contexts for observing settlement dynamics from a diachronic perspective.

On one hand, material culture perspectives (i.e. building and settlement archaeological observations) demonstrate an interdependence between environment, as environmental variability played a fundamental role in shaping material and social structures (construction techniques, productions, infrastructures, or property systems, labour organization and the size of the respective communities). On the other hand, advances in geoarchaeology, palaeoecology, remote sensing techniques and GIS modelling provide increasingly rich views into the dynamics of these systems, and into a variety of factors (e.g. climate, geology, river morphology) influencing the strategies of human communities. Wetland landscapes constantly attracted human populations, yet their dynamic changes (in terms of population size, social organization, landscape environment) posed considerable challenges, requiring adaptation. Although in historical periods, the multicausal nature of anthropogenic forcing mechanisms is better documented, particularly the changing intensity and scale of settlement (contraction-expansion), fundamentally influencing land-cover changes, and also fluvial responses, large scale patterns are less well understood.

Our session adopts a multiperiod-approach, from pre-Roman to late medieval times, inviting papers that

- provide a regional/sub-regional perspective
- investigate "short" or "long durée" human adaptation strategies in specific landscapes
- contrast environmental "determinism" (constraints) and eco-possibilism (human adaptation)
- demonstrate the combined use of geoscientific and settlement archaeological methods to reconstruct past human activities, environmental change, crisis management-resilience strategies
- study settlement structure/distribution dynamics in relation to environmental/socio-economic factors (relevant from the point of view of wetland management)
- track responses of human communities to environmental change (flooding, erosion, other hazards).

ABSTRACTS

1 FLUVIAL ANTHROSPHERES AND THE WAY TO THE ANTHROPOCENE - GENERAL THOUGHTS AND METHODOLOGICAL APPROACHES

Werther, Lukas (Deutsches Archäologisches Institut) - Mehler, Natascha (Tübingen University, Historical Archaeology) - Schenk, Gerrit (TU Darmstadt, History of the Middle Ages) - Zielhofer, Christoph (Leipzig University, Physical Geography)

Floodplains represent a global hotspot of sensitive socio-environmental changes and early human forcing mechanisms. They are exceptionally dynamic landscapes and key areas of European cultural and natural heritage. Due to their high land-use capacity and the simultaneous necessity of land reclamation and risk minimisation, societies have radically restructured floodplains. This anthropogenic restructuring can be so significant that former floodplains are no longer recognisable as such. Parallel hydro-sedimentary and climatic processes and human impact have formed even those floodplains, which are still close to a natural state. The question therefore arises as to whether or when it is justified to understand floodplains as a "Fluvial Anthroposphere" and which socio-ecological processes have been involved in their development. This paper will present scientific goals and methodological approaches of the DFG Priority Programme (SPP) "On the Way to the Fluvial Anthroposphere", which investigates the pre-industrial floodplains in Central Europe and the fluvial societies that operated there. It is based on the key hypothesis of a pre-modern emergence of Fluvial Anthropospheres and asks when and why humans became a significant controlling factor in floodplain formation. It is committed to multidisciplinary approaches from history, archaeology, and geosciences and investigates medieval and pre-industrial floodplains and fluvial societies. As an early transformed, sociocultural highly relevant region, the Rhine, Elbe and Danube river systems form the model region for systematic comparative analyses. The paper will also discuss, how these results can contribute to the current Anthropocene debate and related boundary conditions.

2 ROMAN STRUCTURES AND OPERATIONS AROUND THE VENETIAN LAGOON: ACCESSIBILITY, CHANNEL INTERVENTIONS, AND LANDSCAPE CHANGES

Ugolini, Federico (University of Siena) - Cirigliano, Giuseppe Prospero (IMT Lucca)

During the Roman period, delta, lagoons and rivers of the Adriatic were part of a complex web of geographical, environmental, climatic and geomorphological features. Lagoon environments, and their coastal settlements and ports, such as those of Aquileia, Altino, Concordia, were integrated into networks that included several inland centers, markets and harbours in Roman Adriatic Italy. Scholars have scarcely considered research on lagoon and riverine centers in this region, and only from a limited historical perspective. Lagoon environment also poses multiple challenges to field and underwater research. This paper focuses on the changes and interventions in the environment and landscape of the Venetian Lagoon, in the territory between Altino (Altinum) and Concordia Sagittaria (Iulia Concordia), in 100 BCE - 400 CE. Through an examination of archaeological sources and remote sensing data, this research identifies the scale and extent of these lagoon and fluvial settlements and assesses accessibility and circulation within the Venetian lagoon network. By using itineraries, port structures, embankments, dykes, channel interventions, and settlements this study examines accessibility, development and connectivity of this lagoon environment in antiquity. This project strives to advance methodological approaches, such as aerial- and field-survey and remote sensing techniques to facilitate the integration of sources within the framework of landscape and maritime archaeology in the Venetian lagoon.

3 THE ADAPTATION OF ROMAN AND POST-ROMAN SITES TO LAGOON ENVIRONMENTS: THE CASES OF LIO PICCOLO AND TORCELLO ISLAND (VENICE, ITALY)

Paiano, Jacopo (Ca' Foscari University, Venice) - Bergamo, Martina (Ca' Foscari University, Venice) - Calaon, Diego (Ca' Foscari University, Venice)

The paper analyzes construction technologies, buildings' shapes, environmental entanglements, and the eco-dynamic processes in two specific Venetian area archaeological sites, Lio Piccolo and Torcello. The Roman Imperial age maritime Lio Piccolo villa (Cavallino-Treporti) reveals an intriguing juxtaposition of a traditional 'bricks-and-marble' residential section and an unconventional - at least for the Roman traditional archaeological literature - wooden warehouse. The timber structure is perfectly adapted to the humid surroundings, goods circulation, routes, and the availability of construction materials. In contrast, Torcello island, an Early Medieval maritime trade hub, exemplifies substantial infrastructural investments tailored to port requirements, involving timber, clay/mud, and selected Roman-reused construction materials. The paper analyzes the context of the labor force and technology transfer: the goal is to underscore the socioeconomic and long-term political framework that shapes these building methods techniques and, consequently, the lagoonal landscape in antiquity.

Defining the transforming relationship between humans and the waterscape is critical in the unique context of the Venice Lagoon. The complex and unstable geomorphology imposes a specific approach to understanding how distinctive features have influenced settlement dynamics and defined the ontology of the construction technologies. The Northern Venice Lagoon's recent excavations offer valuable insights into these dynamics, highlighting a diverse array of strategies employed to harness the potential of this aquatic environment, both for trade and production.

4 **TOWARDS MUD AND SHALLOW WATERS: SETTLEMENT DYNAMICS AND ADAPTATION PROCESSES IN THE VENICE LAGOON FROM ROMAN TO EARLY MIDDLE AGES**

Bergamo, Martina (Ca' Foscari University of Venice) - Paiano, Jacopo (Ca' Foscari University of Venice) - Calzon, Diego (Ca' Foscari University of Venice)

Lagoonal environments, shallow sandy coasts and fluvial deltas are peculiar places to establish human settlement, requiring specific adaptation strategies. Nevertheless, they proved to be highly attractive to past societies, preferable for various activities and dwellings. A relevant example of this attractiveness can be retraced in the Northern Lagoon of Venice between the Roman Imperial Age and the Early Middle Ages.

Being settled in Roman and pre-Roman times for productive purposes (salt production and fishery), the lagoonal suburbs of the Roman city of Altinum on the banks of the Sile River steadily grew in importance during the Late Antiquity, giving rise to new sites alongside existing ones. These shifts are intertwined with profound natural and socioeconomic modifications: the crucial changes in Veneto Roman cities and the critical environmental waterscape transformation of the coasts. Ultimately, this process led to new Early Medieval centres with a distinct commercial focus and peculiar urban fabric.

The close correlation between the sites and the intricate pattern of river branches connecting these spaces with the mainland is more than evident. However, integrating geoarchaeological and archaeological data within a digital GIS environment, encompassing both published legacy data and findings from recent archaeological investigations, provides new insights and a more faceted interpretative framework for understanding distribution dynamics and settlement evolution.

This paper presents a sub-regional overview of the entanglement between human activity with fluvial and aquatic elements. In these wetlands, the "fluvial anthroposphere" concept involves specific interactions, including the exploitation of local resources, adaptation to continuously wet conditions, and attempted control over river configuration. Fluvial axes served as connectors and water routes: they are keys to deciphering settlement transformation patterns and interpreting archaeological phenomena.

5 **LIKE A DUCK TO WATER. ROMAN BUILDING AND ENGINEERING AT THE EDGE OF THE VENETIAN LAGOON**

Delpozzo, Eleonora (Ca' Foscari University of Venice) - Sperti, Luigi (Ca' Foscari University of Venice)

The peculiar characteristics of the lagoonscape of Venice have been well known since Antiquity, as it clearly emerges from the classical sources. The area, like much of Northern Italy, is situated on an alluvial plain formed by "megafans" of the main rivers (Brenta, Piave, Tagliamento). During the 2nd century BCE, the Romans intensified their presence in the area and their relations with local elites. In this specific historical framework, usually referred to as "Romanization", the landscape underwent impactful modifications by the Romans, who had to contend with the specific problems related to this territory, rich in waterways and subject to hydrological instability. The Romanization process entailed the construction of infrastructures and buildings, such as roads and bridges to improve mobility between settlements. However, Roman engineering techniques alone could not adapt to this peculiar landscape. This paper, based on these premises, aims to present evidence from archaeological and remote sensing data that illustrates different solutions applied to overcome the geomorphological instability of this territory. Relevant case studies will be presented, primarily from settlements in the northeastern area on the edge of the Venice lagoon, such as Altinum, Opitergium and the centuriation. The main objective of this work is to emphasize the role of local communities in transmitting technical knowledge, as well as the Romans' contribution to the issue, in a peculiar historical context that fostered this dialectic - and prolific - interaction.

6 **CITIES BELOW THE WATER LINE. DUTCH ADAPTATION STRATEGIES FOR DELTAS AROUND THE WORLD.**

Kosian, Menne C. (Cultural Heritage Agency of the Netherlands (RCE)) - Van Lanen, Rowin (Cultural Heritage Agency of the Netherlands)

The Netherlands pride themselves as a unique place in the world being a strongly urbanized, low-lying delta. Especially in these times of climate change and the need for climate adaptation strategies, as well as the necessary transition in

energy production and consumption and a need for change in agricultural land-use, we tend to focus on our "unique" position in the world for tackling these problems.

The delta allowed the country to exist and bloom. Cities in the Netherlands originated from Roman and Medieval times, all on the rivers in the delta, and since almost no rivers were embanked, they had to deal with regular flooding. Not only in the cities themselves, but also on the surrounding agricultural areas necessary for feeding these cities.

The Dutch have a long tradition of water-management and -policies. One of the latest shoots of this tree is the cycle of stress tests Dutch municipalities have to perform. Part of the National Adaptation Strategy, they give an insight in possible water, draught or heat induced problems and asks a follow-up in a risk-dialogue resulting in communal policies. Since November 2022 the Dutch government made the combination of soil and water systems leading in planning for transition assignments; 'soil and water in the lead'.

The Cultural Heritage Agency of the Netherlands (RCE) have always plead for including history and heritage into his stress test analyses. This would not only shed light to former adaptation strategies, but could also provide knowledge, or even solutions for modern policies.

The knowledge obtained from these adaptation policies and the knowledge on how the Dutch dealt with them in the past is not only of national importance. Adaptive strategies like these, including the historical perspective could be helping other low-lying delta areas around the world in their adaptive strategies.

7 **LOGBOATS FINDINGS IN PO VALLEY AND THE EARLY MEDIEVAL CASE**

Lucchini, Alice (University of Zadar, Department of Archaeology)

Logboats represent a peculiar form of watercraft, nowadays long forgotten from northern Italy's naval traditions. The findings remain sealed in deposits of the bodies of water where they used to sail, while their making implied the use of trees with shapes and dimensions that are unknown in today's Po Valley environment. The presence of adequate wood resources, however, is only one of many preconditions of their construction, as the socioeconomic context has an essential role in woodland destination and management.

This contribution aims to analyse the distribution and chronology of the findings in the Po Valley diachronically and to consider what kind of variables could have facilitated the making and spreading of logboats in some periods more than others.

Ultimately, I focus on findings from the Early Medieval Period, where their presence in the plain is more outstanding than other archaeological evidence of transports. Based on studies of cargo capacities of the findings and coeval written sources, I suggest some uses for these boats along the Early Medieval Po Valley settlements, a frame of which extension, unfortunately, is still far from being understood.

8 **CHOOSING YOUR PATH WISELY: HOW THE LONG-TERM ANALYSIS OF SETTLEMENT AND FLUVIAL DYNAMICS CAN HELP TO IMPROVE HERITAGE PRESERVATION**

Van Lanen, Rowin (Cultural Heritage Agency of the Netherlands)

Despite their dynamic nature and susceptibility to natural hazards (e.g., flooding), many river and delta landscapes throughout the past have been densely populated. Accessibility to fertile soils, easily maintainable geographical boundaries, and long-distance transport networks made these areas interesting places to live regardless of their often challenging nature. The Rhine-Meuse delta in the Netherlands is a typical example of such a wetland landscape. As early as the Bronze Age (2000-800 BC) this region was densely populated and played an integral part in long-distance trade connections. Especially during the Roman (12 BC-AD 450) and early-medieval (AD 450-1050) periods the delta underwent significant cultural and environmental changes (i.e., the collapse of the limes, river avulsions, and altering flood regimes). The extent and impact of these changes and their interaction is generally unknown and difficult to untangle, but provides essential information for amongst other heritage preservation and spatial planning.

In this paper I will focus on the long-term analyses of two cultural manifestations, both strongly influenced by cultural as well as natural dynamics: settlement patterns and route networks. Based on recent research, I will demonstrate how (1) increased flooding forced settlement to progressively move to higher locations in the delta, and (2) route networks interconnecting these settlement remained relatively stable despite evident landscape changes. It will become clear that in lowlands, such as the Rhine-Meuse delta, boundary conditions are relatively sensitive to change, making these landscape eminently suited to study and untangle the complex interplay between natural and cultural dynamics. The main aim of this paper is to illustrate that precisely the dynamic nature of delta landscapes helps to develop high-resolution spatiotemporal frameworks of cultural-landscape changes, providing essential information for heritage preservation (i.e., through improving predictive modelling), spatial planning (e.g., learning from the past), and facing future challenges (e.g., climate changes).

9 INVESTIGATING HUMAN-ENVIRONMENTAL INTERACTIONS IN EXTREMELY FLAT FLUVIAL LANDSCAPES: 7,000 YEARS OF SETTLEMENT ECOLOGICAL DYNAMICS ON THE GREAT HUNGARIAN PLAIN

Gyucha, Attila (Department of Anthropology, University of Georgia, USA) - Mesterházy, Gábor (Hungarian National Museum National Archaeological Institute) - Takács, Katalin (Hungarian Institute for Soil Sciences, Centre for Agricultural Research) - Árvai, Máttyás (Hungarian Institute for Soil Sciences, Centre for Agricultural Research) - Nagy, Balázs (Department of Physical Geography, Eötvös Loránd University, Hungary) - Magyari, Enikő (Department of Environmental and Landscape Geography, Eötvös Loránd University, Hungary)

Fluvial environments are favorable landscapes for agrarian communities and, therefore, have been subject to human interventions since the advent of farming. Over the past centuries, extensive anthropogenic alterations have occurred in many of these regions worldwide, causing fundamental changes in water networks, landscape morphology, and soil attributes. These human-induced changes, coupled with natural transformations, pose a considerable challenge for archaeologists attempting to reconstruct ancient landscapes in alluvial plains and investigate past human-environmental interactions.

This paper applies a historical ecological perspective and presents a methodological approach to achieve a nuanced understanding of how different environmental factors, their combinations, and their changes influenced settlement decisions over time in extremely flat alluvial environments. Specifically, we focus on settlement dynamics as they relate to climate, hydrology, topography, and soil characteristics covering ca. 7,000 years for a 75-square-kilometer microregion within the Körös Basin on the Great Hungarian Plain. We took into account information on climatic changes, and using LIDAR data, we reconstructed the ancient river system, which underwent significant transformations due to water regulation campaigns in recent centuries. This same dataset was employed to analyze the topography in a landscape where even slight differences in elevation had a notable impact on the distinction between regularly flooded, temporarily inundated, and flood-free areas. Additionally, we studied high-resolution coring data to investigate the correlation between various soil attributes and human settlement patterns over time. Lastly, systematically collected archaeological data from surface surveys were used to gain insight into how communities, spanning from the Neolithic to the Medieval Ages, adapted to and interacted with their environment in this particular microregion.

10 EXPLORING ENVIRONMENTAL CONSTRAINTS OF MIGRATION PERIOD SETTLEMENT IN THE MUREŞ VALLEY, ROMANIA

Szente, Gergely (Hungarian National Museum (Magyar Nemzeti Múzeum)) - Daczó, Levente (Hungarian National Museum) - Dobos, Alpár (National Museum of Transylvanian History, Cluj-Napoca) - Gáll, Erwin (The Romanian Academy of Sciences, Institute of Archaeology "Vasile Pârvan") - Rácz, Zsófia (Eötvös Loránd University, Institute of Archaeology) - Cosma, Călin (Romanian Academy, Institute of Archaeology and History of Art of Cluj-Napoca)

The authors present preliminary results of archaeological topographical project focusing on the Transylvanian Basin, carried out in the framework of a project on early medieval networks, settlement, production and distribution systems (Project No. TKP2021-NKTA-24 financed by the Hungarian NRD Office). During the Avar period (7th–8th century AD), the Avar type archaeological record was concentrated in the middle section of the catchment of the River Mureş (Transylvanian Basin, Romania), where important economic resources (salt deposits) may have been exploited. We investigate patterns of long-term settlement changes between the Roman (1st–2nd c. CE) and the Árpád period (11th–13th c. CE), and more specifically the settlement network of the Avars, studying environmental parameters. In the post-Roman period, a radical settlement contraction is documented. In the Migration period and the early medieval period another settlement-contraction phase, changes in settlement intensity, and the vertical and horizontal displacement of settlements can be observed. Until the of the Árpád period, a slow recovery could be identified. The fluvial environment seems to have determined human settlement in every historical period, and different patterns of settlement could be documented in the Mureş valley and in the valleys of its tributaries. The settlement pattern was influenced by local and supra-regional road systems, and, most probably also by the two salt deposits, situated to the south of the Mureş (in Ocna Mureş, and Ocnişoara). The area of the Mureş catchment divides into different microregions, characterised by different geological and hydrological conditions, and the core area of Avar settlement (our study area) is found in a region where there were comparatively rather favourable soil conditions for agriculture. The various factors influencing settlement patterns form a complex set of conditions, which we are still in the first stages of understanding. Thus, our contribution also attempts to outline perspectives for further research.

11 DARK SOIL ON SAND DUNES AS A RESULT OF TERRAIN LEVELLING AT THE EARLY MEDIEVAL SETTLEMENT OF MIKULČICE, MORAVIA

Janovský, Martin (Department of Archaeology, Faculty of Arts, Charles University, nám. Jana Palacha 2, Prague, 116 38, CZ) - Lisá, Lenka (Institute of Geology of the Czech Academy of Sciences, Rozvojová 269, Prague, 165 00, CZ) - Hladík, Marek (Institute of Archaeology of the Academy of Sciences of the Czech Republic Brno, v.v.i., Čechyňská 363/19, Brno, 602 00, CZ)

At the early medieval Great Moravian site of Mikulčice-Valy (8th–10th century AD), a metre-thick set of anthropogenic horizons of dark colour mixed with sand from the local dunes were found during rescue archaeological excavations. Archaeologists usually consider similar finds to be cultural layers because they are full of artifacts and ecofacts. It is the question if such general interpretation is sufficient. In order to reveal the formation processes of this humus-rich horizons in detail, the physico-chemical analyses, micromorphological analysis together with archaeological interpretation were carried out. Based on micromorphological analysis, it is clear that this is not only a cultural layer, but rather a Dark Earth that is physico-chemically influenced by the formation and gradual anthropogenic mixing with sandy substrate. This substrate is local fluvial sand, which comes from the Morava River. The river and its connection with the early medieval settlement thus also played a significant role in the development of anthropogenic soils in the 8th to 10th centuries.

12 GOING WITH THE FLOW: SITE DYNAMICS, SETTLEMENT TRANSITIONS AND LAND-USE STRATEGIES IN THE KÖRÖS VALLEY, HUNGARY

Zatyko, Csilla (HUN-REN Research Centre for the Humanities, Institute of Archaeology) - Berta, Adrián (HUN-REN Research Centre for the Humanities, Institute of Archaeology) - Kovács, Bianka Gina (HUN-REN Research Centre for the Humanities, Institute of Archaeology) - Kovács, Gyöngyi (HUN-REN Research Centre for the Humanities, Institute of Archaeology) - Mesterházy, Gábor (Hungarian National Museum) - Pető, Ákos (Hungarian University of Agriculture and Life Sciences) - Saláta, Dénes (Hungarian University of Agriculture and Life Sciences)

The development of interdependence between human communities and waterscapes is not only a subject for archaeological research but a global strategic issue determining the lives of coming generations. Prior to the 19th-century river regulation works, the wetland areas along rivers in Hungarian Great Plain were large extent, environmentally sensitive territories of social and economic life. The presentation intends to contribute to a deeper understanding of how medieval (i.e. 11th–18th centuries) communities of these wetland areas adapted their settlements and land use strategies to the landscape around them by reconstructing the fluvial landscape and examining medieval settlements along the Körös River. How did medieval communities living in the investigated areas exploit the economic potential of the landscape and react to changes in hydrography or vegetation? To what extent can we see environmental reasons or rather farming, and (estate and political) historical motives behind settlement transitions? How did remains of landscape features of earlier centuries, such as the 'Csörsz Ditch' or the 'Devil's Dyke' and kurgans influence the landscape perception of medieval people? The research programme to be presented seeks the answers to these questions by interconnecting results of several disciplines and relying on historical sources, archaeological datasets of surface surveys complemented and interpreted by state-of-the-art methods of archaeological prospection and field survey analysis, remote sensing data, GIS modeling, and analyses in the fields of landscape history and hydrology.

13 THE RIVER WESCHNITZ FLUVIOSCAPE AND ITS INTERACTION WITH THE LORSCH ABBEY - AN OVERVIEW OF RESEARCH QUESTIONS

Prien, Roland (Ruprecht-Karls-Universität Heidelberg, Germany; Hessian State Office for Monuments and Sites, Archaeological Unit, Field Office Darmstadt, Germany) - Henselowsky, Felix (Institute of Geography, University of Mainz, Germany) - Hillmus, Nicolai (Institute of History, Technical University Darmstadt, Germany) - Jäger, Barbara (Institute of Geography, University of Heidelberg, Germany) - Appel, Elena (Institute of Geography, University of Mainz, Germany) - Becker, Thomas (Hessian State Office for Monuments and Sites, Archaeological Unit, Field Office Darmstadt, Germany) - Mächtle, Bertil (Institute of Geography, University of Heidelberg, Germany) - Schenk, Gerrit (Institute of History, Technical University Darmstadt, Germany) - Bubbenzer, Olaf (Institute of Geography, University of Heidelberg, Germany) - Vött, Andreas (Institute of Geography, University of Mainz, Germany)

The River Weschnitz, a 2nd order tributary of the Rhine system, has its origin in the Odenwald mountains and enters the Upper Rhine Graben at the city of Weinheim (northern Baden-Württemberg). Today's course in the Upper Rhine Graben is still partly naturally influenced by the Palaeo-Neckar fluvial system, but has been massively anthropogenically modified for most of its course since Roman times and especially in the Middle Ages and the Modern era. Decisive to these alterations is the foundation of the Lorsch Abbey in AD 764 that caused the emergence of new economic and political patterns closely tied to the river. Though the famous Codex Laureshamensis specifies that the original monastery was situated super fluvium Wisgoz its precise location remains elusive. In the High Middle Ages two

further monasteries were established within the Weschnitz floodplain. Since the Lorsch Abbey and its secular successors functioned as a cultural and economic centre for the wider surroundings, humans had to cope with the naturally high groundwater table and episodic flood events. Therefore, humans carried out river diversions, channel, dam and bridge constructions, as well as flood reduction measures. The river Weschnitz was further subject to the influence of milling, mining and tannery until the 20th century.

Within the framework of this collaborative research project, which is part of the DFG-funded Priority Programme 2361 On the Way to the Fluvial Anthroposphere, environmental historians, physical geographers and archaeologists work closely together on historical documents, maps, archaeological sites, artefacts and sedimentary archives in order to establish a base for reconstructing and modelling the Weschnitz Fluvioscape. In the first year of the project work, a wide range of research questions has been established that will be discussed in this paper based on first preliminary results.

14 MEDIEVAL COLONIZATION OF AN UPLAND LANDSCAPE IN WESTERN BOHEMIA - ENVIRONMENTAL ARCHAEOLOGICAL, HISTORICAL ECOLOGICAL AND LANDSCAPE ARCHEOLOGICAL APPROACHES

Ferenczi, Laszlo (Univerzita Karlova)

The paper focuses on the catchment of the Strela River, in the North Plzen district, in Western Bohemia, where a comprehensive GIS based evaluation of archaeological and historical topographical data has been carried out to study the landscape of a Cistercian estate (the Abbey of Plasy) and the hierarchies and dynamics of the medieval settlement network with respect to monastic colonisation, settlement expansion and subsequent contraction in the high and late medieval periods. In addition to the study of LiDAR data, which inform about agricultural and industrial uses of the now wooded (reforested) landscape zones, the soil topography and bonity have been also evaluated in relation to agricultural farming patterns and the site selection strategy of monastic farmlands. Soil geochemical and soil isotope assessments have been carried as case studies at selected manorial sites, complemented by pollen analytical studies, to understand the environmental impact in the vicinity of monastic manors. The impact of monastic management on the local hydrological conditions have been comparatively evaluated, mapping medieval and post medieval mill sites and multiple fishpond systems for the whole area of the catchment. By implementing this multi-disciplinary approach, it was possible to reflect on the historical narratives with regard to monastic (Cistercian) colonization, water management and woodland management in the medieval period, which fundamentally shaped the history of this landscape. This generally expands our knowledge on how the natural environment influenced monastic settlement strategies, particularly in the context of fluvial landscapes, which connected the relatively earlier settled Altsiedelland with marginal settlement zones.

1168 NOT ALL MEN. APPROACHING MASCULINITIES AS GENDERED IDENTITIES WITHIN THEIR SOCIAL CONTEXTS AND PRACTICES IN PREHISTORIC EUROPE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: "Higuero Pliego, Antonio (Universidad de Cantabria) - Magalhães dos Santos, Juliana (2) Université Paris 1 Panthéon-Sorbonne).

Session format: Regular session

Masculinity is as social constructed, negotiated and performed as Femininity. However, it tends to be more naturalised than its "counterpart" (in a binary system thinking) due to being under-studied. This issue stems from the general lack of interest on Feminism and Gender Theory by male archaeologists, and a major focus on Femininity by the female ones. Also, a lot of the studies on masculinities have been based on the good graves found with bodies estimated as biologically males, such as weapons and personal adornment, and analysed by patriarchal values such as power, violence and social status. Thus, presenting these interpretations as neutral and forgetting the social aspects of the gender. The European Prehistory is a good context to see what have happened and the new direction these studies could take. Not only is interesting the emergence of the warriors elite (and beauty) during the Bronze Age, but also the ways of life of the Mesolithic "men", the impact of the concept on gender from the Neolithic groups that expanded into this wide region, and how the appearance of metallurgy may changed those societies.

In this session, as we aim to rethink the masculinit(ies)y in Prehistoric Europe from a feminist and constructivist approach. First, interpreting the past: How can the masculinit(ies)y be identified in the archaeological record? Which signs and material culture should we look for? And second, studying the masculinit(ies) within the(ir) specific context(s): how was it socially constructed and performed? What kind of impact had in the daily life of those groups? Which values could it be associated with? We welcome different contributions: from case studies, reinterpretations of previous works, new theoretical frameworks. The topics may include: analysis on skeletal remains (osteobiography,

isotopical analysis, palaeopathology...), grave goods (e.g. weapons), monuments (mounds, megaliths...) and graphical expressions, such as funerary stelae.

ABSTRACTS

1 "BROTHERS IN ARMS": THE SIGNIFICANCE OF THE SWORD OF RUCHANO (CANTABRIA) IN THE CONSTRUCTION OF MASCULINITY DURING THE BRONZE AGE

Higuero Pliego, Antonio (Universidad de Cantabria)

Since its discovery, the sword of Ruchano, found in 1975 in the cave with the same name, has been labelled as a "very particular finding". However, its importance has been overlooked in a region where most of the studies have been focused in the hunter-gatherer societies. Without a clear archaeological context, and since the first publication, the typology pointed to an argaric origin, and the location in a flooded room within the cave, was interpreted as an "offering to the waters". Recent analysis (2022) of the lead isotopes confirmed the former point.

An argaric sword in the cantabrian region not only provides valuable information about the trading networks during the Bronze Age in the Iberian peninsula, both for the final product and its components, such as the tin. In the dawn of the warrior societies, it should be understood within the semantics of that specific kind of masculinity, not only as a good of status, prestige and violence. Taking into account more evidences, such as other swords from the same region mixing foreign models with local manufacture, as well as armed and individualised human depictions in rock carvings, suggests that the groups in the cantabrian region were completely integrated in the European warrior imaginary. Although more research is still necessary, it is safe to point that the same processes of individualisation and social hierarchisation took place there. Even more, the mixing of goods from different contexts in a close geographical range, such as the argaric sword of Ruchano (Mediterranean) and the cauldron of Cabarceno (Atlantic), allow us to consider the area as a pivotal point in the dissemination of codes and signs about how to be a man.

2 SIZE AND ATTRIBUTES AT THE DAWN OF SOCIAL PORTRAIT: THE CASE OF THE CANTABRIAN MOUNTAINS, SPAIN

Teira-Mayolini, Luis (Instituto Internacional de Investigaciones Prehistóricas de Cantabria)

In the north of the Iberian Peninsula, the term "idol" or "idoliform" has traditionally been used to identify a group of large anthropomorphic stelae and engravings, chronologically located between the second half of the third millennium and the beginning of the second millennium BC. Unlike this interpretation with a religious background, we consider that these examples identify prominent figures within a human group, in a hierarchical relationship model. In this paper we analyse two sets of anthropomorphs of significant graphic personality and parallel processes in the Cantabrian mountain range which, nevertheless, communicate a similar social message: the emergence of an individualised identity by the male of the group, in which weaponry, together with its representation, played an important role in the (pre) historical development. Even more, considering other contemporary European warrior elites as well as other material culture, it is clear that the Cantabrian region was embedded into a larger social context.

Both groups use a small but common number of graphic motifs that seem to convey attributes of authority and power. In both groups, we observed a play of sizes between similar figures, used as a value discriminant. We also observed the exclusive presence of weapons and dual or twinned representations, in which a gender proposition cannot be ruled out. In short, both use narrative resources which, in a more careful elaboration, we will be able to observe in later archaeological contexts of European or Asian protohistory, in what seems to be the beginnings of social portrait.

However, the different distribution of their elements and the personality of their graphic solutions tell us of two cultural traditions developed in parallel on either side of the Cantabrian mountain range.

3 BEYOND DICHOTOMIES: RETHINKING THE SYMBOLISM AND GENDER ASSOCIATIONS OF SCANDINAVIAN BATTLE AXES OF THE BATTLE AXE CULTURE

Roy, Amber (Stockholm University)

The stone battle-axe stands as an iconic emblem of the Scandinavian Battle Axe Culture (BAC), spanning from 3000/2800 to 2300 BC, a period of profound economic and social change. The presence of battle-axes in the single graves, characteristic of the period, has long been regarded as indicative of their symbolic importance and conjectured function. Traditionally viewed as non-functional, purely ceremonial artefacts emblematic of a male elite/warrior class, these axes are often associated with themes of power, violence, and social hierarchy. These are rooted in fixed dichotomies, symbolic: functional; male: female, which severely limit the interpretation of battle axes by avoiding their multiplicity, and by using generalized ideas which separate the battle-axes from the context of their emergence.

This paper challenges prevailing notions of battle-axes as inherently male-gendered objects, interrogating their characterisation as symbols of a male elite/warrior class. It questions whether archaeologists have inadvertently imposed modern gender dichotomies onto ancient societies. It will leverage novel data on the manufacture and use of BAC battle-axes across Fennoscandia, alongside new materialist methodologies, that emphasize the relational and emergent qualities of material objects to rethink what it means to be human (e.g. Alberti et.al. 2013; Fowler 2013; Crellin 2020), and Posthuman feminism (e.g. Braidotti 2013), to critique the humanist ideal of 'Man'. It will challenge the binary interpretations of these artefacts and illuminate their multifaceted nature.

In doing so, it will explore the avenues that lead to the deposition of some of these objects in graves alongside male individuals and investigates whether such associations reflect gendered identities. By examining the broader lifecycles of these artifacts, it aims to discern whether their burial signifies a connection with masculine identity, or if such associations manifest prior to interment. Additionally, it investigates whether the scarcity of battle-axes in burial contexts signifies divergent meanings or societal roles.

4 **MONSTERS, WARRIORS, HEROES... MEN. THE REPRESENTATION OF MASCULINITY IN IBERIAN IMAGERY**

Martínez-Boix, José Luis (Universitat d'Alacant)

Iberian culture, which developed on the Mediterranean coast of the Iberian Peninsula between the 6th and 1st centuries BC, produced a large body of imagery on various supports throughout its evolution. These images are rich in geometric, vegetal, animal and human forms. Within this, the representation of man and masculinity is manifested through diverse works and on different supports. Those on sculpture and, above all, on painted ceramics are particularly noteworthy.

Anatomical differences, distinctive clothing or archaeological and iconographic contexts are good tools to detect the presence of the masculine concept.

Over the last few decades, especially since the rise of feminist approaches, the study of the human image in Iberian culture has multiplied. The focus has been on female representations, more frequent and with public repercussions since cases such as the Dama de Elche or the Cerro de los Santos sculptures.

This paper deals with the internal evolution of male representations within the Iberian. Thus, we will differentiate their stages to analyse the image of masculinity derived from each of these, proposing possible meanings and ideological changes underlying the representation of men in the Iberian period.

5 **BEYOND WARRIORS AND GOOD SHEPHERDS: AN INTERDISCIPLINARY APPROACH TO UNDERSTANDING CHANGES IN MASCULINITY IN THE PROTOHISTORIC CANARY ISLANDS**

Carballo Pérez, Jared (Laboratory for Human Osteoarchaeology, Leiden University) - González Carracedo, Laura (Departamento de Geografía e Historia, Universidad de La Laguna)

This investigation explores the diverse models of masculinity that existed among the indigenous populations of the Western Canary Islands during Protohistory. Utilizing a feminist and constructivist lens, we aim to interpret the variability of everyday practices as evidenced in the skeletal remains of these inhabitants within its historical context. Our focus centers on osteoarchaeological markers, such as physical activity indicators, to understand the performance of daily activities beyond the average masculine roles.

We propose examining outliers and contexts with high standard deviation values as spaces where men could perform activities that deviate from the typical masculine labor pattern. Additionally, our approach includes a historiographical interdisciplinary perspective, enabling us to interpret shifts in gender models following contact with European conquerors, such as a decline in masculine activity. By combining osteological evidence with a feminist and decolonial review of postmedieval written sources, we offer a more enriched and contextualized understanding of their engendered behaviors.

This line of inquiry not only enhances our comprehension of archaeological evidence but also prompts reflection on the imposition of patriarchal and Eurocentric models of masculinity. These models have shaped a contentious collective imagination about the indigenous Canary man, often used to support the construction of modern identities.

1170 **WINDOWS TO THE PAST: ARCHAEOLOGICAL THINKING, INTERDISCIPLINARITY, AND QUALITATIVE ANALYSIS IN THE DIGITAL WORLD**

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Manzetti, Maria Cristina (University of Cyprus) - Gonzalez San Martin, Ana (Brown University) - Diaz de Liano, Guillermo (MOLA (Museum of London Archaeology))

Session format: Regular session

Archaeology has traditionally struggled with interdisciplinarity. While the discipline has always been eager to borrow methods and approaches from other fields, it has often failed to integrate them into its core. Furthermore, this attempt to be interdisciplinary has focused strongly on borrowing methodologies from the more scientifically oriented approaches, leaving qualitative methods and subjectivity relegated to very few cases. Indeed, the exploration of affects, senses, and emotions in the past is typical of disciplines such as history, human geography, and literature, even if it would be highly relevant in archaeology as well.

With the unstoppable expansion of the digital world, archaeology faces again the same old dilemma: How can we shift towards a more integrative interdisciplinary framework, rather than instrumentalizing punctual approaches from other disciplines? Shall we just adopt the methods of digital humanities, or will we be finally able to integrate them? How can we integrate the subjective aspect of material culture as affects, senses, and emotions into sciences, and into digital archaeology? Above all: can archaeology be effectively interdisciplinary?

This session is interested in exploring how interdisciplinarity can be integrated into the current digital world that is revolutionizing the discipline. Can we create digital archaeological maps that include geographical and historical data, but also speak about a sense of place? Can we introduce emotional communities into our predictive modeling? Where are the senses in our material analyses? Can we include affective actants in our network analyses?

We welcome any paper that aims to go this step further into interdisciplinarity, bridging the gap between sciences and humanities, and particularly within digital methodologies.

ABSTRACTS

1 **"IT JUST FEELS DIFFERENT": AN ETHNOGRAPHIC EXPLORATION OF FIELDWORKERS' EXPERIENCES WITH DIGITAL RECORDING IN ARCHAEOLOGICAL FIELDWORK**

Aaar, Leila (University of York; Museum of London Archaeology)

Over the years, archaeological recording has witnessed several changes, from free-form notebooks to more systematic form-based recording to the gradual adoption of a range of technological solutions to address archaeological problems. With the arrival of portable computing, the speed of the 'digital turn' has accelerated and as a result, archaeology is in the midst of an undeniable shift toward fully digital, paperless recording systems. While existing studies emphasise their potential for enhancing speed, fidelity, and reflexivity (Berggren et al. 2015; Roosevelt et al. 2015; Taylor et al. 2018, among others), little attention has been directed towards their specific implications for archaeological activities conducted within commercial settings.

As archaeological excavations move towards becoming increasingly efficient over the years, there have been concerns that this trend towards efficiency may compromise our understanding of the site (Morgan et al. 2020). Traditional archaeological methods require archaeologists to spend more time in the field, carefully excavating each layer, drawing and recording their findings. Their digital counterparts, designed for speed, often result in fieldworkers engaging less intimately with the site during the recording process.

This project employs ethnographic approaches to explore the nuanced implications of digital recording technologies on fieldwork practices. It investigates how digital tools reshape tactile, sensory, and collaborative aspects of archaeological recording, including their intersection with craft-based labour practices, and interpretation of archaeological knowledge. Building upon existing research (Aaar, Morgan & Fowler 2023), this paper presents preliminary findings from interviews with field archaeologists, aiming to deepen understanding of the practical uses, challenges, and benefits of digital recording in fieldwork contexts. By focusing on fieldworkers' perspectives, the research contributes to understanding the human dimensions of technological change in archaeology, highlighting the impact of digital technologies on the craft of fieldwork and the interplay between technology, work practices, and social dynamics in commercial archaeological settings.

2 REFLECTION, RITUAL, AND MEMORY: INVESTIGATION OF WALL PAINTINGS IN THE ROMAN MAUSOLEUM OF LE CARCERI VECCHIE, SAN PRISCO, SOUTH ITALY

Pillai, Sujitha (Doctoral researcher, Department of Humanities and Cultural Heritage (DiLBeC), University of Campania Luigi Vanvitelli) - CUBELLOTTI, FABIO (Research Fellow, Department of Humanities and Cultural Heritage (DiLBeC), University of Campania Luigi Vanvitelli)

In Roman times, the rich decoration of the tombs, which included sculptures, wall paintings, mosaics, and stucco reliefs was often intended to attest to the social position of the owners. Additionally, these decorations are pivotal in terms of the symbolism of their representation of the afterlife. The current work presents one of the best preserved and least investigated funerary monuments of ancient Capua, the Mausoleum of the "Carceri Vecchie", with its mural paintings, which form an indispensable archaeological testimony to the knowledge of that ancient metropolis which Cicero referred to as Altera Roma. The importance of the monument has been recognised since the Renaissance, a period in which the building was mentioned and depicted by numerous artists.

The Mausoleum of Carceri Vecchie, is located along the modern route of the ancient via Appia in the commune of San Prisco, in the province of Caserta. With its elaborate architecture in circular typology, the mausoleum consists of three tombs with three panels of wall paintings in situ on each side. The mausoleum is usually dated around the Augustan period and preserves wall paintings executed in fresco style with refined stylistic solutions. The multidisciplinary approach adopted for studying the mausoleum and its paintings involves the collaboration of various specialists in mural paintings, ancient architecture, and archaeometry to study ancient polychromy. This presentation will focus on the results of the scientific investigation, such as broadband imaging, non-destructive analytical techniques, and art-historical analysis of the paintings, their decorative programme, the current challenges, their digital reconstruction, tomb plundering, comparative analysis, and conservation measures.

3 WHY MAPPING SENSATIONS IN ARCHAEOLOGY? THE CASE OF THE GRAND TOUR TRAVELLERS IN THE MEDITERRANEAN ISLANDS.

Manzetti, Maria Cristina (University of Cyprus)

In the 1980s, the movement called "spatial turn", born among the humanities, led archaeologists to intensive use of Geographical Information Systems (GIS) with the intent to produce statistical data from a map, employing quantitative analysis. The spatial turn started up to defend the importance of space over the primacy of time. Indeed, in archaeology as in history, chronological investigations were preferred to the geographical ones. With the years, a further concept developed: the distinction between space and place. Generally, a space is considered a geographical area with coordinates; a place is, in addition to a geographical space, where events and relationships take place, and where the culture develops. Archaeologists mainly keep investigating space rather than places probably because it would require analyses of personal experiences and subjective opinions that would not be considered scientific enough. However, we cannot deny that people's reactions to events happening in determined places are an active part of the process of civilizations' development. The use of digital tools together with deep mapping may help the investigation of cultural characteristics that emerged in different places and are evoked by sensations experienced by the people. This paper aims to demonstrate the importance of considering places to their full extent by conducting qualitative analysis through GIS. The case study is represented by the Grand Tour travellers visiting the Mediterranean area and describing their impressions about the places and their historical landmarks. A geodatabase was built with all the relevant information to create a deep map of the explored areas.

4 UNEARTHING URBAN FUTURES: REVOLUTIONIZING URBAN DEVELOPMENT THROUGH INTERDISCIPLINARY DIGITAL ARCHAEOLOGICAL INTEGRATION IN ALMERE, NETHERLANDS

Vanderhoeven, Timo (EARTH Integrated Archaeology) - Kars, Eva (EARTH Integrated Archaeology)

This presentation discusses the combined application of geo-archaeological, geotechnical, and geohydrological surveys during the urban development of a new district in Almere (The Netherlands). The municipality believes that a synergetic, digitally oriented approach is the only solution to address gaps in archaeological, geological, geotechnical and geohydrological knowledge while reducing the risk and adapting to environmental issues (rising sea levels, soil erosion) during/after construction.

The primary objective of this interdisciplinary project is to conduct a comprehensive geo-archaeological, geotechnical, and geohydrological investigation, with a strong emphasis on delivering a digital dataset that contributes to knowledge of the region's archaeological and geological composition.

The investigation involves advanced mechanical core drilling to extract high-quality subsurface data, enabling profound insights into the archaeological, sedimentological, and geological layers of Almere. This data forms the foundation for a detailed 3D underground model and contributes to the existing national digitised geological model. Subsequent steps include 3D interpolation and subsurface and groundwater modelling. This data-driven approach is fundamental

to the design process outlined in the project's master plan, promising an innovative integration of archaeological features into the urban planning framework. The municipality also envisions the creation of a 3D palaeolandscape model and an archaeological risk assessment model based on the acquired dataset and the existing 3D GeoTop model.

This groundbreaking initiative challenges traditional practices by integrating archaeological considerations in the earliest stages of urban planning and by its strong interdisciplinary approach.

This presentation highlights the unique nature of this interdisciplinary endeavour and its potential to revolutionise the integration of digital archaeological data in urban planning, setting a precedent for future urban data-driven development projects.

1172 HOARD IN SITU. THE ARCHAEOLOGICAL CONTEXT FOR UNDERSTANDING METAL AGE HOARDS

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Nordez, Marilou (CNRS (UMR6566 CReAAH-LARA, Nantes)) - Mélin, Muriel (Service archéologique départemental du Morbihan; UMR6566 CReAAH (Rennes)) - Mörtz, Tobias (Universität Hamburg, Fachbereich Kulturwissenschaften) - Nowak, Kamil (Nicolaus Copernicus University (Toruń)) - Tarbay, János Gábor (Hungarian National Museum)

Session format: Regular session

Although the hoards are unanimously considered as emblematic of the Metal Ages, the interpretation of these assemblages is still widely debated. The analysis of hoards in situ provides essential information, which we are deprived of for ancient finds and for assemblages removed from the ground without archaeological excavation. When investigations can be carried out, we can see that these depositions are rarely isolated and are part of a complex of archaeological structures. It is then more appropriate to speak of "sites with hoards". This contextual data concerns the containers of the objects, the type of structure in which they were deposited, and their relations to any other associated structures and immediate surroundings of the hoard. While methodological advances in hoard excavation techniques and documentation (photogrammetry method and computed tomography) are major contributions to the reassessment of these assemblages, large-scale field research at the sites is also necessary for their understanding.

Several examples of recently excavated hoards have renewed our interpretations by suggesting that they were sometimes deposits made as part of community gatherings (Prat, France), bronze workshops (Saint-Avé, France), part of the settlement's internal ritual landscape (Várvölgy-Nagy-Lázhegy, Hungary), sets of households (Zsáka I-II, Hungary) etc. These examples show that it is above all the context, together with the choice and condition of the artefacts, that provides the basic clues for understanding the possible motives for the depositions.

The aim of this session is to bring together case studies of hoards excavated in situ or with the knowledge of the wider context in order to contribute to a more detailed characterisation of the diversity of depositional processes and practices, while contributing to the debate on their function.

ABSTRACTS

1 INCREASING USE OF METAL DETECTORS AND MORE HOARD FINDS - DO THE FIGURES CORRELATE?

Unglaub, Christoph (Archaeologisches Landesamt Schleswig-Holstein)

The use of metal detectors by private individuals for amateur research has been increasing for years. At the same time, more and more hoard finds are becoming known. Based on the practice of public monument preservation in Schleswig-Holstein, the thesis is to be examined as to whether the increased use of metal detectors in areas that were previously only recorded with visual field inspections, if at all, also lead to an increased discovery of hoard finds.

In the north of Germany, the state archaeological office of Schleswig-Holstein has been operating the "Schleswig model" of tense cooperation between the state monument preservation authorities and private detectorists since 2005. The licence to search with a metal detector is linked to a certificate of competence, which must be passed by the applicant. This means that a large number of well-trained and highly motivated people are out and about with metal detectors in the fields of Schleswig-Holstein to find the remains of past eras and make them available to the population as a shared cultural heritage. To mark the 18th anniversary of the cooperation between metal detectorists and state archaeology, the effects on the scientific recording of hoard finds will be examined and compared with other European countries.

2 OFFERING VS. SACRIFICE. A DISTINCTION BETWEEN DIFFERENT KINDS OF METAL DEPOSITION BASED ON SELECTION, TREATMENT AND CONTEXT

Mörtz, Tobias (University of Hamburg)

The Late Bronze Age (c. 1400-800 BC) is characterised by hoards with fragmented metalwork in large parts of Europe. While similar locations were used for deposition across the continent, the very different selection and treatment of the artefacts show regional and temporal variability, which was primarily guided by divergent ideological goals. These can be decoded by analysing the condition of the items, in particular traces of use and deliberate damage, and with detailed knowledge of the respective find contexts, especially the distinction between single and multiple deposition.

Using the Late Bronze Age weapon hoards of north-western Europe as an example, a differentiation between offerings and sacrifices, i.e. acts of consecration and acts of destruction, will be proposed and discussed. Decisive criteria are the choice and arrangement of the artefacts, the extent of deliberate destruction, the possibilities of recovery and the repeated abandonment of bronzes as well as indications of additional ritual practices at the same site.

3 THE NEARLY IN SITU EXCAVATED HOARD FROM JODŁOWNO, NORTHERN POLAND. STUDY OF THE SELECTION PATTERN OF DEPOSITED METALS

Nowak, Kamil (Institute of Archaeology, Nicolaus Copernicus University in Toruń) - Gan, Paweł (Bio- and Archaeometric Laboratory, Institute of Archaeology and Ethnology Polish Academy of Sciences) - Stos-Gale, Zofia (Department of Historical Studies, University of Gothenburg) - Karasiński, Jakub (Faculty of Chemistry, Biological and Chemical Research Centre, University of Warsaw)

The hoard from Jodłowno was discovered in 2021 by a non-archaeologist using a metal detector. However, some artefacts were left in place, which allowed for rescue excavation and partial documentation of the context. Therefore, the arrangement of the bottom of the deposit is known.

Typological and chronological analysis allow us to connect the deposited artefacts with the Early Iron Age, probably Ha D (ca. 650/600-500/450 BC). As a result of amateur exploration and archaeological research, 68 metal objects were recovered. There are such categories of artefacts as ornaments, and their fragments, semi-finished items, casting waste, and bar/ingot fragments. Some metals were connected in groups by an organic cord.

In our ongoing studies, we have undertaken a detailed analysis of all deposit components to try to answer the question of whether a particular depositional pattern is visible. We studied manufacture and use-wear traces to distinguish the state of wear. We also conducted the chemical composition and lead isotope ratio analyses to show the act of deposition on the level of raw-material selection. Finally, we compared the location of deposited artefacts in the hoard with the obtained data.

The hoard we presented was only partially documented in situ, but we believe that the set of analyses we selected allows us to expand our knowledge about the biography of the discovered artefacts and the pattern of their deposition.

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4 THE TREASURES FROM TROY - A NEW LOOK AT AN OLD STORY

Pieniazek, Magda (Universität Tübingen, Institut UFG)

So-called Priam's Treasure and other treasures found in Troy in contexts dating to the second half of the 3rd millennium BC belong to the most famous hoards known from prehistory. Nevertheless, their function and the reason for the depositions are still matters of debate. The treasures were found in the 19th century during the excavations of Heinrich Schliemann. Their location can be roughly reconstructed in relation to the architecture of the period Troy II Late and Troy III, but the details of the contextual situation are mostly lost, unfortunately. However, the composition of the objects included in the hoards and comparison with other finds and features known from Troy provide crucial arguments for the discussion and interpretation of motivations behind the deposition.

It is well-known that the treasures contained many valuable objects, among which there were hundreds of gold items. It was observed that they also include ingots, half-products, and broken objects possibly designated for recycling or repair. This speaks quite clearly of the participation of workshops and artisans in the process of deposition. In fact, there are more arguments supporting this interpretation. The repertoire of gemstone objects found at Early Bronze Age Troy (rock crystal, carnelian, and others) indicates that Troy was also a major center of lapidary. This is supported by the presence of not only finished objects but also semi-finished as well as pieces of raw material. Also, in this case, the treasures mirror the local artisanal production.

5 BRONZES LIE ON TUSKS. THE CONTEXT OF HOARD I FROM SOMLÓ HILL, WEST HUNGARY

Tarbay, János Gábor (Hungarian National Museum (Magyar Nemzeti Múzeum)) - Soós, Bence (Hungarian National Museum; Institute of Archaeological Sciences, Eötvös Loránd University) - Péterváry, Tamás (Hungarian National Museum)

In 2023, the National Institute of Archaeology of the Hungarian National Museum launched a new research programme that aims to investigate with multifaceted methods the Somló Hill and its microregion (Veszprém County, Hungary), one of the potential prehistoric power centres with a timespan that overlaps the Urnfield and the Hallstatt periods in Transdanubia. The very first year of the programme provided three hitherto unknown hoards of Younger and Late Urnfield date, as well as a sickle hoard of the Early Iron Age. All the hoards were excavated in situ on-site and, in one instance, within the laboratory of the institute.

The paper presents our first discovery, Hoard I of the Somló Hill, an assemblage with highly complex composition and arrangement. This unique group of finds consists of metal and organic artefacts characteristic of the second half of the Ha B period. The range of objects from the hoard includes a set of Alpine and Carpathian-style bronze weapons, jewellery, and tools. Also, in a manner unique in the West Carpathian Basin, the hoard contained a set of boar and domesticated pig tusks, as well as wolf teeth, deposited intentionally in a single layer underneath the metal artefacts.

The paper focuses on the initial steps of evaluating the hoard; the processing of field documentation, and the evaluation of 3D in situ models of the hoard's context obtained through photogrammetry. By means of this complex hoard, we also intend to demonstrate how in-depth knowledge of the context can help us analyse the way objects are arranged and grouped, and how this information can be integrated into the interpretation of the assemblage, making it more than just a group of finds studied solely through their typo-chronological traits.

6 FEASTS, ENCLOSURES, AND COLLECTIVE OFFERINGS

Baron, Justyna (University of Wrocław)

The presentation addresses several deposits of ceramic vessels, animal bones, and metal objects distributed in various parts of the late Bronze Age and early Iron Age settlements (ca. 900-600 BC) in today's SW Poland. The settlements represent multiple patterns of spatial organization that could have been studied due to large-scale rescue excavations in the 1990s'. Some are fenced with circular post structures and houses facing the central area. Others are open settlements with no clear boundaries and randomly spaced post houses of various sizes. What they have in common is the presence of deposits composed of pottery, animal bones, stones, and metal objects. All the hoards were distributed between the houses and were dug into thick occupational layers. They were also present in the central place and at the borders. Therefore, they likely do not reflect individual offerings, like foundation offerings, but remain collective activities connected with substantial reorganization of the settlements' space.

7 A LATE BRONZE AGE SETTLEMENT AND ITS METALLURGIST WORKSHOP IN SAINT-AVÉ (MORBIHAN, FRANCE)

Blanchet, Stéphane (INRAP)

Authors : Stéphane Blanchet (Inrap, UMR 6566 CReAAH), Muriel Melin (Service départemental d'archéologie du Morbihan, UMR 6566 CReAAH), Cécile Le Carlier de Veslud (Cnrs, UMR 6566 CReAAH), Théophane Nicolas (Inrap, UMR 8215).

In 2022, a preventive excavation led to the study of a Late Bronze Age settlement (between 1000 and 800 BC). It comprises about ten round houses grouped together in a small area (5000 m²). They are accompanied by various ancillary buildings, in particular granaries. The organisation of the site and the associated artefacts indicate that we are in the presence of a grouped settlement mainly concerned with agro-pastoral activities.

Within this occupation, a small metal hoard associated with a construction, a pit rich in burnt clay rejects and the remains of a furnace also testify to a metallurgical activity. The metal hoard is located inside a building whose oval plan differs from that of the other houses. Deposited in a small excavation, the metal assemblage includes a dozen objects including two fragments of plano-convex ingots, fragments of axes and a fragment of a blade. This assemblage is dated of the Late Bronze Age III. Located in front of the construction, a pit shows a filling made up of a succession of more or less carbonaceous levels associated with numerous fragments of burnt clay. Some of these are similar to furnace walls, others to possible metallurgists' moulds. Fragments of a nozzle also come from these levels. It should be noted that the sole of a heating structure is preserved. Finally, the stratigraphy shows multiple phases of reworking which testify to a working area.

These various elements strongly suggest the presence of a bronzier's workshop closely associated with the settlement.

8 BEYOND THE SURFACE: TOWARDS A BETTER UNDERSTANDING OF EARLY IRON AGE HOARD CONTEXTS IN NORTHWESTERN FRANCE

Cabanillas de la Torre, Gadea (DRAC Bretagne - Service régional de l'archéologie - French Ministry of Culture; UMR 6566 CReAAH)

During the Early Iron Age, a massive amount of bronze axes were hoarded in the Armorican peninsula (Northwestern France). Though found regularly since the 19th c., data concerning the circumstance of those deposits remain too scarce to build interpretations. However, during the last 20 years, research around those hoards has led to the excavation of assemblages or remains in context. This allowed to confirm their dating during the Early Iron Age. One of the key sites in this process is the Early Iron Age settlement of La Touche ès Pritiaux in Saint-Glen (Brittany, France). A hoard of over 150 bronze socketed axes was found inside a ceramic container, together with six other storage jars buried within a roundhouse.

Such finds force us to completely rethink the function of Early Iron Age bronze hoards in Northwestern France, but also the way we investigate metallic hoards in the 21st century. They challenge the traditional focus on objects to question how – by which means, on which surfaces – Early Iron Age sites can be detected, excavated and interpreted. Research on hoards' environments being relatively recent and rare enough in this area, it is yet to impossible to decide whether those sites yielding metallic assemblages within settlements are exceptional or only the tip of iceberg. Concerning the Early Iron Age specifically, they have fostered further collective work on growingly precise chronologies, connections between hoards, roundhouses and storage structures, and in general, links between hoarding and social transitions at the beginning and end of the period.

9 A LATE BRONZE AGE HOARD IN A SETTLEMENT CONTEXT IN GERZAT (PUY-DE-DÔME, FRANCE)

Da Cruz, Lucie (Paléotime) - Auxerre-Géron, Florie-Anne (UMR 5608 TRACES)

A project to build detached houses in the French department of Puy-de-Dôme, in the commune of Gerzat, led to the prescription of a preventive archaeological excavation over an area of 1 hectare. This prescription follows the positive results of a diagnosis carried out by the National Institute for Preventive Archaeology (INRAP). A hoard was found during the earthwork of the excavation area, in May 2023. This hoard counts 15 bronze objects or fragments of objects dated from the Late Bronze Age 3 (950-800 BCE). The discovery was made in a context of a settlement including several building plans on supporting posts, extraction pits, wells, silos, and stone fireplaces. One of those latter was probably used for craft activities. The bronze objects were buried in a small pit, close to a house unit. They were probably packed originally in a container made of flexible perishable material. They fall into a variety of categories (tools, weapons, ornaments, semi-finished products) and appear to have been organised according to a specific plan. Some of them are damaged, while others are in the making off process, as well as functional objects belong to the corpus. The main interest of this find lies in its location. It is the first hoard to be documented in the Limagne Plain, in a chrono-cultural context where the deposit on hilltops seems to be the accepted norm at that time.

10 SIZE MATTERS - SO DOES THE CONTEXT. 794 EARLY BRONZE AGE RIB INGOTS FROM OBERDING

Kutscher, Sabrina (LMU Munich)

The hoard from Oberding with 794 rib ingots was discovered in 2014 in Upper Bavaria (South Germany). Thanks to the block excavation, it is one of the few hoards documented in situ and the best contextually analysed Early Bronze Age rib ingot deposition.

In this paper, I want to present the case study of the exceptional Oberding hoard we are currently analysing in an interdisciplinary DFG project under the project lead of Prof Carola Metzner-Nebelsick at LMU Munich. This research project focuses on research questions regarding the copper types used and value systems, as well as on the immediate find context and its embedding in the micro-regional settlement context on the loess terrace of Oberding.

Non-invasive analyses using 3D computed tomography have precisely documented the exact arrangement of the copper ingots in situ. The ingots were tied into handy bundles of ten and placed in eight larger groups in a separate niche at the edge of an already partially filled settlement pit. Other pits in direct proximity and their find material provide an insight into the associated settlement, which also dates to the later phase of the Early Bronze Age.

Extensive scientific analyses (geoarchaeology, archaeobotany, pollen analyses, archaeozoology, metal analyses, radiocarbon dating, experimental archaeology, e.g.) and elaborate restoration have already provided significant results. Based on the metallurgical analyses, for example, we now know that the copper used for the ingots came from different ore deposits, indicating the significance of the hoard for the transition from the Early to the Middle Bronze Age and the changing patterns of commodity transfers and cultural contacts.

11 SELECTIVE DEPOSITION OF METAL OBJECTS ON THE SUBMERGED SETTLEMENT OF LA MOTTE (AGDE, FRANCE, C. 9TH-8TH BC)

Lachenal, Thibault (CNRS)

The site of La Motte, currently submerged in the minor bed of the River Hérault at Agde (France), is known to have yielded a rich deposit of metal and organic ornaments dating from the 8th century BC. Underwater excavations have since clarified the context of this deposit, as it was abandoned on the vegetated banks of a settlement established on the edge of an ancient lagoon. Further work carried out on the opposite bank of the site, in symmetry with this first deposit, led to other comparable discoveries. In an area with fewer domestic remains (ceramics, fauna, etc.), some forty copper-alloy objects were discovered over an area of about one hundred square metres. The finds, which are dated between the 9th and 8th centuries BC, include weapons (daggers, spear), axes and ornaments (bracelets, leg rings, torques, pins), in some cases grouped by type or function. They are also interpreted as intentional deposits laid out on the edge of the lagoon and dismantled by river erosion. Analyses of the elemental composition and lead isotopes of these objects suggest that they were produced locally, as confirmed by the discovery of several metallurgists' casting moulds on the settlement. The site of La Motte therefore documents the practice of voluntary deposition in a wetland environment on the fringes of a settlement, which is consistent with the hypotheses put forward for lake sites in the Alpine Arc.

12 THE KALLERUP HOARD AND THE DEPOSITIONAL PRACTICES IN LATE BRONZE AGE NORTHERN JUTLAND, DENMARK

Møller, Niels (Museum Thy)

Metal hoards have revealed some of the most iconic and informative artefacts from late Bronze Age Southern Scandinavia. By far the vast majority of these hoards have however been encountered as chance finds during the 19th and early 20th century. And our knowledge of the depositional practices and the relation between metal hoards and their contexts are thus severely hampered by a lack of excavation of their immediate surroundings and hazy information of find circumstances at best.

In recent years, a few metal hoards have been encountered and properly excavated as a result of a close collaboration between metal detectorists and the archaeological museums in Denmark. Through both micro excavation of the hoards and excavation of their immediate setting, these newly excavated hoards allow renewed interpretation of depositional practices and new insight into the relation between the hoard and the local context.

This paper will take its point of departure in the excavation results of Kallerup, a site with a long site continuity and a Late Bronze Age metal hoard, to explore the depositional practices of Late Bronze Age metal hoards and their local and regional contexts in the region of Northern Jutland.

13 FRÖSLUNDA REVISITED: A SHIELD HOARD FROM THE LATE BRONZE AGE IN WESTERN SWEDEN

Nitenberg, Annelie (Västergötlands museum) - Uckelmann, Marion (Durham University)

In the Late Bronze Age, people deposited 16 to 18 bronze shields in the shallow waters of a hidden cove of Lake Vänern in Västergötland, Sweden. Almost 3000 years later, in 1985, a farmer from Fröslunda worked his fields in the now dried up cove and ploughed right through the hoard of shields. It is still one of the largest hoards found in Sweden, with an estimated weight of 23-27 kg. The Västergötlands museum was contacted and excavated the shields en bloc the following spring. The shields were further excavated in the Arkeologiska Forskningslaboratoriet in Stockholm, partly puzzled together and then displayed in the museum. The excavation team used different methods and analyses, but their results were never fully published or made available. In 2023 Västergötlands museum initiated a new research project to investigate the shields and to contextualise the hoard in its wider setting. Metal analyses as well as new studies on the shields are currently being undertaken. The findspot has been revisited with magnetometer- and metal detector surveys, revealing new shield fragments, a possible area with burnt material and other structures related to the shields. New excavations at the site to investigate these possible features will be conducted later in 2024, to explore its context. The find circumstances in Fröslunda can be compared to the ones of other shield hoards, almost all of which are found in a wet context. The Fröslunda hoard will also be evaluated within the context of the deposition customs of Late Bronze Age western Sweden. All these strands of research will be integrated to explain the meaning and significance of this extraordinary hoard.

14 METAL HOARDS IN A RITUAL SPACE? THE ATLANTIC MIDDLE BRONZE AGE SITE OF KEROUARN, PRAT (CÔTES-D'ARMOR, FRANCE)

Nordez, Marilou (CNRS)

At Kerouarn, three hoards containing a total of 89 bracelets (around 15 kg of copper alloy), were found buried inside an area half enclosed by two ditch segments. Those ditches, which are preserved to a depth of 1.5m, were associated with an embankment and separated by a 5m-wide opening, creating a possible monumental entrance to the semi-circular enclosure. Several elements point to the importance of this access from the south: two ceramic vessels were deposited side by side at the base of ditch segment 2, and fragments of a large block of worked granite were found in the upper fill, perhaps indicating the presence of a stele beside the entrance.

Geophysical prospections followed by archaeological excavations brought to light that the only features dated to the Middle Bronze Age are those two ditch segments and the three ornament hoards. The lack of domestic or funerary contemporary remains, in combination with the monumentality of this complex, suggests other functions: it is proposed that the site of Kerouarn were destined for gatherings, possibly for ritual, religious and/or socioeconomic purposes. The hoards may either be the cause of these gatherings or a visible consequence among others that left no trace.

15 HOARD OF BRONZE BRACELETS FROM THE MIDDLE AND LATE BRONZE AGE IN PRAGUE-MODŘANY (CENTRAL BOHEMIA)

Petriscakova, Katarina (The City of Prague Museum) - Kacil, Pavel (The City of Prague Museum)

This study presents the hoard of bronze artifacts excavated in 2020 in Prague-Modřany (Central Bohemia). The assemblage contained six cast bracelets placed in a simple circular pit with a pointed bottom. The three pairs of open bracelets, differing in shape, weight, and engraved decoration (triangles, transverse grooves, semi-circles), were subjected to metallographic and use-wear analysis. Based on analogies, the whole find complex can be dated somewhere between the Middle and Late Bronze Ages (Reinecke's Stage Br C/ Br D). Spatially, the hoard was uncovered within an identically dated settlement, represented by several sunken pits. A burial area from the same period was previously also identified in the vicinity of the settlement. All three components mentioned here were thus situated on a terrace above the confluence of the rivers Vltava and Berounka, in the southern part of the Prague basin. Taken all together, the present evidence supports the existence of a possible complex site that includes habitation, burial as well as likely ritual activities. What makes this deposit unique, in this area, is its known context, which offers certain interpretative possibilities. The presentation will be supplemented by a very short video of the in situ excavation of the items.

16 THE EARLY METAL PERIOD HOARD FROM ŽEIMENA RIVER, LITHUANIA - TIN ARTEFACTS IN THE LIGHT OF LONG DISTANCE CULTURAL CONTACTS

Pranckenaite, Elena (Klaipėda University) - Muradian, Lijana (National museum of Lithuania) - Žilinskaitė, Agnė (Vilnius university)

During Bronze and Pre-Roman Iron Age metal artefacts and hoards consisting of metals in the East Baltic Region are rare compared to the other parts of Europe. The reason for this was the absence of non-ferrous metal ore sources in the Eastern Baltic region. In Lithuania, there are about 350 metal objects belonging to the Bronze and Pre-Roman Iron Age, 37 of which are interpreted as hoards. After 2014 when the discovery of the hoard of unknown type of artefacts on Lithuanian territory by an amateur divers in the Žeimena River (Eastern Lithuania), discussions started on interpretation and dating of this find. The hoard was found on the bottom of the Žeimena river, covered by a thin layer of sediment and while the discovery was quite well documented. An analysis of the hoard's surroundings and an examination of the micro-region were carried out in an attempt to obtain contextual data. The hoard consists of 24 metal artefacts found stacked on top of each other. All of them are just one type: cast and hollow, flat-tipped cone-shaped ornaments decorated with six spurs on the top and a whole surface decorated with uneven lines. The edges of the artefacts were pierced by two small holes for attachment to the garment (?). Conducted analysis of elemental composition revealed that the main element of the alloy is tin, radiographic examinations revealed some results on metal casting. Hoard found in the Žeimena river raises discussion on contacts and trade links with particular regions of Europe where rich sources of tin ore are known. This presentation aims to present possible interpretation of this discovery in the context of the known archaeological material and hoarding practices in the Baltic region. It seeks to enhance better understanding of prehistoric crafting technologies and to trace long-distance contacts and influences.

17 THE SANCTUARY OF ZEUS AT OLYMPIA AS AN EXAMPLE OF A METAL 'HOARD' IN SITU

Scarci, Azzurra (Leibniz-Zentrum für Archäologie)

The term hoarding refers to the deliberate depositing of complete and/or broken objects, a practice that was particularly common during the Metal Ages. However, this concept can also be applied to other types of 'hoards', such

as sanctuaries, which were privileged places for storing large quantities of materials that were dedicated there. The sanctuary of Zeus at Olympia is the most significant sanctuary in Greek antiquity from the Late Geometric period onwards. It represents a true example of a 'hoard' in situ, storing thousands of different object classes, including metal objects, particularly bronze. Many of the bronze dedications have been found both whole and in fragments, sometimes matching, and scattered throughout various areas of the sanctuary. This paper presents the results of a spatial and contextual analysis of the practice of hoarding bronze fragments in the sanctuary of Zeus at Olympia. The main aim is to understand their significance based on their distribution in relation to different areas of the sanctuary, such as workshops, altars, and temples.

18 ISOLATED? IRON SEMI-PRODUCTS HOARDS IN CONTEXTS. THE CASE STUDY OF IRON SEMI-PRODUCTS HOARDS IN NORTH OF FRANCE

Berranger, Marion (Institut de Recherches sur les Archéomatériaux-LMC-CNRS-UMR7065) - Gauthier, Estelle (Laboratoire Chrono-environnement-UFC-UMR6249) - Filippini, Anne (EVEHA) - Mentele, Serge (INRAP)

From north-west of France to the west of Germany, several dozen of iron semi-products hoards has been discovered since the XIXth century. The discovery context of most of them was unknown or the excavation windows was too small to permit a real understanding of their context. Recently extensive excavations has permitted, in some cases, to bring datas about their discovery context. In some region, extensive surveys has also permitted to study the localization and archaeological position of concentration of hoards, which reveals common practices.

Analyses conducted on the objects themselves has permit to determined their chronology, scarcely documented by the discovery context. Archaeometrical analyses give other datas which permit to reconstruct some aspects of their condition of exchange.

The aim of this communication, is to propose a review of these hoards, and to analyze the evolution of their interpretation during the XXth to the XXIth c. The contribution of recent discoveries and well established contexts to the understanding of the condition of hoarding will be discussed. Some case studies mostly situated in north-eastern of France will be presented. In a more general point of view the chronological evolution of these practices will be discussed, as well as the circulation of the iron, from the workshop where they were produced to the hoard. These aspects provide clues to better determine the motivation for these depositions.

19 BRONZE AGE HOARDS AROUND SALINS-LES-BAINS (JURA, FRANCE): A CONTEXTUAL STUDY OF IN SITU METAL FINDS

Gauthier, Estelle (University of Franche-Comté; UMR CNRS 6249 Chrono-Environnement) - Piningre, Jean-François (UMR CNRS 6298 ArTeHis)

A systematic survey program conducted over the last twenty years around the hillfort of Camp du Château (Salins-les-Bains, Jura, France) led to the discovery of 85 Bronze Age hoards. The methodology developed, including meticulous excavations, precise topographic surveys, numerous field observations and abundant photographic documentation, provides exceptional conditions for studying in situ metal hoards. This area offers a rich corpus of excavated hoards whose location, composition, layout and stratigraphy are precisely known, as well as their surrounding context like remarkable natural or anthropic elements in their immediate environment. This particularly enables the study of site selection choices and gestures related to deposition practices, aspects still insufficiently known but likely to provide essential information for understanding the phenomenon of Bronze Age metal hoards.

Concentrations of hoards seem to constitute genuine places of deposition, linked to a recurrent practice over the long term. For example, just in front of the hillfort, 21 hoards were aligned along a plateau edge. These scattered finds suggest an accumulation of small successive hoards. Although arrangements are rarely observed, several hoards appear to have been associated with topographical anomalies. Some of them were placed in rock crevices ensuring their protection. In other cases, the pronounced dispersion of objects, although partially related to erosion phenomena, could also suggest an above-ground deposition practice or perhaps a deliberate absence of burying.

Distributed in dominant positions throughout the valley, with specific topographic choices such as on plateau edges, along ridge lines, or atop steep slopes, hoards seem to surround the Camp du Château. Most of them are located immediately below a rocky spur or a large stone block that could have served as an easily recognizable visual marker in the landscape. Hoards could thus be associated with symbolic practices related to the cultural landscape definition and territorial marking.

20 FLAT AXES FROM ESCALLES: AN UNUSUAL CONTEXT!

Leroy-Langelin, Emmanuelle (Département du Pas-de-Calais) - Gandois, Henri (UMR 8215 Trajectoires) - Ghesquière, Emmanuel (Inrap Grand Ouest) - Marcigny, Cyril (Inrap grand ouest) - Riquier, Vincent (Inrap grand est)

A hoard of approximately 60 bronze flat axe-heads (of which 40 are now preserved) of British type (Stuart's Needham class 3 and 4, dated from 2100 and 1900 BC) has been discovered in Escalles (Pas-de-Calais). This hoard, located 2,5 km away from the shore, in front of England (though the latter is not directly visible), is an outstanding example of cross-Channel relations. This hoard is particularly interesting because of the archaeological context in the area. Nearby, other hoards were discovered, gathering finished objects or raw material. The location of these hoards within the Bronze age occupations shows the attractive side of the area and also links with England and all northwest Europe. The creation of a collective research program allows, for some years now, to study these several impressive hoards (amber raw material, bronze axes, and gold objects) spread over an area of 28 municipalities (254 km²). In the same time, we also analyse the territory information to understand better links between hoards, settlements and funerary area. Finally, hoards in context contribute to help us to understand landscape during Bronze Age.

21 OLD HOARDS, NEW STUDIES: CASE STUDIES FROM WIELKOPOLSKA (POLAND)

Maciejewski, Marcin (Institute of Archaeology, Maria Curie-Skłodowska University, Lublin) - Banaszek, Łukasz (Historic Environment Scotland, Edinburgh) - Bednarek, Przemysła (independent researcher) - Krzepakowski, Marcin (Fundacja Relicta, Poznań)

The newly discovered and systematically excavated metal item hoards are fountains of knowledge on various aspects of metal use in prehistoric societies. However, their research potential is much greater as they also reflect the specific cultural frameworks of the communities that deposited them and the stages and scenarios of the deposition process. While the number of those new finds is still modest, they provide incomparably more premises for interpreting the phenomenon of metal object deposition than the older discoveries.

Out of about 1,100 Bronze Age and Early Iron Age hoards documented in Poland, only a dozen deposition places were archaeologically excavated, usually already after the amateurs had taken out the artefacts. Only a few deposits were excavated in a manner consistent with the archaeological standards (typically after the amateur investigators had located them). Can more information be obtained on the deposition contexts of hoards discovered decades ago, often by people with no archaeological know-how? Can new field surveys and excavations reveal more details about these finds?

Multi-stage studies of Late Bronze Age hoards from Wielkopolska showed it was possible. First, we searched for the exact hoard locations using classical methods, including analyses of archives and maps. We also studied data provided by new technologies, such as airborne laser scanning (ALS) or metal detector and geophysical surveys performed in the areas of the potential discoveries. Last but not least, we analysed the excavation results.

The research presented here is part of the project titled "A Biography of Late Bronze and Early Iron Ages Hoards. A Multi-faceted Analysis of Metal Objects Related to Monumental Constructions in Poland" (UMO-2021/41/B/HS3/00038), funded by National Science Centre, Poland.

22 HERTEFELD 7 (BRANDENBURG STATE, GERMANY) A HOLY SITE FOR METAL DEPOSITING AND SPECIAL TREATMENT OF THE DECEASED

Franz, Schopper (Brandenburg State Authorities for Heritage Management, State Museum Archaeology) - Debo-rah, Schulz (Brandenburg State Authorities for Heritage Management, State Museum Archaeology)

At the so far unpublished site of Hertefeld 7 (Havelland district), a volunteer from Brandenburg State Archeology discovered a large, very remote area for depositing bronze objects. The site was then explored geophysically and through archaeological excavation. To protect the area from robbing, the finds so far have not yet been published; In addition to various bronze objects, animal bones and deposits of disarticulated human skeletal remains were found, which deviate from the cremation burial usual in this culture. The discovery area is located on two natural elevations in the lowlands of the Berlin glacial valley. This island location in the middle of moors may have given the place an outstanding position in prehistory. The excavation focused on the larger sand island (approx. 7,5 ha) showed that it was surrounded by a segmented double ditch. The inner ditch had diagonal posts that angled outwards. Scattered across the area - partly concentrated in several hoards - over 500 bronze objects came to light, including numerous weapons (swords, spearheads, arrowheads) but also costume components (brooches, arm rings, neck rings) and implements (sickles, hatchets, punches). Even in comparison to the famous hoards of Lebus and Eberswalde, this site is the richest in metal finds in Brandenburg and a discovery of national importance. 14C dates of bones set the site to Period IVa of the Younger Nordic Bronze Age around 1000 BC. The special feature of the site lies, in addition to its size, in the unusually good documentation of the context of the find. Measurements of individual finds, excavation

plans and blocks uncovered in the laboratory complement each other. This and the results of further analyses allow to define certain deposit zones (costume versus weapons). Undoubtedly, the site is an outstanding feature within the regional ritual landscape.

23 RECONTEXTUALIZING BRONZE AGE AND FIRST IRON AGE HOARDS IN NORMANDY : DIVERSITY OF APPROACHES AND RESULTS

Marcigny, Cyril (INRAP - National Institute for Preventive Archaeological Research) - Gandois, Henri (UMR Tra-jectoires) - Ghesquière, Emmanuel (Inrap)

Since the 1970s, Norman archaeologists have questioned the contexts of the Bronze Age hoards which were regularly unearthed during various works, since the first mention in 1713 by Jean de La Roque. The excavations carried out by Guy Verron at Moidrey (1972) or Marchésieux (1976) in the department of Manche aimed at providing first answers for the Early Iron Age hoards. This work mainly focused on geophysical prospections conducted by Alain Tabbagh such as those which were subsequently carried out on the palstave hoard of La Chapelle-du-Bois-des-Faulx (Eure, in 1978 and 1982) or Norville (Seine- Maritime, 1981). This issue then became a little less pregnant until the excavation of Agneaux (Manche) at the beginning of the 2000s which lifted the veil on the find context of two hoards containing socketed axes of the Armorican type, thanks to a large stripping of almost 5 hectares. Since this discovery, several interdisciplinary research programs, bringing together archaeologists, geophysicists, paleoenvironmentalists and arte-facts specialists, have been carried out in Normandy on varied scales and over a wide period covering the Bronze Age and the beginning of the second Iron Age. These experiments open up new questions.

This paper will be an opportunity to review these results based on surveys and excavations recently carried out at Bény-sur-Mer (Calvados, Middle Bronze Age, hoard of 189 palstaves), at Port-en-Bessin-Huppain (Calvados, sev-eral hoards on a hillfort), in Saint-Samson-de-la-Roque (Eure, several hoards on a hillfort), in the Val-de Saire (mi-croregional diachronic analysis over 90 km², Manche) and near the territorial ramparts of the Hague Dike (Manche) and Yainville (Seine-Maritime).

24 'EVERYTHING IN ITS RIGHT PLACE' - SELECTIVE DEPOSITIONS IN BRONZE AGE SOUTHWEST SWEDEN

Skoglund, Peter (Linnaeus University) - Nimura, Courtney (Ashmolean Museum, University of Oxford) - Horn, Christian (University of Gothenburg)

Hoards have played a significant role in our narratives of the European Bronze Age, but their purpose and meaning have been the source of much debate. These debates have been positively impacted by studies that investigate the ways in which hoards are connected to specific landscape contexts. In this paper, we discuss the outcome of one such in-depth field study of 62 Bronze Age metalwork deposition locations from the Swedish province of Halland. By systematically analysing digital sources such as museum archives, church records, and historical maps, we were able to establish the locations of a number of previously unlocated finds, which were then visited in the field. Through this combined archival work and fieldwork, we distinguished several patterns that allude to a connection between metal-work deposits, object types, and specific places in the landscape. These patterns shed light on the landscape context of hoards in this region, illuminate how deposition patterns changed over time, and consider some factors that may help to explain these changes. The results emphasise the importance of landscape studies for understanding the role of selective deposition in European Bronze Age societies, and more broadly, the social implications of hoards in their context.

25 HOARDS WITH KNOWN FIND CONTEXTS FROM THE NORDIC LATE BRONZE AGE IN SWEDEN

Sörman, Anna (LARA/UMR 6566 CReAAH, Nantes Université) - Ojala, Karin (Department of Archaeology and Ancient History, Uppsala University)

Metalwork hoards from the Late Bronze Age in southern Scandinavia were primarily discovered in the nineteenth and early twentieth centuries during agricultural activities, lake regulations, dredging and construction projects. The discovery rate was higher when manual labour, horse power and small-scale tools were more commonplace, before the advent of larger machinery. The information collected about the find circumstances, location and context of the hoards varies greatly. This paper looks into the hoards from Nordic Late Bronze Age Sweden and their documented find contexts, classifying the depositions with known find circumstances into qualitative categories. Both dry-land hoards and depositions from wet contexts are considered. Information regarding a Hoard in situ can be defined on various scales; the composition and locus of the hoard, activities and characteristics of the surrounding site, and the wider environment or landscape elements where the deposition took place. More information about "old" finds can sometimes be gained via archival information, unrecorded organic finds and renewed interventions on the find site is exemplified through an ongoing project about an iconic wetland hoard; the Hassle deposit with continental metalwork stacked in a large cauldron, found 1936.

1173 GENDER AND ECONOMIES IN TRANSITION IN THE 1ST MILLENNIUM BC MEDITERRANEAN

Session theme: 6. The Mediterranean from Within

Session organisers: Saltini Semerari, Giulia (University of Michigan) - Ferrer, Meritxell (Universitat Pompeu Fabra) - López-Bertran, Mireia (Universitat de Valencia) - Leigh Newland, Tayla (University of Sydney) - Torres Gomariz, Octavio (Universitat d'Alacant)

Session format: Regular session

In the Mediterranean, the end of the Early Iron Age was characterized by profound social and economic changes. Among these, increases in population numbers, social competition and widespread mobility led to the creation of a more interconnected world, new forms of political institutions and new local identities. Yet while it has been widely recognized that these transformations had a deep impact on Mediterranean communities, the ways in which they affected local gender organization remains largely unexamined. This is unfortunate, because gender is one of the main axes around which the production, distribution and consumption of resources is structured, and thus one critical arena in which social and economic changes are negotiated.

In this session, we would like to zoom in on the relationship between the economic and the gendered organization of Early Iron Age Mediterranean communities, and how these shifted as the Mediterranean world became more complex and interconnected. More specifically, we would like to explore:

(1) Changes to production modes (from domestic to specialized) and their impact on labor division and task differentiation.

(2) Changes to access and distribution of resources, both locally produced and acquired through exchange or migration.

(3) Related to this last point, changes to consumption: whether resources these were used differently by different groups across time.

In this way, we hope to illuminate how gender roles and ideologies were implicated in shaping local agency and responses to global changes in the Mediterranean. Authors are encouraged to think wholistically about gender relationships, and about their intersection with other important social axes such as age and status. We welcome a variety of theoretical perspectives and approaches that may speak to this issue, from material cultural studies to osteological and archaeometric analyses.

ABSTRACTS

1 FAR FROM THE 'MED-DING' CROWD? GENDER, NETWORKS, AND THE WOOL TRADE IN EIA HIRPINIA

Morris, Owain (Catalan Institute of Classical Archaeology (ICAC))

The transition from the EIA to the Archaic period brought profound changes with significant implications for ancient communities. In this transformative era, the Mediterranean region witnessed increased interconnectivity, which led to the spread of new ideas, technology, and ways of seeing the world (Hodos, 2020). This was especially the case with Campania on the Tyrrhenian coast of Italy. Standing at the crossroads of diverse cultures—Greeks, Etruscans, Phoenicians, and Italic peoples—Campania bore witness to an intense web of contact from the 8th century BC. However, prevailing scholarship on the region has upheld a Greek-centric narrative, marginalizing the agency of both local men and women. Gender has been a neglected avenue of exploration and the impacts of economic change on gender organisation have seldom entered key regional debates. While interaction has long been recognised along the Italian coast, areas of the hinterland have either been ignored or characterised as primitive and backwards (D'Agostino, 2006).

One such area is the microregion of Hirpinia within modern Campania, but arguably closer to modern Puglia. Focusing on the Oliveto-Cairano culture inhabiting Hirpinia during the EIA, this paper aims to challenge the characterization of Hirpinia as a conservative cultural backwater (Cuozzo, 2007, 2016). Instead, it seeks to reveal Hirpinia's robust network connections from a very early period, with women playing pivotal roles in the exchange of ideas, technology, and interactions across cultures. These women emerged as key figures in inter-regional trade, acting as crucial links between the east and west coasts of Italy. This paper will underscore how economic transformations in Campania during this period also saw women become significant actors in the production, consumption, and trade of wool.

2 ECONOMIC CHANGE, GENDER, AND LABOR IN THE GREEK EARLY IRON AGE

Murray, Sarah (University of Toronto)

The Early Iron Age (ca. 1100–700 BCE) in the Aegean was characterized by considerable economic dynamism. Facing new institutional and political conditions in the post-Bronze Age Mediterranean, communities in the Greek mainland and neighboring islands seem to have adopted diverse strategies for pursuing wealth and well-being in various spheres, from craft production to the agricultural economy. This paper reconstructs some gendered elements of economic systems in this dynamic period, with a focus on its first three centuries, from 1100–800 BCE. It describes the likely economic changes that transpired between the end of the Bronze Age and the Early Iron Age in Greece, then discusses how such changes might have impacted the allocation of economic tasks among gender categories. Finally, it considers the implications these changing allocations may have had for society. While sure answers are elusive, the available evidence indicates that the distribution of work tasks was relatively evenly spread amongst genders and that it was distinctions of class rather than gender that most strongly determined economic roles in this period of the Aegean past.

3 GENDER, CONSUMPTION AND TRANSITIONING ECONOMIES: CASE STUDIES FROM ETRURIA TO CAMPANIA

Cuozzo, Mariassunta (University of Molise)

The paper deals with consumption and modifications to access and distribution of resources acquired through exchange in Iron Age Etruria and Campania.

Under the theoretical point of view, the article focuses on the issue of social and symbolic significance of consumption as an important aspect of social practice and agency.

It is interesting to observe how these dynamics take on gender connotations. In Etruria and Campania both men and women of exceptional social position were buried with imported symbols of status, which suggest their capacity to monopolize the economic and social relations within the groups to which they belonged, and in the community as a whole. Complex dynamics of socio-political negotiation take on different connotations among different groups, a phenomenon which has implications also for the creation of gender identities

The intercultural consumption of objects and practices between Greek, Etruscan and indigenous peoples is borne out by the complexity of the material culture of the isle of Pithekoussai, where indigenous and Levantine people are present in a manner that was not necessarily subordinate to the Greek element. Selective consumption of objects acquired through exchange is evident in the material culture of many Etruscan and Campanian communities in this phase.

4 FORGING CONNECTIONS, WEAVING COMMUNITIES: MODES OF PRODUCTION AND CONSUMPTION IN THE SOUTHERN PORTUGUESE EARLY IRON AGE AND THEIR GENDERED DYNAMICS

Gomes, Francisco (University of Lisbon)

During the Early Iron Age (8th/7th – 6th/5th centuries BCE), the Southern Portuguese territory saw the appearance of differentiated urban and rural spheres. The former are concentrated on some coastal areas, while the latter occupy the territories of the interior. Although evidence for craft activities during this period remains comparatively scarce, the available data suggests very different forms of economic organization in each of those spheres.

In fact, in coastal areas, marked by an intense Phoenician presence, specialized economic activities rapidly arise, including comparatively intense metallurgical production and a rapid rise of pottery workshops producing considerable volumes of wheel-made pottery. In rural areas, on the contrary, economic activities seem to have remained organized on a household basis, and apart from suggested (but far from demonstrated) dynamics of agricultural intensification, craft activities (such as pottery, still dominated by hand-made wares) retain a low intensity rate.

The gendered implications of these two distinct but interconnected economic systems which coexisted at the time in Southern Portugal have not been fully explored. However, the differentiated economic role of women in both areas and systems may explain perceived asymmetries regarding their prominence in strategies of social representation and their visibility in ideologically significant scenarios, such as funerary spaces.

In order to illustrate the possible linkages between the role of women in different modes of production and their differing social roles as expressed through consumption, this presentation will explore the case study of textile production. Recent research has shown that differing modes of textile production arose in Southern Portugal during this period, with a background household production, namely in rural areas, which contrasts with some instances of possible attached production in coastal sites, associated with sanctuaries. This contribution will analyze the significance of the associated shift in the scale and organization of this traditionally female craft.

5 GENDERED NETWORKS IN PRE-ROMAN ITALY: TRACING LOCAL AND REGIONAL INTERACTIONS

Newland, Tayla (The University of Melbourne)

In the context of ancient southern Italy, the study of burial goods has been coloured by entrenched assumptions drawn from the Classical archaeological tradition. From sex and gender to ethnicity and status, the Greek and Italic communities of the region have been subject to an agenda that not only limits our understanding of their identities, but also obscures the connections between them. In the same vein, social interaction amongst these groups has largely been viewed through a Hellenised lens, and while gender archaeology has proliferated in recent years, studies of south Italian social exchange have seldom factored gender into the equation.

The following paper reframes our understanding of gendered connectivity through a novel and systematic network analysis of burial goods. Drawing together affiliation networks and spatial data, it seeks to identify ties between a diverse range of human and material agents, spanning temporally from the Iron Age to the Classical period, and geographically from Campania to Puglia. It also applies new theoretical and methodological frameworks to identify connections at various regional and interpersonal scales. While this research sheds light on gender roles and patterns of resource consumption over time, it ultimately seeks to reconcile the social, gendered and agent-based factors that drove cultural interaction across the ancient world. This paper, then, has the potential to contribute to our understanding of gender and economies in pre-Roman southern Italy, and to situate these findings within the broader Mediterranean milieu.

6 HOW DO MEDITERRANEAN TRADE IMPACT POLITICAL STRUCTURES AND ENGENDER SOCIAL CONSTRUCTIONS IN NORTH ALPINE WORLD DURING THE SECOND IRON AGE?

Feugnet, Aurélie (Service archéologique de l'Aisne; UMR 7041 - ArScAn) - Trémeaud, Caroline (Cellule archéologique des Ardennes; UMR 8215 - Trajectoires)

Societies from the 1st millennium BC are evolving in an interconnected world in which interactions result from repeated contacts, linked to trade or diplomatic practices on any scale and migration phenomenon or transfers of individuals. It seems apparent we need to consider the weight of these various influences to interpret the evolution that archaeological materials highlight.

Based on two doctoral dissertations, this proposition aims to question the links between economic networks between the Mediterranean world and the North Alpine complex and gender analyses in the funeral practices of elites. During the Iron Age, funerary assemblages in elites' burials highlight engendered social evolutions and aristocratic structuration. Our doctoral works indicate on the one hand a link between funerary changes, with fluctuations among feminine and masculine investment in burials, and economic patterns.

On the other hand, deep modifications in political structures from aristocratic systems to a new system with assemblies seem to also succeed due to an increase in economic relationships (trade) with the Mediterranean societies (Roman imports).

In short, this presentation will be focused on the links between intern mutations and Mediterranean contributions, that is to say, funerary evolutions including especially gender transformations and the potential for interpretations in terms of political structures or territorial organisations, given Mediterranean imports and influences during the second Iron Age.

7 DOMESTIC DUTIES, CIVIC VIRTUE: WOMEN'S ROLES IN WESTERN SICILIAN COMMUNITIES (8TH - 5TH CENTURY BC)

Ferrer-Martín, Meritxell (Universitat Pompeu Fabra)

The historiography of Sicily in the early first millennium BC has long been dominated by colonial perspectives, focusing primarily on Phoenician and Greek settlements, and often neglecting the agency of indigenous populations. This colonialist framework has portrayed Sicilian natives as passive recipients of colonial influence, overshadowing their active roles in shaping their communities.

While postcolonial studies have begun to challenge this narrative in Mediterranean archaeology, they have often depicted Sicilian Iron Age peoples as a homogeneous group, neglecting the diversity of their experiences, particularly from a gender perspective. Consequently, indigenous women in Sicily have remained marginalized, their contributions overlooked in scholarly discourse.

This presentation seeks to redress this imbalance by highlighting the significant roles played by Sicilian women in fostering the well-being of their households and communities during this period. It examines how women engaged in ritual practices within their homes and participated in cooperative and communal activities to promote emotional, economic, social, and political stability within their communities. By foregrounding the agency of Sicilian women, this

study aims to provide a more nuanced understanding of ancient Sicilian society and challenge traditional androcentric interpretations.

8 GENDER AND CRAFT PRODUCTION IN OENOTRIA DURING THE EIA-ARCHAIC TRANSITION

Saltini Semerari, Giulia (University of Michigan)

This presentation draws on previous gender archaeology literature to investigate the gendered dimension of craft productions during the Early Iron Age - Archaic transition.

Craft productions were not only vital aspects of the Early Iron Age economy of local communities, but also an essential element of their worldview and ideology, and one of the ways in which gendered differences were embodied in people's lives. Focusing on southern Italy (Basilicata), I will consider Early Iron Age traditions of textile, pottery, wood and metal production and how they might have changed with the arrival of the first Aegean colonizers and the emergence of the early colonial settlements along the coast. The presence of foreign artisans, the possibility of a transfer of skills and the creation of dedicated productive spaces would have unsettled previous gender dynamics and required adjustments both in the practical organization of production and in the ideological construction of gender roles.

9 INTRODUCING GENDER AND ECONOMIES IN THE IRON AGE ANCIENT MEDITERRANEAN. A PROPOSAL FROM THE GENDYTERRANEAN GROUP

López-Bertran, Mireia (Universitat de Valencia) - Saltini Semerari, Giulia (University of Michigan) - Ferrer, Meritxell (Universitat Pompeu Fabra) - Leigh Newland, Tayla (University of Sydney) - Torres Gomariz, Octavio (Universitat d'Alacant)

In this presentation, we shall introduce the Gendytterranean group, which was born at the EAA held in Budapest in 2022 with the goal of integrating gender into the study of 1st millennium BC transitions from Iron Age villages to urban/early state organizations across the Mediterranean. We understand the Mediterranean as a global case study with a high degree of local variability, where gender dynamics have played an essential role in shaping change at the local level. Our approach to this diverse and fragmentary body of evidence is to focus on local shifts within a comparative and long-term methodology. One of the topics that can be approached from this perspective is the gendered and economic organization of Iron Age Mediterranean communities, the second point of this paper. We want to highlight how gender actively influences the production, distribution, and consumption of resources and how this shaped a more complex and interconnected Mediterranean. We will also briefly present how the papers of the session tackle these issues to set the framework for the discussion slots.

1179 THE EXPLOITATION, USES, AND REPRESENTATIONS OF MARINE INVERTEBRATES (MOLLUSCS, CRUSTACEANS, ECHINODERMS) IN THE ROMAN EMPIRE

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: Mougne, Caroline (Muséum National d'Histoire Naturelle Paris) - Theodoropoulou, Tatiana (UMR7264 - CNRS - Université Côte d'Azur Nice) - Corbino, Chiara (University of Sheffield) - Marzano, Annalisa (University of Bologna)

Session format: Regular session

The aim of this session is to bring together specialists and young researchers working on the role of marine invertebrates (molluscs, crustaceans, echinoderms) in the Roman Empire and provinces. It will offer the opportunity to present studies focusing on various themes, such as:

- dietary practices (exploited environments, harvesting methods, targeted species, preparation of batches, commercialisation and transport, culinary practices, food waste management),
- funerary and ritual practices (offerings, deposits, funerary/ritual meals),
- invertebrates in craftsmanship (dye production, wall decoration, construction material).

The aim is to gain a better appreciation of the relationship that communities that were part of the Roman Empire engaged with the marine world. Various records may help us shed light on these aspects, including invertebrate remains (shell, carapaces, other), iconographic evidence (mosaics, frescoes, vases, objects), ancient texts (Latin, Greek).

A number of more specific research questions may be addressed:

- Are there any differences observed in the ways marine invertebrates were exploited across the Roman empire (West/East, coastal/inland regions, islands/continent) and through time (1st c. BCE to 5th c. CE), as well as with respect to the different identities of various Roman communities?
- What was the impact of the expansion of transport networks in the circulation of marine resources from the coasts inlands?

- What was the influence of romanisation on local dietary traditions linked to marine invertebrates?
- Did the demographic expansion that occurred on the Atlantic and Mediterranean coasts lead to the overexploitation of marine resources?
- Was availability of marine resources a driving factor for the installation of human groups on the coastal zones?
- What role did the marine world play in the symbolic and ritual expressions of ancient communities?
- What were the reasons behind the choice of invertebrates in craftsmanship, dye production, wall decoration, building techniques?

ABSTRACTS

- 1 HARVESTING AND EXPLOITATION OF MEDITERRANEAN MARINE INVERTEBRATES IN ROMAN TIMES**
Carenti, Gabriele (Cepam, CNRS, Université Côte d'Azur, 06300 Nice, France) - Theodoropoulou, Tatiana (Cepam, CNRS, Université Côte d'Azur, 06300 Nice, France)
 Mermaid project proposes an integrated study to understand the relationship between environmental pressure on marine resources and the impact of human communities on marine ecosystems in the ancient Mediterranean Sea. Informations on marine resources and their exploitation in various archaeological sites around the Mediterranean sea are stored in the M-ARCHives database. It is a comprehensive corpus with the aim of addressing environmental and cultural aspects related to the presence and abundance of marine taxa over time in different geographical areas. In this contribution, the discussions will focus on the Roman period in the coastal areas of the Mediterranean. Archaeofaunal data from M-ARCHives mainly concern taxonomic variability and relative abundance of species. The focus will be on the exploitation of marine invertebrates. The data are based on published documents. About 100 archaeological sites were analysed. The archaeozoological data reflect great taxonomic abundance: more than 60,000 identified specimens of 168 different invertebrate species distributed in 73 zoological families were collected. Several topics will be discussed: the spread of the main edible invertebrates; patterns of relative abundance of species over time; differences related to geographic areas; species selection in relation to both dietary practices and exploited ecosystems; industrial production and commercialisation of specific products; and comparisons with pre-Roman communities will also be covered. Through the use of the M-ARCHives dataset, we will be able to perform a synchronic and diachronic analysis useful for detecting differences in the exploitation of marine resources in Roman times along the Mediterranean coasts.
- 2 THE EASTERN VALVE: THE EXPLOITATION OF MARINE INVERTEBRATES IN THE GREEK PROVINCE OF THE ROMAN EMPIRE, AN UNKNOWN RECORD**
Theodoropoulou, Tatiana (CEPAM, CNRS-Université Côte d'Azur)
 Although the Hellenistic as well as Early Byzantine periods are quite well studied for the Aegean area, the Roman domination in this region is much less well documented, especially with respect to the everyday life of Greek populations during this period. Among various material records, shells are a common find in Roman contexts that may provide information on coastal exploitation, but have rarely been studied until now. In this presentation we will present the available evidence of marine exploitation in Roman Greece through recently studied contexts, including residential areas, baths, sanctuaries across the Aegean. We aim to detect possible trends brought to this region by Romans, through comparison with Western Mediterranean contexts, vs. traditional exploitation strategies by local populations, as documented from previous periods. We are particularly interested in the role of local environmental availability vs. cultural choices in the exploitation of marine invertebrates as well as in their uses with the various studied contexts.
- 3 PROVENANCE DETERMINATION OF CONSUMED OYSTERS AT BAELO CLAUDIA, GIBRALTAR**
Mouchi, Vincent (CReAAH - Université de Rennes) - Audebert, Ludivine (ArScAn - Université Paris 1) - Pesnin, Marie (LSCE - Université Paris-Saclay) - Bernal Casasola, Dario (Department of History, Geography and Philosophy - University of Cadix) - Emmanuel, Laurent (ISTeP - Sorbonne Université)
 In Gibraltar, the antique site of Iulia Traducta, located in the current Bay of Algeciras, was a large exploitation site in seashell products, with still visible ostriaria. The contemporaneous site of Baelo Claudia, located by the modern city of Tarifa, a few kilometres West of Algeciras, is characterised by large amounts of oyster shells as food wastes, but no proof of local oyster exploitation has been reported. We attempt to determine if the oysters found at Baelo Claudia originated from the Iulia Traducta ostriaria. To do this, we use shell geochemistry using two methods: stable isotope ratios of oxygen and carbon, widely used in studies focusing on determining shell origins, and the novel approach of elemental fingerprinting. Based on our results, the Baelo Claudia shells share a common origin with most Iulia Traducta

oysters, but we also identify multiple origins among these exploited oysters. Although we are confident that they all originated from the Mediterranean side of Gibraltar, we currently lack references to pinpoint the exact origins. This study highlights the advantages of elemental fingerprinting instead of stable isotope compositions, and raises new questions on the exploitation of oysters at Iulia Traducta, in terms of importation of initial products and/or diversity of fishing localities.

- 4 SEA-URCHIN MIDDENS IN ROMAN ARCHAEOLOGY: NEW EVIDENCE FROM BAELO CLAUDIA**
Bernal-Casasola, Dario (Universidad de Cádiz) - Expósito, José Angel (Universidad de Cádiz) - Lara Medina, Macarena (Universidad de Cádiz) - Díaz, Jose J. (Universidad de Cádiz)
 Marine resources exploitation in Antiquity include sea urchins, even if the evidence from archaeological sites is nearly unknown, at least in the Western Mediterranean. Recent archaeological operations at the fish-salting quarter of the Roman city of Baelo Claudia (Baetica, Hispania), have unearthed deposits of broken sea urchins dating back to the 1st - 2nd centuries AD. Coming from an already abandoned building in the so called Southern Quarter of the Roman city, near the beach, they are said to be remains of garum production in the surrounding later cetariae (fish-salting plants). In this paper we present by the first time these deposits, discussing their composition, and reflecting about the importance of echinoderms in the halieutic cycle in Antiquity. Baelo Claudia has also shown evidence of these marine resources from other archaeological contexts, as well as their representation in mosaic, which will be also part of the discussion, illustrating how sea urchins were much more common in Roman times than expected.
- 5 ECHOES OF THE SEA. MOLLUSKS CONSUMPTION IN THE EGYPTIAN EASTERN DESERT: THE CASE OF DEIR EL-ATRASH FORTRESS**
Morand, Nicolas (Muséum National d'Histoire Naturelle Paris)
 The occupation of the Egyptian Eastern Desert was particularly intense during antiquity, with the extraction of mineral resources (porphyry, gold) and the development of harbors on the Red Sea, facilitating the transportation of goods from the Indo-Pacific world. Roads traversing this region were established, linking the Red Sea coast to the Nile Valley. Along these roads, Roman fortifications (praesidia) were established to protect the populations working in the area and to support caravans crossing the desert. Since 2020, the French Archaeological Mission of the Eastern Desert (MAFDO) has been exploring a fortress in Wadi Deir el-Atrash, located on the road between Qena and Mons Porphyrites. This site has been occupied from the Early Imperial (2nd c. AD) to the Late Roman period (4th - 5th c. AD). Excavations conducted within the fortress and in the surrounding dumpsites have yielded numerous faunal remains, including several hundreds of marine invertebrates. This presentation aims to highlight the increasing part of the invertebrates in the diet of the soldiers occupying the fort through the Roman period. It will provide an opportunity to discuss consumption patterns, as well as potential other uses of shells in daily life, and waste management within the fort. We will be able to compare the specificities of Deir el-Atrash with the other fortlets and quarry sites along this road to the Red Sea in a regional analysis of trade strategies and food supply challenges.
- 6 SHELLFISH EXPLOITATION IN SOUTHERN FRANCE DURING THE ROMAN PERIOD : DEFINITION OF AN " ANTIQUE MODEL " AND RECENT FINDINGS**
Vianney, Forest (INRAP - National Institute for Preventive Archaeological Research; UMR 5608 TRACES Toulouse) - Cyprien, Mureau (CNRS, UMR 5554 ISEM, Montpellier)
 In the 2000s, Anne Bardot-Cambot's academic work on the harvesting of marine shellfish during the Roman period in southern France built up a substantial base of knowledge that serves as a reference for archaeoconchyliological studies in this region. Since then, archaeological sites have provided further insights into various topics. Our communication will focus on recent contributions from archaeoconchyliology in a large part of southern France with the island of Corsica. These include the question of the consumption of *Pecten jacobaeus*, the extraction of porphyrogen from Muricidae and the acquisition of flat oysters *Ostrea edulis*. Moreover, discoveries of marine shells from Late Antiquity and the Middle Ages have made it possible to identify 'markers of Antiquity'. They show that the antique shell trade came to an end around the seventh century. This trade went from being fairly standardised to fluctuating on the basis of several main species already known during the Roman period.

7 IMPACT OF THE ROMANISATION ON THE EXPLOITATION AND USE OF MARINE INVERTEBRATES: THE EXAMPLE OF WEST-CENTRAL GAUL

Mougne, Caroline (UMR 7209 AASPE (Archaeozoology, Archaeobotany, Societies, Practices and Environments), Muséum National d'Histoire Naturelle, Paris, France) - Dupont, Catherine (CNRS UMR 6566 CReAAH (Centre de Recherche en Archéologie, Archéosciences, Histoire), Université de Rennes, Campus Beaulieu, 263 avenue Général Leclerc, bât. 24-25 -CS74205, 35042 Rennes Cedex, France)

Impact of the Romanisation on the exploitation and use of marine invertebrates: the example of west-central Gaul :

We propose to provide an initial overview of the Romanisation's impact on the exploitation and use of marine invertebrates (molluscs, crustaceans and sea urchins) in west-central Gaul, corresponding to Pictons's and Santons's territories. Chronologically, we focus our presentation on the period from the 2nd century BC to the 2nd century AD, thus covering the Romanisation of Gaul over a wider period. As a result, this chronological period will give us an initial glimpse of Gallic practices, followed by the progressive arrival of Mediterranean influences, before concluding with the consolidation of new modes of consumption resulting from the meeting of these two cultures.

Three areas of research will be discussed:

- dietary practices (exploited environments, harvesting methods, targeted species, preparation of batches, commercialisation and transport, culinary practices, food waste management),
- funerary and ritual practices (offerings, deposits, funerary/ritual meals),
- invertebrates in craftsmanship (dye production, wall decoration, construction material).

8 SHRIMPS IN FISH SAUCE? EXCEPTIONAL DISCOVERIES OF SHRIMP REMAINS IN THE ARCHAEOLOGICAL LEVELS OF TWO ROMAN SITES IN WESTERN FRANCE

Borvon, Aurélie (CNRS, UMR 7041)

Shrimp remains (Crustacea decapoda) have been discovered in archaeological excavations in two sites in the West of France: the Roman harbour area of Ratiatum (Rezé, Loire-Atlantique) and the site "Les Coteaux du Calvaire" in the city of Harfleur (Seine-Maritime). Carapace fragments from these small animals can only be detected after careful sieving of the sediment with a 1 mm square mesh. The discovery of these shrimp fragments is exceptional at archaeological sites; their presence in Ratiatum and Harfleur is explained by the favourable preservation conditions offered by a water-logged environment in the first case and a really well-preserved pit in the second one. Shrimp taxa can be identified by the morphology of different parts of their exoskeleton and an identification key for these little animals was recently developed. The morphology of the rostrum (rigid extension of the head) allowed us to identify Palaemon longirostris in Ratiatum, whilst that of the telson (rear end of the body in arthropods) and scaphocerites (antennal scale) makes the sand shrimp Crangon crangon clearly identifiable in Harfleur. On each site, the identified species is quite abundant, with more than a thousand specimens. The ecology of Palaemon longirostris indicates that they were probably caught inside an estuary such as that of the Loire, those of Crangon crangon in estuarine waters near the mouth of the Seine. The fact that pieces of shrimp are systematically associated with small fish used in preparing fish sauces suggests that these shrimps were also used in this type of preparation. The main aim of this communication is to draw the attention to archaeozoologists on this type of neglected remains, and demonstrate that their identification is possible and can provide useful information.

9 SUPPLY AND USE OF MARINE SHELLFISH IN THE CITY OF AUTRICUM (CHARTRES, NORTHWEST FRANCE)

Julie, Rivière (Direction de L'archéologie de Chartres; Museum d'Histoire Naturelle de Paris, UMR 7009) - Caroline, Mougne (Museum d'Histoire Naturelle de Paris, UMR 7009)

Shellfish are often encountered in the sites excavated at Chartres-Autricum, the capital of Carnutes's territory (Northwest Gaul), located to 150 km from the coast.

The arrival of this new resource, whose presence is attested from the 30s AD, onwards, is directly linked to the expansion of the city driven on by the reforms of the emperor Augustus. At the time, the city was undergoing a major demographic boom and large-scale architectural programmes were being implemented.

This synthesis is based on an exhaustive inventory of the presence of shellfish (acquired over more than 15 years of preventive archaeology excavations) and on the archaeomalacological study of four archaeological sites (habitat, sanctuary, burial space). The aim is to document the distribution and use of these marine resources, which are usually overlooked in the economy and belief systems of continental sites during Antiquity.

The results obtained enable us to discuss the systems of transportation and redistribution of these products towards the various consumers, based on a map of finds in the city of Autricum. They also show a certain specialisation of species relating to their use in the different domestic, craft and symbolic contexts.

This initial overview documents more generally the relationship between the sea and a continental urban community, adopting new cultural practices coming from the Mediterranean world from the 1st century AD.

This work is the start of a research project focusing on marine fauna from continental urban contexts in north of Gaul (present-day towns of Chartres, Evreux, Meaux, Paris and Orléans, for the moment). Among other things, the aim is to determine the collection and fishing/preparation areas, then the supply systems via natural communication routes (Seine and Loire rivers) and/or Roman road networks.

10 THE RITUAL USE OF OYSTERS IN ROMAN BRITAIN

Goldstein, Avner (Boston College)

People living in Britain during the Roman period deposited oyster shells for ritual at a number of sites, both spaces associated with more formal religion (temples, shrines, cellars, and cemeteries) and quotidian spaces (pits, floors, wells, and abandoned industrial structures). These oysters were often used across a broad depositional spectrum, accompanied by a number of other materials of religion like priestly regalia, military equipment, plaques, bells, figurines, and portable altars, as well as human skulls, animal heads, antlers, birds, dogs, tools, pots, shoes, lamps, and game pieces. Whilst some of these objects were everyday and more easily sourced, others were precious and difficult to acquire. This becomes especially true at the end of the Roman period when transportation and trade networks disintegrate in the late fourth and fifth centuries. This paper thus investigates the ritual use of the oyster and its place in an economy of religion in Roman Britain. How did those living on coasts and inland acquire their oysters? What ritual practices accompanied their consumption and deposition? How did these practices differ across social groups, geographic location, and time period? What happened to these marine species that were bound up in material, social, and cultural practices after the collapse of Roman systems that had often introduced and sustained them?

1182 COOPERATING OR COMPETING? ? THE ORGANISATION OF SPACE AND POWER USING NETWORKS AND SYSTEMS OF FORTIFICATIONS

Session theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Session organisers: Ibsen, Timo (Zentrum für Baltische und Skandinavische Archäologie (ZBSA); Leibniz-Zentrum für Archäologie (LEIZA)) - Messal, Sebastian (Lower Saxony State Service for Cultural Heritage) - Fontana, Giacomo (University College London (UK))

Session format: Regular session

Fortifications are often viewed and studied as individual monuments, while detecting related pairs or clusters is challenging due to the reliance on clear chronological evidence for their contemporaneity. Without it, interpreting neighbouring monuments as parts of cooperative networks or opposing systems is nearly impossible. Recently, the utilization of LIDAR data and other survey methods has uncovered new elements within known hillfort complexes, shedding new light on the size and function of individual monuments.

Sometimes, previously solitary fortifications are revealed to be part of a network, significantly altering older interpretations and possibly reflecting prehistoric socio-political entities and the processes of organizing space and power to control or protect adjacent territories. Furthermore, there is a plethora of analytical computational tools available for embedding fortifications into spatial or relational networks, focusing on accessibility via routes and road systems, visibility ranges, or cultural territories on both micro- and macro-regional levels. This facilitates the identification of entire fortification systems, such as border defence systems, signalling or warning networks with chains of watchtowers and military camps, or other types of defensive barriers on land and in water. All of these insights provide a deeper understanding of sophisticated organizational structures.

This session diachronically focuses on examples and methods of detecting and interpreting networks and systems of fortifications. We aim to discuss the roles individual monuments played within larger frameworks and the impact of their organization on the control of space and power in entire regions. We welcome papers presenting case studies focusing on landscapes with either opposing systems or cooperating networks of fortifications, and how to identify, define, and interpret such agglomerations. Contributions on analytical tools or methodologies for processing data to identify systems and networks are also appreciated.

1 'THE HEARTBEAT OF HILLFORTS' - ON THE NECESSITY OF CONTEMPORANEITY FOR THE INTERPRETATION OF SYSTEMS OF FORTIFICATIONS

Ibsen, Timo (Leibniz-Zentrum für Archäologie (LEIZA-ZBSA))

Fortifications are often monuments of long existence. Being built originally by one group with a specific purpose, they might change in appearance, function or cultural affiliation over time. Some of them have been used continuously or discontinuously thousands of years with varying degree of intensity.

Very often, spatial neighbourhood is mistaken with simultaneity of the individual fortifications, suggesting a temporarily functional unit. For detecting competing or cooperating systems of fortifications, the prove of contemporaneity on the basis of secure dating is absolutely crucial. Without, all models of settlement development and the role of these monuments in the settlement landscape stay pure speculation.

The lecture emphasises the necessity of proving simultaneity for the interpretation of systems of fortifications, by showing case studies from two micro regions in the Russian Kaliningradskaya district. Here, large numbers of so far mostly unstudied hillforts are concentrated within a limited, but rich in archaeological sites landscape, showing settlement traces from Bronze Age until Medieval times. By applying the method of 'speed-dating', a combination of drilling and C14 dating conducted at the embankments, several hillforts in those agglomerations were dated. The resulting heartbeat of these fortifications shows a surprising number of contemporary sites in almost all time slices. This new chronological information made it possible to identify contemporary hillforts and interpret them on the basis of surrounding archaeological sites and against the background of historical sources. Sometimes patterns become visible and allow for a detailed interpretation of the relation between the strongholds themselves, even hinting at possible functions.

2 LATE BRONZE AGE SETTLEMENT NETWORK IN SERBIAN BANAT, SOUTHERN CARPATHIAN BASIN

Estanqueiro, Marta (University College Dublin; CEAACP- University of Coimbra)

A vast network of more than 100 settlements from the Late Bronze Age was discovered in the Serbian Banat region (southern Carpathian Basin). These sites are spread in the landscape near the major tributaries of the Tisza and Danube Rivers and due to their similarities were designated Tisza Site Group.

The layout and size of these settlements vary, with some featuring a complex system of ditches and encompassing more than 100ha of enclosed space, considered to be mega-forts by some authors.

This presentation will focus on the settlement pattern and spatial analysis results, possible factors that may have influenced site location choice, as well as potential resources exploited and controlled. This seems to indicate the existence of a cooperative network aiming to control the landscape, its resources and fluvial routes.

Additionally, site connectivity will be addressed through intervisibility network analysis and the reconstruction of the former river system, utilizing historical maps prior to the implementation of significant hydraulic regulation works that rerouted and channelled river courses.

Finally, the sudden abandonment of these sites around 1200 BC and a possible connection with a drier climate phase, similar to the Terramare (Italy) will also be discussed.

3 FORTIFIED LANDSCAPES OF HELLENISTIC EPIRUS: FORTIFICATIONS, MOBILITY AND CONTROL OF SPACE

Castignani, Veronica (University of Catania)

Historically divided into tribal groups, Epirus remained a federal state even during the Hellenistic period, under the aegis of the Molossian tribe first and the Epirote League then. The Epirote landscape appears to be strongly militarised. Alongside the urban centres widely known from ancient sources, a dense presence of minor fortified sites has been identified from the numerous wall remains, whose role in the regional context is still uncertain. It has been noticed that most of the Hellenistic examples are hilltop fortifications positioned to control natural routes or access points to significant territorial compartments. An isolated fortification could not ensure an effective defence in a vast territory divided into ethne. Therefore, integrated territorial control systems emerge on a sub-regional scale, established according to internal hierarchical criteria. Through geospatial analyses for determining intervisibility ranges, some networks of fortified sites can be assumed, structured around a main centre - not necessarily urban - and organised in lower-order fortifications along the main routes. The most interesting data for the Hellenistic period seems to be the fading of border militarisation between one ethnos and another. Fortified hilltop sites with plausible strategic roles are located along the main natural route tracks in the Epirote mountainous territory, for which it is not possible to clearly

determine to which political-administrative centre they belong. In light of the data available so far, fortified hilltop sites may have played a role not only in the supervision of borders but especially in the control of communication routes between different communities. This contribution discusses the preliminary results of fieldwork in the Pavlla River Valley (Southern Albania) within the Italian-Albanian "Butrint Project", and the use of a landscape approach to a broader study on Epirote fortifications.

4 THE OPPIDA OF THE ALTO MINHO (PORTUGAL) AND THEIR TERRITORY BETWEEN 2ND CENTURY BC-1ST CENTURY AD: IDENTIFYING SPATIAL NETWORKS

Maciel, Silvia (University of Santiago de Compostela, Spain; Lab2PT University of Minho) - Rotea, Rebeca (Lab2PT, Unity of Archaeology, University of Minho) - Fernández-Götz, Manuel (University of Edinburgh)

The dynamics of fortified settlements in the Alto Minho region (Northwest Portugal) present a great complexity as a result of both endogenous processes and exogenous contacts, as well as the landscape diversity of the region, which provided a rich set of resources to its inhabitants. During the 1st millennium BC we find a mosaic of settlement types, with the large oppida beginning in the 2nd century BC and acting as central places that concentrated religious, political, and economic functions. Although the oppida of this region are well characterised, having been the subject of research for decades, many questions still arise regarding the way in which these settlements consolidated a hierarchical landscape and how this materialised in the establishment of networks of control and coordination between the various indigenous communities. In this paper, we present a methodological approach for multi-scalar analysis, carrying out territorial analysis from the micro to macro scale, using non-invasive techniques (LiDAR, satellite image, geospatial analyses). This strategy allows us to locate new elements, understand the network of settlements with different characteristics and functions, and also explore the relationship between them and the surrounding territory. These new data are combined with archaeological data previously obtained by excavations at these sites.

5 MIDDLE IRON AGE FORTIFICATIONS ON THE NORTHERN EDGE OF THE GERMAN LOW MOUNTAIN ZONE

Messal, Sebastian (Lower Saxony State Service for Cultural Heritage)

A dense network of Iron Age fortifications characterizes the northern German low mountain zone (southern Lower Saxony as well as parts of Hessen and North Rhine-Westphalia). The fortifications are generally regarded as evidence of military conflicts in the centuries before the birth of Christ. Because of the lack of building features in the inner area that indicate permanent habitation, these fortifications are usually referred to as refuges. However, most of the fortifications have been destroyed at the end of the third cent. BC.

In general, the state of research on the castles is very poor. Excavations have only sporadically been conducted so far, and the state of knowledge is mostly based on extensive metal detector prospections. The artefacts from the fortifications are all very varied and partly of high quality. It includes costume accessories, tools and weapons, some of which were deposited outside the castles along the slopes. In fact, the mapping of artefacts also seems to indicate movements of groups of people along the slopes, which researchers interpret as escapes event of the inhabitants of the fortifications. However, questions about the social function of the fortifications and their setting within the archaeological landscape remain largely unanswered.

The lecture would like to summarize the current state of research and look at the Iron Age castles in southern Lower Saxony from the perspective of current research. One of the questions to be addressed is whether the castles, which were built in the beginning of the 3rd century BC and already destroyed shortly after a few decades, can actually be described as refuge castles or whether other possible interpretations can also be considered.

6 LATE IRON AGE ENCLOSURES IN WESTERN GERMANY

Claßen, Erich (LVR-Amt für Bodendenkmalpflege im Rheinland) - Herzog, Irmela (LVR-Amt für Bodendenkmalpflege im Rheinland) - Frank, Klaus (LVR-Amt für Bodendenkmalpflege im Rheinland) - Berthold, Jens (Bornholms Museum) - Weiler-Rahnfeld, Ivonne (LVR-Amt für Bodendenkmalpflege im Rheinland)

In a low mountain range east of the river Rhine in North Rhine-Westphalia there are 44 monuments with above-ground preserved ramparts and ditches. Some of these were investigated in the past by excavations, but most were only topographically surveyed. As a result, only occasional finds were discovered. Written sources lack as well. For these reasons, reliable information on the dating and construction of the ramparts, as well as structures in the interior, are scarce.

Since 2016, we have been working on these issues by analysing LIDAR data, systematic prospections and small-scale excavations. In general, it should be noted that the sites that have been investigated so far date to a wide range of periods, from the Late Bronze Age to the Napoleonic campaigns.

With regard to the topic of the session, we will focus on the Late Iron Age sites, as they are considered to be contemporaneous within a period of about 50-100 years. Several location factors of these sites will be analysed. These include the proximity to different ores in the region, the exploitation of which has been documented since the Middle Ages but can also be traced back to the Roman Imperial period and the Iron Age. Another factor being studied is the accessibility of small waterways. The results will allow assessing the variability of these factors and may provide some guidance for dating the rampart and ditch sites that still lack a verified date. Moreover, the relationship of the Late Iron Age fortifications with settlements of the same period is investigated. Despite all reservations – e.g. regarding small-scale excavations, 14C data accuracy or lack of knowledge of contemporary sites without enclosures – the spatial distribution of these sites indicates a system of fortifications that played an important role in the settlement structure of the region.

7 ROMAN FORTS IN THE LINE OF FIRE. ANALYSING BUILDING PROGRAMMES IN THE LOWER RHINE DELTA

Chorus, Julia (Chorus Archeologie; Radboud University)

The occupation of the Lower Rhine area (the Netherlands) by the Roman army lasted more than three centuries. During that period several series of auxiliary forts were built on the left bank of the river Rhine. Starting as a fortified transport route, the Rhine became the northern frontier of the Roman empire in this area.

The series of timber forts, built in the 1st and early 2nd centuries AD, have long been interpreted as part of one and the same building programme, as one system within the same political situation. A similar picture applied to the stone successors, the forts that were (partly) built in stone during the last decades of the 2nd century AD on top of the remains of their timber predecessors.

Due to dendrochronology, new detailed research of the old excavations of these forts and comparison, the differences appear to be greater than always assumed. By comparing the entire series of forts instead of solely focusing on individual sites, much more becomes clear about their significance. Both foundation dates and building characteristics point to new interpretations of these networks of forts in the Lower Rhine area.

8 WAR ON HIGH: THE EARLY MEDIEVAL KASTRA OF KALYMNOS, GREECE

Kardulias, Drosos (University of Michigan Museum of Anthropological Archaeology) - Greiner, Elliot (University of Michigan) - Nama, Shriya (University of Michigan) - Battista, Vincent (University of Michigan)

The Aegean island of Kalymnos was unsurprisingly transformed by conflict between Roman and Caliphate forces through the early Middle Ages; atypically among its neighbors, the end of antiquity seems to have produced a more durable and connected Kalymnian community, compared to that which came before.

This paper presents new GIS analyses of the island's Roman remains, both previously-undocumented sites and external features of previously known locations. Substantial attention is paid to distinctive emerging tactical trends in fortification architecture, as well as the issue of transport through such a rugged coastal environment. Of special note is the network of previously unrecorded high ground lookout posts which facilitated contacts both among the communities of the island, and from Kalymnos to the broader empire. Connections between the island and its connected islets highlight oft-unrecognized aspects of maritime Aegean economies.

The Medieval Roman Archaeological Survey of Kalymnos project is also a case study in 'agile archaeology', utilizing many vectors of analysis to build a picture of the past without excavation or remote sensing. Through the use of lay informants, consultation with museum personnel, and participation of Greek university students, the project aims to maximize involvement of the local community, while minimizing its impact on the archaeological record.

9 A FORTIFIED ISLAND? SYSTEMS OF DEFENCE AND SURVEILLANCE ON BORNHOLM IN THE 1ST MILLENNIUM CE

Albris, Sofie Laurine (National Museum of Denmark)

How would a relatively small island community organise its defence in the Scandinavian iron Age? The island of Bornholm in the Baltic Sea has at least six hill forts dated to various periods throughout the 1st millennium CE, some located very close to each other, and all drawn away from the coast. A new research project, FORTIS, is investigating the possible relations of these forts to their local landscape and settlement, evaluating historical maps and LIDAR data. Through previous archived investigation reports and small-scale excavations, the project will also address the relations between the forts both in terms of functionalities and chronology. A main question is whether the individual forts replaced each other, competed or belonged to different communities in the island society?

In military descriptions from the Napoleonic Wars, a warning system of beacons covering the entire island is mapped. This paper directs particular attention towards these signalling networks asking if they can be used as a basis for re-constructing older warning systems? Combined with indications of beacons in onomastic material, the project will

investigate whether fortified sites on Bornholm were related to or even connected by such signalling networks and if tracing the networks may provide clues to their interrelations.

10 THE HILLFORT BROBORG PROTECTED THE UPPSALA REGION AND WAS THEN LEFT IN ISOLATION

Sjöblom, Rolf (Luleå University of Technology) - Hjärthner-Holdar, Eva (Luleå University of Technology) - Ogenhall, Erik (Biskopskulla Villsberga 3, 74963 Örsundsbro, Sweden) - Pearce, Carolyn (Pacific Northwest National Laboratory) - Marcial, José (Pacific Northwest National Laboratory) - Neeway, James (Pacific Northwest National Laboratory) - McCloy, John (Washington State University) - Vicenzi, Ed (Smithsonian Institution, Museum Conservation Institute) - Kruger, Albert (US Department of Energy, Office of River Protection)

The hillfort Broborg is located 21 km Southeast of Uppsala in Sweden, and along the Långhundra Waterway, which connected Uppsala with the Baltic Sea. Most of the remaining inner wall was vitrified. This glassy material is presently being investigated for the purpose of serving as an analogue to radioactive waste glass, i. e. to enable comparison with a similar material that has been exposed to the near surface environment for around 1500 years. It has been assessed that the vitrification took place for the purpose of constructing the fort.

This raises the questions of the viability of the waterway during the operational phase, i. e. the incentive to vitrify, as well as that of how the glass might have become altered afterwards. The present work comprises information searches covering various disciplines and includes work by Arbetsgrupp Långhundraleden.

The countryside around Uppsala and Broborg has undergone substantial changes since the fort was constructed and used: a land rise of presently ≈ 1 mm/y, and substantial drainage operations, mainly during the 19th century. Extensive studies of contemporary boat constructions as well as portaging indicate that the waterway was fully operational 1500 years ago and several centuries thereafter.

It has been suggested by Damell (1993), that the protection of Uppsala might well have been coordinated between Broborg, Sunnersta Hillfort and Predikstolen, thus covering all of the potential waterways.

Somewhat later, hillforts fell out of use, Sweden became united, mortar was introduced, and gradually, the Långhundra Waterway became partially drained due to the land rise. Broborg became abandoned and left in isolation. Contrary to the Sunnersta Hillfort where large parts have been turned into a ski-slope, Broborg was left in peace. A plausible contributing factor being that, according to Swedish folklore, such forested heights were inhabited by evil or unreliable creatures such as trolls.

11 THE PIAST DYNASTY'S KEY TO EASTERN POMERANIA? UNIQUE CLUSTER OF THREE STRONGHOLDS IN CIEPŁE (NORTHERN POLAND)

Wadył, Sławomir (Faculty of Archaeology, University of Warsaw) - Szczepanik, Paweł (Institute of Archaeology, Nicolaus Copernicus University in Toruń)

The settlement complex in Ciepłe is a unique cluster of archaeological sites. Until recently Ciepłe was best known for the chance discovery in 1900 of a remarkable cemetery. However, necropolis is only one part of an extensive complex comprising three strongholds, several settlements and two burial grounds.

There is no doubt that gaining control of Pomerania was vitally important for the expanding realm of the Piasts. Most historians are convinced that this region had already become part of the Piast state during the reign of Mieszko I. Current findings indicate that the complex at Ciepłe came into being on the initiative of the Piast princes, Mieszko I or Bolesław I the Brave (late 10th c.). It was probably raised on a site where there had been no previous settlement. One of the factors contributing to the significance of this complex was its favourable location, enabling easy communication with other areas, as well as access to (and control of) the River Vistula and the overland route connecting Greater Poland and Kuyavia with Pomerania.

Despite numerous indications that this was an extremely significant site, Ciepłe has never received the attention it deserves. Strongholds in Ciepłe were excavated on a small-scale during the 1970s, but results of this work have never been published. Analyses of old data and materials prove that strongholds were contemporary. What was the idea behind that? What was the structure of that unique fortification system? These are just a few of questions that are asked as a part of a new multidisciplinary project. It was launched in 2023, and new excavations were carried out.

Objective of our paper will be to show the uniqueness of the cluster of three strongholds in Ciepłe and discuss its significance. We will present results of recent excavations, and results of some spatial analysis.

1184 **ARCHAEOLOGY AGAINST RURAL ABANDONMENT: RETHINKING MEDIEVAL AND POST-MEDIEVAL RURAL SETTLEMENT IN THE LIGHT OF THE CHALLENGES OF THE 21ST CENTURY.**

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Menendez Blanco, Andres (University of Oviedo) - Gago Chorén, Laura (University of Genoa) - Millán Pascual, Rafael (Institute of Heritage Sciences (CSIC))

Session format: Regular session

The depopulation of rural areas is a reality throughout Europe. Although at different rates in each country, the first symptoms were observed in the 18th century and intensified in the second half of the 20th century. In some countries, it is nowadays a central theme in political agendas and a regular topic of debate in the media. In parallel, rural archaeology has experienced intense development in recent decades, generating complex readings on the diachronic transformations of these areas. One issue of this archaeological approach to rural areas is the dynamism of rural settlement over time, in which foundations, profound transformations and abandonment of settlements follow one another.

This session is dedicated to analysing changes or continuities in rural settlement networks in the medieval and post-medieval periods. The theme is open to different approaches, with the central objective of delving into the processes that trigger changes in different regions and periods. Multidisciplinary approaches that build horizontal dialogues between archaeology and other humanistic or environmental disciplines will be particularly welcome.

On the other hand, we propose this session to debate on the role of archaeology in the face of the current depopulation processes. The abandonment of rural areas cannot be separated from other major problems, such as the sustainable management of resources, the loss of biodiversity or the increasing incidence of natural disasters such as fires and floods. Faced with this challenge, can archaeology be a useful tool against depopulation? And if so, how?

ABSTRACTS

1 **REPOPULATING THE BRAES: UNDERSTANDING THE VALUE OF A REPOPULATING APPROACH TO THE ARCHAEOLOGY OF UPLAND SETTLEMENT IN THE SCOTTISH HIGHLANDS**

Stewart, Edward (University of Glasgow)

The Highlands and Islands of Scotland are a region which over the past three centuries has experienced dramatic depopulation with government repression, forced eviction and emigration in the 18th, 19th and 20th centuries resulting in the creation of 'emptied lands'.

In the present, economic and political marginalisation continue to result in depopulation in this region, and as new futures are imagined for the region in the wake of the climate crisis archaeological narratives are increasingly deployed to support competing visions for the future of the Highland landscape. Calls for 'rewilding' inspired by an imagined past wildness are increasingly challenged by local activists with visions of a 'repopulated' landscape, inspired by the busyness of these landscapes in the early modern period, and the past economic and political power of the region.

Through the case study of Glencoe this paper will explore the value of a repopulating approach to the archaeology of these 'emptied lands', highlighting their busyness and connectedness, challenging the dominant narrative of these landscapes as being marginal, wild and empty. Based on archaeological survey, excavations, environmental and creative engagements, and engagement with local stakeholder bodies and communities, this paper will set out a positive vision for the role of archaeology within such marginalised rural upland landscapes in the Scottish context.

2 **BEGINNING, CHANGE AND ABANDONMENT. LOOKING FOR THE TEMPORALITY OF SHEPHERD'S SETTLEMENTS IN MOUNTAIN REGIONS**

Garcia Casas, David (Instituto de Ciencias del Patrimonio (Incipit) - CSIC) - Ballesteros Arias, Paula (Xunta de Galicia)

Seasonal pastoralism was one of the main important socioeconomical activities in different mountain regions of southern Europe until their abandonment during 20th century. During centuries, agropastoral practices shaped the landscape of rural areas in which took place. These remains have been studied by several archaeological researches which showed the human occupation of mountain grazing areas since the fourth to third millenniums BC.

This paper explores the temporality of the pastoral practices which exists during 20th and 19th centuries and were recorded by ethnographers. These concrete ways of livestock are considered "traditional" by the common opinion which drive towards the black and white photography's taken one hundred years ago. Our goal is wonder about the

timeless image assumed in the narratives about ancient pastoralism showing the dynamism of agropastoral communities during long term chronologies. To discuss about the historical changes in livestock practices I will show two study cases. The first one in the Aigüestortes National Park (Central Pyrenees, Spain) and the second one in Sierra do Suido (Galicia, Spain), where new data shows the temporality of traditional agropastoral economy in this mid-altitude mountain range.

Finally, this paper aims to talk about how the archaeological legacy and ethnographical knowledge are turning nowadays in cultural heritage to be protected by public policies. We would like to discuss about if it could contribute to define new socioenvironmental substantiable practices in the regions which are nowadays suffering depopulation and his role to define the future of rural mountain areas.

3 **FROM LANDSCAPE ARCHAEOLOGY TOWARDS A SUSTAINABLE FUTURE FOR RURAL AREAS: ANALYZING THE CASE OF VELVA (LIGURIA, ITALY)**

Chorén, Laura (Università di Genova) - Blanco, Andrés (University of Oviedo)

The inland of Liguria (Italy) currently displays a rural landscape marked by depopulation and accelerated abandonment of agrosilvopastoral activities. The village of Velva represents a paradigmatic example of this process, which began in the mid-20th century. For this reason, the local community has created a Museum of Peasant Culture (MUVEL) that promotes research, dissemination, and reflection on these issues. In this context, in 2023, we have started a research project within the CLOE Project and the Laboratory of Environmental Archaeology and History at the Università di Genova, which aims to contribute to the construction of new policies for the sustainable development and conservation of rural areas.

The first objective is to reconstruct and understand the processes that have led to its current state and configuration, analyzing changes in the management practices of environmental resources in the post-medieval period. Through a methodological program specific to Landscape Archaeology, we are conducting multidisciplinary research that combines analysis of archaeological, environmental, written, and oral sources.

The second objective is to generate new knowledge and tools that can reinforce community initiatives, through close and continuous dialogue with its inhabitants. This communication will present the methodology and results obtained so far and will reflect on their effectiveness in generating useful tools to address the major challenges facing of rural areas today.

4 **ARCHAEOLOGICAL RESEARCHES FROM THE LIGURIAN APENNINES: MULTIDISCIPLINARY APPROACHES TO UNDERSTAND ABANDONMENT PROCESSES OF RURAL AREAS**

Piu, Caterina (Laboratory of Environmental Archaeology and History - University of Genova)

The Laboratory of Environmental Archaeology and History (LASA), a University of Genoa Interdepartmental Centre founded in 1995, carries out researches in the Ligurian Apennines on environmental resources management, depopulation and abandonment dynamics through a regressive and microhistorical approach.

Borrowing from LASA's methodologies, the paper investigates the historical environmental resource management systems – and their transformation, continuity, and discontinuity over centuries – through an archaeological approach. The aim is to provide an overview of five case studies: Viganego (Bisagno Valley), Castagnello (Sturla Valley), Bosco Fontana (Aveto Valley), Fontanigorda and Rovigno (Tebbia Valley). These municipalities are part of the inner area of Antola-Tigullio, which preserves relevant historical, archaeological and environmental evidences of frequentation dating back to pre-protohistorical times.

But which are the limitations of this methodology? And how can we deal with them? The paper discusses these issues in relation to the five case studies: it presents the results of a multidisciplinary approach that combines archaeology with the study of oral tradition, geoarchaeological and ecological data, and archival documentation. The aim is to demonstrate that the abundance of perspectives allows more precise and comprehensive data about depopulation and abandonment dynamics – and, consequently, to develop more effective strategies for environmental resources management, preservation and safeguard of upland landscapes and memories.

The data are the outcome of a PhD project funded by the Department for Cohesion Policies of the Italian Ministry, which works in collaboration with the National Strategy for Inland Areas to fight marginalization and demographic decline of rural areas.

5 **ABANDONMENT OF A RURAL LANDSCAPE. THE CASE OF SIERRA NEVADA (GRANADA, SPAIN)**

Paciotti, Ylenia (University of Genoa) - Stagno, Anna (University of Genoa)

The focus of this research is the study of an area of Alpujarra, in Sierra Nevada in the Southern Spain, specifically in the municipalities of Bubión, Capileira and Pampaneira. This area is characterized by the presence of resource-sharing practices, particularly related to water management. This practice has been highly significant and has persisted for

centuries, making the area interesting for studying resource management practices and understanding the dynamics of abandonment and continuity.

This study focuses on the water system and the utilization of these areas by communities, making use of terraces for both cultivation and pastures.

We will follow a regressive approach, identifying the changes of the rural landscape and observing its continuities and ruptures, especially from the second half of twentieth century to the present.

This research involves cartographic sources, historical aerial photographs, cadastral sources and archaeological data which will allow us to understand the causes and motivations that led to the abandonment of rural areas.

Finally, this study aims to identify and document knowledge and practices that have been disappearing in recent years due to the abandonment of these areas, and how these actions have influenced the appearance of the territory we see today.

The study is related to the research project ANTIGONE (ERC Stg 2019), which aims to verify whether the disappearance of shared practices has played a key role in the abandonment processes of mountain areas in Southern Europe between the 19th and 20th centuries.

The objective of ANTIGONE is to investigate the relationships between material changes in environmental resource management practices and the social organization of local communities, particularly in relation to resource sharing, which has played a significant role in the life of rural communities.

6 RECENT TRANSFORMATIONS OF THE AGRARIAN LANDSCAPE OF ASTURIAS (SPAIN). PERSPECTIVES FOR ITS FUTURE FROM THE STUDY OF CULTURAL HERITAGE

Sánchez Broch, Paloma (Universidad de Oviedo) - Rodríguez Pérez, Santiago (Universidad de Oviedo)

From the mid-19th century to the present day, the Asturian countryside has undergone a deep transformation, accelerated in the last decades of the 20th century. The traditional agricultural model, oriented towards polyculture and domestic livestock farming, was converted into industrialised agriculture, specialising in the dairy and meat industry. This conversion had a strong impact on the landscape, with the transformation of cultivated areas into pastures or monoculture fodder crops; the conversion of the forest into intensive timber exploitation; the disappearance of the peasantry as a social group, and depopulation. The current geopolitical context has demonstrated the weaknesses of this model. The oil crises and the war in Ukraine have highlighted the heavy dependence on fossil fuels for heavy machinery and fertiliser production. Also, the dependence on countries producing cereals used in animal feed for the meat industry. On the other hand, the intensive use of agricultural land has led to heavy soil erosion. Furthermore, in recent years the problem of depopulation has become more acute, together with a series of other issues such as urban speculation, the installation of large-scale energy plants, etc.

Against this backdrop, archaeology and the study of rural heritage can offer analyses and tools to inspire an alternative future for the rural environment: in-depth knowledge of the territory and its historical uses, the role of rural communities as managers of the landscape and ecosystems, cultural heritage and the tangible and intangible record can be key factors for future sustainability. Archaeology also studies the processes of change and the realities of the old and new inhabitants, and through heritage education projects, it can offer its inhabitants the possibility of getting to know their territory better and redefining their relationship with the landscape.

7 FROM THE PAST TO THE FUTURE. ARCHAEOLOGY OF RURALITY IN EXTREMO (ARCOS DE VALDEVEZ, PORTUGAL)

Blanco-Rotea, Rebeca (University of Minho, Landscapes, Heritage and Territory Laboratory (Lab2PT); Associate Laboratory for Research and Innovation in Heritage, Arts, Sustainability and Territory (IN2PAST)) - Magalhães, Fernanda (University of Minho, Landscapes, Heritage and Territory Laboratory (Lab2PT); University of Minho, Unit of Archaeology; Associate Laboratory for Research and Innovation in Heritage, Arts, Sustainability and Territory (IN2PAST)) - Oliveira, César (HERCULES Laboratory, University of Evora; Associate Laboratory for Research and Innovation in Heritage, Arts, Sustainability and Territory (IN2PAST)) - Conceição, Margarida (Art History Institute, Nova University of Lisboa) - Coradeschi, Ginevra (HERCULES Laboratory, University of Evora)

Extremo (Arcos de Valdevez, Portugal) is a small village located in a rural mid-mountain area. Its landscape reproduces the historical processes that took place over time according to political, social, cultural or economic interests of the communities that settled there. The village is dominated by two fortifications erected during the Restoration War (1640-1668). In 2018 we began the archaeological study of its fortified landscape, and identified a defensive complex resulting from the construction process during this war. The fortifications had a major impact on the preceding landscapes. They were also transformed in later times after their ineffectiveness and abandonment. Today, they are important fossil directors for understanding the diachrony of this landscape.

Extremo has a strongly ageing community, which has abandoned most of its traditional agricultural activities, with significant international emigration or emigration to nearby urban areas. The consequences: abandonment of rural areas, disorganisation of the territory and of the activities associated with it, loss of identity and of memory with regard to heritage.

All this makes this village a privileged place to carry out research centred on the Science, Technology and Society paradigm, guided by the following research hypothesis: the landscape of Extremo in the historical period responds to two superimposed constructive processes in the Modern Age that respond to very different macro-structural logics: war and agrarian transformation. Today it responds to processes that are common in many European rural areas. From an interdisciplinary research that crosses archaeology, geoarchaeology, chemistry, geospatial technologies and conceptual modelling of heritage, developed in collaboration between several centres in Portugal and Spain, and in collaboration with the local community that participates in the processes of knowledge generation, we intend to contribute to reversing these problems.

8 THE OTHER TRANSITION: THE LONG LASTING END OF THE MIDDLE AGES IN CALABRIA

Citter, Carlo (University of Siena)

This paper aims to give hints about one of the most neglected topics within the scientific debate in the last forty years not only in Italy. The major focus on the transition to the early middle ages left this large period between the Black Death and the emergence of capitalism virtually without reflections and debate. A new series of projects in Calabria end specifically in the provinces of Vibo Valentia, Reggio Calabria and Catanzaro will address this main topic as the key question. The emergence of open villages, the sparse settlement still visible in most areas, the terraced cultivation systems seem to ferry the middle ages to the contemporary period. This paper aims to introduce the scientific community these researches as part of a single main project. They are at different level of development but they start as strong agreement among the National Heritage Service, the University of Siena and local institutions.

9 BETWEEN STABILITY AND SEASONALITY. MEDIEVAL AND POST-MEDIEVAL VARIATIONS IN THE SETTLEMENT NETWORKS OF THE ASTURIAN MOUNTAINS (NORTHERN IBERIAN PENINSULA)

Menendez Blanco, Andres (University of Oviedo) - Gago Chorén, Laura (Università di Genova)

Settlement networks in the Asturian mountains (northern Iberian Peninsula) shows significant variations over the last thousand years. Among them, moments of regression or expansion of the number of settlements can be detected. Major changes in the internal structures of some settlements are also visible. These dynamics respond to complex and different causes in each historical period. In this paper we will analyse a series of sites that vary between seasonal pastoral settlements and stable villages. From the approaches of Landscape Archaeology and Environmental Archaeology, changes in environmental resource management practices will be related to changes in settlement networks and internal transformations of settlements. The first objective is to understand the broad-scale expansive or regressive dynamics in earlier periods, paying attention to aspects such as the resilience of local communities or their vulnerability to different external factors of change. The second objective is to reflect on the current depopulation process in this region by integrating it into a long-term perspective.

1188 PAST, PRESENT, AND FUTURE OF ARCHAEOETHANATOLOGY: A CRITICAL DISCUSSION ON THE STATE OF THE DISCIPLINE.

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Tamorri, Veronica (Leiden University) - Noterman, Astrid (Department of Archaeology and Classical Studies, Stockholm University) - Fiorin, Elena (Sapienza University of Rome) - Törv, Mari (University of Tartu)

Session format: Regular session

The way we excavate and document burial sites profoundly influences our understanding of past practices, customs, beliefs, and identities. Since the late 1970s, archaeoethanatology has provided a toolkit to conduct rigorous excavations of human remains, further enhancing our ability to more comprehensively study how people in the past handled and interacted with the deceased, regardless of their discovery context. As a result, archaeoethanatology is now widely recognised within archaeology as a discipline in its own right.

Attaining a method that crosses disciplinary and geo-temporal boundaries is a great achievement; however, in the process, its core essence can be lost or altered. Given the growing ambiguity surrounding archaeoethanatology as a discipline, it is now time to pause and return to the fundamentals of the method.

This session aims to reflect on what has been accomplished over the past decades through archaeoethanatology, and how this method is key to bridge the gap between theoretical and scientific approaches to the study of death and

burials. The goal is to foster discussion on the potentials of its current applications, and how to further advance the discipline while preserving its original scope and principles. We invite submissions that address the fundamental question of defining archaeoethanatology, while exploring the ways that various fields within/outside archaeology, such as GIS, forensics and experimental research, feed into this discipline and create new ways of reflecting on ancient burial practice.

We also encourage papers looking at the less studied effects of different climates on the taphonomic history of burials, and research integrating archaeoethanatology within a broader theoretical/methodological framework. Case studies from diverse geographical and temporal contexts, active fieldwork as well as those (re)examining post-excavation documentation are welcome.

ABSTRACTS

1 DIGGING UP BONES, IN A HURRY: ARCHAEOETHANATOLOGY AND RESCUE ARCHAEOLOGY

Oudry, Sophie (INRAP - National Institute for Preventive Archaeological Research; UMR 7268 ADES; ULR 7367 UTML & A Institut Médico-légal de Lille) - **Mangier, Camille** (INRAP - National Institute for Preventive Archaeological Research; UMR 5608 TRACES)

In France, archaeoethanatology – and its predecessor, field anthropology – has been widely taught in universities for more than twenty years. A whole generation of students has learned the theory behind this concept and practiced through internships on archaeological digs, to the point where archaeoethanatology is now widely accepted and applied. It can even be considered as a common language for anthropologists, wherever they come from (universities or rescue archaeology). To be properly implemented, archaeoethanatology requires a series of observations on the physical remains, and sometimes on invisible traces; it also requires a time for reflection on these observations. However, the time and financial constraints in rescue archaeology, especially applied to the recovery of human remains, generate the need for compromise between thoroughness and efficiency, between fieldwork and labwork.

How do anthropologists juggle between these constraints, whilst keeping in mind the focus of archaeoethanatology? How do they use other tools available, such as GIS and photogrammetry, to help in reconstructing gestures from the past and funerary practices in a global approach of the deceased and its grave?

Rescue – or preventive – archaeology uncovers every year thousands of burials in France alone; concomitantly, it produces an incredible amount of documentation, be it physical or digital. It has long become the prime source of human remains' collections. As archaeo-anthropologists, we hope that the documentation we produce is available to but also re-usable by other researchers? How can we ensure a sustainable curation of this documentation for the future generations of anthropologists to use as comparisons and case studies?

2 REVISITING OLD EXCAVATIONS WITH AN ARCHAEOETHANATOLOGICAL APPROACH – BENEFITS & CHALLENGES

Malcherek, Anne (NOVA Lisboa, FCSH; CRIA) - **Rodrigues, Zélia** (NOVA Lisboa, FCSH; CRIA; *Arqueologia e Património*) - **da Graça Pereira, Maria** (*Arqueologia e Património*) - **Fonseca, Jorge** (*Arqueologia e Património*) - **Fonseca, Vítor** (*Arqueologia e Património*) - **Alves Cardoso, Francisca** (NOVA Lisboa, FCSH; CRIA)

Archaeoethanatology provides a set of principles and methods for rigorous data collection and analysis of human remains, mortuary contexts and associated taphonomic processes. However, the archaeoethanatomical approach can also be used, post-hoc, to explore field data such as photographs, written and graphic documentation, allowing the reconstruction of past excavation contexts. This option is crucial when dealing with incomplete documentation, lack of excavation reports, and the need to revisit old sites due to changes in the conceptualisation of the past. This presentation focuses on such a case study: the burial site associated with the 3rd Order of Our Lady of Carmo, in Porto (Portugal). The site was excavated twice: first in 2006, for which no final archaeological report was produced, but the existing data includes photographs, written documents, and graphic documentation. However, the information is incomplete and inconsistent, with important details missing and others contradicting each other. Further, no detailed account of the methodology for recording human remains, mortuary practices, and post-depositional events exists. Currently, the second excavation is ongoing with a known field methodological approach, and a detailed excavation process and archaeoethanatomical data collection process.

In the present analysis archaeoethanatomical data is collected on available documentation from the first excavation, using data from the second excavation as a point of comparison. It aims to demonstrate how archaeoethanatomical reexamination of excavation data can support, challenge and add nuance to previous interpretations, as well as adding new information. At the same time limitations and challenges of working with incomplete documentation will be explored and some suggestions on how to address limitations are introduced. This highlights the potential benefits of revisiting old excavation data using archaeoethanatomical methods, while also emphasising the importance of applying these methods during excavation for optimal data collection.

3 EXPLORING THE USE ARCHAEOETHANATOLOGY IN THE HOT CLIMATE OF THE EARLY EGYPTIAN NILE VALLEY: LIMITATIONS, ONGOING DEVELOPMENTS AND FUTURE RESEARCH

Tamorri, Veronica (Leiden University)

Over the past two decades, archaeoethanatology has emerged as a prominent method for excavating ancient human burials and re-examining field documentation from past excavations. This interdisciplinary approach, at the intersection of biological anthropology, taphonomy, and forensic sciences, is essential for reconstructing mortuary practices and identifying any non-ritual related events that may have influenced the taphonomic history of the cadaver.

However, archaeoethanatology was primarily developed based on the analysis of burials decomposing in the temperate and relatively humid climate of Europe, leading to its comparatively limited application to other environmental settings. Consequently, the adaptation of its principles to diverse climatic contexts remains a work in progress, despite recent efforts to expand its use to wider geographical areas.

The aim of this presentation is to discuss the results obtained by applying archaeoethanatology to excavation documentation of burials decomposing in the arid and hot climate of the Egyptian Nile Valley, during the 5th and 3rd millennium BCE. The analysis will focus on how a dry environment, combined with interment in a sandy soil and within distinctive architectural features, create unique spaces of decomposition that influence the taphonomic pathways of human remains.

The case studies presented will provide an opportunity to discuss how the principles of archaeoethanatology can be refined and adapted to better understand past mortuary practices and taphonomic processes from wider geographical contexts.

4 BURIED IN A KIT: DISMANTLED AND INCOMPLETE FUNERARY BEDS IN EARLY MEDIEVAL ENGLAND

Noterman, Astrid (Stockholm University; Uppsala University)

Burial practices represent a key source for understanding early medieval populations, opening valuable windows on ancient ways of life, customs and beliefs. Some of the most spectacular findings of the period are funerary beds known from around fifty graves from southern Germany to southern Scandinavia, England and present-day Slovakia, and dated from the 6th to the early 10th centuries CE.

Wooden beds in early medieval graves have surprisingly been little studied, and most of time disconnected from the human remains. They are generally discussed in terms of the valuable material items they may contain. In England, for instance, the discovery of fine Christian objects associated with them has placed the discussion in the context of the emergence of Christian religion in the seventh century. In this presentation, I will show how the application of archaeoethanatomical methods to bed graves changes our perception of the practice in England. The re-investigation of these graves shows that the reconstructions carried out so far have not always been compatible with the taphonomic observations of the human remains and the fitting elements of the furniture.

The deposit of dismantled beds is a distinctive feature of bed inhumations in England and the practice is usually described as a mere anecdote. The application of archaeoethanatology shows that the practice may have been much more systematic than previously thought, and more varied, with dismantled beds, as well as incomplete ones. These observations open up a whole field of new reflection: Why put so much effort into dismantling the furniture that would otherwise fit perfectly into the grave? How do we explain a mortuary practice that privileged the incomplete over pure wholeness?

5 BURYING THE DEAD: NEW INSIGHTS INTO FUNERARY PRACTICES IN MEDIEVAL AND EARLY MODERN VENETO, ITALY

Fiorin, Elena (Department of Oral and Maxillo Facial Sciences SAPIENZA University of Rome)

This paper discusses selected case studies showing particular funerary practices in medieval and early modern northern Italian contexts, employing data collected in the excavation by archaeologists and biological anthropologists. The analysis focuses on mass graves and double burials excavated in the late medieval and post-medieval city of Verona and early medieval single burials from the Alpine context of San Donato di Lamon. The main objective of this paper is to cross-reference information gathered in the fieldwork, in the laboratory, and in post-excavation documentation to reconstruct in detail how people in the medieval and postmedieval periods treated their dead. An additional goal is to discuss which data can be lost if the archaeologists and biological anthropologists do not work together. From this study, it emerged that if a specialist trained in funerary taphonomy is absent in the fieldwork, digital applications such as photogrammetry are efficient and detailed tools to be employed for the analysis and reconstruction of funerary practices.

6 LET'S ADD A DIFFERENT APPROACH: THE RE-EXAMINATION OF THORIKOS' MORTUARY PRACTICES THROUGH ARCHAEO THANATOLOGY

Patterson, Sydney (Ghent University) - Docter, Roald (Ghent University) - Lagia, Anna (Ghent University)

Archaeo thanatology is an incredibly informative approach in the study of past mortuary practices. Part of this discipline's strength relies on the meticulous nature it requires during excavations and the recording of bones and other finds. However, when reassessing data from past excavations, the researcher must work with the information as it was recorded by the original excavators. While in these cases, approaching the legacy data through the lens of archaeo thanatology may offer new interpretations of previously excavated graves and of the mortuary practices, there may be obstacles in applying archaeo thanatology to its full potential. This paper will present a case study where the principles of archaeo thanatology are implemented for the reinterpretation of mortuary contexts that were excavated decades ago. The site of Thorikos, in southeastern Attica (Greece), was excavated by the Belgian School at Athens (EBSA) from the 1960s-1980s with excavations resuming within the mid/late 2000s. During the earlier excavations, four areas were uncovered that the excavators described as 'necropoleis' that date to 900-300 BCE. These areas contained inhumations and cremations, adult and subadult burials, and burials with and without grave goods. The original excavators recorded their findings through field journals, photographs, scaled drawings, and publications. The clarity and degree of detail recorded in this legacy data can vary greatly between different burial contexts from these early excavations, a hinderance that makes the utilization of archaeo thanatology difficult at times. Yet, it is essential to attempt such a re-examination of older excavations and their documents by employing different methodologies to those originally used, in order to better enhance our understanding of past mortuary practices.

7 ARCHAEO THANATOLOGICAL ASPECTS OF BURIAL PRACTICES AT YUZHNIY OLENIY OSTROV: INSIGHTS AND LIMITATIONS

Batanina, Olga (University of Helsinki)

Over the past two decades, archaeo thanatological analysis has become invaluable for understanding burial practices, ranging from practical considerations to broader themes like perceptions of the deceased and beliefs about the afterlife.

Mesolithic burial sites in Northeastern Europe, such as Skateholm I and II in Sweden, Zvejnieki in Latvia, Vedbaek in Denmark, as well as Tamula, Kivisaare, and a group of other Mesolithic-Neolithic burial sites in Estonia (e.g., Nilsson Stutz 2003, Tõrv 2016), have been extensively studied through archaeo thanatological examination. These studies not only shed light on funeral practices but also address the reliability of such analyses, especially when dealing with incomplete materials.

This paper presents the initial findings of the archaeo thanatological analysis of Yuzhniy Oleniy Ostrov, a Mesolithic burial site on an island in Lake Onega, Karelia, Russia. Despite being excavated over 80 years ago, the site remains crucial for understanding the region's hunter-fisher-gatherer lifeways. While the available materials include drawings and descriptions, detailed information on grave environments and skeletal completeness is lacking. To supplement this, we analyzed the anthropological collection to understand bone preservation patterns and taphonomic processes.

Our research primarily focuses on general burial patterns such as the nature of burials, decomposition spaces, and evidence of wrappings or clothing. Initial findings from the analysis enhance our understanding of funeral practices, despite limitations in descriptions. However, it's important to acknowledge the constraints posed by incomplete sources.

8 ARCHAEO THANATOLOGY AND FORENSIC ANTHROPOLOGY: SOME PRACTICAL EXAMPLES FROM LEGAL CASES TO HIGHLIGHT A VIRTUOUS INTERACTION BETWEEN THE TWO DISCIPLINES

Galassi, Francesco Maria (Department of Anthropology, Faculty of Biology and Environmental Protection, University of Lodz; FAPAB Research Center, Avola (SR), Sicily, Italy) - Varotto, Elena (Archaeology, College of Humanities, Arts and Social Sciences, Flinders University, SA; FAPAB Research Center, Avola (SR), Sicily, Italy)

This talk aims to underline the importance of a constant interaction between forensic anthropology and archaeo thanatology. Both disciplines focus on reconstructing the biological profile of individuals and, where possible, identifying them. Remarkably, a key methodology adopted by both disciplines is represented by taphonomical analysis.

Thus, by showing a set of cases examined by the authors in Southern Italy as consultants to the prosecutor's office, it will be highlighted how a traditional view that identifies forensic anthropology with the drafting of a biological profile is not enough to answer some of the questions that legal prosecutors may ask their consultants. Indeed, taphonomical analysis can shed light on the terrestrial and aquatic postmortem processes that can alter bones and, subsequently, the very examination of them by forensic anthropologists. To a certain extent, it could be affirmed that taphonomy can support a forensic anthropologist in his quest for answers to key questions such as "how long have the found re-

mains stayed in a given environment? or "what is the timing of a specific lesion/alteration?", "what factor caused it?," "is it possible to distinguish between an anthropic and a non-anthropic factor?." Answering such interrogatives may enhance our capacity to decipher the exact nature of the phenomena that occurred and offer a valuable contribution to justice or archaeology. Indeed, with reference to the latter, such examples can be found to be useful also in different archaeological settings where taphonomical analysis can prove to be an important interpretative element.

Combining theoretical and practical aspects, this presentation will show relevant elements of a set of different cases (some from terrestrial contexts and others from aquatic environments) by utilising anthropological, radiological techniques as well as radiocarbon-dating and, above all, taphonomical approaches.

9 NAVIGATING THE CADAVERIC ISLAND: INTEGRATING ARCHAEO THANATOLOGY AND FORENSIC TAPHONOMY IN THE INTERPRETATION OF PALAEO LITHIC MORTUARY BEHAVIOURS

Randolph-Quinney, Patrick (Uppsala University)

The 'Cadaveric Island' may be viewed as the totality of peri- and post-mortem events which impact on the body, from death to recovery. Navigating this island is a complex task, and involves specialised knowledge which the mainstream archaeological community has been slow to adopt, particularly in the interpretation of extremely ephemeral evidence for mortuary behaviours. This has led to heated discussion, and more than a little rancour, in evaluating evidence for the earliest mortuary and funerary behaviours by Homo sapiens and our extinct cousins. Historically Palaeolithic archaeologists have misapplied classical vertebrate taphonomy in order to understand early mortuary behaviours, often being forced to rely purely on the presence or absence of grave goods to separate anthropogenic from natural processes. This is puzzling as two developed fields already exist to assist in the construction of robust evidential interpretations - archaeo thanatology and forensic taphonomy/thanatology. Sadly, both are often afforded little more than lip-service in classical approaches to interpreting the Palaeolithic burial record.

This paper discusses the epistemological issues that surround archaeo and forensic thanatology - one inductive, the other hypothetico-deductive and actualistic. In particular I will raise issues of equifinality and under-determination, which may be addressed through the application of Bayes modelling and likelihood ratios (common approaches in forensic evidence evaluation) to the benefit of both disciplines. Using case examples of purported mortuary behaviours from the Middle and Upper Pleistocene of Africa and Europe I will argue that it is possible to integrate data from both disciplines (complemented by comparative data from forensic casework) to produce comprehensive peri- and post-mortem narratives which address - and explain - the complex interactions of biological, physical and anthropogenic processes which interact with the deceased, such that any narratives are robust and equivalent in rigour and evidential probity as would be acceptable in a forensic context.

1190 AGRO-SILVO-PASTORAL PRACTICES AND MEETING POINTS IN UPPER MONTANE REGIONS. CREATING AND PRESERVING COMMUNITY BONDS

Session theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Session organisers: Aparicio Martínez, Patricia (University of Toronto; Pontificia Universidad Católica del Perú) - Delgado Arcos, José Alberto (Universidad de Oviedo) - Rebollar Flecha, Luis Miguel (Universidad de Oviedo) - Menéndez Blanco, Andrés (Universidad de Oviedo)

Session format: Regular session

Upper montane regions have been significant for the survival of human communities, their economic output, and their social interactions. These areas encompass uninhabited zones with cyclical gatherings involving exchange, pilgrimages, and other activities. These places are key meeting points on the landscape to understanding how communities interact and reinforce bonds.

Recent changes in environmental resource uses and social structures have led these communities to abandon the long-practiced activities in these places. Still, many locales continue to hold religious and ritual purposes for enduring community practices. In addition, several lines of evidence point to these places as points on the landscape for negotiation to settle disagreements and forge alliances throughout time. This, therefore, demands an archaeological lens.

This session is intended as a forum for interdisciplinary discussion on these places, following instances of mountain areas all over the world. The aim is to explore the dynamics of meeting places throughout history, as well as to analyze their role in the development of community and supra-community senses of belonging. Proposals must have a diachronic approach and may be multidisciplinary - whether from social or environmental sciences. In addition, the session will accept proposals using research with new methodologies and approaches as well as essays on conservation and future sustainability.

1 MOUNTAINS, DEITIES AND PEOPLE: THE CASE OF THE CULT OF NYMPHS AND PAN IN ATTIC CAVES

Martino, Maria Grazia (Independent researcher)

Since ancient times, caves have played an essential role in human development: used as a refuge or place of worship, they were landmarks for those communities far from inhabited centers.

Attica is also dotted with caves used as sanctuaries. Some of them were intended as sacred spaces for the Nymphs, at least from the 6th century BC, and Pan, from the 5th century BC, "rural" protectors of the mountains par excellence.

With the exception of the cave of Pan on the Acropolis of Athens or that of Eleusis, it seems the majority of them were not under direct state control. The dedicatees, therefore, could be of different social backgrounds. Having the same role as the sanctuary of Nymph in Athens, female passage rituals connected to marriage were carried out in the caves by girls of humble backgrounds or who inhabited the surrounding area. The presence of men, shepherds or hunters, in some cases also ephebes, is also attested,

An even more particular case is that of the methecus of the Vari cave, Archidamus, socially accepted because he was a nympholept with the gift of prophecy.

From the epigraphic sources, no figures of priests or priestesses emerge and, from Menander's Dyskolos, it seems that the rituals were carried out by the dedicators themselves. The fulcrum of the ceremony was, therefore, the ritual performance that took place inside the cave and the sensations that the dedicatees felt, which not only linked the believer to the divinity, but also to the other members of the group.

So I will attempt to analyze the cult of Nymphs and Pan in Attica and the people who frequented the caves through a theoretical approach in this paper. Additionally, I will demonstrate how this analysis contributes to our understanding of the topic.

2 FROM RESOURCE COLONISATION TO HERITAGISATION AND LOCAL ACTIVISM. THE HISTORY OF A SHIELING IN WESTERN SWEDEN

Johansson, Annie (County Administrative Board (Värmland)) - Pettersson, Susanne (Independent) - Svensson, Eva (Karlstad University)

Scandinavian agropastoral transhumance is organised around shielings and forested grazing. The classic Scandinavian shieling consisted of a fenced site, most often in hilly or mountainous settings on outlying lands, with meadows and structures for dwelling, stabling livestock, and processing milk. Through the dismantling of rural, forested areas, competition for forest use and heritagization, shielings have been marginalized in today's agrarian life and framed as relics of an outdated system. However, interdisciplinary research involving pollen analyses, archaeology etc. has shown that shielings were constructed as part of an innovative system for settlement colonisation. Moreover, during at least a 2000 years long history, shielings have displayed remarkable adaptive capacities, contributing to the resilience of their local communities. That is - until present times.

Today's shieling owners, like small-scale farmers all over Europe, face challenges including economic viability, loneliness in their work, and difficulty recruiting new shieling workers. Nevertheless, shielings possess a number of qualities, and include practices such as silvopasture, that meet urgent societal needs like climate mitigation, increased food security, and rural development of marginalized communities. Instead of being regarded as an outdated agricultural production mode, shielings and shieling practices should be adapted to meet new societal challenges.

This presentation will focus on both the results of interdisciplinary studies of the history of the shieling Kårebolssättern, and on present challenges faced by shieling activists, the Kårebolssäter Preservation Group, and heritage management.

3 FROM THE ARCHAEOLOGICAL PALIMPSEST TO THE MEETING POINT. TWO CENTRAL PLACES IN THE CANTABRIAN MOUNTAINS, L.LINARES AND CUEIRU

López, Pablo (Universidad de León) - Fernández Mier, Margarita (Universidad de Oviedo)

The intense research work carried out by the LLABOR group on the inhabited villages in the Cantabrian Mountains has provided qualitative archaeological data on the territorialization processes of communities that have used or inhabited the territory from the Neolithic Period to the present day.

Nevertheless, certain sites acquire a special significance within these territorialities that makes them central meeting places. The archaeological excavations at these sites have documented a complex superimposition of occupation

levels. These elements go beyond the archaeological palimpsest giving a resilient character to these landscapes that is codified by the diverse communities cosmopolitan's that re-signify and appropriate the space.

Some of these conceptualizations have come down to us thanks to the extensive local knowledge treasured by the current inhabitants of rural territories. Archaeology provides us with new diachronic data that allows us to understand the identity relations of the communities with their pasts or the centrality of the meeting points as places where political relations -both micro-political and multi-scalar- take place.

L.linares and Cueiru are two meeting points where we have excavated and whose results will be present in this session. Both are located on the borders of historical territories, and crossroads and are currently hosting important celebrations for the region. However, they hide an important overlapping Prehistoric, Medieval, and post-medieval occupations site. The comparative and relational study of the two sites allows us to unravel the different strategies deployed to use and re-signify these landscape landmarks.

4 BEYOND THE 'ROYAL HUNTS': CULTURAL TRACES FOR THE COLLECTIVE CAPTURING OF UNGULATES IN THE SOUTH-CENTRAL ANDES

Oyaneder, Adrián (University of Exeter)

The collective capture of ungulates with V or funnel-shaped traps is a phenomenon extensively documented in Africa and Asia (e.g. desert kites). This practice in the South-Central Andes, known as chaco or royal hunts, has been sparingly studied, with few references alluding to its high effectiveness in capturing vicuña (Vicugna vicugna) during the pre-Hispanic era by the Inka and, more recently, by Andean people targeting vicuña and feral donkeys.

The collective practice for the capture of animals is a more complex phenomenon than has been documented so far in the South-Central Andes. Evidence from colonial bookkeeping speaks of an ethnic group of specialised vicuña hunters, Choquela. Under the same name as these hunters, in the southwest of Lake Titicaca, the Aymara people have a ritual collective dance that performs the hunting of vicuña using the chaco trap. Similarly, the Uru Chipaya in the Salar de Coipasa of Bolivia has myths and rituals that evoke the hunting and consumption of vicuña by untamed winds that come from the Pacific, ascending towards the Bolivian highlands. Along the path of the wind from Chile to Bolivia, key toponyms are mentioned, which are associated with the habitat of the vicuña, which also coincides with the largest and denser set of chaco traps known to date in South America with approximately 300 traps.

Utilising this broad range of evidence, the present work complements the biography of V-shaped traps in the South-Central Andes, particularly in Northern Chile. Moreover, it seeks to document the origins and cultural richness of a mode of animal capture in the Andes that persists in Argentina, Bolivia, and Peru, but under official implementation associated with vicuña preservation efforts and fibre exploitation.

5 ANALYZING THE PASTORAL LANDSCAPE IN THE VALLEY OF SONDONDO, PERU. NEW METHODOLOGIES TO INTEGRATE A SEGREGATED AREA

Aparicio Martínez, Patricia (University of Toronto; Pontificia Universidad Católica del Perú) - Delgado Arcos, Jose (Universidad de Oviedo) - Fernández Mier, Margarita (Universidad de Oviedo)

The highlands of the central-southern Peruvian Andes stand out for their exceptionally transformed landscapes. While the abundant terrace systems have been well studied, little is known about the pastoral landscape of the high-altitude Puna. In the Valley of Sondondo, the Puna supported wetlands, which were used by communities to harvest water for camelid grazing and irrigate fields in lower altitude zones of the valley. Archaeological traces of these activities are evidenced by complex livestock corrals. The corrals also served as important meeting points for communities, such as the sacred practice of chaccu, highlighting the complex relationships between productivity and rituality in the past.

In this talk, we will present the preliminary findings of several recently excavated livestock corrals in the Valley of Sondondo. More specifically, we will discuss how microfossil analysis helped us identify the practices undertaken at the corrals, their possible functions, and their place within the agricultural system. We will also discuss some methodological challenges of studying upper montane areas. Ultimately, our study of pastoral corrals will allow us to document the processes of interaction and vertical relationship of the Puna, which served as a supplier not only of meat and fibers but also of crops and fertilizers during the pre-Hispanic history of the valley.

1192 CURATING ARCHAEOLOGY? HOW TO EXHIBIT THE PAST

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Armstrong Oma, Kristin (University of Stavanger) - Nilsson, Per (The County Museum of Östergötland) - Ramberg, Linn (University of Stavanger)

Session format: Regular session

Public outreach is more important than ever, and a poignant way of doing so is by making archaeological exhibitions, in and outside of museums. Communicating archaeology via exhibitions go back to the infancy of archaeology as a discipline and have developed greatly since they were a mixture of curiosity cabinets – Wunderkammern – and an organisation of based on Thomsen's periodisation. This session endeavours to delve into the process of curatorial practices and the making of exhibitions from the inside out, by inviting speakers who are themselves immersed in curatorial practices and can offer an insider's perspective.

The session addresses issues aligned with the production of content, such as the selection of a theme, developing a concept, selection of objects, writing texts, and developing, implementing and producing design. Important questions to reflect upon are: Who commissions exhibitions? How and by whom are topics chosen? Should it be research-based – and could the process of making an exhibition be regarded as a research process in itself? Who makes them – and how? What kind of competence does curatorial work need? How can archaeologists take a greater part in this process, not just as informants, but as deeply involved in the curatorial process?

By addressing these questions our aim is to start a conversation about the plethora of curatorial practices that exist at archaeological museums – to learn from each other and explore best practice development. Museums are institutions that harbour great trust with the public, and as such museum exhibitions have a power of definition. As custodians of this trust, it is imperative that we openly reflect upon our own roles in society. And taking a greater part in the curatorial process of archaeological exhibitions is both a responsibility and an opportunity for showing society the many aspects of archaeology.

ABSTRACTS

1 STRUCTURING ARCHAEOLOGICAL COMMUNICATION: CONNECTING SCIENCE AND AUDIENCES AT THE NATIONAL MUSEUM OF ARCHAEOLOGY, LISBON

de Souza, Carine (Centre for Archaeology University of Lisbon - UNIARQ; Foundation for Science and Technology - FCT; National Museum of Archaeology, Lisbon - MNA) - **Diniz, Mariana** (Centre for Archaeology University of Lisbon - UNIARQ) - **Neto, Filipa** (National Museum of Archaeology, Lisbon - MNA) - **Carvalho, António** (National Museum of Archaeology, Lisbon - MNA)

Museum exhibitions function as vehicles of communication for an increasingly diverse audience – however, the effective conveyance of archaeological collections requires a robust methodological structure to be implemented in the exhibition process. Prehistory, in particular, demands heightened sensitivity due to prevalent non-scientific perceptions associated with this period. Addressing these challenges involves complex procedures that are subject to debate and are still under construction within the field.

Presently, the National Museum of Archaeology (Museu Nacional de Arqueologia - MNA) in Lisbon, Portugal, an archaeological institution with a 130-year legacy, is undergoing an architectural and thorough conceptual redesign within the framework of the Recovery and Resilience Plan (PRR).

This communication aims to elucidate and scrutinise museographic strategies that effectively translate scientific knowledge into a discourse accessible and engaging for museum audiences. It emphasises the necessity of maintaining scientific rigour in presenting archaeological data while ensuring audience involvement. Furthermore, it seeks to explore exhibition narratives that portray Archaeology as a pertinent science in our contemporary context, transcending approaches centred solely on artefact presentation and challenging the culturally normalised preconceived ideas, fostering the construction of new perspectives and discourses.

These reflections are being developed in the course of a PhD scholarship project in Archaeology and Prehistory (UNIARQ/FCT), as part of a collaborative initiative involving the MNA and the University of Lisbon. The primary objective is to contribute to the advancement of a novel museographic approach for the Prehistory collections within a multidisciplinary team. The project integrates knowledge from Archaeology and Museology while emphasising a commitment to both present and past individuals. Whether considering contemporary visitors or honouring the memories of those from the past represented in the archaeological collections, it is dedicated to promoting understanding and appreciation for Archaeology as a resource for social transformation.

2 TO MAKE ARCHAEOLOGICAL EXHIBITIONS - THE MEETING BETWEEN THE SCIENTIFIC SPECIALIST AND THE PUBLIC

Ramberg, Linn (Museum of archaeology, UiS)

To make archaeological exhibitions are both a social responsibility and an opportunity to spread engagement, knowledge and to foster interest in prehistory.

The making of exhibitions is at the Museum of archaeology in Stavanger most often lead by an archaeologist without specific education in dissemination or public engagement. A team of several archaeologists, a designer, graphic designer, pedagogue, conservator and technicians in-house or on assignment might be included in the work from start or at a later point in the process. The reasoning behind putting the scientific specialist in charge are the deep knowledge in the specific subject and by this the exhibition can present and disseminate the latest research and the complex relation between different interpretations.

In this process there are potentially possible contradictions that affect the exhibition and how it is received by the public. When working with exhibitions, questions frequently asked is to what extent should we take into consideration what the public wants to learn and get knowledge about instead of what the specialist wants to share? Is it best to specialise one archaeologist on making exhibitions and then use consultants when needed, or should the concept and content be developed by a group, securing the quality and diversity? And who's voice counts the most in the team of various specialists?

In this paper I will discuss these questions by using two exhibitions in the Museum of archaeology, University of Stavanger, as examples. One Viking Age exhibition, and one exhibition on the Stone Age.

3 THE HISTORY OF BOHUSLÄN - FROM INSIDE THE HEAD OF AN ARCHAEOLOGIST INTO THE HANDS OF A DESIGNER

Toreld, Christina (Bohusläns Museum) - **Hansson, Pia** (Bohusläns museum)

In 2023 the Swedish Television launched the project "The History of Sweden". A series of 10 programmes visualizing Swedish history from the early stone age to present day. Museums and cultural heritage institutions all over Sweden were encouraged to meet up with local and regional history and prehistory events and exhibitions, to be prepared for the supposed huge interest from the public.

Bohusläns museum accepted the challenge and are now in the midst of a "History Year", where we dig deep into our archives, collections, research and personal memories to create an ultimate historic experience for our public. With a team of archaeologists, curators of collections, research networks, curators of education, producers, technicians, and designers we try with different kind of media to compose a multitude of experiences for our public that includes, but also goes beyond exhibition.

In our paper we will describe our process and the public reactions, but also discuss on whose initiative our work came about. Was it outside forces? Was it by orders from our management and board? Was it an urge from archaeologists and historians wanting to tell a story and designers wanting to visualize it? Or was it a mixture of all? We will also address the possibility that the concept "The History of Bohuslän", where the museum's competences, its active work in collections and cultural environments and its research networks can create a fertile ground for larger research projects concerning history and prehistory.

4 EVIDENCE, SOURCE CRITICISM AND CREDIBILITY IN IMMERSIVE EXHIBITIONS

Westin, Jonathan (University of Gothenburg) - **Almevik, Gunnar** (University of Gothenburg)

Digital knowledge transfer, not least through immersive and interactive technologies, has gained a foothold in museum exhibitions as it allows new ways to explore collections and convey contexts. Interactive exhibition elements can provide accessibility to hidden aspects or fragile artefacts and convey tactile, spatial, or emotional depth of the collections. Immersive and interactive technologies bring opportunities but how is source criticism and rigor on science dealt with? The museum as institution, and particularly historical museums, has a long-standing tradition warranting the public authentic and evidence-based narratives and experiences. Recent surveys show that the public regard museums as highly trustworthy (AAM 2021; SOM-institute 2023) but can this trust be taken for granted? We see an increased marketisation of museum's edutaining exhibitions, with temporary large-scale immersive exhibitions and roll-out of digital business-to-business formats for interactivity and display, but how transparent are the references to evidence, sources, and interpretations?

This paper presents preliminary results from a research project "Evidence, source criticism and credibility in museums' digital transition", aiming to deepen the understanding of the museum's role as administrator and educational mediator of evidence-based knowledge in the ongoing digital transition. An inventory of museum exhibitions in Europe, with focus on the uses of technologies and pedagogies, has been carried out to map and analyse different interaction models and pedagogical frameworks. As a case study with a focus on the experiences of producers, pedagogues and

visitors, the project has followed the implementation of a Virtual Reality exhibition of a digitally reassembled stave church in the permanent Viking exhibition at the Swedish Museum of History. We have for this session a keen interest to discuss how immersive and interactive archaeological exhibitions can ensure and establish forms of dialogue around evidence, source criticism and credibility.

5 AN EXPLORATION OF PRESENTATION REQUIREMENTS FOR ARCHAEOLOGICAL EXHIBITIONS WITH THE AIM OF SHAPING COGNITIVE SENSIBILITIES IN PREHISTORIC KNOWLEDGE

Bielinska-Majewska, Beata (District Museum in Torun, Department of Archaeology) - Majewski, Jakub (Kazimierz Wielki University, Bydgoszcz)

Archaeological exhibitions were, and remain even today, one of the key methods for the popularisation of archaeological heritage, with an especially vital role in disseminating cultural heritage on the regional level. Such exhibitions today must fight to present their content in a visually attractive way, and to engage their audience with a variety of methods, including interactivity. To compete for the public's interest, a museum exhibition may not limit itself to conventional elements such as traditional material exhibits, illustrations and photographs. Multimedia elements are also needed, including films and animations, digital interactive games and applications, either in flatscreen, or extended reality formats. Conversely, these elements should support and enhance, rather than overshadow the traditional components of the archaeological exhibition. The present paper represents an initial foray into examining the presentation requirements for the earliest ages of the human story, in the context of new media and communications technologies used in modern archaeological exhibitions. A core question here is the extent to which museums can use new technologies without disrupting their audience's cognitive sensibilities.

6 FRACTURES AND REPAIRS: A CASE STUDY IN INTERDISCIPLINARY CURATORIAL PRACTICES

Armstrong, Felipe (Museo Chileno de Arte Precolombino; Universidad Alberto Hurtado) - Alvarado-Lincopi, Claudio (Museo Chileno de Arte Precolombino; Centro de Estudios Interculturales Indígenas)

Museums, as artefacts bridging times and cultures, have historically functioned within academic paradigms, and Museo Chileno de Arte Precolombino, in Santiago, Chile, has emphasized archaeological narratives over the last 40 years. Today, however, we recognize the museum as an inherently interdisciplinary space, and we are navigating new curatorial avenues that integrate contemporary art, cultural debates, and 21st-century challenges without forsaking our archaeological foundation.

Our recent temporary exhibition, *Fractures and Repairs*, centred on fractured and repaired objects, epitomizes this shift. It transcends traditional boundaries by engaging with broader discussions such as environmental crises and relevant historical reflections, including the 50th anniversary of the Chilean coup d'état. This initiative emerged amidst institutional changes, post-pandemic adjustments, and resource constraints, demanding an innovative research process that balances academic rigor with public engagement.

By fostering an interdisciplinary team from across the museum's departments, we underscored that archaeology, while foundational, must engage in continuous dialogue with contemporary issues to fulfil its role in curation. This case study not only reflects our commitment to rethinking the museum's role but also highlights the necessity of collaborative, research-driven curatorial practices that resonate with diverse audiences.

This paper aims to contribute to the dialogue on curatorial practices in archaeological museums, advocating for a model that embraces interdisciplinary collaboration and addresses the pressing issues of our time, based on our most recent temporary exhibition.

7 OUR WAY HERE. HOW CAN ARCHAEOLOGICAL PERSPECTIVES BECOME PART OF THE CURATORIAL PROCESS?

Nilsson, Per (The County Museum of Östergötland)

In 2022, a new cultural historical exhibition called "Our Way Here" was inaugurated at the Museum of Östergötland, Sweden. The exhibition covers 11,000 years of regional history, and the visitor is led backward through time, like an archaeologist excavating through cultural layers. A group of six people with different professions were responsible for the making of the exhibition, including myself as responsible for research and contact with experts. The group worked together from the very start of the project to the final vernissage of the exhibition. This meant that the group had a constant dialogue on all kinds of subjects, including research, storyline and curation, as well as on the challenging task of making choices between numerous important stories and artefacts. In this paper, I will use my involvement in the exhibition process to discuss how and why the knowledge and experiences of archaeologists can be useful tools during the complex process of creating and curating a large exhibition.

8 EXHIBITION-MAKING AS AN INTERDISCIPLINARY EXERCISE: COMBINING ART, ARCHAEOLOGY AND DESIGN

Danielsen, Marte Moen (University of Stavanger) - Armstrong-Oma, Kristin (University of Stavanger)

Integration of design and academic content can be a success factor when making archaeological exhibitions. A seamless way of making this work is by in-house cooperation between designer and archaeologists-as-curators throughout the production process. In such a set-up, a concept is developed by the academic staff, based on an assignment from the management. The exhibition is hammered out in close collaboration between archaeologists/curators and designers. This approach safeguards that the look and feel of the exhibition directly and, equally important, subtly, conveys the intentions and aims central to the concept.

In this presentation, a designer and an archaeologist will reflect upon such a collaborative process by discussing three exhibitions where a third element is thrown into the mix: art that borders archaeology.

We have curated and designed three exhibitions that in different ways combine art and archaeology, working closely with artists that by their own practice. The first commented on museums and their role as knowledge institutions, the second on prehistoric objects as art objects – inviting the visitors to meet the makers of the past, and the third on the archaeology of the future and how mass material from our culture will form the archaeological record of our time.

Beyond raising the question: "Do artworks have a place in archaeological exhibitions?", these collaborations raised some interesting questions about what archaeological exhibitions are, and what they should be, but also what they could be. The artists reimagined the archaeological collections in fundamental ways and illuminated questions such as how to communicate the formation of the archaeological record, the messy interfaces the objects have been part of.

9 GOLD OF THE GREAT STEPPE: REFLECTIONS ON CURATION, DESIGN, RESEARCH AND ENGAGEMENT FOR AN ARCHAEOLOGICAL LOAN EXHIBITION

Roberts, Rebecca (University of Cambridge) - Amir, Saltanat (University of Cambridge)

In September 2021 to January 2022, the Fitzwilliam Museum, Cambridge, UK, hosted the 'Gold of the Great Steppe' exhibition. Featuring Iron Age artefacts on loan from the East Kazakhstan Regional Museum of Local History, the exhibition aimed to centre the research and interpretations of Kazakh archaeologists for a British audience who were largely unfamiliar with Kazakhstan and its archaeology. The text of the exhibition and accompanying catalogue drew on research by Kazakh archaeologists, and aimed to convey both the beauty and the scientific importance of the artefacts to the public. During the exhibition, a programme of non-destructive research on the materials was carried out in Cambridge, in consultation with colleagues in Kazakhstan. This paper reflects on the curation, design, build, and transportation of the exhibition, which was undertaken during extraordinary times, beginning just before the first lockdowns of March 2020, and ending with the tragic events of Bloody January in Kazakhstan. Two years on we also reflect on the delivery, reception and outcomes of the exhibition, exploring those aspects which worked well, and those we could have done differently, as well as the longer-term impacts that have been generated.

10 THE UNDERGROUND TURKU: 30 YEARS OF URBAN ARCHAEOLOGY EXHIBITIONS IN FINLAND

Aalto, Ilari (Aboa Vetus Ars Nova Museum; University of Turku)

Turku is the oldest town of Finland, founded during the Swedish rule at around the year 1300. It was also one of the few Swedish medieval towns that had stone houses, the ruins of which have been preserved underground to the present day. A remarkable area of these stone houses was excavated in 1990s around the so-called Villa von Rettig, and it was decided then to turn the area into a museum of archaeology and contemporary art, Aboa Vetus Ars Nova (Latin for old Turku and new art). The archaeological section of the museum consists of an underground area exhibiting the ruins of five medieval houses, built in the late 14th century and the early 15th century. The archaeological activity has continued within the museum since 2005, and participatory archaeological excavations are one of the best-known activities at the museum. The museum houses their own archaeological collection that is open both for exhibitions and for research. Simultaneously, the museum has had two permanent exhibitions on archaeology, and the third exhibition is scheduled to open in 2025. How to present a set of large but very fragmentary find material? How to make hundreds of years' worth of urban stratification understandable and accessible to the public? This presentation gives an overview on how the archaeological research and contents have been presented to the public and what has been learned during the three decades in this challenging yet unique environment.

11 PEOPLING ANTIQUITY. COMICS IN EXHIBITION NARRATIVES

Chourmouziadi, Anastasia (University of the Aegean) - Tourtas, Alex (University of the Aegean)

Currently, every archaeological museum exhibition includes the word "narrative" in its description. However, the majority of exhibitions fail to support their narrative aims, disregarding the essential requirements of a presentation in order to be recognised as a legitimate three-dimensional multimedia narrative. The dominant role of ancient objects,

as building blocks of the exhibition, appointing to all other exhibition media a marginal supporting role usually hinders the development of a meaningful and coherent storyline. But most importantly perpetuates the absence of one of the essential narratorial factors: humans. Either we have in mind the people of the past or those who are studying them today.

Exploring the use of comics as a medium can be beneficial in improving the narrativity of an archaeological exhibition and highlighting the role of human actors. Comic components are utilised as decorative embellishments, informative supplements, or expressive devices primarily aimed at children. Nevertheless, these techniques fail to consider the distinctive narrative attributes of the medium and its potential to play a prominent role in the exhibition, effectively addressing the aforementioned issues. In this line of thought, we are working on the idea of an exhibition that is developed as a three-dimensional graphic novel, which instead of augmenting the archaeological objects' is being augmented by them.

12 IS THE MUSEUM A SAFE SPACE FOR THE DEAD? ANALYSIS OF HOW EXHIBITION CHOICES AFFECT OUR UNDERSTANDING OF HUMAN REMAINS

Crescenzi, Nicole (IMT School for Advanced Studies Lucca) - Nilsson Stutz, Liv (Linnaeus University)

Museums are places of learning, communication, and inclusion, with aims to foster diversity. The public is an active participating stakeholder, a necessary interlocutor, and a stream of revenue. Here it is important to strike the right balance between attracting the public with creative, informative, and sometimes provocative exhibitions, while at the same time not alienating or offending it. But who represents the public? What does it want? This question comes into focus when discussing the increasingly contested topic of the exhibition of human remains – once unproblematic and popular, now increasingly called into question. In the European museum community, the dominating view assumes that the public has no issue with the display of human remains from archaeological contexts. This contrasts with other significant debates in the museum world, such as calls for decolonization and repatriation. Since the issue is likely to grow in the coming years, this paper problematizes and engages with its complexity.

To address this complexity, we have developed a model that understands human remains in collections as liminal and situated on a spectrum between “objects of science” and “lived lives”. The way we view them depends on our own positionality, but also their age, level of preservation, our level of familiarity, our perception of their vulnerability, and what we – through research – know about them and how that is communicated. In this paper we apply this spectrum model in the analysis of survey data of museum visitors, and in a case study of exhibition choices made at the Gothenburg City Museum (Sweden). The results allow us to discuss the impact of the process of curatorial practices in the perception of sensitive content – and asks the question: how, if at all, can we ethically exhibit human remains?

13 ETHNOGRAPHIC PERSPECTIVES ON ANATOMICAL SPECIMENS: CURATORIAL PRACTICES AND PUBLIC ENGAGEMENT AT THE MUSEUM MORGAGNI OF HUMAN ANATOMY (PADUA, ITALY)

Cusan, Alice (University of Aberdeen) - Magno, Giovanni (Morgagni Museum of Human Anatomy- University of Padua)

Recognizing human remains as integral components of the archaeological record, this research contributes to understanding past populations, history of medicine, and societal dynamics, examining the curation of anatomical specimens within the Museum Morgagni of Human Anatomy at the University of Padua from an ethnographic perspective. In addition, the perceptions of visitors will be considered, as to navigate ethical considerations regarding the delicate nature of studying human remains. Therefore, the investigation unfolds in two dimensions: an exploration of curatorial methodologies encompassing the cataloging, preservation, and presentation of human remains, and an analysis of visitor dynamics, seeking to bridge the gap between curatorial decisions and public understanding. A critical aspect highlighted is the importance of curatorial profiles with a multi-disciplinary approach. The need for a comprehensive understanding of decision-making processes, especially concerning human remains, underscores the urgency for curators possessing expertise in museum studies, heritage management, and bioarchaeology. This research significantly contributes to scholarship in museum studies, advocating for increased transparency in decision-making processes and stimulating discourse on ethical considerations. It aspires to cultivate an awareness of the multi-faceted aspects inherent in the curatorial practices of human remains, fostering a more informed and ethically grounded approach within museum institutions.

14 CLIMATE STORIES: PAST EXPERIENCES, CURRENT CHALLENGES

Gundersen, Ingar (Department of Archaeology, Conservation, and History, University of Oslo)

What does past climate extremes have in common with modern anthropogenic warming? The Little Ice Age (~1500-1800) contrasts in many ways the current situation. Instead of global warming, it's about global cooling, and as opposed to modern high-tech societies, European societies were at the time mostly agrarian and pre-industrial. In an upcoming temporary exhibition at the Climate House in Oslo, targeting young adults, the research project CLIMCULT

at the University of Oslo nevertheless asks the questions “how did people cope the last time we encountered rapid climate change”, and “what can be learned from past experiences with climate change? Thus, we wish to engage in an active dialogue with the public and demonstrate how knowledge of the past can contribute to current societal issues.

Museums are crucial contact zones linking academic and public discourses and are seen as neutral spaces in an increasingly heated debate. As such they constitute ready-made infrastructures to disseminate climate research. The exhibition will make use of the rich human and natural archives from this period and discuss how past adaptations resonate with current challenges. In doing so, we wish to move away from a one-dimensional crisis narrative and highlight how human agency is a crucial variable for the social consequences from climate extremes. Thus, by moving humanistic research to centre stage of climate research, we wish to communicate an optimistic story that counter climate anxiety and motivates for constructive action.

In this talk, I will discuss our process from idea to concept, and from concept to individual stories and objects, and how these stories can help to bridge between the past and the present. This follows recent suggestions that ‘anthropogenic’ perspectives can assist museums in advancing from information to storytelling. The exhibition is set for early 2025.

15 CURATING IN THE CLASSROOM: ‘LOST AND FOUND: COLLECTING ANTIQUITY AT KENYON COLLEGE’

Kontes, Zoe (Kenyon College)

University archaeological collections serve to educate students and the wider public not only about the artifacts they hold, but also about the process of curation. In Fall 2023, two faculty members at Kenyon College (an archaeologist and an art historian) joined their students together to curate an exhibit of late antique Roman material that had been donated to the college, none of which had a secure archaeological context. The process allowed a valuable opportunity for the faculty to manage the curation of an exhibition, guiding the students’ research and helping them consider how to present their work to the public. One group worked on selecting, studying and displaying the artifacts themselves—primarily objects of everyday use such as terracotta lamp fragments, coins, and textile fragments, and determined what, if anything, they could learn from this material out of its original context. Issues of collecting, provenance, museum ethics, and authenticity formed the basis of the questions the second group asked of the material, and posed to viewers in a series of wall texts. This paper will discuss the process of curation of this exhibit, as well as the important contribution it made in addressing both the larger controversy surrounding the acquisition of unprovenanced objects, and the more local issue of whether a university collection can be the “right” place for artifacts which have potential educational value even if little true scientific value. The exhibition allowed both the student curators and the viewers to question the role of Kenyon College in owning and displaying such objects. Such transparency is key in maintaining the trust between museums (or in this case university collections) and the public.

16 MATERIAL CULTURE IN MOTION: THE TRANSFORMATIVE POWER OF ON-SITE ARCHAEOLOGICAL EXHIBITIONS

Fiano, Francesca Romana (University of Ferrara)

At the edge of the given framework, the proposal aims to share in first person the experience of a scientific advisor in a non-conventional archaeological exhibition of findings from an ongoing excavation, displayed in the excavation site itself: Appia 39. Souvenirs from the Critical Zone (Rome 2022).

One step before museums, how do findings, as fragmented objects from an obsolete time, manifest in their historical contexts? What does this relationship signify for understanding the material and immaterial values of artifacts? As numerous researchers have noted, appreciating the value of any artifact is closely linked to understanding its related context and intertwined past functions. We have an active relationship with objects as long as we interact with them. However, if objects still populate our daily lives as active agents, it does not seem to be the case for ancient ones displayed in museums.

Differently in the excavation sites, laboratories and deposits, the ancient findings are active agents, engaging in restoration, drawings, analytical activities where their informative potential and historical and cultural meanings emerge. Therefore, an artistic project took place in such interactive settings with the aim of engaging with material culture in the meaning-making moment offered by the archaeological context excavation and to communicate cultural heritage values. The exhibition setting was the excavation site, designed to include public participation in archaeological fieldwork as a precondition for engaging with material culture. The artistic research and its outputs as sensorial assemblages, installations, artworks, and relative narratives, dealing with contemporary findings, engaged the public in the archaeological deductive processes leading to a shared interpretative process of value assignment to artifacts and understanding of their cultural meanings.

The paper aims to discuss limits and opportunities of implementing exhibitions on archaeological sites by sharing the creative, methodological, and research processes from the archaeologist’s point of view.

NEW ARCHAEOLOGICAL EXHIBITIONS AT A TRAIN STATION

Paulsen, Charlotte (Museum Skanderborg)

In 2020, Museum Skanderborg's main department moved to a location in a former post office and administration center at the train station in Skanderborg. The museum is named Platform1, as it is placed by track one. A transformation begins summer 2024, renovating the administration building and adding a new entrance building. The museum is ready to be furnished by November 2025 with new exhibitions and activities. Being a museum also in charge of archaeology, several exhibitions of archaeological sites are being planned, working within a concept called "The cultural waiting room". Close to the entrance, with café and museum shop, smaller exhibitions rooms, "compartments", will be placed, housing special exhibitions of up to date themes, e.g. recent archaeological finds. In the basement, two sites of national importance will be displayed: a magnificent golden horse equipment of a Viking chamber grave from Fregerslev and the cult atmosphere around the Holy Valley of the Iron Age. The museum already displays an open lab where visitors can follow the work of the museum staff as archaeological finds are being cleaned and categorized, historical artefacts are registered, and archives material are scanned. Our aim is that there will be no "behind the scenes" in the work with heritage and on special occasions, the visitors will be invited to join in the activities.

In this paper, we will like to share our thoughts on the process of planning these new exhibitions and open lab, implementing user studies, field archaeologists, artists etc. A station is neutral space. Everybody can enter a station. As a museum, this must be exploited, so that even those who could never dream of entering a museum, suddenly finds themselves in a room with stories that they can reflect on and identify with.

1193 A LIQUID CONTINENT. LINKING SEASCAPES, SOCIAL POWER AND ECOLOGY IN THE MEDITERRANEAN

Session theme: 6. The Mediterranean from Within

Session organisers: vanni, edoardo (University for Foreigners of Siena) - Cambi, Franco (University of Siena) - Blasco Nuñez, Soledad (Centre d'Arqueologia Subaquàtica de Catalunya)

Session format: Regular session

This session explores the mobility of people and goods across the Roman Mediterranean and connectivity between different seascapes. The focus will be, geographically, on the North and West Mediterranean, in particular Italy, France, Spain, Morocco, Tunisia and island archipelagos, attempting to explore the network of mobility through inland and coastal landscapes to produce new insights about long-distance movement and cabotage phenomena. Historically, the session aims to collect contributions that deal with contexts from the end of the Roman Republic to the beginning of the Empire when substantial changes occurred in terms of social actors, ecology, war events and economic transformations. Regarding social agency, our interest is to investigate the role of aristocratic élites in activating this Mediterranean mobility and the underprivileged at the passage of the new imperial control. Methodologically, the session also aims to link vertically and spatially the underwater archaeological contexts, represented by several shipwrecks, conceived as privileged information sites, with the networks of material and immaterial infrastructures widespread along the superficial seascapes (harbours, rivers, islands, cultural, social and economic connections). In this perspective, the Mediterranean is not just a sea between lands but a veritable continent that connects.

This session seeks to gather insights into the Ancient Mediterranean as a distinctive realm of interactions, transforming it into a shared arena of coexistence. We invite contributions spanning Italy, France, Spain, Morocco, and Tunisia during the 2nd Century BC and the 2nd Century AD, with a particular focus on the following themes: the significance of islands in Mediterranean dynamics; the impact of technology on the proliferation of maritime travel; cross-maritime and coastal movements; the correlation between mobility and social standing amid seascapes; shifts in ecology; connections between inland and coastal regions; and the role of shipwrecks in shaping the narrative of the Mediterranean.

ABSTRACTS

1 MOVING STONES. THE SPREADING OF GRANITES FROM THE TUSCAN ISLANDS IN THE ROMAN PERIOD

Pagliantini, Laura (Università degli Studi di Siena)

In the 2nd century AD, the exponential increase in demand for white and colored marbles favored not only the expansion of existing quarries but also the initiation of extraction of local marbles, including the gray and red granites of Elba, Giglio, and Sardinia. Elban granite, extracted in the western part of the island, was mainly used for the construction of structural elements of buildings, particularly for the installation of large columns, employed in Rome in numerous public buildings of the imperial age. The quarries of Elban granite therefore experienced moments of

non-marginal activity in the 2nd and 3rd centuries AD, linked to the production not only of structural elements for public and private buildings but also of artifacts connected with the cultic sphere. The enhancement in the exploitation of this resource could be linked to the presence on Elba of prominent figures in Roman politics, including the powerful prefect of the praetorian guard of Hadrian, Publius Acilius Attianus, whose activity also appears to be attested in another important marble basin, such as the Versilia. Analogously to what happens on Elba, also on the island of Giglio, a significant impulse in the exploitation of granite quarries could be attributed to the powerful Domitii Ahenobarbi family. The known information and the results of the most recent research converge in identifying in the 2nd and 3rd centuries AD a period of economic growth for the entire Elban island territory, probably supported by a flow of massive investments by powerful senatorial families. In addition to the exploitation of granite, a considerable boost is certainly to be attributed also to the vitality of maritime commercial traffic within which Elba is inserted with its ports, as evidenced by the presence on the island of sailors from the imperial class.

2 FLUIDITY AND MATERIALITY. LINKING MEDITERRANEAN WATERSCAPES AND LAND THROUGH MATERIAL EVIDENCE.

Vanni, Edoardo (University for Foreigners of Siena - Italy) - Barthélemy, Filippo (Aix-Marseille (MoMarch) - France)

This study investigates the landscape and economic transformations in the western Mediterranean during the 2nd and 1st centuries B.C., emphasizing the crucial role of underwater and maritime archaeology, together with land infrastructures, in deepening our understanding of the Roman economy in a period marked by significant territorial expansions, internal conflicts, and an intensification of commercial exchanges. With particular focus on the Italian peninsula, it examines the landscape modifications linked to changes in agricultural practices, influenced by economic, political evolutions, and the trends of the time. Tangible evidences of such transformations are the amphorae, which, through all levels of their "chaîne opératoire" highlight the intensity of production, distribution, and consumption as well as the profit ambitions of Roman society, increasingly leaning towards individualism. The analysis of these containers reveals not only details about the diet and commercial habits of the Romans but also about the agricultural techniques adopted and the changes in the rural landscapes of ancient Italy. The "boom of wrecks" in this period in the Mediterranean testifies a significant expansion of maritime goods transport, including those rarely survived in the archaeological record such as wood, barrels, slaves, and other perishable materials. Although these goods leave few traces, they are essential for deciphering the complexities of the Roman economy and the trade networks of the era. The interconnected study of terrestrial and underwater contexts, leveraging interdisciplinary studies, aims to return a complex and layered vision of the socio-economic dynamics and landscape changes that characterized the Italian territory and its waterscapes in the late Republican period

3 MARITIME ROUTES AND ROMAN TRADE NETWORKS: INSIGHTS FROM THE CAMAGGI-TOMASELLO SHIPWRECK (2ND -1ST CENTURY BC)

Barthélemy, Filippo (MoMarch - University of Aix-Marseille) - La Rocca, Roberto (Soprintendenza del mare - Regione Siciliana) - Carrera, Francesco (Soprintendenza Nazionale per il Patrimonio Culturale Subacqueo)

Research on the Camaggi-Tomasello shipwreck, located off the coast of Aci Trezza and Capo Mulini (Catania, Sicily), offers exciting insights into the extent of trade and mobility in the Roman Mediterranean between the late 2nd and early 1st centuries BC. Discovered in 2009 by amateur divers, archaeologists first surveyed the wreck in 2016 and employed various methods of documentation, including photogrammetry and sampling of four amphora types found on site. The results of this survey found that amphorae not only make up the bulk of the ship's cargo but also mark the transition from Greco-Italic to Lamboglia 2 type. This marked transition supports a scope of trade activity in the Adriatic that likely originated from central or south-eastern Italy and presumably aimed at redistribution centers in the Western Mediterranean. In partnership with the Soprintendenza del mare - Regione Siciliana new examinations of the Camaggi-Tomasello were undertaken in 2024. Thus far, this research has revealed two varieties of amphorae not found in the initial survey. These particular amphora types reinforce the hypothesis of the cargo's Adriatic origin, further highlighting the complex trade networks and the intensity of short- and long-distance exchanges characteristic of the end of the Republican era - a period marked by significant economic, political, and landscape upheaval. While archaeometric analysis will be necessary to further confirm these findings, current research on the Camaggi-Tomasello wreck continues to underscore Sicily's geostrategic importance in antiquity and affirm its role as an essential passageway and hub of cultural and economic interactions across various regions of the Mediterranean.

4 POPULONIA IN THE EARLY ROMAN PERIOD: THE TOWN, THE GULF OF BARATTI AND THE SEA

Cambi, Franco (, Department of Historical Sciences and Cultural Heritage)

Born between the end of the Iron Age and the first orientalizing age, Populonia represents an anomaly among the cities of the ancient historical Etruria. With the Romanization phase (between the 4th and 3rd centuries BC) an extremely intense period began from the point of view of agricultural, manufacturing and mercantile activities. In this

context the city's port, in the Gulf of Baratti, experienced a series of very deep transformations from the point of view of urban structures, landscape and environmental setups.

Many of these transformations are linked to the changing strategic roles between Carthaginians, Syracusans, Etruscans and Romans in the Northern of the Tyrrhenian Sea. Between the 4th and 2nd centuries BC, the iron production took on an increasingly important role.

The paper intends to describe the steps of evolution in a reading that brings together urban history, the historical geography of the context, the dynamics of the landscapes, the values of the supply basins and the technological and ideal forms of contamination.

1195 PATH TO NEW HORIZONS OR HANDMAIDEN TO HISTORY? ISOTOPIC STUDIES ACROSS THE PREHISTORIC?HISTORIC DIVIDE

Session theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Session organisers: Trentacoste, Angela (The British School at Rome, Italy) - Gillis, Roz (Referat für Naturwissenschaften - DAI) - Makarewicz, Cheryl (Institut für Ur- und Frühgeschichte Christian-Albrechts-Universität)

Session format: Round table (without formal abstracts)

Isotopic data offer the possibility to investigate individual life histories, tracking growing conditions, and consumption and mobility of both animals and humans, now with high-resolution sampling strategies that can drill into sub-annual changes. This has dramatically refined the temporal purview of materials typically dealt with on the scale of centuries. Therefore provide a temporal scale that can be integrated with the textual and epigraphic sources that inevitably shape investigation and interpretation of later periods. This brings with it a series of opportunities and challenges as archaeologists, archaeological scientists and historians grapple with a material record often different from previous epochs, ancient communities often organized in new and potentially different ways, and a interpretive narrative often dominated by a corpus of high-resolution but intrinsically biased documentary sources. Are isotopic data opening the door to new horizons and contributing to new interpretive models for understanding of human societies? Or simply providing high resolution data recycled through well-trodden generalizations, assumptions, and simplistic reconstructions of human behavior? What lessons can be learned (or not) from approaches that cross the prehistoric-historic divide, considering the many anthropological and taphonomic differences that come into play?

This session invites prehistorians, Classical/historical archaeologists, archaeological scientists and stable isotope specialists to a mutually constructive dialogue. Discussion will seek to identify primary theoretical and interpretive problems and to construct new frameworks to surmount them, linking anthropologically-informed models with integrative datasets, in order to find new pathways forward in the use of isotopes in examining questions on the formation, transformation, and dissolution of human communities. This may include plant and animal husbandry, human diet, mobility, urbanisation, social complexity and inequality. Overall this session aims to push beyond the status quo, and herald in a new era of integrated archaeological stable isotope investigations that bring new understandings to key questions regarding proto-historic/historical societies.

1208 "BUILDING BRIDGES: ADVANCING ARCHAEOLOGICAL HERITAGE AND TOURISM MANAGEMENT". ORGANIZED BY THE COMMUNITY ON THE MANAGEMENT OF ARCHAEOLOGICAL HERITAGE AND TOURISM

Session theme: 3. The Life of Archaeological Heritage in Society

Session organisers: Fonseca, Sofia (Teiduma, Consultancy on Heritage, Culture and Sustainability) - Thomas, Ben (Society of Architectural Historians)

Session format: Workshop

Join us for an engaging session at the upcoming conference, where the Community on the Management of Archaeological Heritage and Tourism will gather to reflect on the achievements of our working groups over the past year and set our goals for the future. The working groups will present their work on: Communication in Archaeology; Guidelines for Sustainable Archaeological Tourism in Europe; Accessibility at Archaeological Sites; and Climate Change and Its Impacts on Archaeological Sites.

A second part of the session will revolve around organizing the Sense and Sustainability II conference in Croatia, a pivotal event that promises to bring together experts and enthusiasts alike to explore innovative approaches in preserving and promoting our archaeological heritage while ensuring sustainability. Together, let's chart a course towards a harmonious balance between heritage conservation and responsible tourism.

This session, organized as a workshop, offers a unique opportunity to collaborate, exchange ideas, and contribute to the continued growth and development of our field. We look forward to your participation and the collective impact

we can make in advancing the management of archaeological heritage and sustainable tourism. Join us in shaping a better future for our cultural heritage.

1225 GENERAL SESSION

Session theme: 1. The Material Record: Current Trends and Future Directions

Session organisers: European Association of Archaeologists

Session chair: Amanda Chadburn

Session format: Regular session

This is a general session, where authors present papers on diverse topics without a specific theme. The session is overseen by the EAA and as such does not have official session organisers.

ABSTRACTS

1 GREEN MORTARS FOR CONSERVATION: UTILIZING AGRICULTURAL AND INDUSTRIAL WASTE FOR SUSTAINABLE RESTORATION

Adomako, Regina (University of Evora, Portugal; University of Sapienza, Rome)

This research project investigates the feasibility of using agricultural and industrial waste, specifically olive tree stones, to create environmentally friendly green mortars for the conservation and restoration of historical structures. The study employs a multi-faceted approach, beginning with the characterization of waste materials through standardized tests like optical microscopy, FT-IR, SEM-EDS, and XRF. The subsequent formulation and characterization of the green mortar involve assessing its mineralogical composition, chemical properties, and structural integrity.

A pivotal aspect of the research is the compatibility testing of the green mortar with historical mortars to ensure its effectiveness without compromising the integrity of original materials. Compressive strength testing is conducted to evaluate its load-bearing capabilities, and an accelerated weathering test simulates natural environmental conditions to anticipate long-term durability. The research culminates with the practical application of the green mortar on a real restoration site, validating its compatibility and effectiveness in authentic conservation scenarios.

The timeline spans sample preparation, experimentation, and data interpretation, ensuring a systematic and comprehensive investigation. By repurposing waste materials for mortar formulation, this research not only contributes to sustainable conservation practices but also addresses environmental concerns associated with waste disposal. The findings aim to promote eco-friendly alternatives in heritage restoration, supporting the preservation of cultural heritage while aligning with broader sustainability goals.

2 MORTARS IN ANCIENT ROMAN AQUEDUCTS: WHAT IS THE SECRET FOR SURVIVING THROUGH MILLENNIA?

Calzolari, Laura (Departement of Earth Sciences, Sapienza University of Rome) - Medeghini, Laura (Departement of Earth Sciences, Sapienza University of Rome) - Mignardi, Silvano (Departement of Earth Sciences, Sapienza University of Rome)

Ancient Roman aqueducts are known worldwide as a proof of the technological level reached by ancient Romans in the development of an efficient hydraulic system. In the city of Rome, eleven main aqueducts have been built during the Roman times, to guarantee the supply of water according to the increasing needs of the city. But what is more impressive is the fact that two of them, Aqua Virgo and Aqua Traiana, are still working.

Acknowledging this fact, many questions arise. Which materials do ancient Romans used for the formulation of the mortar used in the construction of aqueducts, and in particular in the inner duct that was exposed to water? What allowed the surviving of these mortars through millennia? Moreover, is it possible to take advantage from the information obtained by the archaeometric characterization in order to produce mortars that meet contemporary needs?

In order to try to reply to these questions, we studied mortars coming from the inner ducts of some of the aqueducts built in Roman times in the city of Rome, applying several analytical techniques (such as optical microscopy, scanning electron microscopy, X-ray powder diffraction) to characterize the materials used and the reaction occurred between them. Moreover, to assess the degree of hydraulicity, thermogravimetric analyses have been performed. The most relevant outcome is the discovery of an amorphous binder in some of the samples, that shows also the best value of hydraulicity, and present a composition similar to C-(N,K)-A-S-H, a phase usually found in modern cements.

3 DEVELOPING A PREDICTIVE THEORY IN RECUPERATING COLLECTIVE AND SPECIFIC MEMORY AFTER STRUCTURAL APHASIA & BIAS

Stein, Silvia O

Anthropologists and archaeologists do not often discuss that their research sites involving collective past violence, conflict, death, and human sacrifices subjectively influence them (Luhmann, 2023). Modern events similar to those of the past would be classified a crime scene (Holmes & Holmes, 2008), of a collective nature involving generational coverups and reframing of the act in collective memory (Drzewiecka, 2014). Sites of collective violence elicit at times feelings similar to “the way an anthropologist feels when holding the bones of someone murdered by a brutal regime” (Luhmann, 2023). Anthropology, and archaeology, as spiritual disciplines, require that you or I act as an instrument, a tool, a medium recuperating the aphasic information disconnection still in the past (Drzewiecka, 2014). What anthropologists and archaeologists subjectively experience has real scientific validity, and replicable reliability, though requires accepted forensic measures for reporting these cognitive (spiritual) effects during immersion into a site. My goal is to refine my methodology to develop a predictive theory of researcher motivation and site interaction (Stein, 2017). The perception and self report process can be corroborated through audiovideo recordings of the researcher while they are immersed in the archaeological site, and their insights reading the relevant literature, to further psychophysiological measures and contrast these with the subjective self reports, so that critics cannot say “it’s all in your head”, and consider alternative explanations in the fields of Archaeology and Anthropology (Drzewiecka, 2014, Luhmann, 2023, Stein, 2017 & Stevenson, 1997).

4 VIS AUGUSTA: MONOPOLY ON VIOLENCE AND WEAPON CONTROL BETWEEN LEGAL PRACTICES AND IMPERIAL COMMUNICATION

Boragno, Lorenzo (Le Mans Université)

Since Weber’s *Politik als Beruf*, a monopoly on the legal use of force has been seen as a necessary condition for a state in the modern sense. Perhaps unsurprisingly, the concept does not perfectly translate in ancient Latin: *vis augusta* wants to be just a wordplay on a famous pillar of imperial communication, no more than a way to question how imperial authorities managed to control social violence.

Besides extreme forms of anti-social behaviour, such as brigands and rebels, the tumultuous population of Rome and of other ancient metropolis represented a serious and direct threat for the emperors, whose reigns could rapidly meet an end because of an angry mob or a knife in the dark. Clearly some forms of weapon controls must have existed, and indeed narratives of rebels and outlaws confirm that defying the imperial power was a challenge beyond the reach of many: Florus and Sacrovir’s unsuccessful rebellion in AD 21, the massive and obscure phenomenon of the *bacaudes* during late antiquity, but also Bulla’s legendary criminal exploits are all good case studies to shed some lights on the topic. On the opposite side of the spectrum, not only laws and edicts aimed to implement some form of control over weapon proliferation and to obtain a very primitive monopoly on the legal use of force, but imperial authorities did also put their supreme authority over violence at the very heart of their propaganda. Some recently recovered passages of the long-lost *History of Dexippus* offer a unique perspective on the topic.

Hoping to open an interdisciplinary debate on the topic, the present speech aims to explore Roman imperial authorities’ attitude towards the “monopoly of violence” through narrative and legal texts.

5 ALPHABETICAL NUMBERING (FROM THE ANTIKYTHERA MACHINE) USED IN TRADE SINCE THE BRONZE AGE AS A TOOL FOR MEDITERRANEAN CONNECTIVITY

Fayer, Svetlana (Chercheur indépendant)

It is one of the first great discoveries of underwater archaeology: a calculating device. Its remains were found at the beginning of the XIX^e century by sponge fishermen near the island of Antikythera. It was probably assembled in a workshop in Rhodes or Syracuse or Asia Minor at the end of the 2^e century BC. The Antikythera machine is the oldest known gear mechanism. Its reconstruction includes two plates showing several graduated circles. Our analysis focuses on one of these circles, which contains 30 symbols, presumably to represent a month in the Egyptian calendar.

We hypothesize that these symbols represent part of an ‘ancestor alphabet’ which, in the Bronze Age, formed the basis of numerous writings (Etruscan, Phoenician and others). But before becoming an alphabet, this alphabetical numbering was used for accounting purposes.

It is logical to admit that between the IV^e and III^e millennia, agriculture and animal husbandry, which provided more food than the tribes needed to survive, drove them to trade. This led to the emergence of new skills for quantifying, negotiating and exchanging surplus production. Writing was thus born out of agrarian activity, initially in the service of accounting and religious cults (ensuring that these new human activities were profitable). When trade took on an “international” dimension, a common accounting system had to be invented so that the whole world could agree on sales in a single system. What’s more, the Greek alphabet was insufficient to provide the entire alphabetical number-

ing system, so three “related” letters appeared: digamma (or stigma); koppa and sampi from other languages. These THREE missing letters confirm our hypothesis that this alphabetical numbering system could not be attributed solely to the Greeks, as it represented a common accounting system connecting different Mediterranean cultures.

6 THE CONVERSION OF A FACILITY INTO AN URBAN ENVIRONMENT IN THE WESTERN PYRENEES

Mendizabal Sardonis, Oihane (Université de Pau et des Pays de l’Adour (UPPA); University of the Basque Country; Aranzadi Science Society) - Torregaray Pagola, Elena (University of the Basque Country)

The numerous archaeological investigations carried out over the last decade have made it possible to locate and characterise this thermal complex at Zaldua (Auritz/Burguete, Navarre), on the site of the same name located at the edge of the western Pyrenees. Through analysis of the discovered records we have been able to identify various changes that conditioned the development of the facility built during the first decades of the 1st century AD. The initial thermal functionality began to show certain difficulties from the reign of Claudius onwards, which led to the early end of this activity at the beginning of the 2nd century AD. In this new context, part of the site was converted into a production area, first for pottery and then,

during Late Antiquity, for metallurgy. Taking in consideration all this, the transformations identified in this facility allow us to situate the Zaldua site as a whole in the conceptual field of small towns, and to conclude that we are dealing with a small Roman city in a peripheral and mountainous environment located on the edge of a main road.

7 CREMATION PRACTICES IN ROMAN FUNERARY ARCHAEOLOGY: COMPARATIVE ANALYSIS OF POMPEII AND ROME NECROPOLISES

Miguélez González, Ana (Colegio de doctores y licenciados en letras y ciencias de Valencia y Castellón) - Alapont Martín, Llorenç (University of València) - Gallelo, Gianni (University of València) - Marcelli, Marina (Sovrintendenza Capitolina di Roma) - Mas Hurtuna, Pilar (University of València) - Ruiz López, Juan José (Fundación Antonia Clavel) - Thomas, Mark (University College of London) - Prasad, Aarathi (University College of London) - Macleod, Ruairidh (University of Cambridge) - Alfonso Llorens, Joaquin (Colegio de doctores y licenciados en letras y ciencias de Valencia y Castellón)

The study at the Pompeii and Rome Via Ostiensis Necropolises has proven essential for the research of funerary archaeology and the archaeology of death. It is essential to be able to formulate accurate and objective interpretations of funerary and commemorative rituals. Both necropolises offer the possibility to study and analyse an enormous number of cremations in one space. Through creating a new collections management database system, our research intends to take the analysis of both human and non-human remains from Pompeii and Rome necropolises to the next level. The CMS database automatically computes statistical information, graphics and diagrams relating to the content of urns. We intend the research project to be dynamic, transversal, innovative and collaborative

in nature. Our project’s methods and techniques are constantly evolving in order to obtain the newest and most precise data possible about cremation to support objective interpretations of funerary archaeology and the archaeology of death. This study compares data from two funerary archaeology projects in Pompeii (Porta Nola and Porta Sarno) and Rome’s Via Ostiensis necropolises. Both sites offer exceptional conditions for analyzing well-preserved cremation graves, facilitating the creation of comprehensive databases highlighting grave and individual aspects. Statistical analysis of these databases yields innovative, comparable data crucial for interpreting funerary rituals and materials within urns. A multidisciplinary approach combining archaeological techniques with bioanthropology, archaeobotany, zooarchaeology, and geochemistry reveals insights into cremation processes, bone gathering, and funerary deposition. Osteological and X-Ray Fluorescence analyses provide data on cremation temperatures, biological profiles, and paleopathologies. Comparing data from Pompeii and Via Ostiensis enables testing hypotheses about funerary practices and rituals. Statistical analyses also pave the way for gender-based archaeological studies, exploring potential relationships between funerary customs, grave goods, and the sex of cremated individuals to reconstruct the social identity of ancient Romans.

8 SACRED LANDSCAPE IN ALGERIA: CREATION, DEVELOPMENT, AND CONCEPTUALIZATION OF THE CATHEDRAL SAINT PHILIPPE.

Hadjas, Houria (EAA)

Introduction: Algeria, rich in cultural and spiritual diversity, unveils a sacred landscape echoing its inhabitants’ intricate tapestry across epochs. This exploration focuses on Algiers’ iconic site—the Saint-Philippe Cathedral and the Basilica of Our Lady of Africa. Introduction: Algeria’s sacred landscape encapsulates the rich history of its people. This presentation embarks on a journey through the sacred passage, emphasizing Algiers’ treasures—the Saint-Philippe

Cathedral and the Basilica of Our Lady of Africa. The narrative unfolds through three key dimensions: Creation, Development, and Conceptualization.

Historical Context: The Saint-Philippe Cathedral, once the Ketchaoua Mosque, bears witness to Algeria's religious and cultural history. This section explores its evolution and interconnections with the Basilica of Our Lady of Africa and the Mosque of the Fishery, unraveling shared histories within the sacred landscape. **Architectural and Temporal Links:** Examining mutual architectural influences between the Cathedral, Basilica, and Mosque reveals a shared cultural dialogue. Beyond religious functions, these structures symbolize Algeria's cultural and historical identity. **Archaeological Exploration and Current Challenges:**

Archaeological excavations around the Saint-Philippe Cathedral unearth a mosaic of Roman remnants, traces of the Essayida Mosque, and glimpses into daily life, enriching the historical narrative. Current challenges focus on preserving these findings and ensuring structural stability. **Evolution of a Sacred Site: Traversing Eras:** From the Ketchaoua Mosque to the Saint-Philippe Cathedral, this section explores the significance of this transformation. Examining the Cathedral's contemporary role reveals its enduring impact on Algeria's sacred landscape. **Crisis and Renaissance:** The presentation introduces a pivotal period in Algeria's history, exploring its impact on the sacred landscape. Initiatives for preservation, restoration, and redefinition highlight the resilience of Algeria's societal attachment to its heritage.

Conclusion: In conclusion, this exploration synthesizes the diverse facets of Algeria's sacred landscape. The Saint-Philippe Cathedral stands as a living testament, inviting continuous reflection on the complex dynamics between the sacred, cultural identity, and evolution over time.

9 THE MONUMENTAL ROCK RELIEFS OF HERACLES IN IRAN

Heidari, Ahmad (Azad University, Birjand Branch)

Heracles, the son of Zeus, is one of the legendary figures of Greek mythology who had a particular appeal in the eastern Mediterranean lands. During the Hellenistic period, numerous rock reliefs related to Heracles were engraved in the Seleucid and later Parthian realms. Hercules overcomes many obstacles to achieve immortality; he is a hero in battle and faces many obstacles. The narrative of Heracles bears some resemblance to the narratives of Rostam, the Iranian hero, and Gilgamesh, the Mesopotamian legend, however they have clear differences. Lately, a considerable number of rock reliefs from the Parthian (Hellenistic) period have been discovered in remote mountainous regions of southwestern Iran, some of which depict the likeness of Heracles. The aim of this article is to introduce the monuments related to Heracles in Iran. Two Hellenistic depictions associated with Heracles are studied in this article: one portrays Heracles standing nude with a mace-scepter in right hand, while the other style shows lying Heracles on a the bed and holding a bowl with left hand.

10 NEW HOPES IN THE RESEARCH OF PLEISTOCENE CAVE SETTLEMENTS IN HUNGARY - THE PROJECT KŐLYUK I

Szolyák, Péter (Herman Ottó Museum)

The history of Pleistocene prehistoric research in Hungary was primarily defined by the excavations of caves in the first decades (1906-1951). This kind of archaeological and paleontological researches became rare after the WW II. Since the research was extremely intensive up until then, the upper layers of the caves were completely dismantled at almost every site, and the documentations were often very incomplete. These together made it very hard to "re-read" the history of the sites and to compare the old results with the new ones.

The Kőlyuk I, located in the northern part of the Bükk Mountains, is an excellent and probably the last opportunities to carry out full-fledged excavations. Despite the previous illegal diggings, total stratification remained in a relatively large surface from the past 100 thousand year.

Based on the researches carried out from 1913, it previously seemed that the cave had been visited first by Aurignacian man. The cave and its foreground were regularly in use during from the Neolithic to the Roman Imperial Period.

The field surveys and the revision of the artefacts carried out from 2010 confirmed the human presence up to the Neolithic. The presence of Pleistocene man was not clear. The purpose of the excavations and laboratory tests taking place from 2021 is to find the latter one by introducing new methods and a new approach. The most important aspect is to understand the taphonomic processes in the cave, to continue and improve the detailed geospatial surveys. So far, we have only found indirect evidence for the presence of Pleistocene man, but we excavated new objects and finds of the ceramic ages. We gained ten C14 data for the artefacts and we observed a stratigraphic phenomenon linked to the ancient climate at Pleistocene-Holocene border, which affected the human presence.

11 THE ARENA PROJECT: A PRELIMINARY STUDY OF THE VILLAGE AND ITS CASTLE

Felicioni, Camilla (University of Siena) - Martini, Marco (University of Siena)

The Arena Project is a research that has began in 2019 from the collaboration among University of Siena, SABAP per la città metropolitana di Reggio Calabria e la provincia di Vibo Valentia and the Municipality of Arena with the aim of bringing back to the local community the history of this village in the southern Calabria. Starting from the first surveys in the areas surrounding the village, there have followed three archaeological campaigns inside the castle of Arena, formerly dated to the Norman and Svevian periods, in order to understand the stages of life that have gone through.

The aim of this paper is to present the data of the 2024 campaign matched with the previous ones, to give the first hypothesis regarding the original structure of the castle and its several phases that subsequently formed and transformed until the Contemporary era. In addition to that it will be presented a preliminary study about the origin and development of the village of Arena and its settlement linked to the castle.

POSTER ABSTRACTS

5 ALL SAINTS CHURCH IN FORDHAM, ESSEX, UNITED KINGDOM. THE SEARCH FOR ITS ORIGINS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Balbi, Jose (Colchester Archaeological Group (UK))

Abstract format: Poster

Oral Tradition says that in the old town of Fordham, and after the arrival of the Normans to Britain (1066), a large amount of land was donated by William the Conqueror himself to different abbeys, mainly in the north of present-day France. Many of these stories were confirmed although in reality many of the original constructions were remodelled and even date back to the era of Roman occupation (up to 410 BC). We have carried out research on the origins of the Church of All Saints, to which a foundation is attributed to the year 1086. Our work includes consultations with the library of the Abbey of Bec (France), the Domesday book in the British National Archives and a series of bibliographies and correspondence that confirm actions carried out in the 11th century, added to theories about its Roman origins that are complemented by the nearby excavations that are being carried out actually and that include, without a doubt, antecedents of the Roman Occupation of Britannia. Our research reveals more about our city's heritage and its cultural relationships.

23 AN ARM IN THE SEA: DESCRIPTION, DATING AND INTERPRETATION OF A SCAVENGED HUMAN HUMERUS FROM THE MEDIEVAL HARBOR OF OSLO

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Havard, Hegdal (NIKU - Norwegian Institute for Cultural Heritage Research) - Holmen, Khalil (NIKU - Norwegian Institute for Cultural Heritage Research)

Abstract format: Poster

Recent large-scale excavations in the Medieval harbor basin of Oslo have uncovered marine cultural deposits with excellent preservation of organic materials. Among a diverse abundance of structures, shipwrecks, objects and food waste one find stands out as particularly striking: A human humerus, with both epiphyses completely gnawed away by canids. This singular find raises compelling questions: What story does it tell, and what – if anything – does it reveal about conditions in the medieval city?

We here situate this evocative object within its spatial and temporal contexts, and examine the historical record for any evidence relevant to the interpretation. Both stratigraphic evidence and direct dating reveal a deposition date during the 11th or early 12th century, relatively early in the city's history. The place of deposition would have been well out and away from the shoreline and piers at this time. Furthermore, the intense gnawing evident makes it likely that the bone would have had greasy parts intact. A plausible scenario is that the humerus was scavenged from a corpse, likely by a dog, wolf or fox, and dragged out on the ice during winter. This scenario, however, leaves more questions than answers.

28 MOTT-SCHOTTKY ANALYSIS AS AN ARCHAOMETRIC TOOL FOR STUDYING ARCHAEOLOGICAL BRONZES

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Mödlinger, Marianne (Universität Innsbruck, Austria) - Osete Cortina, Laura (Universität Innsbruck, Austria; Universitat Politècnica de València, Spain) - Doménech-Carbó, Antonio (Universitat de València, Spain) - Doménech-Carbó, María Teresa (Universitat Politècnica de València, Spain)

Abstract format: Poster

This work describes the application of Mott-Schottky (M-S) analysis of impedance data of sub-microsamples extracted from the corrosion patina of copper, bronze, and brass archaeological artifacts attached to graphite electrodes. Studied samples include Renaissance statues from the Hofkirche in Innsbruck and a variety of objects from museums and Archaeological Heritage Office (soprintendenza) in Austria (Bad Aussee, Johanneum Graz and the Tyrolean State Museums), and Italy (Genoa and San Remo), dating from the Bronze Age to the 18th century. The theoretical approach developed exploits the semiconducting nature of cuprite and tenorite, the main copper corrosion products formed under 'ordinary' atmospheric attack and moderate corrosion conditions.

Impedance measurements were carried out at sample-modified graphite electrodes in contact with 0.10 M Na₂SO₄ (pH 6.28) aqueous solution and plots of (capacitance)⁻² vs. applied potential (Mott-Schottky plots) were obtained, whose slopes and intercepts can be related with the semiconducting properties of the metal patina in turn related to the composition, compaction, thickness, porosity, roughness and other textural features. The results obtained enable the classification of the studied archaeological samples, providing information on their composition, manufacturing technique, and age.

31 FOOD, FACES, AND STREETS: ARCHAEOLOGICAL INSIGHTS INTO EARLY 20TH CENTURY LISBON'S MARKETS

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Pacheco, Susana (CFE-HTC Nova University of Lisbon) - Leão, Afonso (CFE-HTC Nova University of Lisbon)

Abstract format: Poster

Markets and trade are topics that have been widely discussed in archaeology. However, there are still gaps in their study, especially concerning the contemporary period. This poster aims to address some issues related to markets and street sales in the city of Lisbon during the end of the 19th century and the first half of the 20th century. By focusing on the sale of food products, the aim is to contribute to a better understanding of the recent social history of the city of Lisbon. Through the case study of the Ribeira Market, the oldest market in Lisbon that still exists today, we intend to analyse the evolution of the building and remains of ephemeral structures, using archaeological methods, in order to understand how it gives us information about the evolution of food sales in Lisbon and how consumer habits have changed in the city over the last century. Besides, we will complement our archaeological research with photographs whenever possible, in order to get as close an idea as possible of what Lisbon's markets were like at the time, and by comparing those with the present, we intend to understand issues related to the evolution of food sales in Lisbon.

35 CULTURAL HERITAGE AND EDUCATIONAL ARCHAEOLOGY IN PRESENT-DAY BULGARIA. TRENDS, METHODS, PERSPECTIVES

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Pramatarov, Kaloyan (National Archaeological Institute with Museum at Bulgarian Academy of Sciences)

Abstract format: Poster

The present poster offers a general review of educational programs, presented by the National Archaeological Institute with Museum at the Bulgarian Academy of Sciences, aiming at the promoting and socialization of the cultural-historical heritage. It traces the contemporary trends and methods, applied by museum pedagogues in their work with kids and students, by displaying leading examples of theoretical projects, and their practical application "on terrain". How are the movable and non-movable cultural heritage presented to the youth? What are the global trends in the respected fields, and to what extent are they applied on the local ground? The poster seeks to answer these questions by analyzing the potential that cooperation between teachers and museum workers can offer in engaging the young generation with the achievements of the civilizations, that had inhabited the present-day Bulgarian lands, and their material manifestation by presenting the knowledge in an approachable, esthetic and amusing way.

39 THE VISITOR CENTRE DEBATE: PEAK DISTRICT'S DILEMMA EXPLORED

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Bowyer-Kazadi, Emily (University of Liverpool)

Abstract format: Poster

This poster addresses the dilemma that unfolded around the Peak Districts Visitor Centres from February 2023 for around 6 months. The main question being, are visitor centres in national parks a burden or a resource for society? The proposal to close the Peak Districts visitor centres were put forward during the reviewing of the operational and staffing structure of the Peak District National Park Authority with soaring inflation and costs being cited as the main reasons for closure. However, in June 2023, an anonymous donor provided funding for the visitor centres to stay open for a further three years. The effects on staff were understandably stressful, as their jobs were at risk and there was also a stress put on local museums such as the Old House Museum in Bakewell which has an exhibition in the visitor centre and runs tours of the town from there, and Castleton Museum, which is housed entirely in the visitor centre.

Visitor centres are focal points for engaging with visitors in any location, especially in rural areas such as the Peak District. They provide services such as weather reports, booking help, safety advice and information amongst others and are used by both visitors and locals, especially where the population is more elderly, as is the case in the Peak District, and doesn't have the access or knowledge of how to use the internet. The main questions that this poster aims to ask are whether funding is the issue, or whether management capacity and capability problems within the Peak District National Park Authority are to blame for this closure? Was the closure an easy way out for redirecting funds to the areas of the Authority that need it?

40 UNVEILING ANCIENT FOUNDATIONS: GPR INSIGHTS FOR CULTURAL HERITAGE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Barone, Pier Matteo (American University of Rome; Forensic Geoscience Italy; ANCRIM (Associazione Nazionale Criminologi e Criminalisti))

Abstract format: Poster

Concordia Temple in Sicily and the Bomarzo Cathedral in Latium demonstrates the validity of the GPR technique to investigate the foundation geometry of ancient monument, where it is undesirable to apply a destructive technique.

The Duomo di Bomarzo is a remarkable historical and architectural masterpiece situated in Bomarzo (VT), Italy. Driven by a deep appreciation of the cathedral's historical context (a harmonious blend of Renaissance and Baroque styles), a ground-penetrating radar (GPR) investigation was deployed to gain insights into its foundations and potentially uncover buried remains beneath the floor and altar. The GPR investigation focused on the cathedral's interior, specifically the central and left naves, altar, and oratory. This revealed the presence of disclosed rectangular chambers beneath the floor and altar, along with unique foundation structures.

If this peculiar foundation configuration is quite unique among coeval and neighboring churches in Latium, it is not uncommon in earlier periods. In fact, it has been utilized since ancient times in various Italian and foreign locations, whenever circumstances demanded the expansion of the foundation plane by integrating the natural substrate with a newly created anthropic element. For example, GPR data acquired at the Concordia Temple in Agrigento (Sicily) show a regular sequence of short reflectors alternating with 'signal blanked' areas in the peristyle and a continuous horizontal reflector within the inner part of the temple (the cell). These results may indicate that the construction technique used in the temple was not a compact and homogeneous retaining wall, consisting of an outside layer of bricks and various grouting materials, as was previously thought. It indicates, instead, that ancient Greeks made use of the geomorphology of the surrounding area, which involved exploiting the surrounding landscape to obtain foundations (artificial and natural) capable of supporting such monumental and stately buildings.

42 TAMING DOUBTS - HOW TO SEMANTICALLY MODEL FUZZY AND WOBBLY GEOREFERENCES IN ARCHAEOLOGY AND IN THE GEOSCIENCES

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Thiery, Florian (Research Squirrel Engineers Network; Leibniz-Zentrum für Archäologie (LEIZA)) - Schenk, Fiona (Johannes Gutenberg University Mainz (Institute of Geosciences); Research Squirrel Engineers Network) - Thiery, Peter (Research Squirrel Engineers Network)

Abstract format: Poster

Data modelling in archaeological research must handle uncertainty and ambiguities, especially in georeferencing. This enables re-using research data using the FAIR principles (Findable, Accessible, Interoperable, Reusable) and Open Science while guaranteeing data quality. Furthermore, for linking data, modelling vagueness, georeferencing methods and events, and FAIRification, graph-based modelling as Linked Open Data (LOD) proposed by Berners-Lee is the method and technique of choice. However, due to the enormous variety of research domains, an interdisciplinary, commonly understandable modelling of uncertainties and vagueness in research data is highly challenging. We will present two data-driven interdisciplinary use cases for dealing with and modelling vague and uncertain georeferenced findspots as LOD from the archaeological and geosciences domains.

Graph-based data modelling uses three technologies: (I) Wikidata, (II) ontologies and Linked Open data using the Fuzzy Spatial Locations Ontology (FSLO), and (III) Wikibase. The main modelling idea is to publish and model the following georeferencing information as Linked Open Data: (1) describe where the geoinformation comes from, (2) describe the method of how the coordinate was created, (3) describe the uncertainty issue(s), and (4) use references into the Semantic Web. Methods I-III can be applied to at least use cases from the archaeological and geosciences domain: Ogham Stones in Ireland and the Eruption of the Campanian Ignimbrite.

This poster presents exemplary modelling approaches for archaeology and geosciences, demonstrating the importance of dealing with doubts in the georeferencing process.

48 HOW WE DEALT WITH MOULD IN THE ADBOU BONE COLLECTION

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Theilade, Bodil (University of Southern Denmark)

Abstract format: Poster

The Anthropological Unit at the University of Southern Denmark (ADBOU) curates a collection of around 16.500 human skeletons, mainly from the Mediaeval Period. End of 2018, mold was discovered in the building housing the bone collection. Black spots appeared on the white walls, and an increasing thick layer of dust covered all surfaces.

Cleaning was intensified, floors were swept often, but even inside the boxes with the remains the amount of white dust was increasing.

A consulting engineering company tested different areas, distributed over the whole building, as well as in the boxes and on the remains. The results showed that the concentration of mold in the air inside the building was alarming. All offices were immediately abandoned, and personnel re-housed on the campus, but the large bone collection had to stay in the contaminated building until a solution for gentle, but thorough cleaning of the remains could be found. Luckily, the mold proved to be concentrated in the thick layer of dust on the surface of the remains, while the inside of the bones remained unaffected.

We tested different techniques of cleaning: (1) spraying with hydrogen peroxide, (2) dipping briefly into an ethanol bath, and (3) wiping with a cloth soaked in ethanol, among other things. None of these methods proved to be efficient in killing the fungi, or to be well suited to the fragile and partly fragmented material. After more testing, the most effective way to clean the bones turned out to be blowing off the dust. Trained anthropology students, covered in protective suits and full-face masks, use compressed air to clean the remains before they can be relocated to the newly established climatized storage facilities on campus.

50 PERSONAL ORNAMENTS/AMULETS OF ROMAN SOLDIERS FROM LEGIONARY CAMP BURNUM

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Jadric-Kucan, Ivana (University of Zadar)

Abstract format: Poster

Burnum, a Roman Legion camp and town 2.5 km north of Kistanje in inland Dalmatia, Croatia, holds many archaeological treasures. These include a praetorium, an amphitheater, a campus, and an aqueduct. Among these remarkable remnants, we can single out the unique decorative pendants, a testament to the site's rich history. A total of 22 pendants were found, divided according to the material into pendants made of metal, rock crystal, shell, and stone and further according to the object's shape in medallions, figural, geometric shapes, round box-bull, and baskets. They were found in a specific archaeological context, originating from the western peripheral area of the Burnum Legion camp, where the amphitheater and the military training ground (campus) were located. According to the archaeological material found, they date to the first half of the 1st century, ending with the early phase of Claudius' reign.

We can conclude that the great variety and character of the pendants point to their profound importance and personal meaning for the people who lived in the military camp, which were Roman soldiers, and around the camp, in the canabae of their families. Although women inevitably decorated themselves more and wore jewelry, a specific part of jewelry was also worn by men, i.e., Roman soldiers. This is evidenced by the simple pendants made of natural material that was easily available and cheap to them, stone or shell, as well as those of higher quality material such as bronze and rock crystal, which they wore daily.

In addition to their decorative role, these pendants also functioned as amulets, a testament to their versatility and significance. They not only provided personal protection but also enabled personal communication with the deity. Their apotropaic power provided them protection and security and followed them through their military and later civilian lives.

60 INTESTINAL PARASITES FROM FUNERARY CONTEXTS: AN APPROACH TO HEALTH AND DISEASE IN AL-ANDALUS

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Gijón, Ramón (Universidad de Granada) - Castano-Aguilar, José (Independent archaeologist) - Sarr-Marroco, Bilal (Universidad de Granada)

Abstract format: Poster

The discovery of parasites from archaeological contexts allows us to learn about the socio-economic conditions and dietary habits of past populations, providing new insights into the study of these societies. Despite the smaller number of parasite evidences (especially when we are talking about skeletonised remains), the palaeoparasitological study of sediment associated with individuals allows us to individualise the parasitosis, as well as to know the biological origin of the parasitosis found. This advantage makes it possible to carry out multiple studies, such as the prevalence of parasitosis in a population group, and the approach to the type of parasite that occurs in each sex and age range.

This paper presents the palaeoparasitological results obtained from the analysis of sediment samples from fourteen Andalusian individuals found in the locality of Ronda (Málaga, Spain). The findings provide evidence of the existence of geohelminths in this society, in addition to the multidisciplinary study of variations according to age and sex.

63 THE HOARD FROM SANOK (BIAŁA GÓRA) AND OTHER NEW FINDS FROM THE CARPATHIAN FOOTHILLS IN THE SANOK AREA (POLAND)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Maciejewski, Marcin (Institute of Archaeology Maria Curie-Skłodowska University) - Kotowicz, Piotr (The Historical Museum in Sanok) - Blajer, Wojciech (Institute of Archaeology, Jagiellonian University, Kraków) - Bochnak, Tomasz (Institute of Archaeology, University of Rzeszów, Rzeszów) - Cywa, Katarzyna (W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków) - Kuroпка, Piotr (Department of Biostructure and Animal Physiology, Wrocław University of Environmental and Life Sciences, Wrocław) - Łucejko, Jeannette (Department of Chemistry and Industrial Chemistry, University of Pisa, Pisa) - Mueller-Bieniek, Aldona (Faculty of Archaeology, University of Warsaw, Warszawa) - Przybyła, Marcin (Dolmen Marcin Przybyła, Michał Podsiadło s.c., Kraków) - Skowron, Katarzyna (The Historical Museum of the City of Kraków, Kraków)

Abstract format: Poster

Many new, "accidentally discovered" hoards of metal items and coins have entered Polish museums in recent years. Most of them were extracted from their deposition contexts by non-professionals. Sometimes, information on the exact place of discovery was not even provided or false circumstances of the discovery were given. On the other hand, amateur investigators conducting metal detector surveys are increasingly aware of the significance of the archaeological contexts and some hoards are excavated by archaeologists cooperating with non-professionals.

A hoard from Sanok (Biała Góra) is an example of such a deposit. Not only was it excavated following the principles of archaeological methodology, but also using extraordinary methods. The extracted block of soil containing the hoard was later handled in controlled laboratory conditions. The exploration method made it possible to acquire information on the arrangement of even very fine metal artefacts and to take various samples of organic substances.

The hoard from Sanok (Biała Góra) and four other hoards recently discovered in the Carpathian Foothills near Sanok went through multi-faceted studies. The poster will present the find circumstances of the Sanok (Biała Góra) hoard, methods of its examination and study results, as well as refer to other deposits, especially in terms of the lost scientific information.

69 PASTCLIM AND TIDYSDM: TWO NEW R PACKAGES TO INTEGRATE PALAEOECOLOGICAL ANALYSES IN ARCHAEOLOGY

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Leonardi, Michela (Department of Zoology, University of Cambridge, United Kingdom) - Colucci, Margherita (Max Planck Institute of Geoanthropology Jena, Germany) - Manica, Andrea (Department of Zoology, University of Cambridge, United Kingdom)

Abstract format: Poster

In recent years, the release of large datasets of archaeological occurrences and palaeoclimatic data series covering hundreds of thousands of years opened the door to exciting new possibilities for integrating palaeoclimate in archaeological analyses. Here, we will present two new R packages released by our lab that facilitate the use and analyses of archaeological "big data" with a palaeoecological perspective.

pastclim (Leonardi et al. 2023a) allows easy access and manipulation of several sets of palaeoclimatic reconstructions covering the whole world between 5 million years ago and future climate projections. It can also work on custom data, if properly formatted, and contains a set of functions to recover the climate for periods of interest for the whole world or specific areas; extract data from locations scattered in space and/or time; retrieve time series from individual sites; and visualise and handle the ice or land coverage.

tidysdm (Leonardi et al. 2023b) is the first software to natively perform species distribution/habitat suitability/ecological niche modelling based on time-scattered data. Given a set of observations and the associated palaeoclimate, it identifies the relationship between the species of interest and the environment; and reconstruct the potential distribution through time. The integration with pastclim allows hassle-free access and handling of palaeoclimatic data.

These easy-to-use and freely available tools can offer exciting new possibilities to test for the role of palaeoclimate in cultural or biological processes to scholars studying the past from any field (archaeology, palaeoecology, palaeoanthropology, archaeozoology, archaeobotany, linguistics, etc.).

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STABLE ISOTOPE ANALYSIS AS A TOOL IN FORENSIC ARCHAEOLOGICAL CASEWORK: CURRENT STATUS AND A WAY FORWARD

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Sehwat, Jagmahender (Panjab University, Chandigarh, India)

Abstract format: Poster

Human bones and teeth have the longest post-mortem longevity and serve as crucial markers of human form and identity even after death as they harbor deceased's identity markers in the form of their individualistic physical structures, molecular signatures and chemical compositions. These human tissues have been increasingly used for biological profiling of past individual/s. Stable isotope analysis of such remains retrieved from forensic or bio-archaeological contexts has proven a powerful tool to reveal their geolocations, migration patterns/residential mobilities, dietary practices and food sources and thus, contributing towards their provenance in archaeological sciences (Richards, 2020).

Most of the stable isotope research from India has been reported from geological, water and grain samples discussing about the origin theories of such samples to the past times. Also, a plethora of fossilized remains have been reported from different strata of Siwalik hills in Himalayan region; lying un-investigated in academic museums, university laboratories and research institutes. If such specimens are studied using the advanced techniques of stable isotope analysis, it can provide crucial evolutionary information about ancient life in the region. Hundreds and thousands of human skeletal remains, belonging to the past individuals/populations, have been retrieved from different bio-archaeological or forensic anthropological sites in India like Rakhigarhi, Vadnagar, Karnataka, Ladakh, Ajnala etc. However, only a very few of them has been analyzed using stable isotope analysis to reconstruct their life-histories and past events as pace of such analyses has not gained momentum in India. There is a huge scope for use of stable isotopes for forensic and archaeological purposes in India, provided traditional analyses are seriously extended to the advanced chemical technologies. Indian population is represented by several heterogeneous clusters, thus development of isoscapes of different geographical regions is urgently needed for identification of any unknown human remain retrieved from any part of the country.

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DEALING WITH PAIN; SURVIVE; REPEAT. ANCIENT AND MEDIEVAL DENTAL PATHOLOGIES IN BOURGES FROM 3RD TO 16TH CENTURY (CHER, FRANCE)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Durand, Raphaël (Service d'archéologie préventive Bourges Plus; UMR 5199 PACEA)

Abstract format: Poster

Since the 1980s, the late Antiquity and Middle Ages occupations of Bourges/Avaricum have benefited from numerous archaeological interventions having uncovered funerary sites which dimensions vary from modest to extensive. If we are particularly interested in Antiquity and the Middle Ages, accumulating more than 2000.

The archaeo-anthropological examination of the individuals it hosted makes it possible to establish diagnoses indicating the presence of recurrent dental or periodontopathic diseases, some of which could be the cause of the death of their victims. Above all, these disorders reflect a broad pathological spectrum whose etiology is probably multifactorial. During ten centuries of history of a city regularly changing, such a large number of graves also offers the possibility of observing the numerical, topographic and lesional evolution of oral diseases.

The options of research that are emerging call for the development of protocols making it possible to assess the degree of pain, sometimes chronic, caused by some of these lesions and, in fact, to assess the necessity, even the obligation, to resort to knowledge and/or techniques, if not therapeutic, at least analgesic in order to live and sometimes survive.

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TOUMBA SERRON RESEARCH PROJECT IN NORTHERN GREECE - PRELIMINARY RESULTS OF THE 2021-2023 SEASONS

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Zorzin, Nicolas (National Cheng Kung University; Paris 1 Panthéon-Sorbonne, UMR 8215 Trajectoires)

Abstract format: Poster

This poster consolidates the outcomes of surveys conducted since October 2021, along with the results from the initial two excavation seasons carried out in July 2022 and 2023 by a diverse international team comprising members from Taiwan (National Cheng Kung University), Greece (Direction of Antiquities of Serres), the United Kingdom (University of York), France, Bulgaria, and Italy. Here, we aim to concisely present the initial findings related to the Late Neolithic site of Toumba Serron (5500-4000 B.C.). The recent discoveries have exceeded our expectations, notably by: 1) revealing the presence of a 2.7m large enclosure wall, constructed from burned clay and spanning ap-

proximately 900m in length, encircling the settlement; 2) confirming the existence of a ditch located just outside the enclosure wall; 3) uncovering two circular burials, with one exceptionally well-preserved, situated approximately 4 meters beyond the settlement's wall to the north. These burials likely date back to the Late Neolithic period, holding great historical significance as the first known burials in Eastern Macedonia from that era.

83

MAKING TEXTILE TOOLS FROM SCRATCH: POT SHERDS AND FRAGMENTS OF BRICKS RECYCLED FOR SPINNING AND WEAVING

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Iancu, Alina (National Institute of Heritage of Romania; The Hellenic Centre for Research and Conservation of Archaeological Textiles (ARTEX)) - Sarri, Kalliope (University of Peloponnese)

Abstract format: Poster

In the archaeological record, certain prehistoric and ancient textile tools are clearly identifiable, while others take on less obvious forms and designs. This is because the original purpose of the materials in which they were made was not to produce textiles. Such tools were made when different types of clay vessels and building materials were abandoned from their initial use.

This led to the creation of tools of poorer qualities that were cut up using discarded brick fragments and pot sherds. Sometimes they were embellished or marked through simple incisions. Although brick loom weights and potsherd spindle whorls, resembling the most common discoidal loom weights and cylindrical whorls modelled in clay are frequently found at Mediterranean and European sites, they are often misinterpreted as fishing net weights and tokens.

We propose that many of these should be seen as cheaper and therefore more affordable versions of more conventional tools, being preferred by craftspeople during harsh times.

This contribution aims to offer a critical revision of the topic, arguing for the importance of the reevaluation of the flourishing material of this type in the context of the recent progress in the field of textiles. Some of the main aspects to be discussed are: how to correctly assess the role of such objects based on their morphological features, the importance of the archaeological context and what can we learn about prehistoric and ancient societies that used such textile implements. A set of methods and instruments for an easier identification of textile tools made of recycled pottery will be given too.

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SUSTAINABILITY IN THE NARRATIVE OF THE ARCHAEOLOGICAL MUSEUM OR IN THE NARRATIVE OF HISTORY?

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Peláez, Agustín (Universidad Rey Juan Carlos)

Abstract format: Poster

Our poster aims to present and raise awareness of the fundamental aspects that must be taken into account for sustainability to be effective not only in the construction or maintenance of a museum (as a building), but also in its collections, in the museographic development and temporary exhibitions, specifically in an archaeological museum.

Among the sustainability narratives, it is essential to develop values and objectives such as sustainable rehabilitation, responsible management of waste generated in the emptying and demolition, optimizing the use of materials to cause the least impact on the environment, improving insulation to reduce energy consumption, and sustainable maintenance once the work is completed.

On the other hand, responsible management and sustainable art. The construction and sustainable rehabilitation of listed buildings is an exciting challenge. It is the best way to take care of heritage and resources for future generations and contributes to the work of raising awareness about environmental protection.

The discourse we want to open is how from the beginning of the project it is possible to define some theoretical guidelines that serve as a basis for a more complete and in-depth study of the elements that will make up the museography and its possibilities, establishing a series of compositional laws that go beyond the mere presentation of a collection at a given juncture and can lead to an efficient and lasting museography, beyond its first implementation.

What is sustainable rehabilitation?

For a rehabilitation process to be considered sustainable, this criterion must be present during all phases of the process. There are four key moments in these actions, which the National Archaeological Museum of Madrid has also undergone.

- Waste generated
- Materials used
- Improving insulation

- Subsequent maintenance of the building

87 THE INTRODUCTION OF TIN BRONZE IN SCANDINAVIA - ARTEFACT METAL AS RAW MATERIAL SOURCE IN THE NEOLITHIC AND BRONZE AGE.

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Noergaard, Heide (Moesgaard Museum, Department of Archaeology)

Abstract format: Poster

Southern Scandinavia had no Copper Age! This is due to the way metal reached the Scandinavian south in the early Bronze Age.

No traces of raw material trade have been visible in southern Scandinavia's earliest bronze-using periods, beginning at around 2100 BC in the Late Neolithic. There were also no deposits of ingots, as they are known in southern Germany. Instead, the targeted import of artefacts with certain material properties seems to be the basis for local material production. It will be demonstrated that axe- and ringmetal was traded to Scandinavia for further production. In addition to the actual use of the artefacts, large quantities have been withdrawn from use to be reused in a targeted manner.

Case studies that demonstrate the use of artefact metal instead of raw material in local metalcraft are presented, such as the import of high-tin bronze axes from the British Isles in the Late Neolithic. These axes contributed significantly to the early production of bronze in southern Scandinavia. Together with large amounts of axes made of Ni-fahlore from the Unëtician region and ring-metal of low-Ni-fahlore from the central Alps, they form the material base for the first local metalwork. The appearance of new artefact types, as the spearheads in NBA IA, seems accompanied by an inflow of new metal, again only visible in a specific axe type, and related to the local production of several artefacts with similar metallurgical fingerprints.

This study draws upon the combination of typological studies, trace element and isotopic analyses to reveal the framework of the early metal trade. The targeted trade of specific artefact types seems to be the foundation for early metallurgy in the Nordic Bronze Age.

94 NARRATING THE PAST: THE ROLE OF COMICS AND ILLUSTRATION IN ARCHAEOLOGICAL AND EDUCATIONAL DISSEMINATION

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Tobalina-Pulido, Leticia (Incipit - Institute of Heritage Sciences)

Abstract format: Poster

The fusion of imagery and text holds immense potential as an educational tool, particularly in archaeological outreach and education. This poster delves into the utilization of comics and illustrations to convey archaeological concepts effectively. It underscores their capacity to captivate diverse audiences, fostering a creative approach to archaeological communication.

The emphasis is on the educational prowess of comics and illustrations in elucidating archaeological methods and techniques in visually appealing ways. By integrating visual elements, these materials not only enhance comprehension but also inspire curiosity and engagement among learners.

The poster features two comics from the "Triana and Archaeology" series, serving as examples of how these mediums can be harnessed for didactic purposes. Additionally, an activity booklet within the same initiative is showcased, exemplifying the commitment to presenting archaeological techniques with scientific rigor while employing engaging educational resources.

These materials are designed to strike a balance between academic integrity and accessibility, ensuring that complex archaeological concepts are conveyed in an engaging and comprehensible manner.

96 DETECTING DISABILITY: AN INTERDISCIPLINARY OSTEOARCHAEOLOGICAL PILOT STUDY APPLYING THE INDEX OF CARE TO A ROMANO-BRITISH POPULATION

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Serrano Ruber, Maria (University College Dublin)

Abstract format: Poster

While archaeological investigations often overlook the lives of disabled individuals, it is crucial to recognise that impairment was an integral part of life in the past, just as it is today. One valuable tool for investigating this overlooked demographic is the Index of Care, which investigates the type of care individuals may have needed through interpreting paleopathological lesions. Although this method was developed for prehistoric populations, these contexts lack the

richness provided by textual records that can offer insight into historical medical practices, healthcare traditions, and understandings of disease and identity.

In this pilot study, I draw upon one such contextualised case study from Roman Irchester, UK: A 3-4th Century CE skeletal collection excavated from a Romano-British cemetery in modern-day Northampton, a region with an abundant archaeological record of Roman occupation. I combine the Index of Care strategy with methodologies from archaeological science, including paleopathology, dietary isotope analyses, and biomechanical load bearing to facilitate a holistic understanding of disabled lives in the past. Here, I present the results of a pilot study that will be used as a foundation for a wider population-wide analysis that will contribute to our understanding of disability and identity in Roman Britain.

100 FAR AWAY FROM HOME: THE PRE-COLUMBIAN COLLECTION IN THE NATIONAL GALLERY OF BULGARIA

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Parvanov, Petar (National Archaeological Institute with Museum - BAS)

Abstract format: Poster

The National Gallery of Bulgaria holds a relatively small but varied collection of Pre-Hispanic artifacts. Although regarded as a peculiarity in its permanent exhibition, the existence of this collection is practically unknown in Bulgaria and abroad. The lack of local expertise in Pre-Columbian Studies has been one of the reasons why the collection remains underappreciated by specialists and the wider public alike. While the collection consists of various object types (pottery, clay figurines, an incense burner, funerary masks etc.) with quite diverse origin (Mesoamerican, Peruvian, Brazilian) holding a marked archaeological and ethnological significance, so far they have been contemplated solely through their aesthetic value.

The poster will present the acquisition and institutional history of the collection in the milieu of the cultural program and diplomacy during the late Communist period set by Lyudmila Zhivkova, the daughter of the Bulgarian dictator at the time. In the process some inaccuracies in the identification were recognized, as well a number of artifacts were listed as possible fakes. These aspects of representation and imitation of Pre-Columbian heritage in Eastern Europe offer an alternative insight into the ideological and economic base of collecting practices. This is the foundation for further studies that can understand the assemblage in its proper cultural and historical context.

101 ORNAMENTS FROM ANIMAL TEETH IN THE BRONZE AGE MAROS CULTURE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Vitezovic, Selena (Institute of Archaeology, Belgrade)

Abstract format: Poster

Perforated animal teeth were widely used for personal ornaments since the early Upper Palaeolithic and throughout the prehistoric times. They were modified usually by simple perforating at the upper part, and then combined into jewellery pieces (necklaces, bracelets), or were part of clothing. This poster will present the usage of animal teeth as ornaments in the Bronze Age Maros culture, from two necropolises excavated in northern Serbia, Ostojićevo and Mokrin. Predominantly were used canines from dogs, but other teeth may be encountered as well, such as teeth from horse, residual canines from red deer, etc. Their frequency differs from grave to grave; some contain only few teeth, while in some there are dozens of perforated teeth. They were mainly associated with female graves. Their use wear is particularly interesting – some teeth are completely worn, with broken and repaired perforations, while at some the use wear is rather limited. This shows that these items were indeed worn during the lifetime of the individuals buried with them, but also suggests that the ornaments with teeth were enriched with time, i.e., additional parts were added over time, and it is possible that some of these pendants were inherited.

104 RECYCLED AND INNOVATIVE MATERIALS FOUND IN A ROMAN MOSAIC FLOOR MORTAR

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Baragona, Anthony (University of Applied Arts Vienna) - Fernandes, Isabel (University of Lisbon) - Bugalhão, Jacinta (University of Lisbon) - Mário Cachão, Mário (University of Lisbon) - Fernandes, Lídia (Coordinator of Lisbon Museum - Roman Theater / EGEAC (Lisbon City Council)) - Weber, Johannes (University of Applied Arts Vienna)

Abstract format: Poster

Archaeometric investigations performed during the conservation and restoration of a Roman-era floor mosaic in Lisbon, Portugal (Felicitas Iulia Olisipo, Lusitania) revealed both a high level of recycled material in the preparation layers (a common feature of Roman construction) as well as evidence for the intentional selection of an extraordinary lime

source stone (an aeolianite) for use as the binder material for the mosaic's nucleus. Analysis by polarising light microscopy (PLM) and scanning electron microscopy coupled with energy-dispersive X-ray spectroscopy (SEM-EDS) found that lime made from this carbonate-bound, siliceous stone would have increased the hydraulicity of an already pozzolanic mortar in a location where this effect would have been beneficial. Whether this stone was selected for these exhibited properties intentionally or out of convenience is perhaps unknowable in the absence of written documentation, however there were other potential building lime source materials (for example recycled marble tesserae).

This submission presents evidence supporting the hypothesis that this material would have enhanced the performance of the support layers for the floor mosaic studied, as well as qualitative and quantitative data, based on digital image analysis, for both the recycled and novel materials found within these layers.

119 TURNING UP THE HEAT: FIRE CONTROL IN CERAMIC KILNS AND THE DEVELOPMENT OF TRADE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Asscher, Yotam (Department of Conservation of Material Culture, School of Archaeology and Maritime Cultures University of Haifa, Israel; Department of Artifacts Treatment and Laboratories, Israel Antiquities Authority, Jerusalem, Israel) - Golani, Amir (Department of Archaeological Research and Specializations, Israel Antiquities Authority)

Abstract format: Poster

Fire control and resultant heat management in ancient pottery kilns allowed for better quality control of ceramic production by specialists, allowing production of standardized, durable ceramics of lighter weight that could be more easily transported in larger amounts over longer distances. Two-story updraft ceramic kilns made of mudbrick and clay, known in the southern Levant from the end of the 4th millennium BCE if not earlier, greatly improved control over the firing temperature by its diffusion from the combustion chamber to the upper firing chamber. Such kilns made more efficient use of fuel and improved regulation of the firing process. Technological development of fire control in two-story updraft kilns may have been one factor revolutionizing ceramic trade and apparently accompanied the first urbanization in the Southern Levant, expressing a growing need for efficient and standardized production of well-fired ceramics for a growing market economy that was able to move large volumes of goods over distances.

In this paper we report on an Early Bronze IB two-story pottery kiln from Lod in central Israel, dated to the end of the 4th millennium BCE. Mineralogical analysis based on Infrared spectroscopy demonstrates that temperatures between 700 and 800 °C were achieved in this installation and thin section analysis shows that the mudbricks of the walls were intentionally enriched with quartz, a mineral known for its refractory properties, thus preserving the kiln from thermal shock so that it could be used several times. These findings indicate an advanced level of craft specialization producing quality standardized ceramics for a developing market economy.

121 RURAL ARCHITECTURE IN THE NORTHERN VALLEYS OF BERGAMO: THE FORMATION OF MEDIEVAL HAMLETS IN THE FOOTHILL AREAS

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Matteoni, Federica (Università Cattolica di Milano)

Abstract format: Poster

The province of Bergamo is a privileged context to study rural architectures: in the hilly area near Orobic Alps there are several villages in a good state of conservation, arose in medieval times. The original architectural layout of these hamlets is recognized in the landscape organization, respected in the evolution over centuries until recent times.

Since 2017, a systematic study entitled "Archeologia dell'edilizia storica in provincia di Bergamo. Studio per la valorizzazione e la programmazione urbanistica nel territorio" has been ongoing: this research is about the survey of historic buildings – from 12th to 16th century- to study their urban evolution in a rural area so rich in architectural testimonies.

The extensive development of this research –including over 40 municipalities in the mountain area in the of Bergamo – allowed to study the methods of occupation of the rural community in a highland context, to outline different types of settlement and construction techniques in the territory. This poster aims to relate archaeological and landscape data, mostly linked to the stratigraphic study of architectures and about landscape's organization with ancient roads and field's cultivation.

The results allow us to define the construction peculiarities of this area, with insights on the organization of settlements, which are different in the Bergamo's valleys, and to compare them with data known for the medieval rural buildings in Northern Italy.

126 THE VALUE OF COPROLITES IN UNDERSTANDING ANCIENT ENTOMOPHAGY

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Shillito, Lisa-Marie (Newcastle University) - Blong, John (Washington State University) - Whelton, Helen (Bristol University)

Abstract format: Poster

We reject nutrients that our cultures deem unacceptable - no insects, dog meat or human flesh for us... (Twiss 2019:5)

Entomophagy, the consumption of insects, is a well known phenomenon in cultures around the world, and is being promoted by the FAO to enhance nutrition and food security. Yet, it is rarely considered in archaeological studies on food procurement and subsistence strategies. As Twiss suggests, this may be a result of the cultural taboo against certain foodstuffs in western societies that have dominated archaeological discourse, but another major factor perhaps is visibility. Insect remains only preserve under specific conditions and are not encountered as frequently as other food proxies such as bone and charred plants. When insects are found, they are often interpreted as an environmental proxy, as indicators of past ecosystems and local habitation conditions. This paper highlights the potential of coprolites as a lens into ancient entomophagy. Insect remains are commonly encountered in coprolites; together with bone fragments and plant remains, insects in coprolites indicate not only the variety of things people were consuming, but the wide range of environments they encountered. Using the example of the Paisley Caves human coprolite assemblage (spanning the late Pleistocene - mid Holocene), this paper examines the role of insects, both macrofossils and biomolecular signals recovered from coprolites, and how this data can help us refine our understanding of the seasonality of subsistence strategies, and the value of opportunistic gathering as a key part of food procurement in the past.

137 CITIZENS MAKING MUSEUMS? THE CASE OF THE ARA CONCORDIAE REENACTMENT ASSOCIATION IN THE NATIONAL MUSEUM OF ROMAN ART (MÉRIDA, SPAIN)

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Martín, Nova (Museo Nacional De Arte Romano) - León, Abel (Ara Concordiae Association. Reenactors of Roman Mérida) - Calzado, Miguel (Consortium of the Monumental City of Mérida) - Castro, Pilar (Ara Concordiae Association. Reenactors of Roman Mérida)

Abstract format: Poster

The sustainability of archaeological museums and the heritage they guard depends largely on the appropriation of them by the society that supports them. The case of the National Museum of Roman Art (Mérida, Spain) is very unique. The Museum's collections come exclusively from the former Augusta Emerita colony. The museum has the category of national museum, with an international vocation but located in a city, capital of the region (Extremadura), but a small size, with barely 58,000 inhabitants. Its archaeological heritage is monumental and palpable in every corner of it. For this reason, the collaboration of the Museum with the society in which it is inserted and, especially with the Ara Concordiae Association. Reenactors of Roman Mérida, is a fundamental line of work. The activity of the Association in the Museum allows the development of training programs and historical dissemination activities. This means the direct participation of citizens in the Museum. The activities carried out by the Reenactment Group cover both the military and civil spheres, with special attention to the world of women. Presenting the main lines of work and activities developed in relation to the Museum is the objective of this presentation.

141 SINUSITIS IN THE POPULATION OF SARILHOS GRANDES, PORTUGAL (14TH-19TH CENTURIES)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Magalhaes, Bruno M. (Department of Life Sciences, University of Coimbra, Portugal; CIAS – Research Centre for Anthropology and Health, University of Coimbra, Portugal) - Pereira, Paula (Archeologist; Project coordinator of SAND – Sarilhos Grandes Between Two Worlds; Montijo City Council) - Godinho, Ricardo (ICArE-HB (Interdisciplinary Center for Archaeology and Evolution of Human Behaviour), University of Algarve) - Santos, Ana (Department of Life Sciences, University of Coimbra, Portugal; CIAS – Research Centre for Anthropology and Health, University of Coimbra, Portugal)

Abstract format: Poster

Two burial areas associated with the São Jorge church in Sarilhos Grandes (Portugal) were excavated as part of the project 'SAND - Sarilhos Grandes Between Two Worlds'. A minimum number of 181 individuals (145 adults [80.1%], 36 non-adults [19.9%]; 58 [40%] males, 26 [17.9%] females, 61 [42.1%] indeterminate) who lived during the so-called Little Ice Age (14th-18th centuries) next to the Tagus River was identified. This study hypothesizes that in such moisty and cooler conditions, individuals present higher prevalence of sinusitis compared to the individuals living in warmer temperatures during the 19th-20th centuries. Maxillary sinusitis was macroscopically inspected with the naked eye and with a videoscope searching for spicule-type bone formations, remodelled spicules, lobules of white bone, and plaque. Fifty-two point seven percent (48/91) of the individuals show bone formations associated with

sinusitis, at least 8 non-adults and 29 adults (of whom at least 12 males, 14 females). Prevalence is similar to the ones investigated in the identified collections from Coimbra (Medical Schools collections=53%[105/198]; International Exchange Skull collection=48.3%[248/513]) and Lisbon (Human Skeletal collection=50.6%[435/873]) (19th-20th centuries), showing that the occurrence of sinusitis appear to have been similar during the different historical periods studied. Although literature shows that the etiology of sinusitis may be multifactorial (factors such environmental and hygienic conditions may play an important role), the present results are in accordance with clinical studies in recent years showing that the individuals' mucosal immune responses and mucociliary dysfunctions may be primary factors in chronic sinusitis.

146 AN ANCIENT CRANIAL ENIGMA: 2D/3D ANALYSIS OF CRANIAL MODIFICATION AT THE HIROTA SITE, JAPAN

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Loftus, James (Institute for Liberal Arts, Tokyo Institute of Technology) - Yonemoto, Shiori (The Kyushu University Museum, Kyushu University) - Murphy, Mary-Margaret (Department of Anthropology, The University of Montana) - Seguchi, Noriko (Faculty of Social and Cultural Studies, Kyushu University; Department of Anthropology, The University of Montana)

Abstract format: Poster

Cranial modification is a ubiquitous practice across countless cultures and times in antiquity. Cranial modification is not always an intentional act, but could be the result of habitual action, such as wearing constricting bindings for a prolonged period for one's occupation, however the delineation is still fuzzy at this juncture. In most well-known cases of intentional cranial modification, modifying the shape of an infants skull is a means of establishing societal rank or group identity, through a stark and prominent means - shaping ones skull into a variety of shapes.

The Hirota site, Tanegashima island, Japan (approx. 3rd CE to approx. 5th-7th C CE), was long thought to be such a case of cranial modification, whether it was intentional or not remained unclear until now. Dozens of crania excavated from the Hirota burial site are square in shape, showing extreme flatness of the occipital bone in particular. No such practice has been sufficiently recorded in Japanese prehistory until now.

Utilizing 2D Geometric Morphometric analysis and novel 3D scanning methods, results show a statistically significant morphological difference between Hirota site crania and contemporaneous as well as prior groups. Furthermore, when comparing to examples in Andes and pre-Columbian Mesoamerica civilizations, micro-abnormalities along cranial sutures showcase the strong likelihood that Hirota crania were intentionally modified, without regard to age or sex.

The motivations behind this practice remain a mystery, but due to the individuals being buried with thousands of ornate shell artifacts from hundreds of kilometers away, it is hypothesized that cranial modification was a means of manifesting group identity in aid of a thriving shellfish trade.

156 ARA PACIS AVGVSTAE: AN ASTRO-ARCHAEOLOGICAL ANALYSIS

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Tiede, Vance (Astro-Archaeology Surveys; Yale University, Alumnus)

Abstract format: Poster

The Ara Pacis Augustae is examined according to Vitruvius' astro-architectural precept that "[O]ne who professes himself an architect should be well versed in...astronomy and the theory of the heavens" (De Architectura, l.i.3; IX). In relocating the Ara Pacis so that its magnificent marble sculptures could be displayed in the new Museo dell'Ara Pacis (1937-1938), the altar was rotated by 75°, thereby erasing any original astro-architectural alignment. Because archaeologist Guglielmo Gatti's 1938 site map preserves the altar's original orientation, the author was able calculate the original astro-horizon declination (δ) vector (+11.3° δ) of the altar's northeast opening with Program STONEHENGE (Hawkins 1983, 328-330) and Google Earth Pro imagery/DEM, viz.: True Azimuth \approx 75°; Latitude/Longitude = 41°54'10.47"N/ 12°28'44.60"E; Elevation \approx 10m ASL; and Horizon Altitude \approx +1.1°. Given that the Ara Pacis was dedicated sometime in 9 BC (Moretti 1947, 7), Starry Night Pro digital planetarium calculated that the astro-horizon vector of the Ara Pacis' northeast opening was originally oriented to the rising Sun (+11.0° δ) on both 21 April and 27 August 9 BC. However, the iconography on the northeast exterior's "Tellus" frieze supports an interpretation that only April 21st was intended, because all the sculptural elements form an astrological tableau — flowing amphora (Aquarius), pair of fishes (Pisces), ram (Aries), young woman (Venus), bull (Taurus), infant twins (Gemini) — mirroring Venus/Morning Star's heliacal rise in Aries amid the Vernal Zodiac constellations viewed from the interior sacrificial altar at dawn on the Palilia/Parilia Festival (Pales, goddess of shepherds), 21 April 9 BC. This day commemorates the founding of Rome on 21 April 1 ab urbe condita (AUC) in the chronology of Marcus Terentius Varro, i.e., the 93rd iteration in the 8-year Earth-Venus Synodic Period of Venus/Morning Star's heliacal rise in the constellation Aries on the Dies Natalis Romae, 21 April 753 BC.

160 RECONSTRUCTION THE WORKED-BONE CRAFTING IN MIDDLE NEOLITHIC CHINA THROUGH RESIDUE, USE-WEAR, AND EXPERIMENTAL APPROACHES

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Shen, Jie (Stanford University)

Abstract format: Poster

My work focuses on the production and use of bone artifacts discovered at the Jiangliu site, a Middle Neolithic settlement in North China. The study involves three aspects: 1) the excavated bone tools as well as turquoise beads will be examined with residue analysis to explain the potential uses of these objects and the relation between worked bone and the textile industry; 2) I will use a stereomicroscope to observe the use-wears on bone artifacts to uncover the production process and use of them; 3) a series of replicate experiments will help to build up the chaine operatoire in production and provide a piece of macro-perspective evidence to supplement the results of the use-wear analysis.

This research will help to understand the bone artifact and textile industry in Neolithic China, which are both inexplicit to archaeologists yet. On the other hand, the high intensity of bone artifacts and low density of hunting tools in the site suggest a possibility that the artisans acquired raw materials from other communities. A network between multiple contemporary sites may include raw materials and final product trades. This trans-regional network may to some extent boosted the emergence of the state in the Bronze Age.

165 FLAX FIBRE EXTRACTION PROCESSES IN EUROPEAN PREHISTORY: NEW METHODOLOGICAL APPROACHES

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Ambrosioni, Cristina (University of Padua)

Abstract format: Poster

Flax (*Linum usitatissimum* L.) is one of the most important plants in human history. Its fibre was the most used in Italian and European prehistory, but its extraction processes are not well known. Recent published studies on flax textiles from Italian and European archaeological contexts have demonstrated, that at least until 600 BCE flax was spliced, requiring a different processing procedure. Splicing is a form of thread technology where plant fibre ultimate bundles are manually removed from individual stems and joined together either end to end or continuously to make single yarns.

The poster presents the results of microscopic analysis of flax samples collected during the experimental study on the manual processes extraction of flax fibre.

A new methodological approach is proposed for the study of fibres and processing debris (for example the flax stem) observed at various stages during experimental analysis. This work will identify the potential dichotomous keys for identifying this process in archaeological contexts.

The scarcity of archaeological evidence of flax processing makes these preliminary experimental data an important source for a more detailed understanding of the production process of flax fibre and the choices made during the different stages of processing in the past.

166 STUDY OF THE EARLY NEOLITHIC SOCIETY OF "LA MARMOTTA" THROUGH LAKE SEDIMENTARY DNA AND GENETIC MATERIAL FROM ANCIENT TOOLS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Victoria Nogales, Luis (Technische Universität Braunschweig. Institut für Geosysteme und Bioindikation, Braunschweig, Germany) - Truffi, Michele (Universita degli Studi Roma Tre) - Gibaja, Juan Francisco (Escuela Española de Historia y Arqueología en Roma (EEHAR-CSIC)) - Iriarte Avilés, Eneko (University of Burgos, Department of History, Geography and Communication, Laboratory of Human Evolution-IsoTOPIK Lab, Spain) - Mineo, Mario (Museo delle Civiltà, Rome, Italy) - Nomi, Federico (Scuola Superiore Meridionale, Napoli, Italy) - Mazzuco, Niccolò (Dipartimento di Civiltà e Forme del Sapere, Università di Pisa, Pisa, Italy) - Dulias, Katharina (Technische Universität Braunschweig. Institut für Geosysteme und Bioindikation, Braunschweig, Germany)

Abstract format: Poster

The site of "La Marmotta", submerged under the waters of the Lake Bracciano, represents one of the most important and earliest examples of the Early Mediterranean Neolithic, whose inhabitants abruptly abandoned the settlement due to a probable rise of the water levels and flooding of the village. Nearly four decades of study have revealed a dynamic society with complex agricultural techniques. Research was based on archaeological studies and the study of macro- and microscopic remains, which showed a remarkable state of preservation. However, molecular methods have not been widely applied on "La Marmotta". Here, we employ paleogenetic approaches, including sedimentary

ancient DNA (sedaDNA) from the lake sediments, to expand the knowledge about ancient agricultural practices, animal husbandry techniques and ancient environmental conditions to unravel the past dynamics of Lake Bracciano and the Neolithic settlement. Furthermore, DNA extraction techniques have been tested on the adhesive substance from replicas of harvesting sickles to establish a working protocol for the ancient material. As a result, we successfully obtained and characterized genetic material from replicas revealing great capacity of resin to retain DNA, not only from the harvested crop but also from the surroundings at the moment of use, and analysis of the ancient resin DNA is currently ongoing.

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MODELLING RELIGIOPOLITICS. THE IMPERIUM CHRISTIANUM VIA ITS COMMONERS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Vargha, Maria (University of Vienna)

Abstract format: Poster

The present poster introduces the ERC StG RELIC, which proposes a complex, comparative analysis and contextualisation of archaeological and historical remains of the rural population living on the eastern fringes of the later Holy Roman Empire during the Ottonian and Salian periods (10th -12th c.), exploring the influences of centres and networks of secular and ecclesiastical lords, of the natural environment, and of the economic infrastructure. Investigating this often-overlooked segment of the population, its hitherto unexplored or neglected role allows us to study how (top-level) changes in political and ecclesiastical organisations can be reflected in the evidence concerning the lower levels of society and of the local church network; how different strategies worked in different political settings, and what role local initiatives/agencies could have played in religious and political shifts.

In short, RELIC proposes supplementing large-scale spatial-quantitative analysis of site level historical, art historical and archaeological data with in-depth qualitative comparative analysis of thoroughly-researched and published churchyard cemeteries. The spatial-comparative approach will identify the spatial configuration of social and religious networks of institutionalised Christianisation, and this spatiality will be interpreted also as a proxy to the chronology of the process – of adaptation and expansion, beyond the point of view of the elites exposed in the chronicle tradition. Different regional patterns will point to different dynamics, hinting at the respective causes, for example, different levels of influence of the Church and the secular state, the problems of centralised coordination, of gradual or rapid expansions, how this process potentially influenced the later reorganisation of social structures, of settlement networks and their nucleation processes. Answers to these thematic questions will contribute to a better understanding of rural society and its adaptation to the new social and religious systems and offer a ‘view from below’ on major political and religious processes.

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EXPLORING THE PROTOAURIGNACIAN TECHNOLOGICAL VARIABILITY AT FUMANE CAVE (ITALY) THROUGH CORE REDUCTION INTENSITY APPROACHES

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Lombao, Diego (GEPN-AAT, Dpto. Historia, Facultad de Xeografía e Historia, USC, Praza da Universidade 1, 15782, Santiago de Compostela, Spain.; Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA), Zona Educacional 4, Campus Sescelades URV (Edifici W3), 43007 Tarragona, Spain.; UMR7194 Histoire naturelle de l'Homme préhistorique (HNHP), Museum National d'Histoire Naturelle (MNHN), CNRS, Université Perpignan Via Domitia, Alliance Sorbonne Université, - Musée de l'Homme, Place du Trocadéro 17, 75016 Paris, France) - Falcucci, Armando (Department of Geosciences, Prehistory and Archaeological Sciences Research Unit, Eberhard Karls University of Tübingen, Tübingen, Germany) - Peresani, Marco (Department of Humanities, Prehistoric and Anthropological Sciences Unit, University of Ferrara, Ferrara, Italy; Institute of Environmental Geology and Geoenvironment, National Research Council, Milano, Italy)

Abstract format: Poster

This study focusses on exploring the intensity of core reduction in the lithic assemblage from early Protoaurignacian levels (A1, A2) in Fumane Cave, located in northeastern Italy. Reduction intensity is vital for comprehending blank selection strategies, raw material management, and revealing variability in knapping techniques during the reduction sequence, helping decipher the relationship between blades and bladelets production and understanding their behavioral significance. In this work, we employ various approaches and variables for measuring reduction intensity, such as the percentage of non-cortical surface, the Scar Density Index (SDI), and an adapted Volumetric Reconstruction Method (VRM).

Our results reveal subtle variations influenced by factors like the abundance and proximity of selected raw materials for blank production. Notably, the predominant raw material, Maiolica, results in a higher number of less reduced cores, while overall reduction levels across all discarded cores at the site remain relatively high. The observed variability in the operatory field and the interrelation between blade and bladelet productions highlight the intricate and flexible nature of Protoaurignacian behavior, challenging the definitive separation between the operatory fields of

these productions. These findings underscore the significance of considering reduction intensity in the examination of technological variability and human behavior in Aurignacian studies.

In this sense, this adaptation of the VRM to laminar cores, combined with other reduction intensity proxies, promises to provide a further step in the characterization of stone tool production, offering a pathway to a deeper understanding of Homo sapiens' adaptive behaviors and a clearer framework for framing the development of the Upper Paleolithic.

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NEW DATA ON THE MESOLITHIC IN THE BASQUE COUNTRY: MARINE INVERTEBRATES FROM THE LANGATXO CAVE (MUTRIKU, GIPUZKOA)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Marchán-Fernández, Alberto (Universidad de Salamanca) - Tapia, Jesús (Sociedad de Ciencias Aranzadi) - Álvarez-Fernández, Esteban (Universidad de Salamanca)

Abstract format: Poster

This poster presents the archaeofaunistic study of the archaeological remains of marine origin from the Langatxo cave, one of the caves located at the mouth of the river Deva. It was discovered in 1981 and excavated between 1990 and 1993. Inside the cavity, the remains of a shell midden were found, which has been dated during the Mesolithic period (ca. 7,500 cal BC), in which gastropod shells (different species of the genus *Patella* and *Phorcus lineatus*) and bivalves (*Mytilus* sp.) have been documented, as well as crab pincers. This analysis has made it possible to determine that the groups of hunter-gatherers collected these types of resources from rocky substrates in the intertidal zone close to the cavity. The exploitation of the marine environment by Mesolithic groups is compared with other contexts of the same chronology documented in the Basque Country in general, and in the lower course of the river Deba, in particular.

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HIDDEN, SUBMERGED AND OBLITERATED CONTEXTS FROM THE LIS BASIN

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Pereira, Telmo (C.E.U.-Cooperativa de Ensino Universitário. Universidade Autónoma de Lisboa; Instituto Politécnico de Tomar, Portugal; CGeo – Centro de Geociências da Universidade de Coimbra, Portugal; UNIARQ, Centro de Arqueologia da Universidade de Lisboa. Faculdade de Letras, Universidade de Lisboa, Portugal) - Monteiro, Patrícia (LARC – Laboratório de Arqueociências, Património Cultural, IP, Portugal; ICArHEB – Interdisciplinary Centre for Archaeology and Evolution of Human Behaviour, Universidade do Algarve, Portugal) - Paixão, Eduardo (ICArHEB – Interdisciplinary Centre for Archaeology and Evolution of Human Behaviour, Universidade do Algarve, Portugal; TraCEr – Laboratory for Traceology and Controlled Experiments, MONREPOS – Archaeological Research Centre and Museum for Human Behavioural Evolution. RGZM. Germany) - Nora, David (The Institute of Archaeology, The Hebrew University of Jerusalem, Israel; ICArHEB – Interdisciplinary Centre for Archaeology and Evolution of Human Behaviour, Universidade do Algarve, Portugal) - Assis, Sandra (CRIA – Centro em Rede de Investigação em Antropologia, Universidade Nova de Lisboa, Portugal) - Simões, Carlos (ICArHEB – Interdisciplinary Centre for Archaeology and Evolution of Human Behaviour, Universidade do Algarve, Portugal) - Detry, Cleia (UNIARQ, Centro de Arqueologia da Universidade de Lisboa. Faculdade de Letras, Universidade de Lisboa, Portugal) - Carvalho, Vânia (Museu de Leiria, Câmara Municipal de Leiria, Portugal) - Holliday, Trenton (Tulane University, New Orleans, USA; Centre for the Exploration of the Deep Human Journey, University of the Witwatersrand, South Africa) - Paya, Alexandre (Rococo, Cultura com Estilo, Lda.)

Abstract format: Poster

The fluctuations between global cold-dry and warm-wet periods have had a profound impact on territories and resources worldwide. In the Portuguese Estremadura region, located on the central western coast of the Iberian Peninsula, these shifts resulted in the exposure of vast landscapes during cold-dry periods, which are now submerged. This lost territory likely held significant importance for prehistoric communities, evident from findings in certain sites within this region.

Conversely, the transition to warm-wet periods led to the erosion of cliffs abundant in rock shelters, many of which have since been completely washed away. Nevertheless, those rock shelters that have preserved sediments offer crucial insights into understanding the cold-dry periods. Additionally, the erosion of these valleys has formed wide deposits, dozens of meters thick, which bury Pleistocene layers containing archaeological evidence.

These factors, coupled with the extensive construction of public and private infrastructure, pose challenges to the study, interpretation, and reconstruction of prehistoric populations. In this poster, we explore various case studies aiming to contribute to the discourse on sustainability amidst the crises of the 21st century.

177 LIVESTOCK IN PHOENICIAN GADIR. ZOOARCHAEOLOGY AND TAPHONOMY OF THE SAGASTA-TINTE 1 SITE (CÁDIZ, SPAIN)

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Portero Hernández, Rodrigo (Universidad de Salamanca) - Niveau de Villedary y Mariñas, Ana (Universidad de Cádiz) - Rufà, Anna (ICArEHB, Universidade do Algarve; PACEA-UMR5199, Univ. Bordeaux/CNRS/MCC.) - Martelo Fernández, Marcos (Balteus S.L.)

Abstract format: Poster

Faunal remains from archaeological sites are a fundamental element for understanding the livestock farming practices of past societies. Through archaeozoological and taphonomic analysis it is possible to determine, among other, food production processes, maintenance activities, the type of meat consumption associated with livestock practices and the cultural aspects of animal processing. In this poster, we present a small assemblage recovered during the emergency archaeological excavation of the site on the corner of street Sagasta and street Tinte in Cádiz. This excavation revealed the existence of structures dedicated to copper mining and metallurgical activity in the Phoenician period, the context of which has been radiocarbon dated to between the end of the 9th and the beginning of the 8th century BC.

Archaeozoological analysis has revealed the importance of sheep, goat, and cattle in the livestock economy of Sagasta-Tinte. Other domestic species such as dogs and ducks have also been found. From a taphonomic point of view, we have documented evidence of anthropic manipulation in mammals and birds, being able to determine different tasks within the animal meat processing chain. Among the anthropic alterations, we have documented the use of bones for the manufacture of bone industry. We have also analysed the presence of carnivore marks, as well as the natural agents that have affected the archaeofaunal record. In this aspect, we should highlight the presence of staining of the bone surfaces with green and bluish colouring due to the dissolution of the copper mineral in a humid environment, which seems to be distributed throughout the stratum, completely staining the surface of the bones, and even covering other previous taphonomic alterations such as cut marks.

179 FROM THE SPARK TO THE BLAZE: FIRE-STONES IN THE SEPULCHRAL CAVE OF FORAT DE LA CONQUETA (EASTERN PREPYRINEES, IBERIAN PENÍNSULA)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Cousillas Rúa, Ana (Department of Prehistory, Universitat Autònoma de Barcelona (UAB)) - Roda Gilabert, Xavier (Department of Prehistory, Universitat Autònoma de Barcelona (UAB)); CaSEs Research Group, Department of Humanities, Universitat Pompeu Fabra (UPF)) - Mora Torcal, Rafael (Department of Prehistory, Universitat Autònoma de Barcelona (UAB))

Abstract format: Poster

Excavations at the Neolithic site of Forat de Conqueta (Eastern Prepyrenees, Iberian Peninsula) have documented the presence of a large number of spherical and subspherical flint cobbles with evidence of percussion and friction on their surfaces. The presence of this type of stone tool, classified here as a fire-stone, is not exclusive to this site and occurs in the prehistoric archaeological record from the Late Neolithic to the Late Bronze Age. Analysis of the technological characteristics and use-wear patterns of the fire stones, coupled with the result of an experimental programme, confirms that these tools are suitable for making fire by direct percussion and friction. The abundance of fire altered bone, ceramic and lithic remains recovered from the excavation supports this hypothesis and is consistent with the use of the cave as a burial site for the deposition and cremation of human remains. The results obtained show the importance of this type of tool in the funerary field of this community and provide information on local burial practices within the general Neolithic framework of the area.

183 CULTURAL DYNAMICS IN DYNASTIC TRANSITIONS: EXPLORING FOOD AND ALCOHOL AT THE ZHOUYUAN SITE DURING THE WESTERN ZHOU PERIOD IN CHINA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Li, Jingbo (Stanford University)

Abstract format: Poster

This study investigates food and alcohol production and consumption during the Western Zhou period, focusing on the Zhouyuan site. Following the collapse of the Shang Dynasty, its descendants migrated to Zhou territory, including Zhouyuan. However, their dietary and drinking practices remain unclear. To address this gap, we examined residue from pottery vessels using microfossil analysis to investigate their staples, food and drink for rituals, fermented beverage production, and relevant crafts. We explored the role of non-traditional crops like wheat and rice in food and drink. Analyses of pottery artifacts potentially associated with alcohol-making revealed vessel functions and brewing

techniques used during the Western Zhou period. Comparing alcohol-making methods between the Western Zhou and late Shang periods, we discussed technological and cultural similarities and differences. Additionally, we explored the social identities of Shang descendants in Zhouyuan, shedding light on cultural dynamics in the Shang and Zhou dynastic transition. This study offers new insights and evidence into foodways and drinkways during the Bronze Age in China.

185 DIGITALIZING THE EARLY CHRISTIAN ARCHAEOLOGY IN KOSOVO

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Hoxha, Zana (Institute of Albanology)

Abstract format: Poster

The exploration of Early Christian archaeology in Kosovo offers a unique window into the cultural and religious heritage of the region. This poster presentation aims to present the transformative impact of digital technologies on the study and preservation of this precious heritage. Through a comprehensive digitalization effort, encompassing advanced imaging techniques, a detailed database, and data visualization; we endeavor to preserve Kosovo's Early Christian sites.

By digitizing artifacts, monuments, and archaeological sites, we aim to create an immersive digital database that allows scholars and enthusiasts to explore and analyze these treasures remotely. Moreover, digital reconstructions offer insights into the architectural intricacies and spatial arrangements of Early Christian structures, shedding light on their religious and social significance. Furthermore, by employing digital tools for conservation and documentation, we contribute to the sustainable preservation of these fragile archaeological remains for future generations.

In conclusion, the digitalization of Early Christian archaeology in Kosovo represents a groundbreaking endeavor that harnesses the power of technology to illuminate the past, connect cultures, and safeguard heritage. Through collaboration and innovation, we aspire to create a lasting legacy that celebrates the rich tapestry of Kosovo's cultural heritage.

186 REVEALING A NEW RECORD OF GLACIAL-INTERGLACIAL CYCLES 1 MILLION YEARS AGO, A KEY TIME FOR EARLY HUMAN DISPERSALS IN EUROPE

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Piñero, Pedro (IPHES-CERCA, Institut Català de Paleoeologia Humana i Evolució Social; Àrea de Prehistòria, Universitat Rovira i Virgili (URV)) - Laborda-López, Casto (IPHES-CERCA, Institut Català de Paleoeologia Humana i Evolució Social) - Martín-Perea, David M. (Departamento de Geodinámica, Estratigrafía y Paleontología, Facultad de Ciencias Geológicas, Universidad Complutense de Madrid; IPHES-CERCA, Institut Català de Paleoeologia Humana i Evolució Social; Institute of Evolution in Africa) - Elia, Del Castillo (Departamento de Química Agrícola, Geología y Edafología, Facultad de Química, Universidad de Murcia) - Alías Linares, M. Asunción (Departamento de Química Agrícola, Geología y Edafología, Facultad de Química, Universidad de Murcia) - Iannicelli, Claudia (IPHES-CERCA, Institut Català de Paleoeologia Humana i Evolució Social) - Pal, Shubham (Departament de Geologia, Universitat Autònoma de Barcelona; ICP-CERCA, Institut Català de Paleontologia Miquel Crusafont, Universitat Autònoma de Barcelona) - Muñoz-Gómez, Balder (Departament d'Arts i Conservació-Restauració, Universitat de Barcelona) - Navarro-Gil, Albert (IPHES-CERCA, Institut Català de Paleoeologia Humana i Evolució Social; IPHES-CERCA, Institut Català de Paleoeologia Humana i Evolució Social) - Agustí, Jordi (ICREA, Institució Catalana de Recerca i Estudis Avançats; IPHES-CERCA, Institut Català de Paleoeologia Humana i Evolució Social)

Abstract format: Poster

The Early Pleistocene site of Quibas (southern Spain) represents the longest and most complete pre-Jaramillo to post-Jaramillo continental vertebrate succession in Europe. The whole sequence has been dated to approximately 1.1–0.9 Ma, immediately post-dating the oldest hominin record in Europe. Quibas stands out as one of the rare European sites where the Jaramillo subchron has been surely identified. This paleomagnetic episode characterizes the onset of the Early-Middle Pleistocene transition, a time span that presents major changes in the Earth's climatic cyclicity. Moreover, this interval is particularly relevant regarding the earliest hominin presence in Western Europe. Paleoclimatic proxies, inferred from sedimentological analyses conducted on the various lithostratigraphic units of Quibas, revealed a record of up to seven alternating humid and arid phases resulting from the Early Pleistocene glacial-interglacial dynamics. The high-precision chronology of Quibas allowed a correlation of the succession of the continental paleoenvironmental shifts to the marine oxygen isotope record (MIS). The lowermost pre-Jaramillo units (1.1–1.07 Ma) were deposited during a long-lasting interglacial, correlated to MIS 33–31. It was followed by an increase in aridity in the Jaramillo units of Quibas (1.07–0.99 Ma), revealing the beginning of a glacial period, which can be correlated to MIS 30. The vertebrate succession from these units agree with a significant environmental change, with the disappearance of forest species. The upper Jaramillo (1 Ma) and post-Jaramillo units (0.99–0.9 Ma) suggest these were deposited in alternating periods of aridity and humid conditions, although less humid than the pre-Jara-

millio period, probably representing the MIS 29 interglacial, the MIS 28 glacial and the MIS 27 interglacial. With this, Quibas emerges as a key reference site for advancing our understanding of the climatic events that occurred around 1 Ma in the Iberian Peninsula. Furthermore, it enhances our comprehension of the paleoenvironmental context of early humans in Europe.

188 THE EARLY MEDIEVAL ST. GEORGE'S ROTUNDA IN NITRIANSKA BLATNICA (WESTERN SLOVAKIA)

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Robak, Zbigniew (Institute of Archaeology, Slovak Academy of Sciences)

Abstract format: Poster

The neglected Rotunda of St. George, located in the forests of Western Slovakia, was for centuries just a local place of worship with a late medieval tradition. With the discovery of the nearby archaeological site of Bojná, it became clear that the rotunda could be much older and part of an incredibly rich complex. The complex seems to comprise a stronghold, manor, and secondary fortresses, and represents one of the centres of power of Great Moravia. The rotunda immediately became an object of interest for politicians, the media, the Church, and, of course, scientists. Money was found for conservation, and (partially) its early medieval appearance was restored. The entire process was accompanied by misunderstandings and convenient legends as to who its founders were. Moreover, the rotunda and the entire archaeological site have also become objects of competition between the two municipalities in which they are located which heated the debate even more. The poster aims to debunk myths that aroused around the rotunda and communicate results of reliable research that has confirmed that the construction may date from the late 9th to early 10th century, making it one of the oldest still existing churches in Central Europe. Finally, I will discuss a consensus that now seems to have been reached on the presentation of these monuments – the rotunda and the associated archaeological site – and the joint organisation of tourism.

191 THE SORGHUM IN NORTHERN ITALY: FIRST EVIDENCES, SPREAD AND USES

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Bosi, Giovanna (University of Modena and Reggio Emilia; NBFC, National Biodiversity Future Center, Palermo) - Rottoli, Mauro (ARCO Como) - Castiglioni, Elisabetta (ARCO Como)

Abstract format: Poster

Sorghum [*Sorghum bicolor* (L.) Moench], which is a taxon of African origin (probably in the South Sahara area) known to Pliny (N.H., XVIII, X, 55), has faint signals in Italy during the Roman Period (e.g. at Pompeii it is reported to have been found only in the form of straw, used for plaiting).

It seems to have been cultivated just in Northern Italy, from Late Roman (5th-6th century AD) onwards, becoming quite widespread in the Middle Ages (Castiglioni & Rottoli 2010, 2013 and unpublished data).

Starting on the most recent archaeobotanical data (charred and uncharred caryopses and lemmas/paleas; Bosi et al. 2016, 2023 and unpublished data), we would like to understand the history and economic importance of sorghum in Northern Italy, also pointing out some long-lived ethnobotanical regional traditions.

Funder: Project funded under the National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.4 - Call for tender No. 3138 of 16 December 2021, rectified by Decree n.3175 of 18 December 2021 of Italian Ministry of University and Research funded by the European Union – NextGenerationEU;

Award number: Project code CN_00000033, Concession Decree No. 1034 of 17 June 2022 adopted by the Italian Ministry of University and Research, CUP E93C22001090001, Project title “National Biodiversity Future Center - NBFC”.

Bosi G. et al. (2016) Archaeobotanical evidences of food plants in N-Italy during the Medieval and Renaissance periods. Abstracts IWGP, pp. 47-48.

Bosi G. et al. (2023) New crops in the 1st millennium CE in N-Italy. Veg. Hist. Archaeobot. <https://doi.org/10.1007/s00334-023-00955-9>

Castiglioni E., Rottoli M. (2010) Il sorgo (*Sorghum bicolor*) nel Medioevo in Italia Settentrionale. *Archeologia Medievale*, XXXVII: 485-495.

Castiglioni E., Rottoli M. (2013) Broomcorn millet, foxtail millet and sorghum in N-Italian Early Medieval sites. *PCA* 3: 131-144.

193 ASSESSING THE VALIDITY OF DIGITAL METHODS IN DISCUSSING HOMININ PHYLOGENETICS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Davis, Chloe (University of Bradford)

Abstract format: Poster

This poster presents the use of 3D structured-light scanning as a method of collecting cranial metrics on a selection of hominin casts, comparing this to a selection of online scans from sources such as Sketchfab and MorphoSource, and to the reports from the original specimens. This is then used to assess the reliability of current suggestions of phylogenetic trees, exploring cranial landmarks as a method of measuring dimorphism amongst a species. As a comparison to the hominin casts, a modern sample of *Homo sapiens* was used to provide a baseline. Results indicate that digital methods are not statistically different from the original specimens, although interpretations over metric landmarks is a point of debate. Using quartile data, percentage variation is calculated in comparison to a known modern human population. No significant difference is shown between the quartiles for the modern human sample in comparison to some of the species of hominins. The study concludes by providing a potential for the use of 3D technology in determining variation within species, and in the wider picture of allowing online sources as a reliable resource for use in studies.

199 THE USE OF MINIUM IN THE 8TH C. PAINTED STUCCO OF ST. MARTIN'S CHURCH IN DISENTIS, SWITZERLAND

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Cavallo, Giovanni (University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Switzerland) - D'Erme, Chiara (University of Applied Sciences and Arts of Southern Switzerland (SUPSI), Switzerland) - Cassitti, Patrick (Foundation pro Monastery of St. John, Münstair, Switzerland; Albert-Ludwigs-Universität Freiburg, Abteilung für Frühgeschichte und Archäologie des Mittelalters - Otto-Friedrich-Universität Bamberg) - Villa, Luca (Foundation pro Monastery of St. John, Münstair, Switzerland)

Abstract format: Poster

Archaeological excavations carried out in the Monastery of Disentis (Canton of Grisons, Switzerland) during the years 1906-07 brought to light the remnants of a group of churches from the 8th century. Among the finds made during these and subsequent excavations are c. 12.000 painted stucco fragments, attributed to the second phase of the church of St. Martin, dated to the mid-8th century. This unique complex is being studied within the project “Forgotten Colors”, funded by the Swiss National Science Foundation.

The microstratigraphic research on microsamples was conducted after a detailed non-invasive campaign that allowed for the identification of the pigments used (i.e. red and yellow ochre, lead white, C-based pigments) and, in particular, of very well-preserved minium. This pigment was extensively used on the painted surfaces and exhibits different hues ranging from the typical orange to pink and light pink as in the incarnates.

Optical (Vis, UV incident light; PLM) and electron microscopy (Scanning Electron Microscopy coupled with an X-ray Spectrometer, SEM/EDX) were used on polished cross-sections for the microstratigraphic research and microanalysis of the individual paint layers.

Minium was applied both over a lime-based preparation layer and directly on the ground mortar. It was generally mixed with lime (which is quite surprising considering the instability of this pigment with the alkaline environment of the lime). In one case, it was found associated with white phases containing Ca, P and Pb. In a few samples, the association of Pb-Sn-(Si) elements in different proportions associated with minium suggested the presence of lead-tin yellow confirmed by micro-Raman Spectroscopy. The results provide interesting clues, that will be discussed, related to the technology of production of Pb-based pigments in the 8th century.

200 HIGH-RESOLUTION GENOMIC ANCESTRY REVEALS MOBILITY IN EARLY MEDIEVAL EUROPE

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Skoglund, Pontus (Francis Crick Institute) - Speidel, Leo (Francis Crick Institute) - Silva, Marina (Francis Crick Institute) - Booth, Thomas (Francis Crick Institute) - Raffield, Ben (Uppsala University) - Anastasiadou, Kyriaki (Francis Crick Institute) - Barrington, Christopher (Francis Crick Institute) - Götherström, Anders (Stockholm University) - Heather, Peter (King's College London)

Abstract format: Poster

Ancient DNA has unlocked new genetic histories and shed light on archaeological and historical questions, but many known and unknown historical events have remained below detection thresholds because subtle ancestry changes are challenging to reconstruct. Methods based on sharing of haplotypes and rare variants can improve power, but are not explicitly temporal and have not been adopted in unbiased ancestry models. Here, we develop Twigstats, a new

approach of time-stratified ancestry analysis that can improve statistical power by an order of magnitude by focusing on coalescences in recent times, while remaining unbiased by population-specific drift. We apply this framework to 1,151 available ancient genomes, focussing on northern and central Europe in the historical period, and show that it allows modelling of individual-level ancestry using preceding genomes and provides previously unavailable resolution to detect broader ancestry transformations. We infer detailed ancestry portraits integrated with historical, archaeological, and stable isotope evidence, documenting mobility at an individual level. Overall, our results are consistent with substantial mobility in Europe in the early historical period, and suggest that time-stratified ancestry analysis can provide a new lens for genetic history.

201 RECYCLED PAST: A CIRCULAR ECONOMY PROJECT FOR THE STUDY OF PREHISTORIC METALLURGY

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Lackinger, Aaron (University of Granada) - Ruiz Soto, Alonso (University of Granada) - Cárdenas Paiz, Carolina (Unidad de Calidad Ambiental - University of Granada) - Comendador Rey, Beatriz (GEAT - University of Vigo)

Abstract format: Poster

Metallurgy includes various technological processes, ranging from extractive metallurgy to the manufacture, repair and recycling of metal objects.

Of all the metals used in prehistoric times, copper and its alloys were the most important in terms of quantity, being used to make everything from ornaments to weapons. Copper has remained important from prehistoric times to the present day.

One reason for its importance is that it can be recycled without changing its properties. This property has led to a significant amount of prehistoric metallic heritage being recycled, first by the societies that originally produced it and then by others, making it impossible to quantify the amount that has disappeared. Similarly, prehistoric mining landscapes associated with copper mining have been totally or partially destroyed by the increasingly aggressive nature of the extraction processes.

We have used the method of experimental archaeology to study different prehistoric metallurgical processes using mining and metallic waste as raw materials. Using mining waste, we have conducted smelting experiments to extract metals from their ores. We have cast replicas of various shapes of prehistoric objects (axes, daggers, halberds...) from scrap metal in order to approach their production processes and to study their use and mechanical properties. Methodologically, this work has been carried out in both realistic and laboratory conditions. Our field of study has been the metallurgical technologies of prehistoric times (Copper and Bronze Ages) in the Iberian Peninsula.

Our work has had a dual objective: archaeometallurgical research on the one hand, and a social and educational vocation on the other. We have contributed to the latter by carrying out performative activities aimed at different types of public. With this type of activity, we manage to recycle, research and disseminate, generating an environmental and social return through research based on waste.

204 EASTERN POTTERY IN A WESTERN WORLD: NEW INSIGHTS ON EASTERN SIGILLATA FROM PISA THROUGH THE LENS OF ARCHAEOMETRY

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Madrid i Fernández, Marisol (University of Barcelona) - Ortega Palacios, Clàudia (University of Barcelona) - Menchelli, Simonetta (University of Pisa) - Maiorana, Helga (University of Pisa) - Camilli, Andrea (Ministero della cultura, Direzione regionale musei della Toscana)

Abstract format: Poster

Our understanding of the productions known as Eastern sigillatas needs to be completed, both from an archaeological and archaeometric perspective. The archaeological lack of knowledge is more pronounced in the western Mediterranean, sometimes caused by difficulties recognising its physical characteristics. However, there is a practically total archaeometric knowledge gap, especially regarding the consumption centres of the central-Western Mediterranean.

To fill this gap, an archaeometric research focusing on 30 Eastern sigillata samples from the ancient port of Pisa is presented to enhance our understanding of Eastern productions. The samples come from the archaeological site of Pisa-San Rossore (Tuscany-Italy), where the remains of approximately 30 Roman shipwrecks were found in 1998. The excavation brought to light an ancient bed of the Auser/Serchio river, equipped with a river port which in Roman times constituted part of the harbour system of the ancient city of Pisa. The boats have been variously dated (between the 2nd century BC and the 5th century AD) and were shipwrecked due to a series of flood events that periodically affected the paleo riverbed, with an average frequency of one flood every 100 years. Among the types of boats, some merchant ships were found with their cargo, from which the materials taken into consideration come.

For this purpose, all the individuals were analysed by means of X-ray fluorescence (XRF) for the studies of provenance and X-ray diffraction (XRD) for the studies on the technology used for their production. A selection of them has been further analysed under Scanning Electron Microscopy (SEM) to complement the technological research. These results were compared with those already achieved for the same period and the same materials on the Catalan Coast in the Iberian Peninsula to deeper into the role of the workshops involved in commercialising these products in the Western Mediterranean.

213 "A LOOK IS WORTH A THOUSAND WORDS". HISTORY AND 3D MODELING OF THE ROCK ART PANEL OF EIRA DOS MOUROS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Carrero-Pazos, Miguel (University of Santiago de Compostela)

Abstract format: Poster

The Petroglyph of the Eira dos Mouros, nestled within the Cividade hillfort in San Xurxo de Sacos (Cerdedo-Cotobade), Galicia (NW Iberian Peninsula), has long intrigued scholars and archaeologists due to its enigmatic motifs and unique placement. We carried out a comprehensive investigation of this Bronze Age rock art panel, employing a multidisciplinary approach that shed light on its cultural significance, stylistic attributes, and historical context.

Through a combination of archaeological fieldwork, digital photogrammetry, and analysis of historical documentation, we documented the intricate motifs adorning the large, flat stone known as the Eira dos Mouros. Our research revealed a rich tapestry of over a hundred motifs, including geometric patterns, human figures, animals, and abstract symbols, reflecting a diverse array of artistic styles and techniques. Drawing on historical accounts from early researchers such as Manuel Murguía, Enrique Campo, Juan Cabré, and Ramón Sobrino Buhigas, we explored the evolving perceptions and interpretations of the petroglyph over time. These accounts provides valuable insights into the shifting scholarly discourse surrounding the Bronze Age rock art in Galicia and beyond.

215 WASTE DISPOSAL PROCESSES AND LANDFILL MANAGEMENT REFLECTED BY COMBINATION OF ANALYTICAL METHOD: LATE BRONZE AGE BŘEZNICE SETTLEMENT SITE (SOUTH BOHEMIA)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Šálková, Tereza (Faculty of Arts, University of South Bohemia in České Budějovice) - Budilová, Kristýna (Laboratory of Archaeobotany and Paleoecology, Faculty of Science, University of South Bohemia in České Budějovice) - Kovárník, Jaromír (Faculty of Fisheries and Protection of Waters, University of South Bohemia in České Budějovice) - Novák, Jan (Department of Botany, Faculty of Science, Charles University) - Pavelka, Jaroslav (Centre of Biology, Geosciences and Environmental Education, University of West Bohemia) - Strouhalová, Barbora (Department of Physical Geography and Geoecology, Faculty of Science, Charles University) - Vobejda, Libor (Faculty of Arts, University of South Bohemia in České Budějovice) - Štastný, Ondřej (Faculty of Arts, University of South Bohemia in České Budějovice) - Kuna, Martin (Institute of Archaeology of the Czech Academy of Sciences, Prague) - Chvojka, Ondřej (Faculty of Arts, University of South Bohemia in České Budějovice)

Abstract format: Poster

Waste disposal processes and landfill management are crucial subjects in the field of settlement archaeology. Our study is focused on the reconstruction of the community economy in the context of the Late Bronze Age; understanding the processes that led to the filling of settlement features; reconstruction of the recycling system of building materials (daub and wood) and the waste management. These research questions were addressed based on plant macroremains, charcoals, phytoliths, starch, micromorphology, phosphates and magnetic volume susceptibility. The results showed the waste character of features infills which reflected specific economy and habitats around the single households. The composition of the archaeobotanical assemblages was not determined by the type of feature, however similarities in the plant spectra could often be observed in the infill of features that were located close to each other. Charred remains of firewood inside the assemblages, also contained a proportion of burnt oak structures. The remains of various parts of uncharred plants were detected by phytolith and starch analyses. Animal proteins detected the presence of livestock meat and dung. Anomalies in soil phosphate contained different amounts of organic matter in single features. Magnetic susceptibility measurements showed that the features were backfilled in a one-time event. Sedimentological analysis showed that the infills of the different types of features were similar, but only the infills of the trenchlike features were compacted, unlike the other features.

216 ARCHAEOLOGICAL RELICS AND COLLECTIVE MEMORY: AN URBAN LANDSCAPE CASE-STUDY FOR A HOLISTIC CULTURAL HERITAGE MANAGEMENT

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Chroni, Athina (Hellenic Ministry of Education, Religious Affairs and Sports; National Technical University of Athens)

Abstract format: Poster

Ioannina, Epirus, Greece, is a city with a high dynamic; it constitutes a neuralgic node for the wider region, both in the past as well as in contemporary times. Nowadays, a large part of the population, directly related to the University of Ioannina, such as students and staff, is constantly changing, showing, in fact, an upward trend, followed by a corresponding upward trend in the city's commercial activity, as well as in tourism. The afore-mentioned result in pressing short-term or long-term housing requirements, a fact that entails a high risk for the historical buildings, still existing, which, due to their size and layout, do not meet current needs, while at the same time they occupy high-value plots within the urban web.

The combined application of remote sensing, photointerpretation and GIS methodology with archaeological, bibliographical and imagery data, have successfully contributed in locating destroyed architectural assets (landmarks) within the dense urban web of the modern city of Ioannina, along with achieving, also, the cultural relics' qualitative and quantitative documentation.

Under the perspective of a holistic cultural heritage management model proposal, crowdsourcing open call, buildings-at-risk cultural interactive procedure, open-data/open-access mentality, educational seminars at different levels of the educational sector, open workshops for people of various backgrounds, are practices already applied in the framework of IASIS Postdoctoral Research Project. Final goal, the active involvement in cultural procedures of young people, the local community and non-traditional audiences, such as elder people and refugees hosted in the city, ending up in raising the feeling of "belonging", "sharing", "feeling useful and creative".

218 APPLIED SCIENCES FOR A HOLISTIC ARCHAEOLOGICAL DOCUMENTATION MODEL

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Megalooikonomou, Pavlos-Stylianos (National Technical University of Athens) - Chroni, Athina (Hellenic Ministry of Education, Religious Affairs and Sports; National Technical University of Athens)

Abstract format: Poster

The high number of archaeological finds, movable or immovable, of various cultural periods of the past, combined with their wide typological variety, require effective holistic systems for recording and documenting, while ensuring, at the same time, the scientific character of the process and enabling data exchange among the scientific community.

Consequently, open data and free software, such as the QGIS software, are proposed for the overall archaeological research process, field work-laboratory work-communication to the public, thus enhancing the notion of public archaeology.

Furthermore, the use of digital systems for the integrated management of cultural heritage by a multitude of bodies and institutions, public or private, highlights the need to harmonize the different documentation systems in order to enable the communication and exchange of data, thus ending up in linked open data. Applying standardized documentation models, such as the VRA Core, and controlled vocabularies, such as the Getty vocabularies, already developed, on a global scale, in combination with GIS, effectively contributes to increasing the degree of flexibility of the procedure, as well as to the revelation and interpretation of correlations between different geospatial points of interest.

220 WOMEN, ART AND ANTIQUITY. BREAKING CLICHÉS THROUGH ARCHAEOLOGICAL RESEARCH

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Vidal Lorenzo, Cristina (Universitat de València) - López-Bertran, Miriea (Universitat de València) - Vázquez de Ágredos, María Luisa (Universitat de València) - Horcajada Campos, Patricia (Universidad Complutense de Madrid) - Muñoz Cosme, Gaspar (Univeristat Politècnica de València) - Parpal Cabanes, Esther (Universitat de València) - Feliu Beltrán, Núria (Universitat de València) - García López de Andújar, Vanesa (Universitat de València)

Abstract format: Poster

This poster presents some of the historical recreations we have made as part of the project Women, Art and Antiquity. Breaking clichés. The aim of this project is to highlight the role played by women in the societies of the past, and thus contribute to breaking down certain stereotypes with which they have traditionally been associated. The images were created by the artist Érika Meijide Jansen, drawing on archaeological and anthropological data obtained during our research in the field of pre-Columbian and ancient Mediterranean archaeology. The result is a corpus of images of

great artistic quality, featuring female protagonists from different cultures, social status and ages. In this poster we describe the research methodology used in the production of three scenes in which women are the protagonists of ritual activities, accompanied by other members of the society of their time who have only rarely been represented: namely, the children and the elderly.

227 LANDSCAPE ARCHAEOLOGY IN MIDDLE VJOSA VALLEY (ALBANIA)

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Shehi, Eduard (Albanian Institute of Archaeology) - Fioriello, Silvio (Bari University) - Rama, Taulant (Albanian Institute of Archaeology) - Veseli, Sabina (Albanian Institute of Archaeology)

Abstract format: Poster

This presentation offers a preliminary overview of the findings from the inaugural archaeological campaign conducted between September 10th and October 8th, 2023, in the Middle Vjosa River Valley, Albania. The interdisciplinary team undertook a comprehensive topographic survey covering a vast area along the SH4/E853 State Road.

The survey employed systematic intensive reconnaissance techniques, with direct on-site verification facilitated by a team of surveyors positioned at regular intervals. In the span of 26 days, approximately 80 hectares were surveyed, resulting in the identification and documentation of 67 Topographic Units and 22 Sites. Notable discoveries include a Roman imperial-era building complex with thermal rooms, a potential villa or religious site, and five Roman farms.

One of the most remarkable findings was the unexpected discovery of a significant quantity of fragmented pottery and lithics buried in recently plowed fields near the riverbed, suggesting the presence of a Neolithic village site of potential regional significance.

This presentation serves as a preliminary glimpse into the rich archaeological landscape of Qesarat, Albania, and sets the stage for further exploration and scholarly inquiry into this historically significant region.

229 CREMATION AS A "TOTAL EXPERIENCE". CONTRIBUTION OF A HOLISTIC APPROACH TO UNDERSTANDING THE GESTURES AND STAGES OF ROMAN CREMATIONS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Granier, Gaëlle (UMR 7268 ADES, CNRS - EFS- Aix-Marseille University, Marseille, France)

Abstract format: Poster

Archaeoethnology, in its study of death in past societies in all its dimensions, whether social, biological or cultural, makes it possible to considerably renew our understanding of cremation and extend the scope of our knowledge of the different stages in the 'operating chain' when a community chooses to transform the dead body by fire. Using several examples from the Roman period, we propose to demonstrate the contribution of close collaboration between biological anthropology, anthracology, archaeology and environmental sciences, which have enabled us to reconstruct many aspects of this practice. Firstly, the way in which the pyres were built, which shows that they were both the product of specific skills (which allowed a degree of standardisation of the elements needed to ensure the solidity of the structure and to promote use) and the reflection of individual choices. The various elements used on the structure, whose precise nature, topography and seasonality have been determined, show that at the time of cremation, in addition to the active participation of the living by performing certain gestures, interaction with them was maintained by appealing to all their senses: certain elements were chosen for their odour, visual or sound properties. Alongside the study of the bone remains, all of this is part of the staging intended by the deceased himself and/or those responsible for his funeral, at every stage of the cremation process. These examples will also lead us to discuss the practical and technical aspects of the gestures, as well as their possible symbolic and therefore ritual aspects.

231 ARCHAEOLOGICAL WORKSHOPS AS TOOLS TO EDUCATE ON EQUALITY AND HERITAGE CONSERVATION

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Rodríguez-Caraballo, Selene (University of La Laguna)

Abstract format: Poster

Archaeological workshops are a teaching tool for secondary education groups, fundamental in developing awareness of heritage conservation and promoting gender equality in past and current populations. The aim is to eliminate some preconceptions in addition to promoting values related to equality, the preservation of heritage and encouraging a scientific vocation in girls from Canary Islands. These are carried out in two parts, first there is an expository talk to explain basic concepts and then a practical part of anthropological work with human remains. Throughout the expository part, questions are asked about the previous ideas related with it means to be a scientist or if they know women scientists. In the practical part, the student oversees carrying out a brief anthropological study in small groups, which

allows them to have a direct experience with human remains. An attempt is also made to address the importance of preserving protected areas both for their natural or heritage character in the Canary Islands. The material that we analyse in this work is the result of the preparation of surveys that we conducted prior to the beginning of the talk and at the end of the practical part of the workshop. Thus, some prior knowledge that the student had is evaluated to see if it has been beneficial to them subsequently, in addition to evaluating whether the care of heritage or scientific vocations has been promoted among groups of children. The results of the 159 surveys reveal data on the knowledge that secondary school students have about archaeology and evidence that there are gender differences in groups of adolescents. These workshops can be a teaching tool in equality and sustainability in our societies, where debates are frequently generated around the sustainability of the tourist economic model compared to the conservation of heritage assets.

233 THE STRATEGIC ROLE OF THE GUADIANA RIVER FOR CERAMIC TRADE IN SOUTHERN LUSITANIA: STATE OF KNOWLEDGE AND FUTURE PROSPECTS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Martins, Ana (CHAIA - Universidade de Évora; Universidad de Granada; FCT - Fundação para a Ciência e a Tecnologia)

Abstract format: Poster

The Guadiana River is one of the most important communication and supply routes to the southern interior of Lusitania. Although it is not completely navigable, it played a fundamental role in the dynamics of trade, supply and circulation of products during the historical periods of the Roman Empire and Late Antiquity.

The aim of this work is to review the state of knowledge about the strategic role of the Guadiana River in the trade of terra sigillata in southern Lusitania (which includes some regions that today correspond to southern Portugal and Spain) between the 1st century BC and the 7th century AD, by identifying the scientific work carried out on the geographical area studied and the different methods used. Another aim is to understand the consumption patterns of the imported pottery and the preferred economic cycles of the archaeological sites along the Guadiana River based on the available data. In addition, it is proposed to identify some future perspectives for the study of this topic.

234 RITUAL HORSE BURIAL OF THE LATE AND FINAL BRONZE AGE IN PRAGUE-STODŮLKY A NEW STORY ABOUT ONE OLD FIND

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Petriscakova, Katarina (The City of Prague Museum) - Trojáňková, Olga (Institute of Archaeology of the Czech Academy of Sciences, Prague; Charles University, Prague)

Abstract format: Poster

Horse burials started to appear in any significant number on the European continent only towards the end of the Bronze Age, in 13th century BC. This phenomenon is usually associated with the animal's growing importance in society. Archaeologically, this is reflected by horse remains in what is known as a form of burial - i.e. deposition of a whole skeleton or its part in a pit of its own. An example of such a practice can be also the horse burial in a storage pit, covered with cervical spine of a cow, excavated in 1979–1981 in Prague-Stodůlky (Central Bohemia). The AMS radiometric analysis estimated the date of the horse skeleton to be cal. 1216–1056 BC. According to Reinecke's chronology, these values roughly correspond to phases Ha A1 or Ha A2. A complete osteological analysis of the animal skeleton showed basic physiological features and no traces of intentional alterations, such as cutting, scratching, or burning, were found on the skeleton. Based on similar contemporary finds elsewhere, several interpretations of such a find can be offered, all pointing to deliberate deposition for symbolic reasons. The relationship between man and horse in the given period can be analyzed from many different viewpoints. For example, in mythology the horse is traditionally associated with two basic principles - of life and death. The horse is linked to death through its alleged role as a guide to the afterlife, and the principle of life is linked to the Sun, which, seated on a chariot pulled by a horse, travels on the sky every day. This sun symbolism was quite widespread during the Late and Final Bronze Age.

237 FROM PENCILS TO DRONES. A MULTI-SCALAR APPROACH TO THE STUDY OF KHIRBET AL-KHALDE (AQABA GOVERNORATE, SOUTHERN JORDAN)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Intagliata, Emanuele (Università degli Studi di Milano) - Harvey, Craig (University of Alberta) - Raja, Rubina (Centre for Urban Network Evolutions and Classical Studies, Aarhus University)

Abstract format: Poster

Except for limited occasional visits, Khirbet al-Khalde, situated in the Wadi al-Yutm - 26 km northeast of Aqaba - had never been the object of systematic investigations until recently. However, the site's research potential has been evident since the first explorations of its remains in the late 19th century. Located along a major trade artery connecting Petra to Aqaba, Khirbet al-Khalde was a crucial stopping point for people and goods moving from the Red Sea to the Hisma desert and beyond. The remains at this site, which date from the Nabataean period to Late Antiquity, include a fortlet next to a presumed caravanserai. The fortlet-caravanserai combo is not new in the region. Still, it is only attested once in the Wadi al-Yutm and speaks of the symbiotic relationship between long-distance trade and the Roman army in the empire's borderlands.

In July 2023, a new international project was established to explore the history and remains of this poorly researched site. The methodology to document the remains included traditional surface collections coupled with the study of satellite imagery and old reports, drone photography, 3D modelling, laboratory analyses, and a damage and risk assessment. This variegated toolkit has contributed to casting light on the site's history from antiquity to the modern day. This paper aims to present the methodology used for the study of this site while also reflecting on the different types of data collected during our survey season.

238 WEAVING STORIES: COMMUNITY ARCHAEOLOGY AND COLLECTIVE MEMORY AT CASTILLO DE GUZMÁN (BURGOS, SPAIN)

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Polo-Romero, Alberto (Rey Juan Carlos University)

Abstract format: Poster

The research project "Fortified Landscapes of Guzmán" (Burgos) is coordinated by the Archaeology Area of the Rey Juan Carlos University (Spain). The initiative comes from the local community itself, located in the Ribera del Duero area in Burgos, a space characterized by low population density. Beyond the scientific results, in this poster, we will address how Public and Community Archaeology enables the participation of the local population in research projects. We rely on the theoretical models of Community Archaeology (Marshall, 2002; Tully, 2007) and Public Archaeology (Moshenska, 2017), with implementation in rural areas through heritage socialization.

This is a didactic and informative project that values the archaeological heritage from the interests of the local population. How is the local population involved? Through the collaboration of local people in archaeological excavation or tasks such as collective mapping, which allows the creation of heritage cartographies. Additionally, a series of scientific conferences have been held in the local communities, book presentations, intergenerational educational workshops on archaeology, guided visits to archaeological sites, or visits to nearby heritage sites.

Finally, all generated resources are made available to the general public in open access. Thus, resources in extended reality, storymaps, and audiovisual material about the projects have been created.

240 GENDER, IDENTITY AND SPACE: STUDYING EARLY MEDIEVAL SOCIETIES IN THE NORTHWEST OF THE IBERIAN PENINSULA FROM ANOTHER PERSPECTIVE

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Rodríguez-González, Celtia (Centro de Investigación Interuniversitario das Paisaxes Atlánticas Culturais (CISPAC), Universidade de Santiago de Compostela)

Abstract format: Poster

The study of gender through archaeological materiality has not been addressed in the context of the northwestern Iberian Peninsula for the period covering the transition to the Early Middle Ages. During the 4th to 6th centuries AD, a series of changes began to occur that immediately affected everyday life and the people who lived in these contexts. All of this has been demonstrated thanks to new ways of analyzing the period and surpassing the limitations of written sources, which are often insufficient for a comprehensive study of this context. The considerable increase in archaeological excavations has enabled the development of new analytical proposals for this period. Within these new contributions, this proposal is included, aiming to present the theory and methodology associated with gender archaeology that has facilitated a pioneering study to examine women, as well as the gender relations existing within contexts associated with the transition to the Early Middle Ages.

243 OBJECTS OF IDENTITY AND ADORNMENT: VIEWING FEMALE IDENTITY THROUGH INVESTIGATIONS INTO ISLAMIC GLASS BANGLES

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Nash-Pye, Charlotte (British Museum; University of Kent)

Abstract format: Poster

By the 14th century, Islamic glass bangles had become an ubiquitous part of female material culture across the Islamic world. These ornaments are intriguing objects of adornment, offering rare insight into many aspects of the cultural, female and personal identity of both elite and non-elite women throughout the Islamic world.

Glass bangles uniquely represent an element of medieval cultural transfer from the Christian Byzantine Empire into the early Islamic Middle East and further transfer of such traditions to Muslim and Hindu communities in South Asia. There is also tantalising evidence for deeper symbolic cultural and regionalised meanings to these enigmatic objects, demonstrated by different colours, combinations and designs. Evidence for such can be drawn from detailed ethnographic research on traditional glass bangle wearing practices in South Asia, which find many roots from earlier Middle Eastern customs. This study also explores the evolution of female fashions from an early Islamic glass bead, to a primarily medieval-Ottoman glass bangle, wearing culture and the development of imports and local manufacturing, such as west African imitations.

Following vigorous research into the periodic and regional trends of these decorative and typological styles, along with archeometric analysis of the chemical compositions of the glass, interesting insights into trade and cultural transfer has been ascertained. Now, this research attempts to go one step further by exploring the more intangible aspects of the value, meaning and cultural identities that may lie behind these objects of female adornment. It discusses their wide adoption across the Islamic worlds, how they may have varied across periods and places and attempts to interpret the possible values and meanings behind these symbolically charged aspects of female diaspora.

249 3D DIGITIZATION TECHNIQUES AND ARCHAEOBOTANICAL ANALYSIS OF WOODEN ARTIFACTS RECOVERED IN WATERLOGGED CONTEXTS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Gibaja, Juan (IMF-CSIC) - Caruso-Fermé, Laura (Instituto Patagónico de Ciencias Humanas y Sociales (IPCSH-CONICET)) - González-Bagur, Ivana (Instituto Patagónico de Ciencias Humanas y Sociales (IPCSH-CONICET)) - Monteiro, Patricia (Laboratório de Arqueociências. Divisão do Patrimônio Arqueológico e das Arqueociências) - Remolins, Gerard (Regirarocs, S.L.) - Mozota, Millán (Laboratorio Agroalimentario de Santander. Ministerio de Agricultura, Pesca y Alimentación)

Abstract format: Poster

The 3D scanning of wooden artifacts allows to obtain high resolution geometrical and radiometric information which is used to make quantitative and qualitative comparative analysis. The processed digital models can store geometrical information about texture and register the artifacts' state of conservation. These data allow to create virtual collections which can then result in further studies of the artifacts at archeometric level in a remote way.

The objective of this work is to present the combination of 3D scanning techniques with the archaeobotanical analysis of wooden artifacts recovered in waterlogged contexts. With this purpose, we studied wooden artifacts recovered under the waters of Bracciano lake (Anguillara Sabazia, Italia). These artifacts belong to La Marmotta Neolithic site -5700 and 5300 cal BC-.

We worked with two 3D scanning techniques: digital photometry and 3D laser scanning with the objective of presenting the scope and limitations of both techniques and their usefulness in the analysis of woody raw material. The analysis of 3D triangular meshes, with different software bring a new perspective to discuss methods and techniques applied to the study of wooden archaeological artifacts. The methodology of analysis developed in this work makes it possible to apply it to the study of different woody materials regardless of their chronology and recovery site.

255 GEOMETRIC MORPHOMETRICS IN LITHIC CLASSIFICATION: ANALYSING THE LITHIC INDUSTRY OF STRUCTURE I-A IN THE LOWER GALLERY OF LA GARMA (SPAIN)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: García-Noriega, Carlos (University of Cantabria; International Institute for Prehistoric Research of Cantabria (IIIPC)) - Portero, Rodrigo (University of Salamanca) - Ontañón, Roberto (International Institute for Prehistoric Research of Cantabria (IIIPC); Prehistory and Archaeological Museum of Cantabria (MUPAC)) - Arias, Pablo (University of Cantabria; International Institute for Prehistoric Research of Cantabria (IIIPC))

Abstract format: Poster

The traditional classification of lithic industry, based mainly on visual and morphological characterisation, is limited by its inherent subjectivity. However, technological advances in recent decades are propelling the development of new digital analyses in this field. Among these innovations, three-dimensional geometric morphometrics is notable for its ability to geometrically characterise lithic artefacts, allowing for a quantitative analysis of their shapes. This innovative approach establishes the foundations for a more objective classification based on geometric principles.

Within this framework, the work carried out inside a Palaeolithic dwelling structure in the Lower Gallery of La Garma has been crucial. This work has enabled the documentation of lithic knapping processes in situ, with an exhaustive analysis of more than 600 objects. The high quality of the sample has facilitated the development of a new classification method. Through the digitisation and analysis of 410 lithic artefacts, we have gained a preliminary understanding of how such analysis can contribute to a more accurate classification of lithic artefacts. Among the most significant advances of this method are the precise definition of geometric types, the development of new typologies, the detailed characterisation of fractures or technical gestures and the efficient automation of the classification process.

256 WHAT IS BEHIND 'EARTHEN' IN PREHISTORIC CONSTRUCTION? THOUGHTS ABOUT THE SOURCES OF BUILDING MATERIALS AND THE CHAÎNE OPÉRATOIRE OF CONSTRUCTION

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Peto, Ákos (Hungarian University of Agricultural and Life Sciences) - Kovács, Gabriella (Hungarian National Museum, National Institute of Archaeology) - Röpke, Astrid (Institute for Prehistoric Archaeology, University of Cologne) - Anvari, Jana (Institute for Prehistoric Archaeology, University of Cologne) - Vicze, Magdolna (Hungarian National Museum, National Institute of Archaeology) - P. Fischl, Klára (University of Miskolc, HUN-REN HRC Institute of Archaeology) - Kienlin, Tobias L. (Institute for Prehistoric Archaeology, University of Cologne) - Kulcsár, Gabriella (HUN-REN HRC Institute of Archaeology)

Abstract format: Poster

Earthen architecture is known in many regions of the world, and it has a long tradition even in the more humid climate zone of Central Europe. Earth as building material is a rather open umbrella term including different parts of the soils and sediments of varying origin and genesis. The term 'earth' or 'earthen' is often associated with the uppermost humic substance of the land surface, the 'living skin under our feet', pedologically speaking: the topsoil or humic horizon. Having a closer look at the archaeological literature, most of the so-called 'earthen floors' are made out of very different materials. They are brownish-greyish informal floors, easily prepared from the soils nearby, or formal floors produced from recycled materials, from mud of fluvial origin or unweathered sediments. The texture varies from sandy loam to clayey silt, but in some of the cases they are generally termed as 'clay', referring to a very fine composition. Based on our results there is a lot to be explored in this topic, as via the proper characterization of the building materials, local, regional or cultural similarities and differences can be detected. According to pedological classifications only floors made from soil or its recycled mixtures would deserve the phrasing of 'earthen' but not those made out of unweathered sediments such as loess or alluvial deposits, for example. Another important aspect is the temper of the construction materials, which seems to be crucial and was well selected to stabilise the construction. Using examples from different archaeological sites in the Carpathian Basin we will illustrate the different floor and wall preparation 'recipes' and techniques based on the local given soil and sediment sources. Furthermore, construction materials will be looked at as artefacts and an attempt will also be made to reconstruct their chaîne opératoire.

258 USE OF LOW-COST LIDAR TO DOCUMENT ARCHAEOLOGICAL FINDS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Hiltcher, Tomáš (Prácheňské muzeum v Písku) - Jiřík, Jaroslav (Prácheňské muzeum v Písku; Charles University in Prague) - Pixová, Erika (Prácheňské muzeum v Písku; University of South Bohemia in České Budějovice)

Abstract format: Poster

In archaeology, it's customary to leverage technologies originally designed for other purposes. Presently, certain mobile phones are equipped with LiDAR technology, enabling the generation of straightforward yet precise 3D models. Given its integration into widely used devices, LiDAR technology offers affordability and accessibility. Its efficacy in documenting stationary archaeological findings is remarkable, potentially supplanting traditional photogrammetry methods. Key advantages include rapid processing, repeatability of capture, and modest hardware requirements. This post will showcase several specific instances of mobile LiDAR documentation. It has been employed to document commonplace archaeological finds, expansive sites, and sections of extant structures. Preserving the exact visual representation of monuments holds significant importance in salvage archaeology. LiDAR not only captures the forms of objects but also their spatial relationships, making research cheaper and faster. Furthermore, it opens avenues for future investigations and offers an appealing presentation to the public, therefore, it could become one of the basic forms of archaeological documentation..

260 CROSSING BORDERS BETWEEN THE CROSSFIRE OF ENEMIES. RHENISH STONWARE FROM LOUISBOURG (NOVA SCOTIA, CANADA)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Prieto-Martínez, M. Pilar (University of Santiago de Compostela; CISPAC)

Abstract format: Poster

Rhine stoneware is manufactured in the Rhine area of Europe, managed by Dutch intermediaries on this continent, with great success, especially in English taverns and homes, it is not manufactured in America in its beginnings, but is carried through a series of routes maritime, usually linked to the English colonists. However, it is frequently found in Louisbourg, a territory colonized by France. The fortress of Louisbourg (Nova Scotia, currently in Canadian territory) is an important site for the study of ceramics from the first half of the 18th century and the Rhenish stoneware is a small but significant set of pieces that does not reach 10,000 fragments in this site. In particular, the high quality of the manufacture of Westerwald Rhine stoneware together with a certain typological and decorative variety makes this ceramic very attractive for everyday use in different environments of social life. I present a first approach to the study of this ceramic from a selection of pieces studied in the fortress museum (highlighting jugs, mugs, chamber pots,...) with the aim of making an interpretation in a social key. In this case, this ceramic seems like interesting evidence that is testimony to a more intense contact than expected between enemies and in a period of intense conflict.

270 WASHED ASHORE: THE FIRST MESOLITHIC BARBED POINT IN COASTAL LITHUANIA

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Rimkus, Tomas (Institute of Baltic Region History and Archaeology, Klaipėda University) - Pranckėnaitė, Elena (Institute of Baltic Region History and Archaeology, Klaipėda University) - Urbonaitė-Ubė, Miglė (Institute of Baltic Region History and Archaeology, Klaipėda University) - Ubis, Edvinas (Institute of Baltic Region History and Archaeology, Klaipėda University) - Piličiauskienė, Giedrė (Faculty of History, Vilnius University)

Abstract format: Poster

The Mesolithic (ca. 9 000–5 000 cal BC) in coastal Lithuania was marked by intense environmental change. Fluctuations in the Baltic Sea water level and dynamics of the coastline affected coastal hunter-gatherer societies. Environmental dynamics are thus one of the main reasons why so little is currently known about the Mesolithic people in coastal Lithuania. Known old osseous collections from this region provided more data on the Late Mesolithic organic tool types. However, no tool types concerning the coastal hunting techniques were available. In 2023, a stray find was found on the beach adjacent to Klaipėda city. It is a 24.9 cm long, 1.3–2.4 cm wide and 0.9 cm thick complete uniserial barbed point. The artefact has three large barbs and a hole in the proximal part. It is made from the metatarsal bone of Eurasian elk (*Alces alces*). AMS 14C dating has shown that the artefact dates to the end of the 6th millennium cal BC, thus making it the first known Mesolithic barbed point in coastal Lithuania. The tools surface is smoothed and shiny, indicating that it has been heavily affected by seawater. Therefore, it is likely that it was washed away from a submerged Mesolithic landscape, known in Lithuanian waters. In this paper we present the barbed point and its latest research, highlighting it as an important object providing new data on the Mesolithic coastal hunter-gatherers.

271 ARKEOPEN AND THE MASAPLUS CONSORTIUM RESOURCES TO LINK OPENDATA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Bernard, Loup (MASAplus; Université de Strasbourg; CNRS)

Abstract format: Poster

For over a decade, French archaeologists and archivists work together in order to promote standards, interoperability and tools for their communities. The former MASA consortium of the french infrastructure HUMA-NUM has evolved in MASAplus Consortium-HN, and keeps promoting several platforms, standards and best practices. This poster will focus on the open platform ArkeOpen to highlight how the ecosystem works.

Indeed, once a dataset is shared on the ArkeoGIS platform -and declared open in ArkeOpen-, it implies the use of the thesauri (Pactols / Opentheso), ontologies (CIDOC CRM), server hosting (HUMA-NUM), data warehousing (NAKALA) and can be requested online using OpenArcheo.

All those elements are of course great resources for the Data Management Plan, from the excavation to the long term archive. Once data has been shared on one of the platforms, it becomes FAIR, and with the help of the semantic web widely interoperable and also machine readable.

This poster will invite any interested researcher or research group to access those tools, standards and invite them to exchange with other europeans projects having the same interests in order to enlarge the FAIR and open communities.

273 EGYPTIAN FAIENCE IN THE LAB: AN EXPERIMENTAL APPROACH

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Muñoz Sogas, Judith (University of Barcelona; Universitat Pompeu Fabra) - Moretó, Elisabet (Eli Moretó Ceràmica)

Abstract format: Poster

Ancient Egyptian faience is a type of non-clay ceramic material that was widely produced and used in Egypt from as early as the Predynastic period (c. 4000 BCE) until the Roman period (c. 30 BCE - 395 CE). The production of faience involved a complex process that required skilled craftsmen. The raw materials, including ground quartz or sand, natron, and other mineral additives, were mixed together to form a paste, which was shaped into the desired form and heated at high temperatures to induce vitrification, resulting in the formation of a glassy surface.

An examination of several faience objects currently found at Museu de Montserrat, including ushabtis, figurines of divinities, beads and scarabs, provided information of their manufacturing process. The replication of this procedure has been made by the experimentation of several techniques, including efflorescence, cementation, manganese application and hole perforation. Ash and sand were used as ingredients for certain pieces and frits were manufactured as well and used to cover pieces made of other materials. The results, observed through binocular loupe, vary with the techniques implemented, the amounts and quality of raw materials used, as well as with exposure to humid environments.

275 EPHESIAN POTTERY ON DELOS: TRACING ECONOMIC AND CULTURAL EXCHANGE IN THE LATE HELLENISTIC PERIOD

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Marzec, Edyta (Fitch Laboratory, British School at Athens) - Kajzer, Małgorzata (Institute of Archaeology and Ethnology of the Polish Academy of Sciences) - Gros, Jean-Sébastien (Independent Researcher)

Abstract format: Poster

The paper presents the results of an interdisciplinary study of Late Hellenistic fine wares from Aphrodision of Stesileos and Sarapiea A, B and C on Delos. Examination of the pottery assemblages from the sanctuaries integrated with laboratory analysis of selected samples indicates that Ephesian fine pottery found on the island is more varied in terms of the appearance of fabric and shape than reported so far. The macroscopic variability of Ephesian fabric seems to be a result of varied firing processes, including different atmospheres, temperatures as well as arrangements of vessels in kilns. Today, this causes difficulties in identifying Ephesian pottery and its underestimation on Delos and beyond, and for this reason, this paper presents its macroscopic, technological and compositional characterization. Furthermore, the paper discusses the role of Rome as a political and economic agent influencing the production and flow of goods from Asia Minor to the West through a duty-free commercial hub on Delos.

277 THE FORMS OF LIVING IN THE MEDIEVAL MEDITERRANEAN. THE CASE OF SARDINIA**Abstract theme:** 4. Persisting with Change: Theory and Archaeological Scrutiny**Abstract authors:** Panetta, Alessandro (Institute of History of Mediterranean Europe (ISEM), National Research Council (CNR))**Abstract format:** Poster

This paper aims to propose a reflection on the theme of living (as a set of practices, objects, spaces and family/social relationships) in the Mediterranean area between the Middle Ages and the Modern age, taking inspiration from the case of Sardinia. The objective of this paper is to build a general picture of the state of research concerning Sardinia, for which the strong and peculiar tradition of geographical and anthropological studies perhaps not has so far found solid support in the historical-archaeological evidence. The contribution will focus mainly on the comparative analysis of the two largest Sardinian cities, Cagliari and Sassari, in the late Middle Ages, broadening the analysis to other minor urban and rural realities of the period, to investigate not only the formal aspects of the archaeological evidence but also the broader dynamics of the population (dwelling), the relationship between internal and external spaces, the internal partition on a functional basis but also linked to the gender/age of the occupants of the house, the relationships with environmental resources (animal, agricultural, pastoral) and the possible place of the latter inside the houses, the negotiation between public and private space, the important social role of the neighbourhood as it emerges from the archival and archaeological evidence and the possibility of identifying different processes for the different social and ethnic groups who inhabit the cities in this period. At the basis of these reflections is the consideration that structural/material transformations are the result (and at the same time a trace) of broader social transformations in communities or of even broader historical events, which in the Sardinian case can directly concern the possible influence of the various political entities that compete for control of the island and succeed each other in its government.

281 A STUDY ON THE ANIMAL REMAINS UNEARTHED FROM THE SHENGJINDIAN CEMETERY IN TURPAN, XINJIANG, CHINA**Abstract theme:** 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps**Abstract authors:** Yu, Xin (Jilin University; University of Bologna) - Liu, Hailin (Jilin University) - Wang, Chunxue (Jilin University)**Abstract format:** Poster

The custom of burying animals has continued in Xinjiang since the Bronze Age. Shengjindian cemetery is located in the southern suburb of Shengjindian Village, Turpan City, on the slope between the reservoir and Flaming Mountain, about 40km away from Turpan City in the West. The existing cemeteries are oval, and the tombs are evenly distributed and orderly arranged. The cemetery was in the Western Han Dynasty, between 2200 and 2050. In this paper, the animal remains unearthed in the tombs were identified and preliminarily studied. The phenomenon of sacrifice in tombs is common, but there were only sheep, fewer goats and more sheep. Sacrificed animals mostly occurred in the multiple burials, and there were two-story platform in the tomb. Animals were usually placed on the container in the tomb. The sacrificial animals were not a complete individual and were used more skulls. The sex ratio and age distribution of sacrificial animals were balanced, and there was no clear selective tendency.

291 PERCEIVING THE LANDSCAPE AT GINOSA: SETTLEMENT STRUCTURE IN THE LOWER REACHES OF THE BRADANO VALLEY**Abstract theme:** 4. Persisting with Change: Theory and Archaeological Scrutiny**Abstract authors:** Piccenna, Simona (University of Bari Aldo Moro) - Moro, Angelo (Freelance Archaeologist) - Fioriello, Custode (University of Bari Aldo Moro) - Nardò, Livio (University of Bari Aldo Moro) - Stasolla, Vincenzo (Archaeological Society Ethra - Taranto; University of Bari Aldo Moro)**Abstract format:** Poster

The progressive census of the archaeological sites in the Ginosa (Taranto-Puglia-Italy) area, supported by GIS implementation over the past few years, has revealed the recontextualisation of the sites of human frequentation and occupation in the lower valley of the Bradano river.

The analysis of the known sites makes it possible to restore the hypothesis of the roads and river routes in ancient times in the area under study; this road network connects the area with the nearby Peucezi settlements of Montescaglioso, Ginosa (urban centre), Passo di Giacobbe and the colony of Taranto, which played an extremely interesting role both in the Magna Graecia period and in the Roman and medieval periods. Furthermore, the presence of the nearby colony of Metapontum, with its port landing, allows the area to interact with the rest of the Mediterranean.

The study proposes the possibility of undertaking additional identification, integration and interpretation of new findings concerning the road system of the past, through a process of archaeological investigation involving the re-ex-

amination of bibliographic and archival data. A new and more systematic topographical mapping of the known settlements and surface finds highlights and more accurately delineates their spatial distribution and relationships with the surrounding landscape.

293 ESPAI MAMMUTHUS: EXPLORING THE EARLY PLEISTOCENE AT THE EL BARRANC DE LA BOELLA SITE (LA CANONJA, SPAIN)**Abstract theme:** 3. The Life of Archaeological Heritage in Society**Abstract authors:** Saladie, Palmira (IPHES) - Fontanals, MArta (IPHES) - Vallerdú, Josep (IPHES) - Lopez-Polin, Lucia (IPHES) - Orellana, Miquel (Ajuntament Canonja) - Plneda, Antonio (Muséum National d'Histoire Naturelle) - ROsas, Antonio (Museo de ciencias Naturales de Madrid) - Garcia Taberner, Antonio (Universidad de leon) - Caceres, Isabel (URV) - Garcia Medrano, Paula (Muséum National d'Histoire Naturelle)**Abstract format:** Poster

The Centre for Interpretation of the Archaeological Site of Barranc de la Boella (La Canonja, Spain) is an unprecedented museum facility in Catalonia primarily addressed to families and school groups, mainly aimed to generate a hub for cultural tourism in the regions of Camp de Tarragona and Terres de l'Ebre. Among the visiting public are families, students of different ages, specialized audiences, and anyone interested in enjoying and learning about our ancestors. The project has been funded by the City Council, the Tarragona Provincial Council, and the European Union.

The archaeological findings and the derived scientific studies have propelled the research project at the Barranc de la Boella site. Visitors could enjoy a throw-back journey to a million years ago to understand and experience life in this prehistoric period while exploring human evolution. The new interpretive center will be equipped with museum resources and interactive exhibitions tailored to different audiences, combining archaeological and scientific information and communication technologies together with recreations, audiovisual presentations, displays of original fossils recovered from the site, replicas for hands-on exploration, and sounds.

MAMMUTHUS aims to be a unique and singular space for understanding prehistory and the early human populations on the Iberian Peninsula. Since the campaign of 2007, the Barranc de la Boella site has become an international reference for the knowledge of Europe's earliest human populations. MAMMUTHUS Space offers a genuine prehistoric experience.

297 LOCAL COINAGE IN THE CITY OF OSSONoba (FARO, PORTUGAL) AS A SIGN OF ISOLATION AND INTEGRATION**Abstract theme:** 6. The Mediterranean from Within**Abstract authors:** baeta, Alice (UNIARQ; University of Lisbon)**Abstract format:** Poster

During the Late Republic, several cities on the Iberian Peninsula produced their own currency for local circulation to sustain their economies in everyday trade. Being in the periphery of Rome's domain, this happened due to the lack of official Roman coins in circulation to supply the local demand, which was already adapted to a monetary economy. The isolation from the capital allowed for a bigger independency, with the production of local coinage.

This poster is centered in the city of Ossonoba, today's Faro in the south of Portugal, and its monetary production and circulation. Of Turdetan origin with an agricultural and fishing economy, it developed greatly during the Roman occupation with fishing and canning activities, which is why the iconography on the coins is mostly maritime motifs. Based on known coins made of copper and lead alloys: the different types will be analyzed first, to try to identify the number of dies, and secondly by their dispersion according to each series of coinage. This study is part of the PhD project in progress in the University of Lisbon, in which the main goals are to determine the number of dies and therefore the number of coins that were made in this and other cities, and the importance of this mint to local economies.

299 THE DEMISE OF THE ATLANTIC GREY WHALE; NEW BIOMOLECULAR ARCHAEOLOGICAL FINDINGS ON AN EXTIRPATED WHALE POPULATION

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: van den hurk, Youri (Norwegian University of Science and Technology; Natural History Museum Paris) - Buss, Danny (Norwegian University of Science and Technology) - Seiler, Martin (Norwegian University of Science and Technology) - Philippsen, Bente (Norwegian University of Science and Technology) - Barrett, James (Norwegian University of Science and Technology)

Abstract format: Poster

Understanding the extirpation of the grey whale (*Eschrichtius robustus*) from the North Atlantic is more vital than ever, as four individuals from the North Pacific have re-entered the North Atlantic in recent years, possibly signalling a recolonisation of the species in the Atlantic Ocean. Although, the grey whale now only resides in the North Pacific, historical, palaeontological, and archaeological evidence suggest that this species used to be present in the North Atlantic but was extirpated from this ocean basin at some point during the late Holocene. Here, using radiocarbon dating of archaeological and palaeontological grey whale specimens from the eastern North Atlantic, we reconstruct when the grey whale disappeared from the eastern North Atlantic. Results from radiocarbon dating suggest that extirpation of the grey whale from the North Atlantic directly correlates with medieval whaling activities, indicating that early whaling was even more destructive than previously assumed. Moreover, using stable isotope analysis we infer the past foraging behaviour of the grey whale and use this to infer the ecological niche that they would have occupied in the North Atlantic in the past.

319 OIKOS BUILDINGS IN SICILY BETWEEN OLD RESEARCH AND RECENT DISCOVERIES

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Pisani, Marcella (University of Rome Tor Vergata) - Fasoli, Fabrizio (University of Rome Tor Vergata)

Abstract format: Poster

Since 2021, the University of Rome Tor Vergata, in collaboration with the Archaeological Park of Leontinoi and Megara, is bringing to light a Greek archaic temple on the northern part of Colle San Mauro in Leontinoi. The building, which has undergone various transformations over time, falls into the typology of temples without peristasis, a very widespread typology in this period and documented in Leontinoi itself by the less preserved temple discovered on the Colle Metapiccola. This discovery, in addition to increasing knowledge on the sacred topography of the ancient colony, constitutes a significant addition within the framework of sacred buildings without colonnade in Sicily, providing an opportunity to rethink the discussion on the subject. A more recent review of these sacred structures, in fact, invites us to reconsider the great variety of planimetric and architectural solutions currently included in the oikos building typology and to discard the hypothesis of exclusive ownership by some deities.

321 BROOCHES AND IDENTITY IN EARLY MEDIEVAL BURIALS IN BRITAIN

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Christopher, Elizabeth (University of New Hampshire) - Fry, Megan (University of Florida) - McCrane, Samantha (University of New Hampshire)

Abstract format: Poster

One of the many ways to learn about past societies is through the study of funerary objects. For cultures that lived during the early medieval period of Britain, especially before the widespread adoption of Christianity, there are few preserved, written records of how people interacted with each other. Therefore, these types of analyses are especially important for illuminating past cultural practices. While brooches were primarily a way to secure clothing, they provided a secondary aspect of being able to ascertain an individual's social standing, which community they are associated with, and aspects of their personal identity. In addition to typologies, here we examine the spatial distribution of brooch placement within the grave in the early medieval burials. This research sheds light on more nuanced aspects of funerary practices, specifically focusing on individual agency of the deceased as well as the role funeral dress played in signaling social status, identity, and community. Analysis of brooches can inform on mobility, ceremony, and identity more broadly during the 5th-9th centuries, providing insight into a period with little written documentation.

322 THE CONTRIBUTION OF DECORATED CERAMICS TO UNDERSTANDING THE DYNAMICS OF CHALCOLITHIC COMMUNITIES: BETWEEN ESTREMADURA AND ALENTEJO (PORTUGAL)

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: PEREIRA ROCHA, LEONOR MARIA (CHAIA/Universidade de Évora) - Branco, Maria Gertrudes (CHAIA/ Universidade de Évora)

Abstract format: Poster

Ceramic vessels are part of the visual environment of human behavior. One of the characteristics of the European culture of the Neolithic or later Copper Age is the appearance of special types of pottery indicating a particular concern with the presentation of food and drink, presumably for consumption in special social contexts.

In fact, if a piece's functionality is attributed by its shape, its decoration, applied to pieces and in places that allow visualization, carry a communicative intension, constrained by the social and symbolic environment of the potter, destined to be understood in contexts of specific consumption.

It is in this context that the ceramic decorated with «folha de acácia» appears in the archaeological record, whose presence is understood as one of the «fossil director» of the communities that inhabited Portuguese Estremadura, during the Chalcolithic.

This type of ceramic decoration, a minority among the ceramics collected in the habitat of Estremadura, is present in a large number of habitat (about 20), witnessing the existence of an extended community that shares a message expressed in a restricted set of ceramic recipients, which makes them eminently symbolic.

Recent works, carried out in the habitat of Santa Cruz 13, in Central Alentejo, allowed the picking of some ceramic fragments with «folha de acácia» decoration. These fragments are one of the elements that evidence the intensification of inter-regional interaction during the Chalcolithic, present in the circulation of ideas, people and objects, their true dimension will be apprehended, always in a tiny way, through the study and continuity of archaeological works.

323 BEFORE THE ROMANS. ADDRESSING THE INTERPLAY BETWEEN GENETIC AND CULTURAL VARIATION IN PRE-ROMAN ITALY

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Scorrano, Gabriele (University of Copenhagen) - Sabatini, Serena (University of Gothenburg)

Abstract format: Poster

In recent years, studies of the European Bronze and Iron Age have experienced a paradigm shift in which interdisciplinary approaches have taken centre stage in an effort to produce new knowledge. In particular, the study of ancient genomics has seen a dramatic boost adding dimensions to our understanding of prehistoric societies that previously were unimaginable. Critical voices have raised as to the interpretative models used to present the attained results and as to the danger of uncritically linking culture and genetics.

We present the ongoing project "Before the Romans. Addressing the interplay between genetic and cultural variation in Pre-Roman Italy". Ancient Italy offers a unique wealth of archaeological and textual evidence suggesting a sizable cultural and linguistic variety prior to the Roman Era. It is therefore an outstanding case to investigate the complex interplay between cultural

and genetic variation. The project aims to combine in a synergic interdisciplinary approach, the study of archaeological and genetic evidence with data about dietary customs, and life style/health, adding a new depth to our assessments of cultural characterization. The aim is to produce a novel methodological approach for the investigations of the relationship between culture and genetics widely applicable to the study of past societies.

324 ARCHAEOGENETICS AT THE BRONZE AGE NECROPOLIS OF OLMO DI NOGARA, ITALY

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Sabatini, Serena (University of Gothenburg) - Canci, Alessandro (University of Udine) - Eylem Yediay, Fulya (University of Copenhagen) - Kristiansen, Kristian (University of Gothenburg)

Abstract format: Poster

The poster presents the results of a unique in-depth study of the archaeogenetics of the Bronze Age community from Olmo di Nogara in northern Italy.

Olmo di Nogara is located in the Veronese valleys not far from the current city of Legnago (Verona province) and occupy a strategic position dominating several main waterways crossing the region and linking, among other things, the Po valley with the Alps and their rich minerary resources.

Continuous excavation campaigns (between the 1990ies and 2009) have returned 533 tombs, 471 inhumation burials and 62 for cremation and both adult and child burials. 14C and chrono-typological analyses of the grave goods

suggest that the necropolis was in use between approximately the Italian Middle Bronze Age 2 and the Recent Bronze Age (c. 1550-1150 BCE). Three graves dated to c. 800 AD suggest that the area was to some extent used for burials also in medieval time. We carried out a thorough genetic study of over 80 individuals and discovered a complex picture with multiple ancestries being represented in the community. We aim to present our innovative approach and disclose the potential implications that large datasets from single communities represent for our understanding of Bronze Age communities in northern Italy and beyond.

325 THE SCIENCE OF RELIGION: SELECTED ANIMAL REMAINS FROM KYIVAN RUS' SACRED CONTEXTS. THE FIRST RESULTS OF THE INTERDISCIPLINARY PROJECT

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Khamaiko, Natalia (Leibniz Institute for the History and Culture of Eastern Europe (GWZO), Germany; Institute of Archaeology, National Academy of Sciences of Ukraine) - Lundgren, Magnus (Uppsala University, Sweden) - Philippsen, Bente (NTNU, National Laboratory for Age Determination, Norway) - Gol'din, Pavel (Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine) - Mazza, Selene (University of Cambridge, Great Britain) - Kublii, Mykhailo (Institute of Archaeology, National Academy of Sciences of Ukraine) - Yanish, Yevheniia (Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine) - Barrett, James (NTNU, University Museum, Norway) - Woloszyn, Marcin (Leibniz Institute for the History and Culture of Eastern Europe (GWZO), Germany; Rzeszow University, Poland)

Abstract format: Poster

Sacred animals have been used in various ritual practices by diverse peoples across different eras. Two of the most renowned research sites in Ukraine were selected to investigate sacred animals used as sacrifices within the territory of Kyivan Rus'. One site features a cat skeleton unearthed in a grave in Shestovytsia, possibly constituting the oldest regional evidence of a domesticated cat. The second site reveals an oak trunk with the lower jaws of pigs embedded within it, discovered in the Dnipro River near its confluence with the Desna. The cat served as a funerary offering, while the oak trunk with pig jaws suggests a ritualistic context. Oaks are associated with the Slavic worship of Perun, the patron of thunder and lightning. However, the Scandinavians, upon their arrival in the region, brought with them a rapid surge of trade and state-building, incorporating animals and trees into their ritualistic practices as well. Both instances are linked to the formative period when the early state of Kyivan Rus' was emerging. They both provide insights into the worldview of the people who left them and raise numerous questions, ranging from dating accuracy to genetic and ecological affinities of the animals, as well as identifying the individuals who performed the sacrifices. Modern interdisciplinary research, combining archaeology, zooarchaeology, genetics, isotopic analysis, and radiocarbon dating, can offer solutions to various queries, from precise dating to comprehending origins and ecology. Comparing this data with finds from European studies will enable us to position these artefacts within their broader European historical context.

329 BROKEN, SPLIT, OR KNAPPED STONES: THE VERSATILITY OF THE BIPOLAR TECHNIQUE IN ETHNOGRAPHIC DATA

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Yesilova, Gökem (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA), Tarragona, Spain; Departament d'Història i Història de l'Art, Universitat Rovira i Virgili, Tarragona, Spain)

Abstract format: Poster

The first chapter of his book, titled "Palaeolithic Reflection" by Brian Hayden, concluded with the statement, "Again, comparative data on ethnographic campsites where only stone tools were used is very important, for if it is not done in the next 5 years, it will be too late. This assertion underscores the significance of the material culture not only of Australian Aborigines but also of the tribes within the Oceania. Until 1945, indigenous tribes in the New Guinea Highlands exclusively utilized stone tools. From this perspective, the contribution of ethnographic and ethnoarchaeological materials to archaeological studies from an analogical standpoint cannot be denied. Building upon these premises, our poster presentation seeks to review all ethnographic research concerning the bipolar technique and introduce its technological and functional aspects. The bipolar technique has been extensively documented by pioneering researchers in various ethnographic studies conducted among indigenous peoples across the Americas, Africa, South Asia, and Oceania. Historical records demonstrate the versatile nature of the bipolar technique, as it was employed to fulfill a diverse array of functional purposes. While some researchers have interpreted its simplistic mechanics as indicative of gender bias or a low level of technical skill, the bipolar phenomenon instigates significant discourse regarding technological proficiency and complexity.

332 LIDAR-BASED TARGETED DETECTION AND SPATIAL ANALYSIS OF NE ROMANIA'S BURIAL MOUNDS. CASE STUDY: THE JIJIA RIVER'S CATCHMENT

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Brasoveanu, Casandra (Alexandru Ioan Cuza University of Iasi) - Brunchi, Radu-Alexandru (Alexandru Ioan Cuza University of Iasi, Institute of Interdisciplinary Research, Arheoinvest Centre)

Abstract format: Poster

Nowadays Romania's territory benefits of an impressive number of burial mounds, erected since the beginning of the Bronze Age and used up until the early medieval stages. Focusing on the Jijia River catchment, an area encompassing approximately 5750 sq. km, the objective of our research was to precisely pinpoint and characterize the micro-morphology of the tumuli monuments, in the quest for establishing their chronology. In this sense, we should mention that so far was noticed a significant lack of organized initiatives to document these sites, ascertain their chronology, or study their geomorphological characteristics. By employing an innovative methodological approach centered on high-resolution airborne sensing techniques, our study has been able to identify 1600 such sites and reevaluate their spatial distribution across the Jijia River catchment landscape.

This endeavor has significantly increased the number of burial mounds known in the territory of interest while, also, obtaining novel datasets regarding their morphological characteristics and spatial location, providing important clues in establishing their potential chronology. We consider the results obtained as more than important, especially since the sites are constantly under threat by intensive modern agricultural practices, most of them being already flattened.

333 CARVING OUT COMMUNITIES IN PRE-NURAGIC SARDINIA

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Lilley, Kirsty (University of Edinburgh)

Abstract format: Poster

Pre-Nuragic Sardinia (c. 4400-2300 BC) was a period of changing social and cultural practices, characterised by both insular developments and external influences. This is epitomised by the domus de janas: rock-cut tombs that were, uniquely for this period in the Mediterranean, increasingly embellished with architectural, representational, and abstract art. Traditionally, these monuments have been the subject of many typo-chronological and cultural-historical studies, and yet the social role of the tombs in their wider prehistoric contexts has been largely neglected.

This research explores the hypothesis that the domus de janas were central in the creation and articulation of group social identities in the pre-Nuragic period, and attempts to construct a 'social geography' of Sardinia based on the tombs' artistic embellishment. To do so, this study generates spatial clusters and connections from databases of the 492 decorated domus de janas and of all rock-cut tomb cemeteries across the island, employing statistical and computational methods combined with comparative approaches. In particular, it suggests that statistical similarity can be used to consider difference, which, when placed in its geographical, political, and socio-cultural context, may indicate not only the nature of distinctions present between communities, but also the reasons for their development. Analysing and evaluating data at different scales, the study generates an island-wide view of cultural difference – and similarity – in this period, as well as regional variations in the social roles of tombs.

Overall, it argues that distinct identity constructions and expressions are visible across the island through funerary architecture, and that these resulted from several factors including cultural traditions, trade and exchange, and topography. Placing the tombs and their social functions in the wider context of Mediterranean rock-cut tombs, it also contributes to debates surrounding connectivity and insularity in the Late Neolithic and Chalcolithic periods.

335 UNVEILING THE DRUMBEAT: EXPLORING DRUM MOTIFS IN SOUTH AFRICA AND ZIMBABWE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Kumbani, Joshua (Institut d'Arqueologia UB (IAUB), Universitat de Barcelona; Departament d'Història i Arqueologia, Universitat de Barcelona) - Díaz-Andreu, Margarita (Institut Català de Recerca i Estudis Avançats (ICREA); Institut d'Arqueologia UB (IAUB), Universitat de Barcelona; Departament d'Història i Arqueologia, Universitat de Barcelona)

Abstract format: Poster

The presence of musical instruments in the rock art of southern Africa offers a compelling window into the cultural practices and beliefs of ancient societies. While extensive research has been dedicated to various aspects of southern African rock art, the examination of musical instruments, took a slow trajectory. This poster aims to shed light on the occurrence of drum motifs within southern African rock art, focusing specifically on two sites in South Africa and Zimbabwe. The drum motifs are found at Grootvlei 158 in the Eastern Cape of South Africa and at the Bushman Point site in the Mashonaland West province of Zimbabwe. Through a desktop-based analysis of published data and rock art

databases, this research explores the contextual significance of drum depictions within these regions. Comparative analysis between the two sites is conducted, accompanied by an examination of the ethnohistorical background surrounding the use of drums in African communities. Drums held various roles, serving as instruments for musical expression, integral components of rituals, and even mediums for communication. By delving into the portrayal of drums in southern African rock art, this study contributes to a deeper understanding of the cultural heritage and traditions of these ancient societies, enriching our knowledge of their spiritual and social practices.

This research is part of the ERC Artsoundscapes project (Grant Agreement No. 787842) that has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme. PI: Margarita Díaz-Andreu.

343 MOSAIC TILE FLOORS IN 12TH CENTURY ROSKILDE (DENMARK) – A LINK TO ROMAN ANTIQUITY?

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Langkilde, Jesper (Roskilde Museum)

Abstract format: Poster

In the town of Roskilde, Denmark, archaeological excavations at two ecclesiastical sites, one of them with relation to the first Cistercian monasteries in Denmark, have brought forward remains of some of the earliest tile floors in Denmark and Scandinavia. The tile floors date to the mid- or late 12th century when the art of brick and tile making was at the very beginning in Denmark. The design and fabric of these tile pavements are hitherto unparalleled in Denmark and Scandinavia, even in later medieval ornamented tile floors, which came in to widespread use from the mid-13th century. The inspiration – and maybe even production – of these pavements can be linked to central and southern Europe, and even far back in time to Roman mosaic pavements. These floors thus appear as an example of links between the figurative language in Roman antiquity and high medieval northern Europe and the explicit Roman heritage in medieval Romanesque architecture. In addition these floors contribute to our understanding of the Church as a decisive agent in the introduction of revolutionizing technologies and architectural ideas in medieval Northern Europe. The poster will present the archaeological finds and the design of these tile floors along with comparative material and results of scientific compositional analysis of the provenance of some of the Roskilde tiles.

350 ARCHAOMETRICAL ANALYSES, EXPERIMENTAL ARCHAEOLOGY AND CONSERVATION OF AN EARLY IRON AGE HELMET

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Grahek, Lucija (Institute of Archaeology, ZRC SAZU) - Petrič, Mitja (University of Ljubljana, Faculty of Natural Sciences and Engineering) - Fajfar, Peter (University of Ljubljana, Faculty of Natural Sciences and Engineering) - Muck, Deja (University of Ljubljana, Faculty of Natural Sciences and Engineering) - Žužek, Borut (Institute of Metals and Technology) - Batič, Barbara (Institute of Metals and Technology) - Nemeček, Nataša (National Museum of Slovenia)

Abstract format: Poster

Bronze helmets are among the most prestigious objects of the Early Iron Age (Hallstatt period). A poorly preserved, ritually damaged Negova-type helmet was recently discovered at Pezdričeva njiva, Slovenia. A detailed study was carried out to further understand the significant elements of the helmet. The study included determining the helmet's composition and state of preservation, which are crucial factors in determining the best conservation techniques for the artefact. A metallurgical analysis was also carried out to gain insight into the manufacturing processes and craftsmanship of Iron Age metalworkers.

The helmet is now part of the permanent archaeological exhibition at the Bela Krajina Museum in Metlika and a valuable part of the local cultural heritage. In addition to experiencing the multi-sensory nature of the helmet, a replica has been made, providing visitors with a unique opportunity to gain a deeper understanding of material culture.

The importance of past craftsmanship and manufacturing processes is highlighted through the interdisciplinary collaboration of experts from different fields. It demonstrates the need for further multidisciplinary research and the importance of preserving our material and intangible cultural heritage.

351 GOTLANDIC PICTURE STONES – THE ONLINE EDITION

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Helmbrecht, Michaela (archäotext) - Oehrl, Sigmund (Stockholm University; Universitetet i Stavanger)

Abstract format: Poster

The Gotlandic picture stones are among the most famous archaeological monuments of Scandinavian history. The particularly rich imagery of the Gotlandic picture stones, dating to ca. 400 to 1100 AD, offers a unique source for studies of Late Iron Age material culture – e.g. male and female dress, architecture, ship technology as well as carriages, weaponry and combat, hunting and fishing. The picture stones from Gotland are an unparalleled source for information on Scandinavian pre-Christian religions and Old Norse myths, as they depict ritual and cultic acts like horse fights, drinking ceremonies, human sacrifices, and funeral rites. Nearly 700 picture stones are known today.

From 2018 to 2024, a project aiming for a new digital edition of Gotland's picture stones was conducted at the University of Stockholm and Gotland's Museum in Visby. This new edition, fully accessible online, contains all available information about each Gotlandic picture stone, including high-resolution 3D models, photos, archival material, and a bibliography.

With our poster, we would like to draw attention to the upcoming launch of the website.

357 EXPERIMENTAL TEXTILES ARCHAEOLOGY: STUDY OF "RIBBED ARMOR" FROM THE LONGOBARD PERIOD

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Belletti, Clara (Università Cattolica del Sacro Cuore - Milano)

Abstract format: Poster

This work deals with textiles archaeology and examines, at an experimental level, a particular armor found recurrently within Longobard culture burials in Italy: it is a pattern that determines the creation of a fabric called 'ribbed': that presents an alternation of reliefs and grooves on the fabric.

The starting elements are preserved through the mineralization process and have been studied by the Laboratorio di Archeobotanica di Como (by Mauro Rottoli and Elisabetta Castiglioni)

From the observation of the finds, an experimental procedure was developed by evaluating the tools and materials to be used to reproduce the armor under study.

Next, the phase of assembling the healds to compose the specific armor is analyzed, the variables are evaluated and the critical issues are presented; a portion of fabric is then worked to reproduce the weave*.

Finally, the fabric created can be compared with the archaeological originals to evaluate the effectiveness of the procedure.

*For the practical part of the experimentation I took advantage of the collaboration of Paola Boerci, weaver.

358 RETHINKING THE USE OF GAULISH LANGUAGE IN EASTERN GAUL : ARCHAEOLOGICAL AND EPIGRAPHIC ASPECTS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Janin, Marie-Anais (PhD in Roman History, Université de Bourgogne)

Abstract format: Poster

For those scholars who wish to study the spread and use of this language with fragmentary evidence, the ancient written sources on Gaulish are rather scarce. In fact, until the 19th century, the idea of a common written use of Gaulish was not taken for granted. All epigraphic records were considered to be corrupted Latin. With improvements in linguistics and archaeology, scholars are now aware of the extent of the written record in Gaulish. During my doctoral thesis, I worked with literary, archaeological and epigraphic data from Eastern Gaul (Senoni, Aedui, Lingones and Sequani tribes) in order to add elements about the use of the Gaulish language (personal/official use, chronological expansion, possible dialects).

Between the La Tène period and the 3rd century AD, these Gallic tribes, as well as southern Gaul and the Rhone basin in particular, were well connected with Rome and southern Gaul, where the Gaulish language is attested in Etruscan and Greek scripts. The privileged relations between the Aedui and Rome implied diplomacy and trade and, consequently, a habit of epigraphy much earlier than in other parts of Gaul (except the South).

This case of study, which was the subject of my doctoral thesis and in which several approaches and methodologies were used, needs to be further investigated, taking into account the other Gallic tribes and the archaeological data, in

order to map and better understand the spread and the persistence of the written habit in the Gallic language during the Principate.

370 A MUSEUM BY THE EYES OF WOMEN ARCHAEOLOGIST: A PERUVIAN CASE

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Tavera-Medina, Carito (Departament d'Història i Arqueologia, Universitat de Barcelona (UB), Barcelona, Spain; Instituto Peruano de Estudios Arqueológicos; Universidad Nacional Mayor de San Marcos)

Abstract format: Poster

While museums have historically been among the initial material power institutions created by archaeologists, the distancing that the discipline took with collecting weakened the museums from the perspective of 'the form in which we produce science.' This shift has led to a change in the status hierarchy of what the academy recognizes as a prestigious position. In this way, universities become the primary locus of prestige and power for male archaeologists. However, in the context of the early stages of Peruvian archaeology, a resilience process is evident, wherein women archaeologists redefine the museum as a space for creating and disseminating archaeological knowledge to non-specialist communities.

This poster presents the contributions of three different generations of Peruvian women archaeologists who served as directors of the Archaeological and Anthropological Museum at San Marcos National University during the 20th century: Rebeca Carrion Cachot, Rosa Fung, and Ruth Shady. This investigation reveals their strategies, alliances and achievements during their time as directors.

372 SANDARNA CULTURE THROUGH ARTIFACTS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Zerue, Amanuel (National Historical Museums, Arkeologerna) - Nieminen, Johannes (National Historical Museums, Arkeologerna) - Andersson, Jessica (National Historical Museums, Arkeologerna)

Abstract format: Poster

The Sandarna culture is a Mesolithic culture group that covers an area that extends along parts of the Swedish west coast. It has primarily been defined based on its specific flint industry, dated traditionally to a period from 7,700 BC to 6,000 BC.

Our poster will present the technological analysis of lithic artefacts from two prehistoric settlements belonging to the Sandarna culture that were excavated in 2022 and 2023 in the Gothenburg area. The purpose of our analysis has been partly, to highlight the chronological aspects of the flint materials and partly to illustrate which lithic reduction techniques and processes are represented in the material remains through a chaîne opératoire analysis.

Analyses were made on several attributes of the lithic artefacts, such as dimensions, platform's preparations and facets, bulb of percussion, flaking angles, etc. These attributes often tell us something about the reduction techniques and processing. In such a classification, all artefacts belonging to the same reduction process are compiled and assessed. The results of the analysis are then obtained by interpreting the process of manufacturing and the execution of one or more orders of removal in a lithic reduction process.

The poster will further present the results of our analysis as well as comparisons with previously published studies at the local, regional, and supra-regional levels. Our focus is to try to relate our results to new research which demonstrates that the Sandarna culture's flint technology should be seen as a parallel phenomenon to the Maglemose culture in Southern Scandinavia (Aldén Rudd et al. 2019). In that case, the Sandarna culture would therefore be placed in a larger northern European Mesolithic context. With time, this can lead to a further discussion about mobility and cultural contact networks over the greater area of Northern Europe during the Mesolithic period.

376 WHO LIVED THERE? STUDYING THE TERRITORY FROM THE PERSPECTIVE OF THE ARCHAEOLOGY OF DEATH (5TH-7TH CENTURIES AD) IN SOUTHERN SPAIN

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Sánchez, Irene (Universidad Rey Juan Carlos)

Abstract format: Poster

This proposal arises from the question: Who lived there? When we do not have sites of a residential nature located in the rural sphere, we have to study the territory from another perspective, based on the funerary record. The selected chronology under study ranges from the 5th-7th centuries AD, since it is known that some necropolises were in use since the 5th century AD, being reused during the following centuries. Furthermore, in the region under study, southern Spain, three population groups -Hispano-roman, Visigoths and Byzantines- 'coexisted' from the 6th century AD onwards. For these two reasons, this chronology has been chosen as the focus of this research.

The aims of this research are summarised in the following objectives:

- To carry out a study based on the population density of the southern area of Spain from the graves of the rural necropolises during the chronology under study.
- To observe the evolution of the funerary spaces themselves.
- To see the articulation of the sites in the territory (visibility between the funerary sites, communication routes and even the elements that make up the landscape in its orographic sense).

Once the selection of rural funerary sites has been made, we will proceed to use Geographic Information Systems (GIS), as this will allow us to carry out the relevant analyses of territorial visibility between the sites and the territory. The aim is also to understand the interactions between different human groups and their impacts through geospatial analysis.

Finally, and in line with the above, we will proceed to the analysis of the material culture and its chronotypological distribution in the necropolis under study.

In this sense, with the factors described above, we will be able to better understand the territory and estimate the population density based on the burial sites.

383 THE STRAIT OF GIBRALTAR IN THE MIDDLE AGES: HOW TO FORTIFY THE GATES OF THE MEDITERRANEAN

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Biro-Sarrias, Matthias (Universidad de Granada)

Abstract format: Poster

The proposed study will focus on the state of research of architectural archaeology of the fortifications around the Strait of Gibraltar (Spain) between the 9th and the 15th centuries. While many of these fortified sites have been studied in the past (Tarifa, Gibraltar, Algeciras, Castellar de la frontera, etc.), few have undergone in-depth architectural analysis, and some have not been studied at all (Casares, Gaucin). The study of these sites, the collection of new data, and the compilation of architectural data from previously studied sites will enable a large-scale chronological analysis of the evolution of architecture and its relationship with the evolution of borders. Therefore, the objective of this work is to provide a visual overview of significant architectural studies undertaken in the study area, as well as to identify buildings that have not been previously studied. The proposed poster will thus, after a brief contextualization of the research topic and key elements, present, through maps and site photos, the state of research on medieval defensive architecture around the Strait of Gibraltar, as well as future work to be undertaken during the author's investigation.

384 ARCHAEOETHANOLOGY OF THE POSTMEDIÉVAL CEMETERY AT POBĚŽOVICE (THE CZECH REPUBLIC)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Pruchová, Erika (University of South Bohemia; Prácheň Museum in Písek) - Chroustovský, Luboš (University of West Bohemia) - Hiltšcher, Tomáš (Prácheň Museum in Písek)

Abstract format: Poster

The current research of archaeological burial contexts requires interdisciplinary collaboration. Here we present the significant benefits of biological anthropology engaged not only in post-excavation data gathering and processing, but in the collection of the primary data during the fieldwork. This archaeoethanological endeavour aims to reconstruct and characterize burial rite and following formation processes impacting skeletal remains as well as grave goods or grave construction. During the salvage excavation of the postmedieval church cemetery at Poběžovice in the southwestern part of the Czech Republic the detailed taphonomic investigation together with precise 3D spatial documentation of individual objects (skeletal remains and grave goods) were engaged. When these methods are formalized, they enable to reconstruct the spatial distribution of graves (even if grave boundaries cannot be recognized), the original positions of interred bodies (burial rite) or various taphonomic processes and they don't slow fieldwork significantly. Moreover, they produce data that can be easily analysed even when the rigorous post-excavation processing is postponed or abandoned due to the weak financial support.

385 GLASS IN PROGRESS: CRAFT COMPLEXES OF MEDIEVAL KYIV

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Zhurukhina, Olena (The Museum of History of the Desiatynna (Tithe) Church (Kyiv, Ukraine); Leibniz-Institut für Geschichte und Kultur des östlichen Europa (GWZO) (Leipzig, Germany))

Abstract format: Poster

During the Middle Ages, the territory of Kyiv, as the administrative, political, cultural, and economic centre of Rus', accumulated processes that contributed to the development of crafts, internal and external trade relations.

The emergence and development of local glassmaking production became possible after accepting of Christianity and intensifying of the connections to Byzantium through the import of glass products, and of course, the skills and knowledge of the Greek craftsmen. The workshops to produce glassware can be divided into two groups. The first group was located near the temple-building places. These workshops probably appeared in the 11th century and produced glassware for temple decoration (mainly smalt for mosaics, and windowpanes). However, at the beginning of the 12th century, the need to decorate temples with mosaics gradually disappeared. Step by step, mosaics were replaced by a mural.

The second group of workshops appeared in the 12th century and thanks to technologies such as serial winding, focused on a wide market. Most of them are fixed on the Podil district – the craft and trade centre of Kyiv. Glassware from the 12th to the first half of the 13th century is the most numerous and diverse group with new product categories (beads, bangles, finger-rings, inserts for rings and vessels). The glassmaking complexes worked with both imported glass/raw materials and recycled glass products and may have used their own raw materials.

To ascertain the chemical composition of Kyiv workshops glass is important, as well as the comparison it with medieval glass from the lands related to ancient glassworks and traditions. A study found out, that Kyiv glassmaking was based on lead and potassium-lead glass, which is evidenced by the findings of lead ingots, chipped glass, analyses of finished products.

387 ARCHAEOLOGY AND SCIENCE: A DIGITAL TOOL TO FACILITATE THE INTERPRETATION AND SPREAD THE KNOWLEDGE OF FINDS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Chirco, Gabriella (Dipartimento Scienze Tecnologie Biologiche, Chimiche Farmaceutiche – STEBICEF, Università degli Studi di Palermo, Parco d'Orleans II, Viale Scienze 17, Palermo I-90128, Italy; Dipartimento Culture e Società, Università degli Studi di Palermo, Viale delle Scienze 15, 90128, Italy) - Chiari, Giacomo (Getty Conservation Institute (Retired), S. Tommaso 29, 10121 Torino, Italy) - Chillura Martino, Delia Francesca Chillura Martino (Dipartimento Scienze Tecnologie Biologiche, Chimiche Farmaceutiche – STEBICEF, Università degli Studi di Palermo, Parco d'Orleans II, Viale Scienze 17, Palermo I-90128, Italy; ATeN Center-Laboratorio Caratterizzazione Struttura Atomico-Molecolare, Università degli Studi Palermo, Parco d'Orleans II, Viale Scienze 17, Palermo I-90128, Italy; Consorzio Interuniversitario Nazionale per Scienza e Tecnologia dei Materiali (INSTM) - UdR Palermo, Viale delle Scienze 17, Palermo I-90128, Italy) - Portale, Elisa Chiara (Dipartimento Culture e Società, Università degli Studi di Palermo, Viale delle Scienze 15, 90128, Italy,)

Abstract format: Poster

In recent decades science has made giant strides in every field, including archaeological studies.

Archaeometry employs digital media diagnostic tools, enabling the understanding of the composition of materials. This provides information about execution techniques, materials used, and conservation conditions.

However, the data obtained is not always immediately understandable to all professionals collaborating on an interdisciplinary study, and often even less so to the end-users. This limits diffusion of information.

The applications presented here show how low-cost digital tools can facilitate scientific information. Noninvasive tools preserve the object's integrity by eliminating sampling for laboratory analysis, including micro sampling.

The SmART_Scan software, which statistically combines a high-resolution visible image with a relatively small number of X-ray fluorescence spectra acquired at selected points, produces false-color maps showing the distribution of the chemical elements present.

Visualizing the distribution of each element in the painted layer greatly enhances its comprehension. When an element is not indicative of a single pigment, Boolean operators can combine more than one element to build a compound.

In this way, the results are not confined to the sphere of science but can be a good source of dissemination among archaeologists and art historians.

388 INSIGHTS INTO PRODUCTION OF POTTERY FROM THE END OF THE LA TÈNE PERIOD IN CENTRAL EUROPE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Volf, Jan (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic; Department of Archaeology, Faculty of Arts, Charles University) - Slavíček, Karel (Department of Geological Sciences, Faculty of Science, Masaryk University) - Thér, Richard (Department of Archaeology, Philosophical Faculty, University of Hradec Králové) - Trnová, Kristýna (Department of Geological Sciences, Faculty of Science, Masaryk University)

Abstract format: Poster

Pottery surveys enable to study not only manufacturing process but also contacts between communities and organization of societies. Manufacture of ceramic vessels was influenced by multiple factors, such as the raw material used, function of vessels in the society, organization of their production, and cultural conventions. The research of pottery represents an important source of information about changes of society during the late La Tène period in Central Europe. At the end of this period and the beginning of the Roman period, in the first century BC, settlement network and material culture, including pottery, underwent a significant transformation. To understand the characteristics of this transformation, it is necessary to study ceramic assemblages from the end of the La Tène period, specifically from the phase LT D1b. In Bohemia, one of these assemblages is represented by pottery from Křinec in Central Bohemia. Our study of the assemblage from Křinec incorporated macroscopic survey, x-ray fluorescence analysis, thin section analysis and computed tomography. Using these analyses, we have obtained new data on the settlement's position in the regional economic and social network which suggest that at the end of the La Tène period contacts between settlements in the region included the transportation of ceramic vessels or material for their manufacture, but potters from different communities did not share knowledge about pottery production. The presented approach offers a deeper understanding of the organization of society at the end of the La Tène period and demonstrates the potential of multifaceted pottery research in archaeological studies.

389 CULTURAL HERITAGE INSTITUTIONS OF SMALL MEDITERRANEAN ISLANDS. FRAMING AND FACING THE DIGITAL DIVIDE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Di Biase, Federica (University of Cyprus)

Abstract format: Poster

In today's digital era, numerous cultural heritage institutions grapple with a diverse array of technologies to enrich the promotion of their collections and enhance visitors' experiences. Recent reports have highlighted the efforts of well-resourced cultural institutions to bolster their digital presence, while museums and scientific publications have showcased exemplary digital storytelling. The majority of these success stories come from larger, well-resourced institutions and with the capacity to implement robust digital strategies. In contrast, several reports have highlighted the digital divide within cultural heritage institutions networks, but scant evidence exists regarding this issue from small Mediterranean islands. This presentation discusses preliminary results derived from the analysis of the digital portfolios of cultural heritage institutions located on small Mediterranean islands. A detailed examination of the digital assets of each institution is crucial for identifying their skills' gap and charting a tailored learning path built on a needs-based analysis. This digital portfolio analysis, indeed, serves as the initial milestone in a broader project that aims at developing practical, step-by-step guides for creating digital content promoting museums and other cultural institutions in areas that are not easily accessible to the wider public.

395 A VIKING AGE BURIAL GROUND IN TVÅÅKER, COUNTY HALLAND, SWEDEN

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Nordin, Petra (National Historical Museums) - Kjellin, Anders (National Historical Museums)

Abstract format: Poster

This poster is about a Viking age burial site in Halland, Western Sweden. The burial ground is nearly totally destroyed by agriculture and other disturbances. Part of the burial ground was discovered during a pre-excavation survey in 2017. The subsequent excavation uncovered approximately 139 burials or parts of burials, with the help of a systemic method of looking for burials and metal finds. Burials and burial related layers had to be interpreted based on negative impressions in the ground: bone layers on cremation sites, robbed out standing stone pits. Interpretation was further complemented by the finds recovered from the graves, these were mainly Viking-era metal objects and early medieval ceramic sherds from 246 vessels. Metal objects reflect a world of symbolism that we find at this time in Northern Europe. The period around 1000 AD Sweden was changing from hedonism to Christianity, but when exactly did that change take place? The burial ground is only partially excavated (approximately 6%). The overall picture with finds and

symbolic graves with ship shape stone settings, tridents, mounds and standing stones plus a water well indicates that a relatively large population lived here during the Viking Age (Late Iron Age). Technical advances in hydropower and iron making in the area can be traced back to the Viking Age. The oldest traces are located along the river Tvååkersån.

400 TRACKING AN EARLY ATTIC ROAD

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Wagman, Robert (University of Florida) - Nichols, Andrew (University of Florida)

Abstract format: Poster

In this presentation we offer a preliminary investigation of a little known early road in northwest Attica linking the Eleusinian Plain to the highland of Chasia along the southern foot of the central Parnes range. Several elements in this road's construction and layout point to its continuous use from antiquity to modern times as the northernmost connector between the west and east Athenian plain across the Aegaleos-Parnes barrier.

Today the easiest way to access the road is from a trailhead off the main Fyli motorway, in the location known as 'Farangi'. As the name suggests, here a stream called Iannoula carves a narrow defile between the lower folds of the Parnes massif and the hill ridge of Vouno Fylis. Upon approaching the defile, the traces of a low embankment begin to appear underneath the thick shrubbery covering the base of the ridge. Since they are all arranged on the same line, with no further walling above or below them, the remains of this embankment do not seem to be part of a terracing system. Also, instead of running close to the contours of the ridge as an agricultural terrace would do, the embankment follows the course of the modern hiking path as this meanders across the defile on both sides of the streambed. The construction method and the building materials closely resemble those of the surviving sections of the ancient Phyle road, as they can be observed, for example, near the Kleiston Monastery. Most interestingly, a variety of ruined structures are found along the edge of the road, from lime kilns and animal enclosures, to a large settlement with buildings in dry rubble work. Our presentation will cover the topographical and archaeological features of this little-known early road, along with essential information on the hitherto unexplored buildings along its route.

402 A COMPARISON OF TWO APPROACHES FOR ESTIMATING TRAUMA PREVALENCE FROM INCOMPLETE HUMAN SKELETAL REMAINS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Beier, Judith (DFG Center for Advanced Studies 'Words, Bones, Genes, Tools', University of Tübingen, Tübingen, Germany; Paleoanthropology, Institute for Archaeological Sciences, Department of Geosciences, University of Tübingen, Tübingen, Germany) - Santon, Matteo (Ecology of Vision Group, School of Biological Sciences, University of Bristol, Bristol, United Kingdom) - Rathmann, Hannes (Senckenberg Centre for Human Evolution and Palaeoenvironment, University of Tübingen, Tübingen, Germany; Paleoanthropology, Institute for Archaeological Sciences, Department of Geosciences, University of Tübingen, Tübingen, Germany)

Abstract format: Poster

The preservation of archaeological human skeletal remains significantly influences the assessment of past trauma prevalence, as trauma that was once present may be obscured. In this study, we evaluated the performance of two approaches for estimating trauma prevalence from incomplete samples: crude frequencies (CFs) considering only specimens with $\geq 75\%$ completeness, and generalized linear models (GLMs) incorporating specimen completeness as a covariate. Using a simulation framework, we assessed how closely CF- and GLM-based trauma prevalence estimates matched the known prevalence levels of two cranial samples (with benchmarks of 10% and 30%, respectively), after introducing increasing amounts of missing values (resulting in about 20%, 40%, 60%, and 80% incompleteness). Our simulations incorporated empirical data on cranial fracture patterns from real-life forensic and clinical cases alongside patterns of varying completeness observed in archaeological cranial remains. Our results show that at 20% and 40% missing values, CFs and GLMs generated trauma prevalence estimates of comparable accuracy. However, with 60% to 80% missing values, CFs tended to increasingly underestimate the benchmarks, while GLMs tended to overestimate them. CF estimates consistently exhibited a lower precision than GLM estimates across all levels of incompleteness. Additionally, as skeletal preservation decreased, CFs increasingly often yielded incorrect reversed relative prevalence patterns between the two samples, provided estimates of 0% prevalence, and occasionally failed to produce estimates. Owing to their superior performance and analytical versatility, we recommend using GLMs or, preferably, generalized linear mixed models (GLMMs) over CFs, especially when dealing with largely incomplete samples. Furthermore, when skeletal remains are highly incomplete, we suggest focusing on relative GL(M)M prevalence patterns between samples rather than on absolute GL(M)M estimates.

404 REDISCOVERED GLASSES FROM THE NATIONAL MUSEUM IN PRAGUE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Svobodová, Helena (National Museum Prague) - Rohanová, Dana (University of Chemistry and Technology Prague)

Abstract format: Poster

During the study of the collection of Gothic and Renaissance glass in the National Museum's repository, one of the authors noticed glass fragments attached to two cards (numbered 84 and 85), lying on top of a box marked for disposal. It was a surprise to find that one of the fragments belonged to a cage cap, which was a lost piece originally belonging to the Bartholdy collection in Rome. It was drawn among other items in his catalogue created in 1820. We tried to hypothesize how these fragments ended up at the National Museum: Already in 1867, the cage cup fragment appeared in the National Museum in Prague together with four other glass fragments when the archaeological exposition was being prepared. After the exhibition finished, these fragments remained forgotten until their rediscovery in 2020. The other glass fragment attached to card number 84 was a part of flat pane glass. On card number 85, there were two fragments of ancient glasses – a dish decorated with two rows of wheel-cut facets (AR 16.2) and a fragment of a deep bowl with a horizontal handle (Isings 75), both made from natron glass (sodium-calcium). The last piece of glass on card 85 was the bottom of a Gothic Bohemian-type beaker, made from the Regional Gothic type of potassium-calcium glass.

405 MULTICULTURALITY, ECONOMIC PATTERNS AND TRADE DYNAMICS IN THE NEW CARTHAGINIAN CITY OF IBERIA: THE PROJECT #PRODUCINGANDSUPPLYINGQART-HADASHT

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Cutillas-Victoria, Benjamin (Universidad de Murcia; Institute of Nanoscience and Nanotechnology, NCSR Demokritos.) - Ramallo Asensio, Sebastián (Universidad de Murcia) - Martín Camino, Miguel (Museo Arqueológico Municipal de Cartagena)

Abstract format: Poster

This poster introduces the main objectives of the project "Producing and supplying the new Punic capital of the Western Mediterranean: contextualisation and archaeometric characterisation of ceramic materials from Qart-Hadasht". We focus on the ceramic assemblages assigned to Qart Hadasht, the town founded by the Carthaginians in 228 or 227 BC, identified under present-day Cartagena (Spain). Scholars to date have mainly focused on typological and descriptive issues. However, our main objective is to complete this perspective with the application of characterisation analyses (e.g. XRF, pXRF, XRD, SEM-EDS, OM, TG) to determine the consumption, production and exchange patterns of the Punic city. This approach allows us to go deeper into the possibilities of the archaeological record, being able to explore specific questions such as the areas of production, the raw materials selected, the technological strategies and chaînes opératoires, or the trade networks that were established at local, regional and trans-Mediterranean scale. The presentation will address the objectives of the project and present the preliminary data and its archaeological implications.

408 DRIFT CAPACITY OF RIVER CURRENTS FROM THE POINT OF VIEW OF ARCHAEOLOGICAL ARTIFACT TRANSPORTATION

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Machová, Barbora (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic) - Hradilek, Václav (Faculty of Environmental Sciences, Czech University of Life Sciences Prague)

Abstract format: Poster

The issue of transporting archaeological river finds due to the transporting capacity of river currents is crucial in any attempt to assess the distribution of archaeological artifacts within riverine cultural landscapes. The transporting capacity of the current depends on many factors, and its simulation is not straightforward. The main factors include hydrological and geomorphological characteristics of the watercourse on one hand, and the material, shape, and weight of the archaeological artifact on the other. In order to better understand the distribution of river finds in a specific area, we have decided to conduct an experiment aimed at evaluating the transporting capabilities of the Jizera River in selected sections. Three main variables were introduced into the experiment: (i) Locations of fords in as natural a state as possible; (ii) Several types of archaeological artifacts commonly found in watercourses; (iii) Time.

For the implementation of the experiment, we selected three fords in chosen sections of the Jizera River. Bathymetric measurements were conducted at all sections using the RiverSurveyor M9 sonar, confirming the suitability of the selected sites. As test artifacts, replicas of an iron horseshoe, bronze axe, silver coin, ceramic vessel, and stone beads on a natural string were selected. The first phase of the experiment took place during suitable hydrological conditions,

when it was possible to ford the river without difficulty. The primary goal of the first phase was to select the placement of objects in the fords. The positions of the placed objects were then monitored every two months.

The presented contribution aims to acquaint readers with the first phase of the experiment, which focused on establishing a method for describing bedload transporting processes of the river. Furthermore, it highlights the actual placement of objects at the ford locations and the initial monitoring of their transport.

409 ENHANCEMENT OF GEOPHYSICAL DATA USING DATA SCIENCE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Oliveira, Rui (University of Évora - Institute of Earth Sciences; University of Évora - Physics Department; University of Évora - Earth Remote Sensing Laboratory) - Caldeira, Bento (University of Évora - Institute of Earth Sciences; University of Évora - Physics Department; University of Évora - Earth Remote Sensing Laboratory) - Borges, José (University of Évora - Institute of Earth Sciences; University of Évora - Physics Department; University of Évora - Earth Remote Sensing Laboratory) - Bezzeghoud, Mourad (University of Évora - Institute of Earth Sciences; University of Évora - Physics Department; University of Évora - Earth Remote Sensing Laboratory)

Abstract format: Poster

In geophysical prospection it is quite common that the results are not very clear regarding the existence of buried structures, despite the good terrain conditions and the efficiency to carry on the methods. A detectability problem related to low signal-to-noise ratio has been identified. The problem can be caused by excessive overturning of structures and ceramic remains, or soil properties that are averse to methods such as ground-penetrating radar and magnetic. Standard processing for both methods is unable to effectively eliminate or mitigate this effect. Therefore, advanced, and customized processing can contribute to solving the problem. We highlight the use of mathematical transformations combined with matrix factorization techniques, which allow easier and less computationally intensive data manipulation. The application of these operations allows the improvement of geophysical data despite an apparent lack of information.

Acknowledgment: The work was supported by the Portuguese Foundation for Science and Technology (FCT) project UIDB/04683/2020 - ICT (Institute of Earth Sciences).

412 NEANDERTHALS AND ANATOMICAL MODERN HUMANS AT CUEVA DEL ARCO (MURCIA, SPAIN). COMPARISON OF THEIR HUNTING AND CONSUMING PATTERNS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Real, Cristina (Universidad de Valencia) - Román, Dídac (Universitat Jaume I) - Martín-Lerma, Ignacio (Universidad de Murcia)

Abstract format: Poster

Cueva del Arco is an archaeological site situated in the Mediterranean region of the Iberian Peninsula. The site comprises several cavities, named A to E, which contain a sequence from the Palaeolithic to the Neolithic period. Cavity D is particularly noteworthy for its Palaeolithic art. The most comprehensive and well-represented sequence from the site is found in cavity A, where levels from the Middle Palaeolithic and Upper Palaeolithic have been identified. This study presents the analysis of faunal remains from level III (Mousterian, older than c. 55 ka BP) and level II (Gravettian, ca. 33.8–32.0 ka cal BP) found in this cavity.

The main objective of this work is to compare the subsistence behaviour of two distinct human groups, Neanderthals and Anatomical Modern Humans, who used the same dwelling. A zooarchaeological and taphonomic analysis was conducted to achieve this goal.

The assemblages consist of several species of ungulates, carnivores, and leporids. Leporids are the most abundant group (ca. 90%), while ungulates mainly comprise *Capra pyrenaica*, with few remains from *Bos primigenius*, *Equus ferus*, and *Cervus elaphus*. The assemblage is highly fragmented and diagenetically altered, though some anthropogenic and non-anthropogenic modifications could be identified.

The comparison reveals minor variations in the taxonomic composition, age-at-death, and resource exploitation, including thermal alterations, percussion marks, cut-marks, and non-anthropogenic modifications. Additionally, the study of the material culture suggests that both Neanderthal and Gravettian human occupations were brief and infrequent, and faunal study should help to better understand their nature.

413 PITS AND PEOPLE: BIOMOLECULAR, OSTEOLOGICAL AND FUNERARY APPROACHES TO THE HUMAN REMAINS FROM DANEBURY IRON AGE HILLFORT

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Bleasdale, Madeleine (University of York) - Fischer, Claire-Elise (UiT - Norges Arktiske Universitet; Tromsø Museum - Universitetsmuseet) - Metz, Sebastian (University of York) - Castells Navarro, Laura (University of York) - Büster, Lindsey (Canterbury Christ Church University; University of York) - Legge, Michael (University of York) - Evans, Jane (National Environmental Isotope Facility, British Geological Survey, Keyworth) - Wagner, Doris (National Environmental Isotope Facility, British Geological Survey, Keyworth) - Reich, David (Department of Genetics, Harvard Medical School) - Armit, Ian (University of York)

Abstract format: Poster

Danebury Hillfort (c. 550 - 100 BC) is one of the best known Iron Age sites in Britain and has served as a focal point for discussions surrounding social organisation at this time. Excavations led by Barry Cunliffe (1969-1988) unearthed approximately 300 deposits of human remains (e.g. pit 'burials', partially articulated remains, isolated bones). Despite the significance of Danebury within its regional context and its vital contribution to our wider understanding of Iron Age society, questions remain about the interconnectedness, residential origins and social structure of the buried community. Here we present new multiproxy results (DNA, isotopes, osteology) to tackle these important questions.

Previous isotope results of animals from Danebury show significant levels of mobility (Hamilton et al. 2019). These data have been used as a proxy for human mobility to challenge concepts of Iron Age communities as predominantly sedentary. To further explore this, we generated genetic data (n = 90) and applied a multi-isotope (Sr-Pb-O-C) approach to over forty (n = 41) individuals. We confirm the presence of non-locals who spent their childhood elsewhere but came to be buried at the hillfort as adults. We also identified a core local group who likely lived and died at Danebury. This multidisciplinary approach has offered fresh insights into the lives of the Danebury community and through comparisons with neighbouring sites (e.g. Suddern Farm) will be woven into broader narratives of mobility and connectivity during the British Iron Age.

414 PRYSSGÅRDEN - SUSTAINABILITY AND CHANGE OVER 5 000 YEARS OUTSIDE THE MODERN CITY OF NORRKÖPING, SOUTHERN SWEDEN

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Sjölin, Marita (National Historical Museums) - Larsson, Fredrik (National Historical Museums) - Asserstam, Marcus (National Historical Museums)

Abstract format: Poster

In the early 1990's vast archaeological excavations in Pryssgarden, Norrköping, revealed a substantial settlement with 90 well-preserved remains of post-structured buildings dating from 4000 BC - 1200 AD. Alongside the buildings were numerous activity areas dedicated to cooking and crafts as well as a large number of enclosures. There was also a considerable ceramic material with various pots and a unique tuyères.

Pryssgarden is located near the important river Motala Ström which provided excellent communications to the inner of Sweden as well as the Baltic Sea. Within 1 km lies one of Sweden's most significant rock carving sites, Himmelstalund. Alongside the river were easy manageable soils and fruitive pastures.

Currently new excavations 2022-2024 have so far revealed at least 10 farms consisting of more than 100 post-structured buildings and 6 pit-houses from approximately 4000 BC-1200 AD. Furthermore 10 sill-stone houses from 1200-1600 AD. The latter are the remains of a well remained rectory farm.

The current excavations focus on the farms and the household as well as the surrounding landscape and the local society in the form of extended villages. The questions of the project center on sustainability and change over a long period of time. This deals with questions of how long the individual farms has survived, strategies for their survival in time of crises, for instance times of pest, war or climate change. Other questions concern strategies for crops, husbandry, various handcrafts, trade and other subsidiary incomes.

In this poster we will present two distinctive farms; First a late bronze Age farm with a three-aisled longhouse containing a large underground storehouse; Second an Iron Age farm with a 30 m long three-aisled longhouse, a well-preserved fenced courtyard, corrals and an associated economy building.

MODELLING (AND SIMULATING) ANCIENT LANDSCAPES AND IDENTITIES RETHINKING LIMINALITY OPEN ACCESS DATA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Limina, Valentina (Université Catholique de Louvain)

Abstract format: Poster

RELOAD is a post-doctoral project funded by FNRS at UCLouvain. The aim of the project is to re-evaluate the marginal areas of northern Tuscany through Volterra's case study. The ultimate aim of the project is to contribute to the re-evaluation of the role of 'liminal' areas - in the wider sense of the term, that is, marginal as border areas, but also as real or perceived physical barriers - in landscape studies to demonstrate their pivotal role in space perception and in the expressions of identities between the Roman conquest and late antiquity. The project's ambition is to propose an innovative interpretative model thanks to the integration of legacy data, the collection of new data from archaeological field survey campaigns, data management on the GIS platform and the application of Agent-Based Model Simulation in NetLogo. Indeed, RELOAD intends to be part of the wider debate on Resilience theory and it adopts, for the first time, the concept of Anti-fragility in archaeology. The elaboration of archaeological data and the simulation of social dynamics within a virtual environment will allow analysis of complex behaviours, prompting a deeper understanding of how social groups perceived boundaries and shaped their identities along with the landscapes. In the end, the project shows how an integrated approach to the complexity of ancient landscapes, assisted by ABMS techniques, could help bridge the gap between disciplines, promoting sharing, reproducibility and standardisation of data and practices.

HIPPONION - VIBO VALENTIA: ONE HUNDRED YEARS AFTER PAOLO ORSI, NEW DATA FROM THE "BELVEDERE TELEGRAFO" SANCTUARY

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Mazza, Michele (Ministry of Culture)

Abstract format: Poster

In this paper we will present the data that emerged from a brief archaeological survey carried out during the redevelopment of the area of the municipal administration of Vibo Valentia, on the area of the sanctuary of Belvedere Telegrafo. The sanctuary on the hill of Belvedere-Telegrafo (today the Park of Remembrance), stood to the north of the plateau on which Hipponion was founded. Here, in 1916, P. Orsi brought to light the remains of the base of the most monumental of the hipponiate buildings known so far, spared by the stone quarrymen only in the eastern part of its foundations. From the evidence collected, however, P. Orsi was able to reconstruct a Doric temple measuring 37.45 x 20.50 m, built in limestone, with a cella (naos) preceded by an atrium (pronaos) and a deep room behind it (adyton). The cella was surrounded by a colonnade with a single row of columns (peripterus). The proportions of the temple, slightly elongated, are unparalleled by contemporary sacred buildings in Western Greece. The excavation was carried out in a hurry, and the data collected did not allow us to better understand the limits of the sanctuary, but above all to identify its tutelary divinity. With the excavation conducted in 2023, additional elements have emerged that allow us to provide further data on the chronology of the sanctuary.

THE BELL BEAKER PHENOMENON IN LIGURIA (ITALY): CURRENT STATE OF RESEARCH AND NEW PERSPECTIVES

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Doderò, Chiara (University of Genoa)

Abstract format: Poster

During the late phases of the Copper Age, traces of the Bell Beaker phenomenon are also known in Liguria. Its spread is attested in at least nine sites, most of which are located in the western part of the region. The evidence in question comes from sporadic discoveries, from the results of old or not yet fully published research, from preliminary studies or, finally, from contexts in non-primary deposits. Rare are the more substantial traces from stratified contexts. A recent study, by re-examining the Bell Beaker and the common pottery from one of these sites, Pianaccia di Suvero (SP), has made it possible to clarify the characteristics, chronology and relationships with neighbouring areas of this context during the Bell Beaker phase. In the light of these results, a broader research project has been launched, which aims to provide a global description of the characteristics and dynamics of the spread of the Bell Beaker phenomenon in Liguria, through a complete analysis of the material culture of the Bell Beaker sites and of some sample sites that can be broadly attributed to the Copper Age. The aim of this paper is therefore to describe the current state of research on this important phenomenon, to provide an initial framework for reading, and to outline the current prospects for ongoing research on the available material evidence.

FOOD TECHNOLOGY AND DIETARY HABITS IN THE IRON AGE: NEW GAS-CHROMATOGRAPHIC DATA FROM THE VERONA AREA (NORTHERN ITALY)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Migliavacca, Mara (Department Cultures and Civilization University of Verona) - Bandera, Silvia (Department Cultures and Civilization University of Verona) - Donadel, Valentina (Department Cultures and Civilization University of Verona) - Pogietta, Luigi (Department Cultures and Civilization University of Verona)

Abstract format: Poster

The gas chromatographic analyses carried out by University of Verona on the selected samples from Iron Age settlements in the Verona area have provided valuable insights into the dietary habits of the inhabitants during that time period. By analyzing the residues found on the pottery items, we have been able to reconstruct the types of foods and beverages that were consumed, as well as the methods of food preparation and preservation.

In particular, the results of the analyses suggest that there was a wide variety of foods consumed by the Iron Age population in Verona. The presence of plant and animal lipids on the pottery items indicates that both plant-based and animal-based foods were part of their diet. Additionally, the presence of dairy lipids suggests that dairy products such as milk and cheese were also consumed.

Furthermore, the different shapes and functions of the pottery items provide insights into the food technology used during the Iron Age. For example, the presence of dolia for conservation, plates and jars for preparation, and bowls and cups for consumption suggest that the inhabitants had developed sophisticated methods for storing, preparing, and consuming their food.

Overall, the results of the analyses shed light on the food choices, dietary habits, and food technology of the Iron Age inhabitants of the Verona area. Future research will continue to explore these aspects in order to gain a better understanding of the culinary practices of this ancient population.

POOR WOMEN, RICH MEN? WHEN SEX AND SOCIAL STATUS INTERTWINE: THE CASE OF THE LINEARBANDKERAMIK CULTURE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Waldvogel, Laura (Université de Strasbourg)

Abstract format: Poster

In archaeology, assessing the wealth of graves often relies on counting the number of objects and/or object categories they contain, although ethnological data has long shown the limits of this approach. In fact, in traditional societies with "socially useful wealth", comparable to Neolithic societies due to their practice of storage, objects requiring a great deal of labor and made from distant raw materials are socially valued and perceived as wealth ("precious" goods).

With this framework in mind, I used a points-based method which considered these two criteria and applied it to the 6 main graveyards of the Linearbandkeramik culture (LBK). The results showed a partition of the buried population into three wealth groups. The first one is the poorest, and the tombs related to it are devoid of "precious" goods: those only belong to the two richest groups (groups 2 and 3), which are distinguished between themselves by the greater number of such objects in group 3. By comparing these data with the biological sex of the dead, I found that these two groups systematically included a majority of male individuals, as long with a smaller number of females and immatures. Furthermore, among the "precious" goods found in groups 2 and 3, specific types of adornment were worn only by a fraction of the deceased, with sex being one of the archaeologically discriminating criteria behind this divide. The most notable case is that of V-shaped Spondylus and bifurcated Spondylus shells, whose systematic location around the pelvic area suggests similar use for both sexes: while the former are worn by men, the latter are associated with women. These elements therefore show that, in the LBK societies, there were groups of individuals who distinguished themselves from one another through social status. However, these groups also knew internal differentiation based on their sex.

MEALS FOR THE DEAD? INVESTIGATING THE INTERSECTION OF FOODWAYS AND FUNERARY PRACTICES IN ROMAN BRITAIN VIA ORGANIC RESIDUE ANALYSIS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Jones-Williams, Medi (University of Bristol)

Abstract format: Poster

In my research project, I am exploring the intersection of foodways and funerary practices in Roman Britain by conducting the first large-scale study of Romano-British accessory vessels, employing organic residue analysis (ORA). My samples derive from distinct 3rd-century funerary contexts at Brougham, York, and Colchester. My case studies

will offer unique insights into the contrasting characters of Romano-British sites, from remote military cemeteries to cosmopolitan urban centres. Based on ceramic variability at each site, the chosen methodology ensures a nuanced exploration of vessel function across settlement hierarchies and regions. Results will be compared with new residue data from domestic assemblages, contributing to our understanding of these key Romano-British sites.

Research on archaeological biomarkers has revolutionised our understanding of ancient foodways. Utilising gas chromatography (GC), gas chromatography-mass spectrometry (GC-MS), and GC-combustion- isotope ratio MS (GC-C-IRMS), I will identify biomarkers that characterise the nature of substances, both food and non-food, stored or prepared within the vessels before deposition. Results from ORA are particularly powerful in contexts lacking historical evidence of non-elite lifeways, like Roman Britain. Moreover, highly acidic soils on the frontier limit skeletal and zooarchaeological evidence.

Using a novel multidisciplinary approach, my research will enrich our understanding of later Roman Britain, a culturally complex society undergoing social, economic, and environmental changes. The findings will contribute to the reconstruction of vessel function, patterns of consumption, and diversity in burial traditions on an inter- and intra-site level, considering the economic, political, and cultural position of Britannia in the wider context of the Roman empire.

This poster will introduce the research aims, case study sites, and material being investigated for this project. Methodologically, my project combines material culture analysis with new organic residue data and the existing archaeological and zooarchaeological evidence, providing a comprehensive understanding of foodways, and the function(s) of accessory vessels.

436 WIVES, WIDOWS AND UNMARRIED – WOMEN'S AGENCY IN EARLY MODERN TOWN

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Niemelä, Tia (University of Helsinki) - Uotila, Kari (University of Helsinki; University of Turku; Muuritutkimus Oy)

Abstract format: Poster

In the early modern period Finland (in this case, from AD 1650 to the early 19th century), women were unable to run businesses or have merchant status. Nonetheless, in some cases, widows took responsibility for their late husbands' businesses and retained autonomy to remarry or remain widowed. Historical archaeology within the feminist framework provides an opportunity to investigate women's agencies using archaeological data from excavations, together with archival material. This study aims to combine materials from recently excavated large-scale urban site in Turku Market Square in Southwest Finland with historical written sources, such as probate inventories from the early 19th century.

Early modern women were not mentioned in archival materials as much as were men. The underrepresentation of women can be explained simply by the fact that written sources usually contain only those in power who were men at that time. To overcome this challenge, this poster presents five case studies in which probate inventories are used together with archaeological material to research the complexities of women's agencies in the early modern period at the micro-level through material culture.

438 SICULI (RESNIK, CROATIA) IN UNDERWATERMUSE PROJECT

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Bralic, Anamarija (Muzej grada Kaštela) - Kamenjarin, Ivanka-Katya (Muzej grada Kaštela)

Abstract format: Poster

The Adriatic Sea has been, for thousands of years, an important traffic link. This traffic left numerous traces of ancient routes, ruins, harbors, and cities. The Underwater Muse project includes several sites in Croatia and Italy (Torre Santa Sabina, Grado, Siculi/Resnik, Venice Lagoon). These sites exhibit strong diversity and are characterized by their rich cultural heritage. Through innovative and experimental methodologies, the project's objective is to transform these sites into an underwater archaeological park. In Siculi/Resnik, for almost three decades, the Museum of the Town of Kaštela has conducted research on the mainland. But now, with underwater archaeology, we are able to reach new comprehension about the Hellenistic settlement, Roman harbor, and remains of Neolithic settlement.

The UnderwaterMuse project extends beyond just archaeological preservation; it also offers a new model for engaging with our underwater cultural heritage. The initiative aims to make these underwater sites more accessible and understandable to a broader audience, ensuring that the legacy of these maritime landscapes is preserved for future generations while also promoting regional economic development.

By combining cutting-edge technology with experimental methodologies, the project seeks to reduce the loss of cultural heritage and enhance the tourist-cultural promotion of the areas involved. The UnderwaterMuse project represents a unique blend of archaeology, technology, and tourism, offering a sustainable and inclusive approach to engaging with underwater cultural heritage.

447 COME TOGETHER. CONNECTING DEMOGRAPHY AND CENTRALIZATION PROCESSES IN THE EUROPEAN IRON AGE

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Quatrelivre, Carole (SFB 1266, Christian-Albrecht Universität zu Kiel (DE); CNRS UMR 8546 Aoroc (FR)) - Bilotti, Giacomo (SFB 1266, Christian-Albrecht Universität zu Kiel (DE)) - Scholtus, Lizzie (SFB 1266, Christian-Albrecht Universität zu Kiel (DE)) - Zeviani, Camilla (SFB 1266, Christian-Albrecht Universität zu Kiel (DE); McDonald Institute for Archaeological Research, University of Cambridge (UK)) - Nakoinz, Oliver (SFB 1266, Christian-Albrecht Universität zu Kiel (DE))

Abstract format: Poster

Since Arlinghaus, central place theory relies on a Zipf or Pareto distribution, which states that the hierarchical level of a central place in a system is correlated to its size in population. The more people a place has, the more it is likely to expand its central functions. The archaeological translation of this distribution, called the rank-size rule, uses the spatial extent of sites as a proxy for population. However, recent regional studies imply that centralization processes may have been out of sync with demographic evolutions. This discrepancy points to more diverse paths to centrality taken by past societies. We analyze this inconsistency by assessing centralization and population dynamics separately and by looking at variations in the relationship between these two indicators.

Three windows into the European 1st millennium allow us to compare how both criteria behave, independently and together, in different socio-political and cultural contexts: 1. Central Italy, 2. South-West Germany and Eastern France, 3. Northern Germany and Denmark.

Integrating central place theory and network theory, our method for assessing centrality focuses on the intensity of interaction on a local and global scale, in different areas of central functions, such as economy, politics, military and symbolic. The resulting empirical model of centralization process for each window will be compared to demographic estimations. Relative population fluctuations are analysed combining the available archaeological data. Radiocarbon data is used whenever available, comparing it to site count and variation in settlement dynamics (house size variation and houses per settlements) in order to identify significant patterns of boom and bust.

By testing centralization and population growth as individual variables, we will characterize contrasting trajectories of State formation north and south of the Alps, from Etruscan cities to Celtic Princely Seats, and we will consider the integration of the Cimbrian peninsula in global European phenomena.

448 QUARTZ EXPLORATION AND USE DURING THE MIDDLE PALEOLITHIC: INSIGHTS FROM CARDINA-SALTO DO BOI (GUARDA) AND FIGUEIRA BRAVA CAVE (SETÚBAL), PORTUGAL

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Melo, Maria (UNUARQ - Centre for Archaeology. School of Arts and Humanities. University of Lisbon) - Ramos, Patrícia (CITCEM - School of Arts and Humanities. University of Porto)

Abstract format: Poster

Throughout the Middle Palaeolithic, human groups adapted to different environmental constraints. This can be acknowledged when considering the diverse array of raw materials chosen to produce tools, as evidenced by the studies of multiple assemblages of knapping remains recovered from all over Europe. Technological analysis of assemblages is well established for flint, whereas lithic industries in quartz have been largely neglected by scientific researchers until recently.

Although it has been considered a "second-rate" raw material, due to its susceptibility to fracture, quartz emerges as the main resource exploited at numerous sites across the Iberian Peninsula. Such is the case of the Cardina-Salto do Boi and Figueira Brava cave, in Portugal. These two sites, with occupations ranging from MIS 6 to MIS 3, hold significant potential, not only for providing very complete lithic assemblages but also for providing insight into the diachronic variation of the chaîne opératoire of quartz knapping. The archaeological findings from these sites can enhance our understanding of knapping behaviours among Neanderthal groups, particularly because their disparate geographical locations—inland and coastal, respectively—imposed different adaptation requirements.

Here we discuss the data from an investigation that involved a comparative analysis of knapping techniques and raw material use across various phases of occupation at both sites. Overall, our findings indicate that the challenges posed by the high fragmentation rate of quartz can be overcome through the application of specific techniques and their diversification, emphasizing the inherent adaptability and versatility of this raw material.

449 TEXTILE ECONOMIES IN TRANSITION FROM PLANT FIBRES TO WOOL IN BRONZE AGE NORTHERN ITALY: EXPERIMENTAL AND ARCHAEOLOGICAL EVIDENCE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Bertoli, Maria Elena (University of Glasgow)

Abstract format: Poster

The transition from plant to wool fibre textile economies in northern Italy during the Bronze Age (c. 2200-1200 BCE) is a crucial economic juncture. The adoption of wool would have affected many aspects of daily life, such as the social organization of textile production, animal husbandry, and breeding forms.

In northern Italy, Bronze Age pile dwellings allowed optimal preservation of plant fibre textiles. However, they are humid alkaline environments, which result in the near complete decay of the protein matter, such as wool.

Rare wool fabrics in northern Italy come from a few sites of the Middle-Late Bronze Age, such as Molina di Ledro (TN) and Castione dei Marchesi (PR).

However, numerous textile tools, such as spindle whorls and loom weights, found in the pile dwellings and Terramare sites suggest from the Early Bronze Age, wool played a consistent role in their economy. Changes in these textile tools in the transition from the Early Bronze Age to the Middle Bronze Age have been linked to the adoption of wool, but this hypothesis has never been verified.

To address this gap in academic knowledge, I will present an early stage of the research, focusing on the analysis of the textile tools discovered in the Bronze Age pile dwellings and Terramare sites in northern Italy. To date, these textile tools have been mainly studied through a typological analysis.

In the paper, I will present the preliminary results of the functional analysis conducted on clay replicas of archaeological loom weights, used in weaving experiments on a warp-weighted loom.

451 DEATH IS NOT THE END - A CASE STUDY OF 'COFFIN WEAR' ON BRONZE AGE DISARTICULATED HUMAN REMAINS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Grzybowska, Milena (Archaeological Research Services Ltd)

Abstract format: Poster

The recognition and investigation of taphonomic effects is woefully underrepresented in analyses of human remains. When pursuing an understanding of osteobiographies, investigation of the skeletal remains often fails to address the question of post-depositional history of any studied individuals. This case study attempts to demonstrate the value of the most basic examination of post-depositional changes to human bone, while addressing a poorly understood history of disarticulated bone from prehistoric contexts.

Analysis focuses on the spatial distribution of areas of cortical and trabecular erosion across disarticulated skeletal elements of a male individual recovered from a Bronze Age ditch terminus in Kent, United Kingdom. When zones of skeletal erosion are correlated with recovery position and orientation of the skeletal elements, it becomes evident that the individual was redeposited having initially been placed in a 'coffin-like' environment with the erosion zones appearing after the decomposition of soft tissues and cortical erosion. The structure and distribution of the eroded areas is characteristic of 'coffin wear' (e.g. Pokines et al. 2016) with the implied deposition of the male in a supine extended position within a non-homogenous and relatively non-permeable environment, likely a wooden coffin, prior to the redeposition of his disarticulated remains in a ditch. Contextualised macroscopic observations of post-mortem bone erosion point towards an intentional reworking of these skeletal materials and highlights the value that human remains were afforded likely years after death of an individual.

452 (DE)CONSTRUCTING CULTURE - P-XRF AND ARCHAEOLOGICAL STUDIES ON LA HOGUETTE POTTERY

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Schauer, Michaela (Vienna Institute for Archaeological Science (VIAS); CIfA Deutschland)

Abstract format: Poster

Pottery is a key artefact in archaeology, providing insights into past cultures. Among these, the La Hoguette (LH) pottery stands out, appearing between the late 6th and early 5th millennia BC across a wide geographical area encompassing regions from the Atlantic coast to northern Bavaria, the Rhone valley and the Netherlands. Contemporary with the Linear Pottery Culture (LBK), LH pottery has been the subject of ongoing debate as to its origins and cultural significance.

Scientific research has presented two main contrasting theories regarding the origin of LH pottery: A) attributing it to a Western European Mesolithic society based on typological analysis, and B) considering it as a special type of pottery within the LBK repertoire due to its frequent occurrence alongside LBK artefacts. Recent archaeological studies have also revealed common technological features between LH and LBK, with clear similarities in tempering and shaping techniques. In addition, the newly discovered possible common origin in the Balkans suggests a close relationship between the two.

To help resolve the debate portable X-ray fluorescence (p-XRF) analysis was used to examine the chemical composition of LH and LBK pottery, daub and clay from three key settlements. The results indicate that LH and LBK pottery in all cases was produced locally, using local clays or loess. In addition, the study revealed different technological approaches within the same settlement, which were nevertheless used to produce both LH and LBK pottery. Therefore, the results support the hypothesis that LH pottery was likely produced by specific cultural lineages of the LBK, indicating LH as a subculture or specialised pottery technology within the broader LBK pottery tradition.

455 USING POLLUTION AS A SOLUTION: NOVEL APPLICATIONS OF SULPHUR ISOTOPES IN EIGHTEENTH AND NINETEENTH CENTURY KINGSTON-UPON-HULL, ENGLAND

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Hinch, Noel (Durham University) - Montgomery, Janet (Durham University) - Kendall, Ellen (Durham University) - Rogers, Bryony (University of Bristol) - Moore, Joanna (Durham University) - McIntyre, Lauren (Oxford Archaeology) - Loe, Louise (Oxford Archaeology) - Gröcke, Darren (Durham University)

Abstract format: Poster

Stable sulphur isotopes are a relatively underutilised tool in archaeological studies, with limited research reconstructing mobility patterns and/or subsistence strategies prior to industrialisation. Due to the marginal isotopic fractionation when metabolised and incorporated into food chains, sulphur isotopes provide direct evidence for the environmental provenance of consumed resources with generally marked differences between terrestrial and marine origins. However, these interpretive pathways remain highly contested and understudied given the complexity of the sulphur cycle when factoring in biogenic and anthropogenic sources—the latter being completely neglected in bioarchaeological research. A primary concern when measuring archaeological samples for sulphur stems from the issue of industrial pollution likely altering the isotopic values, which hinders the viability of proxies and comparative data geo-temporally. To better understand the impact of pollution on sulphur isotopes, this study explores a unique population of 61 individuals from the port-city Kingston-Upon-Hull, England during the Industrial Revolution. Sulphur isotopic data from the rib collagen of the Trinity Burial Ground (c. 1785-1861) assemblage demonstrates how the interpretive value of sulphur can be strengthened and supplemented to incorporate novel investigations into urban industrialisation, pollution exposure, and subsequent diseases. The findings indicate that females possibly experienced more vulnerability to sulphuric pollution than males, possessing values similar to those in the population with evidence of respiratory disease. While a pioneering implementation of sulphur isotopes, this study acknowledges the lingering complications, namely: the unestablished proportionality of sulphuric inputs to human collagen biochemistry. Nevertheless, the results show a successful means of attempting to remodel these persistent challenges into a notable advantage, as it is the first to address the presence and impact of industrial pollution on humans in the past using sulphur isotopes.

459 EXPLORING IRRIGATION AND INTENSIVE LAND-USE IN SOUTHERN HISPANIA TARRACONENSIS: THE STILLA ARCHAEOLOGICAL PROJECT

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Mateo Corredor, Daniel (University of Alicante; Catalan Institute of Classical Archaeology (ICAC)) - Grau Mira, Ignacio (University of Alicante) - Molina Vidal, Jaime (University of Alicante) - Sarabia Bautista, Julia (University of Alicante)

Abstract format: Poster

In recent years, the field of Roman landscape studies has witnessed a significant paradigm shift, challenging long-held agrarian theories centred on the villa system. The STILLA project aims to address this historiographical gap by investigating the Intensive land-use and agro-hydraulic systems in the southern region of Hispania Tarraconensis from 1st century BCE to 5th century CE. This research focuses on examining the intricate relationships between cultivated terrains, hydraulic structures, and socio-economic factors.

Employing a diverse range of methodologies, including cutting-edge geospatial technologies, non-invasive archaeological techniques (such as LiDAR, comprehensive surveys, and geophysical surveys), and excavations, we seek to uncover the underlying connections among irrigation systems, agricultural productivity, and local distribution networks, overcoming the traditional view of the ancient agrarian space as subsidiary to the urban nuclei and networks.

Additionally, this investigation involves specialised analytical methods like geochemical, micro-stratigraphic, and palaeobiological analysis.

This poster will present the main characteristics and objectives of the project, as well as the initial steps taken.

462 ABOUT THE FUNCTIONAL USE OF PICKS BY THE LINEAR BAND POTTERY CULTURE COMMUNITIES IN THE UPPER VISTULA BASIN (S POLAND)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Szeliga, Marcin (Institute of Archaeology, Maria Curie-Skłodowska University in Lublin) - Osipowicz, Grzegorz (Institute of Archaeology, Nicolaus Copernicus University in Toruń) - Bosiak, Mariusz (Faculty of Chemistry, Nicolaus Copernicus University in Toruń)

Abstract format: Poster

Picks are extremely rare artefacts associated with flint inventories of the Linear Band Pottery (LBK) culture in central and western Europe. This situation is also very clearly legible in the northern foreland of the Carpathians. Previously, only three such artefacts attributed to this culture were found in the drainage basins of the Vistula and Oder Rivers. Discovery contexts of picks dated to slightly later times indicated that they should be linked with mining activities of early agricultural societies. The presented research results concern collection of this type of tools from the LBK settlement in Wólka Wojnowska (S Poland). Currently, it is one of the most numerous typological series of picks found at a single site within the entire range of the LBK. The results of traceological and chemical SEM-EDX analyses of residues preserved on their surfaces indicate that these tools were used in processing hematite in order to produce ochre. The obtained data considerably broaden the scope of the functions of picks used during the Early Neolithic and allow us to question the interpretation that they were employed only in mining for siliceous materials.

463 SEA-LEVEL RISE IN APULIA: MAPPING THE CULTURAL HERITAGE OF THE GULF OF MANFREDONIA AND IONIAN COAST AT RISK

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Lobascio, Arianna (University of Bari) - Fioriello, Custode (University of Bari) - Martinez, Gianluca (University of Bari) - Nardò, Livio (University of Bari) - Scardino, Giovanni (University of Bari) - Scicchitano, Giovanni (University of Bari) - Zingaro, Marina (University of Bari)

Abstract format: Poster

The rising sea levels caused by climate change pose a severe threat to cultural heritage sites worldwide. However, the potential impact on Apulian sites is widely overlooked due to the slow progression of the phenomenon. To effectively conserve and protect these sites, it is crucial to identify which ones are at risk of flooding or submersion by 2050 and 2100. To achieve this, the following research study reviews the scientific literature regarding the coastal dynamics in Apulia, focusing on the Gulf of Manfredonia and the Ionian coast between Ginosola and Taranto. Consequently, the vulnerable coastal assets located within these areas were mapped in a GIS by combining submersion projections and heritage census databases. Among the others, flood maps created by the Earth Sciences Department of the University of Bari Aldo Moro and territorial information systems created by other institutions were utilized as data sources. The results provide a foundation for defining a methodological standard that could assess endangered Italian heritage and aid in communal risk management planning. Publishing these maps is essential to increase awareness of the impacts of climate change on cultural heritage and enable effective risk communication.

465 USING STABLE ISOTOPES TO RECONSTRUCT ANIMAL HUSBANDRY AND ANIMAL-HUMAN INTERACTION AT THE EARLY NEOLITHIC SITE OF GOVRELEVO, NORTH MACEDONIA

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Feichtinger, Miriam (University of Vienna, Vienna, Austria) - Blanz, Magdalena (Vienna Institute of Archaeological Science (VIAS), University of Vienna, Vienna, Austria; Human Evolution and Archaeological Sciences (HEAS), University of Vienna, Vienna, Austria) - Fidanoski, Ljubo (Museum of the City of Skopje, Skopje, Republic of North Macedonia) - Fidanoska, Aneta (Museum of the City of Skopje, Skopje, Republic of North Macedonia) - Balasse, Marie (Muséum national d'Histoire naturelle (MNHN), Paris, France; Centre national de la recherche scientifique (CNRS), Paris, France) - Ivanova-Bieg, Maria (Johannes Gutenberg Universität, Mainz, Germany)

Abstract format: Poster

The objective of this study is to reconstruct the dietary patterns and potential husbandry techniques employed in the Early Neolithic settlement of Cerje-Govrelevo (early 6th millennium BC) in North Macedonia, based on the analysis of stable isotope ratios (C, N) in 65 animal bones. The examined fauna comprised both wild and domestic animals,

including herbivores and carnivores. While the Balkans play a pivotal role in understanding the spread of the Neolithic throughout continental Europe, bioarchaeological investigations in this region are scarce. Through the findings of this research and comparisons with data from neighbouring regions, we aim to shed light on husbandry practices during the Early Neolithic in North Macedonia and the level of domestication present during that era. The results indicate that sheep and goats were managed similarly by the initial settlers of Govrelevo, with differences in $\delta^{13}\text{C}$ values primarily attributed to varied feeding habits. Conversely, cattle and domestic pig $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values show differences in nutrition and thus husbandry practices. Particularly cattle exhibited a wide range in $\delta^{13}\text{C}$ values (-22.61‰ to -15.34‰). Furthermore, the data on Govrelevo domestic pigs reveals a narrow range of stable isotopic values for carbon and nitrogen, especially the $\delta^{13}\text{C}$ values overlapping with those of wild boar. Instead, the maximum domestic pig $\delta^{15}\text{N}$ value (9.44‰) even tops those of dogs (8.54‰) at the site, indicating a large amount of animal protein in the domestic pig's feed. Accordingly, this suggests a close relationship between domestic pigs and humans.

466 THE CONSERVATION SOFT BOX (CSB): AN INNOVATIVE, EFFICIENT AND LOW-COST TECHNIQUE TO PRESERVE BIOLOGICAL REMAINS

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Samadelli, Marco (EURAC Research - Institute for Mummy Studies) - Paladin, Alice (EURAC Research - Institute for Mummy Studies) - Donegá, Massimo (Eco Research) - Lara Ibeas, Irene (Eurac Research-Institute for Renewable Energy) - Zink, Albert (EURAC Research - Institute for Mummy Studies) - Tirlir, Werner (Eco Research)

Abstract format: Poster

The long-term preservation of biological remains within conservation parameters in museum collections is a challenge that confronts specialists with multiple issues from both a conservation and an ethical perspective. In particular, the human remains, which encompass mummified remains, but also bones, soft tissue, ashes, hair, and teeth require special measures to be taken due to their delicate organic nature to prevent chemical and microbiological deterioration processes.

Currently, there are several techniques for the preservation and display of human remains categorized into two logical-constructive types: 1. active and 2. passive systems. However, these types were never designed for truly effective long-term preservation.

Therefore, the aim of our study is to develop an innovative solution for the long-term preservation of human remains, that not only meets conservation parameters, but also has the advantage of being multifunctional and low-cost.

We have thus designed the Conservation Soft Box (CSB), which is a durable and airtight structure made of various inert and low-emission polymeric materials (e.g., PTFE, Polyethylene).

Within the CSB, environmental parameters are customized in order to optimize conservation treatment: for example, an oxygen-free atmosphere with stable relative humidity can therefore be realized.

Each individual element composing the CSB was chemically analyzed in order to determine its VOCs emissions and evaluate the level of hazardousness. Emission analysis results allowed us to select the most suitable materials to use thanks to the very low emission values obtained. In addition, the versatility of construction and low structural weight give the CSB a great advantage over classical conservation solutions. The CSB also allows mummies to be CT-scanned directly inside it, due to the absence of metal elements. In conclusion, our conservative solution is a safe and suitable tool for the long-term storage, handling and treatment of biological remains.

469 THE SACRED SPACE OF MOUNT OF VISO (CELORICO DE BASTO, PORTUGAL)

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: de Oliveira Teixeira, Luisa (Universidade Autónoma de Lisboa)

Abstract format: Poster

This paper explores the long-standing connection between human communities and the mountain-top places of worship. The impressive landscape of Monte do Viso, composed of massive and distinct granite blocks and offering a wide visual range, is believed to have sparked the imagination of ancient communities. The goal of this paper is to demonstrate the persisting and evolving sacralization of Monte do Viso from prehistoric times to the present day.

In the vicinity of the sanctuary, various objects signify worship and remembrance, ranging from megalithic tombs to the chapel of Our Lady of Viso, situated at the mountain's peak. The proximity of these elements highlights the continued importance of this symbolic space. It possesses unique topographical features where the ancient rites and beliefs of the Mother Goddess, who served as the protector of the community and territory, endured throughout the ages. These beliefs were both mythical-religious and cosmological and gave way to new collective altars and rites.

Our Lady of Viso is part of a group of seven sisters, situated on high points and visible to each other, who serve as protectors of the communities and have the responsibility of watching over the land and its inhabitants, much like the Mother Goddess.

470 QUBBET EL-HAWA NORTH, EGYPT: ONGOING BIOANTHROPOLOGICAL STUDY ON THE HUMAN REMAINS FROM THE OLD KINGDOM TOMB 9 (QHN 9)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Paladin, Alice (Institute for Mummy Studies, Eurac Research, Bolzano, Italy.) - Teßmann, Barbara (Museum für Vor- und Frühgeschichte, Staatliche Museen zu Berlin, Germany.) - Seyfried, Friederike (Ägyptisches Museum und Papyrussammlung, Staatliche Museen zu Berlin, Germany.) - Konert, Sarah (Ägyptisches Museum und Papyrussammlung, Staatliche Museen zu Berlin, Germany.) - Kuhn, Robert (Ägyptisches Museum und Papyrussammlung, Staatliche Museen zu Berlin, Germany.)

Abstract format: Poster

The necropolis of Qubbet el-Hawa Nord (QHN) in Aswan, Egypt, is located about one kilometre away from the renowned burial site of the ancient city of Elephantine, Qubbet el-Hawa (QH). Recent scientific excavations, part of a joint-rescue project by the Ägyptisches Museum und Papyrussammlung Berlin and the Aswan Inspectorate, have uncovered and are currently preserving ten elite tombs, dating back to the Old Kingdom (T.9, possibly T.10) and New Kingdom (T.1-T.8). This was an effective intervention as, prior to the Egyptian-German Mission, the necropolis experienced significant looting, causing partial damage to structures, cultural materials and to human remains. Therefore, for the first time, a bioanthropological investigation was also launched to preserve the osteological remains and to provide deeper insights into the individuals living in this region, aiming to reconstruct their biological (e.g., sex, age at death) and paleopathological profiles.

This study focus on tomb 9 (QHN 9), the oldest one, that faces east towards the Nile, including an external courtyard with a long staircase where single burials, possibly belonging to officials serving the tomb owner, have been discovered. From the preliminary analysis, a minimum number of at least 19 individuals (8 adult males, 6 females, 5 subadults) were identified, including those buried in single graves along the staircase as well as the remains scattered by the looters' actions. Paleopathological observations revealed severe oral, degenerative diseases and traumas. Additionally, a small coffin found left to the main entrance contained a cranium with evidence of sharp forced traumas, indicating a case of decapitation. Musculoskeletal stress markers also suggested evidence for long-distance walks on the sand.

Next project plans include performing further anthropological and paleopathological analyses of the commingled osteological remains found within the internal rooms of QHN 9, as well as in the other tombs.

471 ANCIENT GOLDSMITHING IN THE NILE VALLEY FROM ARCHAEOMETRIC INVESTIGATIONS TO EXPERIMENTAL ARCHAEOLOGY

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Patrevita, Maria (University of Bari Aldo Moro; National Research Council of Italy, Institute of Heritage Science, CNR-ISPC, Rome)

Abstract format: Poster

My research focuses on the study of ancient gold working and goldsmithing practices along the Nile Valley, mainly in Egypt, but also integrating the evidence from ancient Sudan, dating from the Egyptian Middle Kingdom and the Middle Kerma period in Upper Nubia (ca. 1980-1760 BCE) to the Meroitic Kingdom, contemporary to the Ptolemaic Period in Egypt (332-30 BCE). In order to highlight the mutual influences and diversities of Egyptian jewellery and Nubian goldsmithing, the research will use an interdisciplinary approach, which will unite archaeology, goldsmithing, archaeometric investigations, ethnoarchaeology and experimental archaeology.

On a stylistic and technological basis, the most interesting jewels will be selected and studied through SEM Scanning Electron Microscope and EDS Energy Dispersive X-ray Spectrometer, to investigate the following aspects: elemental composition of the gold foil used; production techniques and creative processes; elemental composition of the welding formulas.

The jewellery which will be examined is of Egyptian origin, currently kept at Museo Egizio, Turin. In particular, jewellery dating to the New Kingdom (1550-1070 BCE) will be studied, but also some gold appliques belonging to the Third Intermediate Period (ca. 1076-723 BCE) and the Late Period (ca. 722-332 BCE) shall be examined, opening the possibility of comparison with Nubian techniques and typologies.

Thanks to the collaboration of Museo Egizio and my co-tutor Dr. Johannes Auenmüller, a group of about 50 gold jewels will be study, including funerary amulets in gold foil, but also technically and stylistically more complex pieces, such as: a Royal child amulet, made by two embossed and chiseled halves and then welded together (New Kingdom, 1540-1076 BC); a Lotus flower pendant, gold and enamel (New Kingdom, 1550-1292 BC).

The main research goal is creating a protocol for the study of gold jewellery, supported by archaeometric analyses, ethnoarchaeological data and experimental approaches.

474 A BIOAVAILABLE STRONTIUM ISOSCAPE MAP FOR CENTRAL EASTERN ARGENTINA FOR PROVENANCE STUDIES

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Scaggion, Cinzia (Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia) - Loponte, Daniel (Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Instituto Nacional de Antropología y Pensamiento Latinoamericano) - Carbonera, Mirian (Centro de Memória do Oeste de Santa Catarina, Universidade Comunitária da Região de Chapecó) - Lugli, Federico (Institut für Geowissenschaften, Goethe-Universität Frankfurt) - Armaroli, Elena (Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia) - Bernardini, Sara (Department of Cultural Heritage, University of Bologna) - Marciani, Giulia (Department of Cultural Heritage, University of Bologna; Research Unit Prehistory and Anthropology, Department of Physical, Earth and Environmental Sciences, University of Siena) - Cipriani, Anna (Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia) - Bortolini, Eugenio (Department of Cultural Heritage, University of Bologna) - Giovanardi, Tommaso (Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia)

Abstract format: Poster

Over the last 40 years, the use of bioavailable strontium isotopes has become increasingly frequent when applied to archaeo-anthropological contexts being a powerful tool for provenance and mobility studies. Determining the provenance of biological materials through the use of strontium ($^{87}\text{Sr}/^{86}\text{Sr}$) isotope ratios requires a reference isoscape (i.e., a map of isotopic distribution) of a specific geographic area, useful for the correct interpretation of the isotopic data obtained. In the present work, we propose a first isoscape map of strontium isotopic signatures and their spatial variation in central eastern Argentina using new bioavailable data. The isotopic map, created using a Random Forest model, will aim to fill a gap in the study of the provenance of pre-Columbian hunter-gatherer peoples who inhabited the Paraná delta region. The work is extended to the Pampa and Entre Ríos region of Argentina and to the western part of Uruguay across the Uruguay river, with the main objective of creating an isotopic domain mapping with a high enough resolution to create archaeological mobility models of ancient South American skeletal remains. This work is part of the Habits PRIN 2022 project, number 2022BC2Z5F, included within a broader archaeological research program taking place in southeastern South America (www.assaprogram.com), focused on studying the cultural evolution and lifestyle of local pre-Columbian populations together with their mobility and residence patterns.

475 FACIAL DEPICTIONS OF PRE-COLUMBIAN BOLIVIAN MUMMIES AND ETHICAL MUSEUM APPROACHES: AN INTRODUCTION TO THE PROJECT

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Conti, Viviana (Face Lab, Liverpool John Moores University; Institute for Mummy Studies, Eurac Research) - Liu, Jessica (Face Lab, Liverpool John Moores University) - Valverde, Guido (Institute for Mummy Studies, Eurac Research) - Castedo, Luis (Ministry of Cultures, Decolonization and Depatriarchalization of Bolivia) - Maixner, Frank (Institute for Mummy Studies, Eurac Research) - Zink, Albert (Institute for Mummy Studies, Eurac Research) - Paladin, Alice (Institute for Mummy Studies, Eurac Research) - Wilkinson, Caroline (Face Lab, Liverpool John Moores University)

Abstract format: Poster

The exhibition of human remains in museums poses a controversial cultural challenge within public discourse and academic investigation. Facial depictions of individuals from the past help contextualising human remains and communicating complex data derived from interdisciplinary studies, making them a valuable tool for museums and research institutions addressing this issue. However, further problematisation arises when dealing with remains from under-represented cultural communities in countries with a history of colonisation.

In 2021, an international collaboration between the Ministry of Cultures, Decolonization and Depatriarchalization of Bolivia, the National Museum of Archaeology - MUNARQ, and Eurac Research set the ground for scientific research. This collaboration aimed to develop an interdisciplinary project (MumBo, PI Valverde) focused on the first bioarchaeological study of pre-Columbian human remains from Bolivia. The MUNARQ collection comprises over 50 bodies, and over 500 human skulls linked to the Late Intermediate Period (1100-1450 CE) and potentially to the Inca Period (1450 - 1532 CE), many showing signs of artificial mummification and cranial modifications.

The present project aims to investigate the use of facial depictions as a tool to facilitate the ethical dissemination of ancient human remains. For this project, a combination of anatomical modelling and application of average tissue depth data will be employed. Information on genetically predicted phenotypic traits pertaining to selected individuals

(gathered through MumBo) will be considered to maximise accuracy of the facial depictions. The project will utilise participatory co-design methods to ensure that the relevant communities are considered and involved throughout the process of investigation and dissemination.

The use of facial depictions will implement existing knowledge of pre-Columbian population history, foster public interest in the cultural heritage represented by the MUNARQ collection, and, by involving local descendant communities, support ethical approaches to address scientific research for the study of human remains in Bolivia.

476 **WOVEN CRAFT PRODUCTS FROM TWO BURIAL MOUNDS IN SOUTH-EAST BULGARIA (4TH-2ND CENTURY BC)**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Dimova, Bela (University of Padua) - Andonova, Mila (Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences) - Agre, Daniela (National Archaeological Institute and Museum, Bulgarian Academy of Sciences)

Abstract format: Poster

Burial mounds were a long-standing part of funerary traditions in ancient Thrace and thousands of mounds have been excavated throughout the region. The use of organic materials in funerary and commemorative rites has been evident since the earliest archaeological discoveries, but few monuments have preserved organic remains.

This paper presents evidence for woven mats and textiles from two mounds: at Sinemorets on the Black Sea coast (late second century BC) and at Malomirovo - Zlatinitsa, some 150 km inland (mid-fourth century BC). At Malomirovo - Zlatinitsa a young ruler was buried in an underground wooden chamber. Fragments of various mineralised and organic textiles were found in the grave, including plain weaves, tapestries, weft-faced tabby and gilded silver threads. Two horses were buried at ground level near the burial chamber, on a plaited plant fibre mat. At Sinemorets, the in-situ cremation of a woman preserved carbonised fragments of a mat made of monocotyledonous and woody plants. Mineralised textile remains were also preserved on an iron object from the pyre. This poster focuses on the weaving techniques of the mats, their raw materials, their use in burials and their comparanda.

480 **CEREAL CULTIVATION PATTERNS IN THE FOREST AND FOREST-STEPPE OF EASTERN EUROPE OF 1000 BC-1000 CE**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Salova, Julia (University of South Bohemia) - Viazov, Leonid (University of Ostrava; Centre for Baltic and Scandinavian Archaeology - ZBSA (Schleswig, Germany)) - Beneš, Jaromír (University of South Bohemia)

Abstract format: Poster

We have compiled data on over 800.000 plant macroremains and their inclusions in pottery from 321 archaeological sites in the forest and forest-steppe zones of Eastern Europe, spanning from the Baltic to the Urals and collected and studied over a century of archaeobotanical research. The spatiotemporal distribution of these remains was analysed using multivariate statistics, unveiling intricate cultivation patterns influenced by both geoclimatic and historical factors. In the timeline, millet-dominated agriculture was prevalent in Eastern Europe from approximately 2.8 to 1.8 kya, followed by the increase in barley production at around 1.7 kya, potentially associated with western migrations. During the Migration Period (approximately 1.6 to 1.3 kya), barley-focused agriculture peaked in the northern part of the region, while the forest-steppe regions continued to exhibit millet-rich macroremains. Around 1.3kya, wheat gained prominence in the steppe-bordered regions, and rye production increased in the north. We notice a gradual rise in the proportion of weed species over two millennia, leading to the growth of "mixed" cereal compositions. Our analysis demonstrates the potential to discern trends in cereal production by combining data from various research methods. However, data gaps hinder our understanding, underscoring the importance of intensive sampling.

485 **"THE UGLY DUCKLING" IN THE SOUTHERN CARPATHIANS. A BRONZE AGE HALBERD FROM SĂLĂTRUCU (ROMANIA)**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Mandescu, Dragos (Arges County Museum Romania) - Ștefan, Cristian ("Vasile Pârvan" Institute of Archaeology Bucharest) - Mărgărit, Monica ("Valahia" University of Târgoviște) - Mirea, Dragos Alexandru ("Horia Hulubei" National Institute for Research and Development in Physics and Nuclear Engineering, Bucharest; Bucharest Municipality Museum)

Abstract format: Poster

The Bronze Age golden halberds from Perșinari and Măcin (Romania) are already well-known and as exceptional items for the South-Eastern Europe prehistory. Recently (summer of 2023) a massive halberd of such kind, not in gold but in copper-based alloy, was found by chance in the Carpathian mountains area, in Sălătrucu, Argeș County, Romania. This copper replica of the exceptional gold specimens is added to a fragment also in copper-based alloy found few years ago in Urlați (South Romania). The poster introduces the implement found at Sălătrucu, detailing on their morphology and functional traces, on its copper-based alloy composition characterized by an intriguing high percentage of Bismuth, but also on the strange peculiarities of the findspot (part of a possible passage landscape). Several aspects are also discussed in the background, such as origin and chronology of these kind of Bronze Age implements in the area between the Carpathians and the Lower Danube, their analogies and presumed function. The halberd from Sălătrucu constitutes a valuable source of information on metallurgy and depositional practices specific to the mid-3rd millennium BC of the Southeast Europe Bronze Age.

489 **THE FIRST NEANDERTAL THUMB PHALANX DISPLAYING OSTEOARTHRISIS**

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Voisin, Jean-Luc (UMR 7268 ADES, Aix-Marseille Université/EFS/CNRS, Faculté de Médecine - La Timone, 27 Bd Jean Moulin, 13385 Marseille Cedex 05, France) - Condemni, Silvana (UMR 7268 ADES, Aix-Marseille Université/EFS/CNRS, Faculté de Médecine - La Timone, 27 Bd Jean Moulin, 13385 Marseille Cedex 05, France)

Abstract format: Poster

In this study we present an adult Neandertal first thumb proximal phalanx (I2-104) from the Baume de Moula-Guercy (Ardèche, France). This phalanx displays an asymmetric eburnation on the distal epiphysis associated with an osteophyte on the palmar surface, without any periosteal bone reaction visible on CT images. All of these characteristics taken together are consistent with osteoarthritis.

Osteoarthritis has a complex etiology depending on extrinsic (i.e. obesity) and intrinsic (i.e. previous joint damage) joint factors as well as on systemic factors (i.e. age). The osteoarthritis of the Moula-Guercy I2-104 phalanx may also be due to a genetic predisposition for osteoarthritis known in Neandertals and associated with short limb bones. The osteoarthritis could have been aggravated by the age of this individual and by an inflammatory reaction caused by repeated movements and intense vibrations provoked by high-frequency knapping or by some other unknown use of the hands.

The I2-104 phalanx is the first Neandertal thumb phalanx known to display osteoarthritis, although in modern humans (both ancient and current populations) joints of this bone are frequently affected by this pathology. We propose an explanation of this difference between the two human populations.

490 **PORTSALT - THE BEGINNING OF SALT EXPLOITATION IN PORTUGAL**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Jesus, Luís (Autonomous University of Lisbon; Estoril Higher Institute for Tourism and Hotel Studies) - Pereira, Telmo (Universidade Autónoma de Lisboa; Instituto Politécnico de Tomar; Centro de Geociências da Universidade de Coimbra; UNIARQ, Centro de Arqueologia da Universidade de Lisboa)

Abstract format: Poster

Sayings such as "He is not worth his salt" or "salarium argentum" show that salt has been a fundamental resource since the invention of writing. Therefore, it is possible to assume that it was already vital before that. Despite being a fundamental resource for millennia, the evolution of Archaeology made the investigation about salt during Pre- and Protohistoric times to be neglected for decades with very few studies of this kind in Portugal. The increasing of multidisciplinary studies, the development and democratization of instrumental equipment, the investigation beyond the traditional artefact typological and technological analysis, and the search for answers to new questions made the investigation of salt interesting and feasible in recent years. In the Portuguese territory, salt has been highly exploited across historical times. It started at least in the Roman period when the production of garum across the basins of the

Tejo and Sado rivers and the Algarve coast to serve the entire empire demanded its extensive exploitation. However, several sites have indirect evidence that has been (humbly) suggested to be related to salt exploitation through brine. The PortSalt project seeks to understand how salt was introduced, exploited, used, and transported into the diet, economy, and life of Proto- and Prehistoric populations from western Iberia. In this regard, ceramic fragments from various archaeological sites, dated chronologically between the Early Neolithic and the Iron Age, will be used. This study will encompass three main components: experimental archaeology with ceramics, geochemical analysis of both prehistoric and experimental ceramics, and geochemical analysis of the deposits from which these ceramics originate. Ultimately, it aims to find possible continuities and ruptures that characterized the food patterns of these communities, contributing to the knowledge about eating habits and taste that guided food choices over time.

492 **A FRAGMENT OF A HANDLE FROM A ROMAN JUG WITH A DIONYSIAN HANDLE ATTACHMENT FROM VANOVICE (MORAVIA): POSSIBILITIES OF INTERPRETATION**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Kirilová, Terézia (Masaryk University) - Jílek, Jan (Masaryk University)

Abstract format: Poster

A remarkable discovery has been made in Vanovice (Moravia, Czech Republic): a fragment of a Roman bronze jug handle from the 1st century AD, probably Augustan period. The craftsmanship of the bronze handle attachment far exceeds the typical finds from the Moravia region. The style of handle attachment is connected to the Hellenistic toreutics traditions. The head depicted on the handle is believed to be that of Dionysus or Silenus, as determined through iconographic analysis and comparison with other works from Roman sculpture (mostly Double herms) and craftsmanship. The context of this discovery raises intriguing questions. The artifact was found on the periphery of the Barbarian settlement from the Roman period. The main characteristic of the site is the hilly landscape without any settlement or funerary activities from the Roman period. Could this be an isolated find, or does it indicate evidence of ritual practices during the Roman Period in Barbaricum?

494 **EMERGING LANDSCAPES AND IDENTITIES: MODELLING MODIFICATIONS IN CENTRAL ROME THROUGHOUT THE 1ST MILLENNIUM BC**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Antler, Chen (University of Glasgow)

Abstract format: Poster

At the beginning of the 1st millennium BC, the city center of Rome was the home of a small community(ies), its natural environment still mostly uninhabited and unchanged. Over the following centuries, this area, which would become the center for one of the most important cities in the Mediterranean, will continuously change through building and rebuilding projects - some small, some monumental- from the river's valley to its surrounding famous hills.

The substantial and prolonged effort made by the habitants of central Rome throughout the millennium, not only resulted in a new anthropogenic landscape but also a new sense of communal identity, built on a narration of these changes. This study explores how people built and maintained a resilient collective Roman identity around their activity of modifying and change their natural environment. The poster will present a portion of this research, in which the extent change to the natural environment is quantified via a computational model of the methodologically challenging urban environment of Central Rome. It will discuss integrating various sources of information (archaeological, geological etc.), challenges in standardizing data and interpolation on various geographical scales.

Beyond providing a clearer understanding of how the complex human-environment relationship played out during the first millennium BC in Rome, this study makes the case for reframing the environment as an active agent in the formation of human identity and makes critical contributions to current debates on how collective identities were formed in the past and how they are maintained today. It argues that as we look forward and make new policies to address critical environmental challenges, we should acknowledge how intrinsically human identity is intertwined with features of the biophysical landscape and highlight the shared roles of natural and cultural heritage to maintain resilient communal identities in a changing world.

496 **RURAL SETTLEMENTS OF ADAL SULTANATE: THE CASE OF AIYANLE (AWBARRE, ETHIOPIA)**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Rouco Collazo, Jorge (INCIPIT)

Abstract format: Poster

This paper aims to present the preliminary results of the 2023 excavation campaign at the medieval site of Aiyarle, in the Ethiopian town of Awbarre, very close to the Somaliland border. This intervention is part of the ERC pro-

ject "Statehorn: Pathways to Statehood. Authority, Legitimacy and Social Diversity in the Horn of Africa (11th-16th centuries)", which aims to study the formation, development and disappearance of Islamic sultanates in the Horn of Africa during the Middle Ages.

In the specific case in question, the main research question was how settlement was organised in the border region between Somaliland and Ethiopia in the time of Adal Sultanate. To address this question, we carried out in October 2023 the first archaeological intervention on a medieval site in the Somali Region of Ethiopia, the rural settlement of Aiyarle with the aim of characterising one of the settlements in this area and its material culture. The intervention has yielded interesting results on the domestic spaces of this rural site, occupied between the 14th and 16th centuries, i.e. during the Adal sultanate. Evidence has also been found that the settlement was part of the trade routes from the Indic trade to the interior of Ethiopia from imported pottery and glass beads.

502 **ZOOARCHAEOLOGICAL INSIGHTS INTO CHALCOLITHIC LIFEWAYS: EVIDENCE FROM YEGHEGIS-1 ROCK SHELTER IN SOUTHERN ARMENIA**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Mkrtchyan, Satenik (Institute of Molecular Biology, NAS, RA; Department of Archaeology, Max Planck Institute of Geoanthropology) - Nazaryan, Gayane (Institute of Molecular Biology, NAS, RA) - Saribekyan, Mariam (Institute of Archaeology and Ethnography, NAS, RA) - Azatyan, Karen (Yeghegnadzor Regional Museum, Armenia) - Yepiskoposyan, Levon (Institute of Molecular Biology, NAS, RA) - Amano, Noel (Department of Archaeology, Max Planck Institute of Geoanthropology) - Antonosyan, Mariya (Department of Archaeology, Max Planck Institute of Geoanthropology)

Abstract format: Poster

The Chalcolithic in the South Caucasus, spanning from 5,500 to 3,500 BCE, is considered a period marked by heightened social differentiation and connectivity. Despite being represented by a limited archaeological record concentrated at a few sites, this epoch is believed to be characterized by dynamic and mobile human communities engaging in animal herding, particularly of goats and sheep.

The Yeghegis-1 rock shelter is a newly discovered site, located in southern Armenia, that was occupied between the 5th to the 4th millennium BCE, allows to reveal new insights into Chalcolithic lifeways in the region.

Here we discuss human subsistence strategies through detailed morphometric and mass-spectrometry-based identification of the recovered fauna, with a focus on large ungulates. Additionally, we analyze the taphonomic history of the assemblage accumulation, coupled with the age of death profiles and killing patterns of the ungulates.

Our results revealed that the groups utilizing the site mainly focused on sheep and goat herding, with little evidence of cattle in the herds, demonstrating the importance of Caprines in the subsistence economy. Additionally, we demonstrate that Caprines of all ages were culled, suggesting that the animals were utilized for a range of their primary and secondary products.

503 **INFERRING GENOMIC ANCESTRY AND PHENOTYPIC TRAITS OF MARCUS VENERIUS SECUNDIO, A FREEDMAN AND FORMER SLAVE FROM THE POMPEII CITY**

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Modi, Alessandra (Department of Biology, University of Florence, Florence, Italy) - Cannariato, Costanza (Department of Biology, University of Florence, Florence, Italy) - Diroma, Maria Angela (Department of Biology, University of Florence, Florence, Italy) - Amoretti, Valeria (Parco Archeologico di Pompei, Naples, Italy) - Macleod, Ruairidh (Research Department of Genetics, Evolution and Environment, University College London, London, UK) - Alapont Martin, Llorenç (Universitat de València, Valencia, Spain) - Osanna, Massimo (Ministry of Cultural Heritage and Activities and Tourism, Rome, Italy) - Thomas, Mark G (Research Department of Genetics, Evolution and Environment, University College London, London, UK) - Zuchriegel, Gabriel (Parco Archeologico di Pompei, Naples, Italy) - Caramelli, David (Department of Biology, University of Florence, Florence, Italy)

Abstract format: Poster

Pompeii became a Roman colony during the Republican period, developing into one of the most prosperous Mediterranean harbors and attracting people from all over the empire, as attested by the numerous archaeological evidence. Among these, one of the most exceptional findings is the tomb of Marcus Venerius Secundio, discovered in July 2021 in the necropolis of Porta Sarno. The tomb structure and the inscription, the burial, the painted facade, and the mummified remains recovered, allow us to reconstruct the biographical profile of Marcus Venerius Secundio. He was a public slave and custodian of the Temple of Venus, and upon being freed, he reached a certain social and economic status applying himself to organize theatrical performances in the Greek language. Moreover, Marcus Venerius' mummy shows well preserved organic remains including hair, cartilage, and internal organs that allow the

application of an integrated “multi-omic” approach to reconstruct his life history, including his ancestry, diet, health and pathogen load.

Here we present the results of the genome wide analysis carried out on a premolar tooth. We reconstructed 86% of the nuclear genome with an average depth of 5.44X. We were able to identify the remains to be of male origin, showing sufficient DNA damage, deriving from a single person and being thus likely authentic. Furthermore, we investigated functional and phenotypically informative SNPs and searched for the presence of possible pathogens. The maternal haplogroup was determined to be U3b3, a subclade of the U3 haplogroup that is today present at highest frequencies in the Middle East and Caucasus. Furthermore, genomic data indicate high genetic affinities with present-day people living in the Caucasus, supporting a foreign origin of Marcus Venerius, as suggested by the nature of the burial and the documentary records.

504 MEGALITHS OF CENTRAL LEVANT: PETROGRAPHY OF SHARDS FROM EARLY BRONZE AGE TOMBS OF MENJEZ (AKKAR, LEBANON)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Carloni, Delia (Groningen Institute of Archaeology, University of Groningen, Netherlands) - Wygnańska, Zuzanna (Institute of Mediterranean and Oriental Cultures, Polish Academy of Science, Poland) - Steimer-Herbet, Tara (Laboratoire d'archéologie préhistorique et anthropologie, Department F.-A. Forel for Environmental and Aquatic Sciences, Université de Genève, Switzerland)

Abstract format: Poster

Over the past two years, a Swiss-Polish team of archaeologists led by Dr Tara Steimer-Herbet and Dr Zuzanna Wygnańska has been investigating the megalithic culture in the Akkar district of northern Lebanon. The MEG-A project focused on the emergence of the megalithic tomb-building communities in the region as well as their significance in the development of the first urban centers. A key objective of current research is to ascertain the megalith builders living area and to identify their material culture for accurate chronological placement. Early field data suggest that some of the graves were probably not linked to the housing structures discovered nearby. Path and agricultural terraces were abandoned at the time the tombs were built. The chrono-classification of the tombs, currently under study, will enable us to distinguish between a pastoral society and one in transition. The scientific team has embraced a comprehensive and interdisciplinary approach to further investigate the significance of the megalithic monuments and the material culture.

The petrographic analysis regarded 26 potsherds from Tombs of both 'Kroum Metowmeh' and 'Haklet Bou Dib' sectors, selected considering archaeological information and paste characteristics. Optical microscopy allowed to define five fabrics, characterized by presence of 1) basalt, 2) carbonates, 3) quartz, 4) quartz and argillaceous rock fragments, and 5) quartz and plant matter. Evidence suggests the exploitation of clay-rich sediments that formed from basalt and/or argillaceous rock bodies and a moderate degree of transport. These resources may be found in the vicinity of the Menjez necropolis, whose geology is dominated by Late Cenozoic basalts of the Tripoli-Homs Depression and Early and Middle Cretaceous sandstone-limestone sequence, along with Quaternary colluvial and alluvial sediments. Interestingly, some of the pottery fabrics from Menjez find comparisons with the Early Bronze Age II ceramic assemblage from Tell Arqa, located further west in the Akkar plain.

507 FOSSILIZED SECRET OF GRAVE 12

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Jurkovic Pešić, Filipa (Sveučilište u Zadru)

Abstract format: Poster

During protective archaeological excavations in Zadar (Croatia) conducted in 2021 and 2022 at the area of Roman era necropolis, grave number 12 attracted special attention. It is a burial of the cremated remains of two individuals; one female person who died in young adulthood and another, probably a female adult. Seemingly, it is a classic Roman era grave with all the characteristic of the 1st century AD period. What is more, if we take into account that graves of this type can often be extremely rich in finds, it could be said that this burial has relatively poor grave goods. The reason why we singled out Grave 12 is a finding of two fossilized sea urchin spines from species *Balanocidaris glandifera*, surely put inside the urn as grave goods. This kind of object is extremely rare in the archaeological context, and so far, unrecorded in the area of the ancient Zadar (Iader) necropolis. However, the known symbolic and utilitarian meaning or usage of these objects has opened a gate to a world of Roman magical and healing utilisation of these long-extinct sea creatures.

510 INVESTIGATING SEASONALITY OF SHELL COLLECTION BY NEANDERTHAL GROUPS FROM RIPARO BOMBRINI (VENTIMIGLIA, ITALY)

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Gazzo, Silvia (Department of Antiquities, Philosophy, History, University of Genoa, Via Balbi, 2 - 16126 Genoa- Italy) - Gutiérrez-Zugasti, Fernando Igor (Instituto Internacional de Investigaciones Prehistóricas de Cantabria (Universidad de Cantabria, Gobierno de Cantabria, Santander), Avda. de los Castros s/n, 39005 Santander, Spain) - Marin-Arroyo, Ana Belen (Grupo de I+D+i EVOADAPTA (Evolución Humana y Adaptaciones durante la Prehistoria). Dpto. Ciencias Históricas. Universidad de Cantabria. Avda. de los Castros 44, 39005 Santander, Spain) - Negrino, Fabio (Department of Antiquities, Philosophy, History, University of Genoa, Via Balbi, 2 - 16126 Genoa- Italy) - Riel-Salvatore, Julien (Département d'Anthropologie, Université de Montréal, Montréal, Canada)

Abstract format: Poster

In this study we explore Neanderthal adaptations to coastal environments through stable oxygen isotopes analysis on the malacological remains from Riparo Bombrini (Ventimiglia, Italy), a collapsed rockshelter in the Balzi Rossi Palaeolithic site complex. These new data provide a better understanding of human-environment interactions during the Late Mousterian along the Mediterranean coast. The Late Mousterian and Protoaurignacian levels from Bombrini have yielded abundant lithic artifacts and faunal remains, including many marine molluscs from intertidal rocky shores (e.g., *Phorcus turbinatus*, *Mytilus galloprovincialis*, *Patella* sp.). We focus here on some of the Late Mousterian levels (M2-M5) from the site, which reveal evidence of intense exploitation of marine molluscs, providing new insights into the diversified diet adopted by Neanderthals in the region. The highly fragmented nature of the malacological record required careful planning of suitable sampling strategies. Calcium carbonate (aragonite) microsamples were extracted using standard procedures. A long sequence of $\delta^{18}\text{O}$ values was obtained on one complete shell, while shorter sequences were analysed in fragmented shells. Variations in $\delta^{18}\text{O}$ values in specimens of the rocky-shore intertidal gastropod *P. turbinatus* (Born, 1778) from these levels allowed for the inference of the seasonality of harvest, providing information on Neanderthal's dietary habits, subsistence strategies and their variation across the different phases of occupation. Furthermore, oxygen isotope analyses provided data for estimating seawater temperatures during shell growth, offering new insights into the paleoenvironmental reconstruction of the western Liguria coastal area throughout the Late Pleistocene.

Acknowledgements

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511 INTRODUCING ARTIFACTS' VOLUMES AND SUPERIMPOSITION IN STRATIGRAPHICAL ANALYSIS: INTEGRATING 3D-MODELING AND SPATIAL ANALYSIS AT THE ABRIC ROMANÍ MIDDLE-PALEOLITHIC SITE (SPAIN)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Zangrossi, Filippo (Departament d'Història i Història de l'Art, Universitat Rovira i Virgili; Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA)) - Chacón, M. Gema (Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); Departament d'Història i Història de l'Art, Universitat Rovira i Virgili; UMR7194 Histoire naturelle de l'Homme préhistorique (HNHP), Museum National d'Histoire Naturelle (MNHN), CNRS) - Lombao, Diego (GEPN-AAT, Dpto. Historia, Facultade de Xeografía e Historia, USC; Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA); UMR7194 Histoire naturelle de l'Homme préhistorique (HNHP), Museum National d'Histoire Naturelle (MNHN), CNRS) - Saladié, Palmira (Departament d'Història i Història de l'Art, Universitat Rovira i Virgili; Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA)) - Vallverdú, Josep (Departament d'Història i Història de l'Art, Universitat Rovira i Virgili; Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA)) - Vaquero, Manuel (Departament d'Història i Història de l'Art, Universitat Rovira i Virgili; Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA))

Abstract format: Poster

Archaeological layers often represent complex palimpsests, reflecting depositional processes that span over extended periods of time. Discerning distinct phases within these layers is crucial for the interpretation of human occupation patterns and cultural changes. The rapid advancements in informatics, such as Geographic Information Systems (GIS) and 3D modeling, offer increasingly automated and efficient methodologies to investigate formation processes, commonly based on Cartesian coordinates and/or orientation and inclination.

In this study, we present the first steps of a novel approach aimed at incorporating the artifacts' volume and their superimposition in spatial analysis to clarify the depositional processes within the archaeological layers. Our methodology involves the automatic generation of 3D models, cluster detection, determination of artifact accumulation sequences, tridimensional visualization, and the production of flowcharts representing superimposition relationships. These analyses are conducted within the "R" environment using standard excavation documentation, including XYZ coordinates and orientation/inclination data. Applying this approach to Level M of the Middle Paleolithic site of Abric Romaní (Spain), reveals a significant presence of distinct artifact clusters of varying natures, involving more than one fifth of all finds.

This research highlights the potential of computational methods and 3D modeling, when combined with traditional approaches, for spatial analysis. Future improvements of the method, which include integrating attributes such as refittings, raw materials, and post-depositional alterations, will potentially enable the stratigraphic division of Level M into sub-levels. This approach will serve as a new tool for investigating formation processes and refining the stratigraphy of archaeological sites as well as to the study of occupation dynamics.

512 HARVESTING CEREALS WITH OBSIDIAN TOOLS: WEAR MECHANISMS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Astruc, Laurence (CNRS-VEPMO-ArScan) - Vargiolu, Roberto (LTDS/ECL) - Anderson, Patricia (CNRS-CEPAM) - Zahouani, Hassan (LTDS/ECL)

Abstract format: Poster

Obsidian is a silica-rich volcanic glass. Wear on obsidian tools has been studied for the first time in an article of Semenov, the founder of the discipline of traceology. Since then, the literature developed far less than for flint. Wear on obsidian has its own specificity. The four main wear attributes are like for other rocks: scaling, striation, smoothing/abrasion and polish. We will focus more in this poster on two of them: striation and polish. Striation develops quite rapidly. Thus, after short duration of use even on soft material, the tool motion can in general be identified. Linear components and striae show a larger variability of morphologies than on flint tools. Experiments have demonstrated that polishes also develop on obsidian tools. They are less visible as the surface of the obsidian is highly reflective. The polish is perceptible by slight changes in surface microtopography. Parameters used for other kinds of raw materials such as the 'trame', the limit or the extension of the polish, can difficultly be observed.

To better understand the processes of wear on obsidian tools, we collaborate with tribologists from the LTDS of the Ecole Centrale de Lyon. Tribology is the science of friction and wear, and it is usually used for industrial or pharmaceutical applications. Our first case-study is the processes of wear during the harvesting of cereals. Experiments in laboratory (simulation of use by scratch, simulation of friction with a linear tribometer) allow us to follow and analyse the development of striae and polish. In fine, a model presenting the three wear phenomena going on during the cut of cereal straws was proposed.

513 FINGERPRINT ANALYSIS IN TERRACOTTA FIGURINES: A CASE STUDY FROM AGRIGENTO, SICILY (FROM CA. MID 6TH CENT. BC)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Palumbo, Federica (Department of Cultures and Societies, University of Palermo) - Fiorentino, Claudia (Department of Cultures and Societies, University of Palermo) - Henneberg, Maciej (School of Biomedicine, The University of Adelaide) - Sineo, Luca (Department of Biological, Chemical and Pharmaceutical Sciences and Technologies (STEBICEF), University of Palermo) - Galassi, Francesco (Department of Anthropology, University of Lodz) - Varotto, Elena (Department of Cultures and Societies, University of Palermo)

Abstract format: Poster

Hand modelling is a crucial aspect of coroplastic production and, subsequently, of its retrospective analysis. It provides valuable insights into an artisan's techniques, crafting sequence, and stylistic choices. The present study explores the application of fingerprint analysis on terracotta figurines from the Sanctuary of the Chthonic Deities (Agrigento, Southern Sicily, Italy). By analysing pressure variations and distribution patterns of fingerprint impressions, one can attempt to reconstruct the ancient artisan's shaping sequence and the techniques which were employed. These markings are more commonly found on the inner surfaces of the figures – which are hollow on the inside – due to the clay adhering to the mold, although they can also be present on the figures' back. Notably, dermatoglyphic analysis on an archaic terracotta figurine can highlight the potential of these markers as a tool for investigation in both archaeology and anthropology.

A preliminary anthropological analysis of these fingerprints was performed. From among the three identified fingerprints, only one had clear enough visibility of sufficient number of ridges, namely the AG8624 print. It is likely a print of the right thumb and has areas indicating movement of the digit while it was printed – the upper part is too large as

if the thumb was slightly elevated while making contact with the clay, and later slid down to settle making a clear print, but, at the bottom, ridges are somewhat misplaced as if the digit after printing was pulled to the right. By calculating the Finger Print Ridge Density (FPRD), the most likely conclusion is that the fingerprint is that of an adult male individual, since ridge count is directly influenced by body size, which will remain a preliminary assessment without having more data on the distribution of male and female body sizes in the population to which this individual belonged.

515 COMMUNITY BUILDING FOR INCREASING DATA SCIENCE SKILLS IN ARCHAEOLOGY

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Karoune, Emma (The Alan Turing Institute)

Abstract format: Poster

Data Science is gradually permeating through the different sub-disciplines of Archaeology but many archaeologists currently lack the skills to implement data science best practices. This lack of skills is affecting the speed of this transition to data science practices leaving Archaeology behind other disciplines and therefore hindering greater impact such as reuse of data and other research outputs and the adoption of new technologies such as AI.

So how can we support this transition to greater use of data science in archaeology?

Community Building is one way to do this and can be used to upskill and support the adoption of new data science skills such as FAIR data management and stewardship, open source coding, and reproducible workflows. Training courses are often not sufficient to help researchers implement best practices as they need greater peer-support and mentoring to put what they have learnt into practice.

This poster will highlight a number of initiatives that have started to do this community work such as the FAIR Phytoliths Project – a project that aimed to raise awareness and knowledge of the the FAIR data principles in phytolith research, Open Phytoliths Community – this community has been offering training and advise in open research practices, and also the recently funded People in Data project, which aims to convene existing data professional communities to share knowledge, tackle challenges and build capacity across domains and sectors.

517 MATERIALITY AND THE RELIGIOUS CHANGE ON THE POLISH – POMERANIAN BORDER IN THE 11TH – 12TH CENTURIES

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Sikora, Jerzy (Institute of Archaeology University of Lodz)

Abstract format: Poster

Long-term interdisciplinary fieldwork, including archaeological excavation, non-invasive prospection and metal detecting, in Ostrowite, a small village in northern Poland, led to the discovery of a large medieval settlement complex dating from the 11th-14th centuries. In the Middle Ages, the complex was an important point on the border between Piast Poland and Pomerania. It was a witness of turbulent events connected with the long process of military and cultural pressure from Poland on Eastern Pomerania in the 11th and 12th centuries, which led to the development of the semi-independent Duchy of Gdańsk and the adaptation of Christianity. The paper aims to show how this change is represented in the archaeological record, with particular attention to material culture and objects. Three categories of finds will be highlighted:

1. Features discovered on the island of Ostrowite Lake, which may represent material traces of pre-Christian ritual activity.
2. The inhumation burials, which reflect complex rites with Christian disposition of the body, rich grave goods, Christian symbols and traces of highly unorthodox animal sacrifices.
3. Small finds associated with Christian worship and the alleged, still uncovered, church building.

520 CURRENT LIFE IN A ROMAN COLONY – WELCOME TO CASTRUM NOVUM!

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Mackiewicz, Klementyna (University of West Bohemia in Pilsen) - Preusz, Klára (University of West Bohemia in Pilsen) - Preusz, Michal (University of West Bohemia in Pilsen) - Enei, Flavio (Museo Civico di Santa Marinella “Museo del Mare e della Navigazione Antica”)

Abstract format: Poster

Castrum Novum (Santa Marinella, Italy) is the roman maritime colony, dated from the 3rd century BC to 5th century AD. Since the 1970s, archaeological excavations have been taking place and over the years, researchers from whole Europe (France, Czech Republic, Finland, Germany or Poland) have joined the Italian project. However, what sets Castrum Novum apart is the group of excavation volunteers – mostly elderly, often retired community from Il Gruppo

Archeologico del Territorio Cerite. The organization tries to physically bring the local history and archeology closer to tourists and city residents, enabling commented tours and offering the souvenirs devoted to the location. Due to their passion, in 2023, the municipality of Santa Marinella, awarded participants of the project with the honorary citizenship of Castrum Novum as a sign of the "new life of the colony". However, with technology development, Castrum Novum has gained a new life also in a virtual world.

Last years, the site has been mostly promoted on television, radio and social media. For those interested in archeology and architecture, 3D reconstructions of the colony are available on YouTube. However, the tribute to younger generations is the computer game.

In cooperation with TECRON VR and iINFINITE PRODUCTION, a computer simulation "Castrum Novum VR - Life in a Roman colony" was created (available on the Steam platform). Users can feel how life was in a typical ancient colony of Rome. They can move directly to 153 AD and explore the whole area, meet the locals and feel the Roman power in its heyday.

See the role of heritage in society and its imagination. Welcome to Castrum Novum!"

521 AS A WITNESS OF THE PAST FIVE THOUSAND YEARS: THE LUDAS-HALOM MOUND IN HUNGARY

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Bede, Ádám (HUN-REN Centre for Ecological Research) - Csathó, András István (Independent researcher) - Valkó, Orsolya (HUN-REN Centre for Ecological Research) - Deák, Balázs (HUN-REN Centre for Ecological Research)

Abstract format: Poster

The Ludas-halom (meaning 'Goose Mound') is a Yamnaya kurgan from the Late Copper Age, near Mindszent (Csongrád-Csanád County, Hungary). This burial mound has many historical traces from the past five thousand years, as evidenced by its more than twenty variants of names. Within an interdisciplinary project we taken geomorphological, landscape historical and botanical researches on the kurgan. We collected all of the historical maps, aerial photos, local and archaeological literature for the landscape historical investigation. A complete list of vascular plants was prepared with attributes of frequency. The kurgan is located on a loess remaining surface of the Maros river from the Pleistocene Age. It has been inhabited almost continuously since the Bronze Age; in the Middle Ages a church was built on it. At the early 18th century, the deserted site was used for occult religious purposes, where witches gathered for séances (we can read about this in an investigation from 1730). After that, presumably for exorcism, a crucifix was erected on the top, which still stands today. Since 1921, on the feast of Peter and Paul, a mass is celebrated here. The borders of three settlements (Mindszent, Szegvár, Derekegyház) still meet here, marked by three small border hills on the top of the kurgan. In the 19–20th centuries, the sides of the Ludas-halom and its surrounding area were ploughed, but the central part was always covered with grassland. Unfortunately, the ploughing of the southern side is still going nowadays, and the human bones found here are considered by local people to be a memory of old wars or epidemics. The mound is not only significant for the heritage protection, but it has also outstanding nature conservation importance, as its surface has disturbed, but valuable loess vegetation, with typical dry grassland species and rare weeds.

523 LJUBAČ - LJUBLJANA, CROATIA: NEW PERSPECTIVES AND INSIGHTS

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Gusar, Karla (University of Zadar, Department of Archaeology) - Šimičić, Marina (University of Zadar, Department of Archaeology) - Glavaš, Vedrana (University of Zadar, Department of Archaeology)

Abstract format: Poster

It is assumed that Ljubljana site in Ljubač, near Zadar, has been inhabited since the Iron Age. The site is located on a promontory just above the Adriatic Sea. Due to its strategic position on the Adriatic coast, from the site it was possible to monitor both maritime routes along the Adriatic and those leading towards the Velebit mountain. The first mention of Ljubač in historical sources is from 1205, when king Andrew II demarcates the territory of the diocese of Nin, excluding the lands of the Liuba castrum, which then belonged to the knights Hospitalier. At the beginning of the 15th century, in the dramatic battles for the Croatian - Hungarian throne between Louis I of Anjou and Ladislaus of Naples, Ljubač was conquered by the Neapolitan captain Aldemarisco. Since 1409, Ljubač has been formally under the rule of Venice, but in reality, under the rule of the noble Matafar family. After the extinction of Matafars, Ljubač once again passed into the hands of Venice, after which it briefly came under Ottoman rule in the middle of the 17th century and later returned to Venetian administration.

This poster presents methods and results of three research campaigns at Ljubač during which archaeological excavations were carried out at several different positions on the site which revealed remains of the ditch, ramparts, tower, cistern, dwellings and two churches. For locating burial sites, HRD dogs were successfully used so cemeteries could

be mapped and also partially excavated. All unearthed structures at the Ljubljana site were 3D modeled by the use of photogrammetry method which helped to better understand the dynamics of this coastal settlement.

525 THE PRESENCE OF CHILDREN IN MONUMENTAL TOMBS IN THE LATE BRONZE AGE ON THE ISLAND OF KEFALONIA, GREECE

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Albanese, John (University of Windsor) - Johnstone, Brenna (University of Windsor)

Abstract format: Poster

During excavations in the mid-1990s, human remains were recovered from a unique combination of a tholos tomb and an adjacent ossuary from the Late Bronze Age at Tzannata on the Island of Kefalonia, Greece. A systematic analysis of the osteological remains has been on-going since 2015. We present some of the results with a focus on the remains of juveniles. The commingled and fragmentary nature of remains confounds the construction of a demographic profile for each tomb. However, it was possible to assess the range of ages of children present in each tomb using three overlapping approaches. First, long bones with unfused epiphyses were seriated based on size. Second, the stages of growth and development were assessed using partially fused epiphyses. Third, the development of the deciduous and permanent dentition was assessed. There is clear skeletal evidence that individuals ranging in age from neonates to young adults were included in both tombs. The analysis of the juvenile remains is complementary to other archaeological approaches for reconstructing the concept of childhood and roles of children during this period. There is evidence that, at least in these monumental tombs, mortuary practices were similar for children and adults regardless of age and gender. These data, along with other evidence of contact, from what is often referred to as an island on the "Mycenaean periphery" are an asset for better understanding of the Late Helladic in general.

526 ENCOSTA DA LAGOA: FIRST BIOANTHROPOLOGICAL RESULTS FROM A SAMBAQUI IN GAROPABA, SANTA CATARINA, ATLANTIC COAST OF SOUTH BRAZIL

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Bianchi, Vittoria (University of Bologna) - Schneider, Bruna (Unochapecô) - Mazza, Barbara (CONICET) - Carbonera, Mirian (Unochapecô) - Silveira Costa, Silvano (Arqueoste Consultoria) - Marciani, Giulia (University of Bologna) - Loponte, Daniel (CONICET) - Vazzana, Antonino (University of Bologna) - Bortolini, Eugenio (University of Bologna) - Benazzi, Stefano (University of Bologna)

Abstract format: Poster

The Encosta da Lagoa Archaeological site is a shallow Sambaqui that yielded materials which were first excavated in 2022 and are currently undergoing a variety of analyses through the international research programs named "Biogenetic profile, diet and mobility of the prehistoric population of southern Brazil: Research and Training" (HABIT-MAE-CI), and Archaeology of Southeastern South American project (ASSA).

The archaeological excavation was carried out in three sectors corresponding to 28.3 m², where the funerary structures were documented and removed to complete their excavation in the laboratory.

The anthropological analyses were focused on the determination of the minimum number of individuals and, for each, the sex and age estimation, the registry of morphometric and biomechanical variables, together with the observation of taphonomic traces and bone and dental pathologies.

The skeletal sample consists of 36 individuals of which 13 were identified as sub-adults and 23 as adults. Extramastatory tooth wear is common across the sample. The individuals present low to medium enthesal changes and some cases of osteoarthritis mainly in the vertebral column. Some individuals exhibit a more complex pathological and taphonomic situation, which are currently under study.

In addition to human remains, excavations documented a conspicuous amount of diverse terrestrial and marine faunistic remains. It is attested the production of material culture involved polished and flaked lithic instruments and bone tools. Associated with the burials there was a great amount of ochre and other grave goods but no pottery. Direct dating of these remains is ongoing, but current findings suggest 5000-3000 years BP as the most likely chronological interval for this occupation.

Current results confirm the relevance of Encosta da Lagoa as one of the key sambaquieira in the southern coast of Santa Catarina which will shed light on change over time in adaptive strategies and population structure in the region.

528 ALTERNATIVE ARCHAEOLOGIES. AN ENQUIRY ON UNCONVENTIONAL VISITORS TO ARCHAEOLOGICAL SITES

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Michalopoulou, Maria (University of Bologna)

Abstract format: Poster

The poster summarizes the titular master thesis on the unconventional visitors to the archaeological sites of Stonehenge; Delphi; and Machu Picchu, as part of alternative archaeology. Unconventional visitors are defined as visitors who engage in activities such as meditation and yoga and have an alternative interpretation of archaeology. The purpose is to present the perspectives of such visitors, by highlighting the often-ignored multivocality of archaeological sites, introduce consequent matters and reveal their relationship to archaeological authorities. With the aid of interviews and bibliographical sources, comparative results of the sites are presented. The correlation of politics and alternative tourism is examined, as well as the importance of archaeological narrative. Finally, proposals on cultural heritage strategies are given, focusing on the protection of the sites and the inclusivity of all visitors by encouraging a fruitful dialogue among them, archaeologists, and cultural heritage managers. The proposals are accompanied by results of archaeoacoustics experiments and projects on the improvement of mental health, which demonstrate a positive impact on the human brain by visiting archaeological sites and interacting with them.

532 SEEING RED: USE OF IRON-OXIDE RICH COLORING MATERIALS AT ISTURITZ AND GATZARRIA CAVES DURING THE AURIGNACIAN IN THE PYRENEES, FRANCE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Querenet Onfroy de Breville, Iris (University of Connecticut; TRACES UMR 5608)

Abstract format: Poster

The Pyrenees region holds significant importance for investigating the early migrations of Homo sapiens into Europe, particularly during the Proto- and Classic Aurignacian periods. Among the notable sites within this area, Isturitz and Gatzarría caves stand out for their in-situ archaeological layers, offering valuable evidence of iron-oxide exploitation during these chrono-cultural phases.

My combined scientific, experimental, and social research explores the different ways that the Proto- and Classic Aurignacians in the Pyrenees exploited iron-rich coloring materials and to understand the cultural contexts in which this material was used. Whether due to scraping, abrading, or grinding, the evidence of exploitation, or use-wear, is detectable on well preserved artifacts. But, contrary to much of the literature around coloring materials, the presence of use-wear marks on coloring material artifacts is not necessarily evidence of symbolically mediated behavior, since the selection, collection, and transport of coloring materials is also evidence of forward planning and intentionality.

To gain a comprehensive understanding of these coloring materials, my research integrates archaeology, geology, and traceology. Each discipline complements the others, utilizing observations ranging from macro- to micro-scales to unveil insights into iron-oxide rich rocks. By progressively assembling a detailed picture of these materials and their chaîne opératoire—the social acts involved in their production, use, and disposal—we gain valuable insights into the evolution of tool technology within culturally specific lifestyles.

This poster aims to outline the methodological approach employed in studying the coloring material collections from these two sites, while also providing preliminary data gleaned from these investigations.

537 FROM THE LAND OF FIRE: ISOTOPIC ASSESSMENTS ON MARITIME LIFESTYLES AND SEXUAL VARIATIONS IN DIET, SOUTHERN PATAGONIA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Kochi, Sayuri (Johannes Gutenberg-Universität Mainz) - Tessone, Augusto (Instituto de Geocronología y Geología Isotópica; Consejo Nacional de Investigaciones Científicas y Técnicas; Universidad de Buenos Aires) - Zangrando, Francisco (Centro Austral de Investigaciones Científicas; Consejo Nacional de Investigaciones Científicas y Técnicas; Universidad de Buenos Aires)

Abstract format: Poster

Research about prehistoric dietary variations in Patagonia is frequently structured by optimal foraging models, as for small hunter-gatherer groups is expected dietary homogeneity between individuals. Several ethnographical examples about the central place provisioning also reinforce the notion that sexual dietary variations among adult individuals are mainly relevant to short-term dietary patterns in the life cycle. Stable isotope analyses of human remains have unmatched resolution power to test these assumptions because they reflect an average of the groups of resources assimilated by an individual over the last decades of life. In this poster, we discuss, from an isotopic perspective, the sexual dietary variations in the southern coast of Tierra del Fuego (Argentina) during the late Holocene (2000 yr cal.

BP-first decades of the 20th century). Carbon and nitrogen stable isotope analyses were performed on bone collagen and bioapatite samples from 58 adult individuals, comprising 25 females and 33 males. Dietary interpretations are framed within a local isotopic ecology that encompasses several organisms from marine and terrestrial environments (n=238). Female adults have consistent and homogeneous marine diets, while isotopic values have a dispersed and asymmetrical distribution in the subset of male individuals. These patterns may be related to differences in logistical movements and food consumption outside the base camps. However, in a regional scale of analysis, Tierra del Fuego presents a pronounced bimodal trend in dietary isotopic markers. Therefore, another possibility is the existence of exogamic patterns; where a few male individuals circulate between different subsistence systems. This phenomenon also has some support in local ethnographies regarding the relationships between the northern Selk'nam groups and coastal Yagán groups. From these results, we highlight the possibility of detecting not only interindividual dietary variations among maritime hunter-gatherers but also issues related to mobility and the maintenance of social networks in the past.

538 THE SOLANA DEL ZAMBORINO: REDISCOVERING A LATE MIDDLE PLEISTOCENE OPEN-AIR CAMPSITE HALF A CENTURY LATER (GRANADA, SPAIN)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Solano García, José (University of Granada) - Serrano-Ramos, Alexia (University of Granada) - Sánchez-Bandera, Christian (Institut Català de Paleoecologia Humana i Evolució Social) - Herranz-Rodrigo, Darío (University of Granada) - Ortiz-García, Elisabeth (University of Granada) - González-Quirónes, Juan (University of Granada) - Ochando, Juan (University of Murcia) - Gutiérrez-Rodríguez, Mario (University of Jaén) - de Lomberra-Hermida, Arturo (University of Oviedo) - Jiménez-Arenas, Juan (University of Granada)

Abstract format: Poster

Mesopleistocene open-air sites with good preservation are rather scarce. These types of locations provide us with information about human activity and its interaction with the environment, which is different and complementary to cave sites.

La Solana del Zamborino is a rich multi-layered site, with nearly 10 meters of archaeological depth, located in the centre of the Guadix endorheic basin (Fonelas, Granada). Between 1972 and 1978, six excavation seasons were conducted, of which only the first two were published, along with a few subsequent studies of paleontological and archaeological research. These pioneering multidisciplinary works highlighted the significance of the site due to its rich archaeological and faunal record within a fluvial-marshy paleoenvironmental context during the Middle Pleistocene. Moreover, not only were traces of fire detected, but also a possible hearth structure delimited by stones was documented.

Recognising the importance of the site, various attempts at magnetostratigraphic dating have sparked lively ongoing debates, yet no archaeological excavation activities had been undertaken until 2024. Through a new stratigraphic survey, our overarching goal aims to address questions regarding human behaviour and activities outside their shelter/habitat zones and their interaction in open environments. To achieve this, we have implemented archaeological interventions primarily focused on recovering all analytical samples that allow us to reconstruct the formation of the site and the paleoenvironment in its diachronic development.

We present the new multidisciplinary project that has been launched and a preliminary report on the first excavation campaign, during which a substantial amount of lithic industry has been recovered and the initial sets of analytical samples have been taken.

540 THE WHEELS ARE TURNING. THE INTRODUCTION OF THE POTTER'S WHEEL IN LATE BRONZE AGE CYPRIOT SOCIETY

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Peri, Elena (Göteborg Universitet)

Abstract format: Poster

The aim of this poster is to present my PhD project, which investigates the impact of the introduction of the pottery wheel during the Late Bronze Age in Cyprus (17th to 11th centuries BC). This technological innovation has implications for social, economic, and cultural change. The focus is on Plain White Ware, a type of pottery both hand and wheel-made, which requires in-depth study.

Unlike traditional pottery studies, which focus on typologies and decoration, this research shifts the focus to technological aspects. The aim is to understand the links between the introduction of the wheel and the resulting changes in society, economy, and culture.

To achieve this, the study will analyse pottery from Enkomi, Kition and Hala Sultan Tekke using macro-, meso- and microscopic methods. By examining these archaeological materials, the research aims to provide valuable insights

into the wider implications of the introduction of the pottery wheel. This approach enhances our understanding of the socio-cultural changes influenced by technological advances in ancient pottery production.

542 TECHNIQUES, TOOLS AND BOUNDARIES: THE IMPRESSED CORDED WARE AND THE WHITE NILE MESOLITHIC

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Usai, Donatella (Centro Studi Sudanesi e Sub-Sahariani - Treviso) - Maritan, Lara (Department of Geosciences, University of Padova, Via Gradenigo 6, 35131 Padova, Italy) - Roma, Sara (Centro Studi Sudanesi e Sub-Sahariani - Treviso)

Abstract format: Poster

Pottery production, in the Nile valley, south of the First Cataract down to the White and Blue Nile rivers, dates back to the 9th millennium BC. This production takes place in a context of hunter-gatherer-fishers and, although it shows some common characters, it also diversifies greatly from north to south. Although pottery manufacturing is family-based, and therefore highly variable, analytical studies enable to define some macro-areas with their own specificity, especially considering the technique, the tool and the final decorative motifs. Impressions realised with a tool composed of a cord element are reported in the literature but were never studied in detail. This kind of impressions is frequent in the pottery production of al-Khiday sites, located on the left bank of the White Nile, and dating to the 7th millennium BC. Considering some important observations made on the ceramic fragments, we explored, through experimentation, the possibility of tracing back to the specific tool and reproducing the motifs identified in the ancient material.

Finally, the "formal" analysis of these decorative motifs has demonstrated, once more, to be a key tool in defining the dynamics of Nile Valley peopling as the study contributed to identifying the cord-impressed decorations documented at al-Khiday as characterizing a specific macro-area along the White Nile.

544 CHRONOLOGICAL AND SPATIAL ANALYSIS OF ROMAN AREA DURING IV-III MILLENNIUM BC

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Lucchini, Francesco (Sapienza University of Rome) - Rizzitano, Filippo (Sapienza University of Rome) - Bucci, Laura (Sapienza University of Rome) - Pascale, Ilaria (Sapienza University of Rome) - Balbo, Eugenia (Sapienza University of Rome) - Daniele, Annamaria (Sapienza University of Rome) - Di Renzoni, Andrea (Institute of Heritage Science - National Research Council of Italy)

Abstract format: Poster

The occupation of the Roman area during the Eneolithic (4th and 3rd millennium BC) is a rather complex reality characterised by different archaeological and cultural aspects (Rinaldone, Conelle-Rinaldone, Gaudio, Laterza, Ortucchio). The chronological sequence of these material cultures is difficult to understand. Therefore, this study attempts to shed light on the settlement patterns and on the possible coexistence of these groups. Starting from the digitization of data provided in Anzidei and Carboni 2020 "Roma prima del mito: Abitati e necropoli dal Neolitico alla prima età dei metalli nel territorio di Roma (VI-III millennio a.C.)", a chronological and spatial analysis was carried out to explore the link between coeval settlements and necropolises related to different cultural aspects. The results show how, during the analysed period, groups adopting different cultural elements lived next to each other in the area at certain times. These data make an important contribution to the study of the Italian Copper Age, expanding our understanding of the spatial distribution of these communities.

551 DON'T WASTE THE GARBAGE! DATA FROM SOME MEDIEVAL AND POST-MEDIEVAL DISCARD PITS IN NORTHERN LATIUM (ITALY)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Alhaique, Francesca (Museo delle Civiltà, Rome Italy) - Brancazi, Luca (Dipartimento di Scienze dell'Antichità, Sapienza Università di Roma, Rome, Italy) - Cerafoli, Eleonora (Dipartimento di Scienze della Terra, Sapienza Università di Roma, Rome, Italy; Dipartimento di Biologia Ambientale, Sapienza Università di Roma, Rome, Italy) - Liberali, Giulia (Scienze e Tecnologie per la Conservazione dei Beni Culturali, Sapienza Università di Roma, Rome, Italy) - Masci, Lucrezia (Dipartimento di Biologia Ambientale, Sapienza Università di Roma, Rome, Italy) - Moricca, Claudia (Dipartimento di Biologia Ambientale, Sapienza Università di Roma, Rome, Italy) - Piermartini, Lavinia (Dipartimento di studi linguistico-letterari, storico-filosofici e giuridici, Università degli Studi della Tuscia, Viterbo, Italy) - Romagnoli, Giuseppe (Dipartimento di studi linguistico-letterari, storico-filosofici e giuridici, Università degli Studi della Tuscia, Viterbo, Italy)

Abstract format: Poster

The aim of this poster is to emphasize the informative value of refuse, not only as evidence of ancient discard practices, but also as an indicator of lifestyle and social status. It will present archaeological, archaeozoological, and - where available - botanical data from a dozen of waste pits situated in several localities in northern Latium (Central Italy). Some of the sites under examination are situated within the boundaries of Viterbo (Via di Valle Piatta and Via Zelli Pazzaglia), while others are located in smaller settlements related to a church (Tessennano), an affluent residence (Celleno Vecchio), and a castle (Graffignano), spanning from the 13th to the 16th century. Through comparative analysis of the contents of these pits, considering both chronology and context, it is possible to infer valuable insights into the lives of those who utilized these discard features, including details about their diet, related to personal preferences, religious prescriptions, as well as observations on waste management practices.

This research not only highlights the advantages of combining archaeozoological and archaeobotanical data, but also emphasizes the potential of applying palynological analyses on archaeological samples, yielding information about "missing plants", seasonality, land use and diseases in the Middle Ages.

556 NOT EVERYTHING IS LOST - THE CASE OF THE ROBED THRACIAN WARRIOR'S TOMB NEAR BOTEVO VILLAGE, YAMBOL DISTRICT, BULGARIA

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Valchev, Todor (Historical museum - Yambol) - Trautmann, Martin (University of Helsinki)

Abstract format: Poster

In the spring of 2020, a group of treasure-hunters dug on a Thracian burial mound near Botevo village, Yambol district, Bulgaria. It is 5.0 m high and has a 50.0 m diameter at the base. The mound is part of a bigger necropolis situated at the base of a rock ridge.

Treasure-hunters' managed to reach the central tomb and rob it. The tomb is created by large stones. It has a trap-ezoidal shape. The roof is made from 3 big, flat stones. The base and lower parts of the walls are covered with white putty. The treasure-hunters removed one of the roof's stones and entered the tomb. They stole all the grave goods and threw the skeleton remains in a hole.

The aim of the poster is to present the anthropological research on the skeleton remains. Unfortunately, we will never know what the grave goods were, but the anthropological data show us interesting moments from the military life of the Thracian nobleman.

557 ARCHITECTURAL DREAMS: EXPLORING THE ARCHITECTURAL SETTINGS IN ETRUSCAN MIRRORS BETWEEN REAL AND FANTASY BUILDINGS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Tulipano, Jacopo Francesco (Università degli Studi di Roma La Sapienza)

Abstract format: Poster

Etruscan mirrors serve as invaluable artifacts shedding light on various aspects of Etruscan society, culture, and artistic expressions. Among the diverse motifs depicted on these mirrors, architectural settings stand out as significant representations providing insights into Etruscan architectural practices, urban landscapes, and socio-cultural contexts. This poster aims to provide a concise overview of the architectural buildings portrayed in Etruscan incised mirrors, especially temples or sacred buildings, emphasizing their typology, nature and structural characteristics, delving into the possibility that the architectural structures depicted may represent real or, alternatively, fantastical monuments.

Through comparative analysis of the images depicted on the mirrors, published within series like the CSE or the Etruskische Spiegel, and the temple models known to us, both from archaeological and art evidence, the aim is to identify the elements attributable to real structures and those characterized by features of fantasy. It can indeed be hypothesized that the Etruscan or the more famous Greek sanctuaries could have been a source of influence for iconographies. Conversely, an alternative perspective posits that many architectural motifs depicted may represent fantastical or idealized constructions

Through the analysis of recognizable elements pertinent to the depicted architectural features, this poster will endeavor to elucidate with greater clarity the typology and architectural orders represented in the mirrors, juxtaposing them with insights gleaned from archaeological documentation, written sources, and known temple structures, particularly prevalent in Etruria and Central Italy. This will further enable a critical examination of previous literature on the subject, verifying interpretations historically attributed to the architectural representations depicted in Etruscan mirrors when available. Notably absent within dedicated studies of Etruscan architecture are precise and substantive references to this aspect.

In conclusion, this study also aims to preliminarily delineate the boundaries and possible future prospects of such analyses, thereby highlighting potential challenges therein.

559 TRANSCRIPTION OF THE MEDIEVAL BIRCH-BARK MANUSCRIPT FROM TURKU

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Kinnunen, Jussi (University of Turku, Department of archaeology) - Harjula, Janne (University of Turku, Department of archaeology)

Abstract format: Poster

The poster focuses on the paleographical analysis of the first medieval birch-bark manuscript found in Finland. The document was found from an archaeological excavation carried out in the medieval town area next to the Turku Cathedral in 2005–2006. The object was C14-dated to the 14th century, and named after its finding spot as ‘the birch-bark letter of the Turku Cathedral Square’. In this poster, we present the analysis and transcription of the manuscript. Firstly, the birch-bark document was scanned using microscope photography. Secondly, digital microphotographs were combined digitally, and the contrasts on the script were amplified with digital image processing. The text is an extremely rare example of medieval non-formal language use in medieval Finland as it seems to enlighten the thoughts of a medieval common citizen. The meticulous documentation and paleographical analysis of the find carried out leaves the opportunity for alternative interpretations of the text in the future.

561 EXPLORING A POSSIBLE SCHEUERMANN'S DISEASE IN A HUMAN SKELETON OF 16TH CENTURY, FROM IASI (ROMANIA)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Groza, Vasilica-Monica (“Alexandru Ioan Cuza” University of Iasi, Faculty of Biology, (Romania); Romanian Academy, Iasi Branch, “Olga Necrasov” Center of Anthropological Research, (Romania)) - Popovici, Mariana (“Alexandru Ioan Cuza” University of Iasi, Faculty of Biology, (Romania); Romanian Academy, Iasi Branch, “Olga Necrasov” Center of Anthropological Research, (Romania)) - Ciorpac-Petraru, Ozana-Maria (“Alexandru Ioan Cuza” University of Iasi, Faculty of Biology, (Romania); Romanian Academy, Iasi Branch, “Olga Necrasov” Center of Anthropological Research, (Romania)) - Văleanu, Mădălin-Cornel (“Moldova” National Museum Complex of Iasi, History Museum of Moldova, Iasi, (Romania)) - Bejenaru, Luminița (“Alexandru Ioan Cuza” University of Iasi, Faculty of Biology, (Romania); Romanian Academy, Iasi Branch, “Olga Necrasov” Center of Anthropological Research, (Romania))

Abstract format: Poster

Analysing pathological conditions in archaeological contexts is often a challenge, as there are far fewer resources to call upon compared to the modern clinical setting.

This study details a case of a possible Scheuermann's disease (SD) in a skeleton dated to 16th century, discovered at the “Frumoasa” Monastery from Iasi (Iasi County, Romania), during the preventive archaeological research in 2018-2019. The case of Scheuermann's disease, described in this study, was identified in a skeleton belonging to a male of about 25-30 years (young adult). The skeleton was discovered in a partially disturbed tomb, with 14 gold coins of 16th century. It was incomplete and poorly preserved showing signs of old cracks in some bones (i.e., parietal, femur).

The macroscopic analysis of the disease affected bones was followed by the X-rays and computed tomography (CT). Osteometry was performed at the level of vertebral bodies using the digital calliper. The teeth were analyzed using a Carl Zeiss Stemi 2000-C stereomicroscope with a Canon Power Shot SX70 HS attached.

The analysed skeleton shows signs of Scheuermann's disease, mainly identified by the modification of the thoracic vertebrae, which caused an excessive curvature in the dorsal region, with a visible deformity of the back in the shape

of a hump. This condition usually occurs during the period of growth and development, before puberty, being more common in males. Although the Scheuermann's disease is well known through current clinical cases, few findings have been reported in archaeological skeletal remains.

Spina bifida occulta in the sacrum bone was also identified. At the dentition level, they are found multiple caries, calculus, and enamel hypoplasia (linear transversal type, on incisors, canine, and premolar teeth).

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563 HUMAN POPULATION DYNAMICS IN LATE NEOLITHIC AND CHALCOLITHIC ANATOLIA - PRELIMINARY INSIGHTS FROM ARCHAEOGENOMICS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Aydogan, Ayca (Department of Anthropology, Hacettepe University)

Abstract format: Poster

The Chalcolithic in Anatolia was a period that served as a link between the Neolithic Transition and the emergence of Urbanization. Archaeological research suggests significant cultural interactions in this period between Anatolia and neighbouring regions, and more distant areas. While the societies from southeastern Anatolia were influenced by Hassuna-Samarra and Halaf cultures of Mesopotamian origin, north and western Anatolian populations display cultural similarities with the Balkans and the Aegean region. By the end of the Chalcolithic, technological advancements further facilitated interaction networks with distant regions. However, whether this picture of widespread cultural interaction was accompanied by genetic changes in the human gene pool is not well understood. Here we present 40 new genomes from 11 previously unsampled settlements to analyse population dynamics during the Late Neolithic/Chalcolithic era (c.6000-3000 BCE). Our findings suggest a correlation between cultural and genetic association among the populations and also multiple gene flow events from its eastern regions, possibly Caucasus, into Anatolia, with varying genetic impacts in different regions. We find that populations linked with the Hassuna-Samarra culture show genetic separation from Early Neolithic Upper Mesopotamian groups, suggesting admixture. We also find genetic differentiation between Central Anatolia and Eastern Thrace by the 6th millennium BCE, with Central Anatolia exhibiting closer associations with eastern populations and Eastern Thrace sharing similarities with the Aegean islands and Balkan sites. Although association with the Caucasus continued in the following millennium, genetic heterogeneity among Anatolian regions remains. Finally, by the Bronze Age, populations from both Anatolia and Upper Mesopotamia became genetically relatively homogeneous.

564 DIVING INTO CENTRAL EUROPEAN NEOLITHICS' SUBSISTENCE. 25 YEARS OF SLASH AND BURN EXPERIMENT FORCHTENBERG, GERMANY - RESULTS AND FUTURE PERSPECTIVES

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Nelle, Oliver (Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart) - Marinova, Elena (Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart) - Dreibrodt, Stefan (Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart) - Pickartz, Natalie (Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart) - Ehrmann, Otto (Büro für Bodenmikromorphologie und Bodenbiologie Creglingen) - Schlütz, Frank (Christian-Albrechts-Universität zu Kiel) - Knapp, Hannes (CEZA Mannheim) - Eckmeier, Eileen (Christian-Albrechts-Universität zu Kiel) - Gerlach, Renate (LVR-Amt für Bodendenkmalpflege im Rheinland) - Rösch, Manfred (Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart)

Abstract format: Poster

This contribution provides quantitative data on the application of fire in subsistence practices of a Central European landscape and their potential visibility in paleo-environmental archives based on the results of a multidisciplinary experimental approach. In a forest near Forchtenberg, Baden-Württemberg, Germany, over the last 25 years, plots of 300-900 m² were cleared (on some occasions with “Neolithic” tools) and burned in subplots of 50-100 m² using a rolling fire blast technique, developed by the Forchtenberg experimental fire team. This resulted in a satisfactory burning of the branches and smaller diameter stems of the felled trees and an even distribution of the combustion products over the plots and is therefore considered a possible model for Late Neolithic slash-and-burn applying fire to extend cultivation in Central European mixed deciduous forests. The amount of wood burned and the amount of charcoal and ash produced during the fires is documented. The change in soil properties is examined immediately after the fire. The long-term change in soil properties is being monitored by sampling and analysing all previously burned areas. The burnt areas were planted with old cereal varieties over a period of one year, the respective yields were documented, and compared with the yields of permanent cultivation with and without previous burning. The visibility of the areas in the pollen count of the surrounding landscape is documented in pollen traps and the natural succession of the forest on the areas after the end of agricultural use is documented by vegetation relevés as well as tree ring

data. Isotope analyses of cereals and soils were included in the last years to evaluate isotopes from archaeobotanical material as possible markers for slash-and-burn in the past. We are also investigating the fate of charcoal in the soil to allow comparisons with Neolithic black soils.

565 PLANT AND ANIMAL USE IN LATE MEDIEVAL AND MODERN RELIGIOUS CONTEXTS IN CENTRAL ITALY

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Moricca, Claudia (Sapienza University of Rome) - Alhaique, Francesca (Museo delle Civiltà, Rome Italy) - Barelli, Lia (Sapienza University of Rome) - Brancazi, Luca (Sapienza University of Rome) - Masi, Alessia (Sapienza University of Rome) - Picuti, Maria (Sapienza University of Rome) - Piermartini, Lavinia (Università degli Studi della Toscana) - Pugliese, Raffaele (Independent researcher) - Romagnoli, Giuseppe (Università degli Studi della Toscana) - Sadori, Laura (Sapienza University of Rome)

Abstract format: Poster

Excavations carried out between 1996 and 2016 in Latium and Umbria (Central Italy) allowed the recovery of faunal and, sometimes, plant remains from religious contexts spanning from the 13th to the 17th century. The analysis of these organic materials, as well as their comparison, allowed us to investigate how these resources were used not only by the monastic communities but also by laypeople who lived in and around these religious complexes. The examined assemblages represent, in most cases, food waste but also include plants and animals employed for other purposes. The diet was, of course, influenced by religious rules; however, it differed, for example, according to the monastic order, the chronological period, the local availability of resources, and the social status. In this sense, noteworthy is the retrieval of *Cucurbita* sp. (pumpkin) seeds and a *Cavia porcellus* (Guinea pig) pelvis in Early Modern contexts from the Santi Quattro Coronati complex (Rome), products imported from the newly discovered Americas, thus available only to the elite.

566 GEOPHYSICAL AND GEOCHEMICAL PROSPECTION AT THE RINGFORTS ON ÖLAND, SWEDEN

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Hedberg, Ellinor (Archaeological Research Laboratory, Stockholm University) - Lidén, Kerstin (Archaeological Research Laboratory, Stockholm University) - Viberg, Andreas (Guideline Geo AB) - Isaksson, Sven (Archaeological Research Laboratory, Stockholm University) - Papmehl-Dufay, Ludvig (Linnaeus University)

Abstract format: Poster

The use of the ringforts on Öland, dated to the migration period (200-800 CE) have long been debated with many different interpretations, such as defence systems, meeting places, cult places and that it reflected turbulent times. One method to quickly gain more information about the ringforts is different archaeological prospection methods, e.g. LiDAR, ground-penetrating radar, magnetometry and soil samples. The project CrisConClimate aims to study archaeological change related to crisis, conflict, and climate with the ringforts on Öland as a case study. A wide range of archaeological research methods will be used and one of them is archaeological prospection that will be carried out as an initial step before turning to other materials and methods. The aim of the prospection is to gain information about the spatial layout, structures, wells, defence systems and other features of interest that can be used in the forthcoming research. The methods that have been used are LiDAR, ground-penetrating radar and pXRF element analysis of soil samples. The LiDAR data gave high resolution pictures of the ringforts, something that was not available before and will help the interpretation of the sites. The result from the ground-penetrating radar survey was more difficult to interpret but could confirm that most of the archaeological structures have been removed, maybe due to ploughing. The soil samples showed the mineral content of the ringforts that was compared to divide them into different types and indicate different activity areas. All these methods show that archaeological prospection is highly relevant and can give a lot of new information about archaeological sites without having to damage the sites and do archaeological excavations, something that is not possible to do over such large areas.

571 GEORGIAN MONASTERIES BETWEEN INVASION AND RESILIENCE DURING MIDDLE AGES

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Bertoldi, Francesca (Ca' Foscari University Venice, Dipartimento di Studi Umanistici) - Fabbri, Pier Francesco (Museo e Istituto Fiorentino di Preistoria) - Cameriere, Roberto (Università degli Studi del Molise) - Piano, Denise (Università Politecnica delle Marche, Dipartimento di Scienze Biomediche e sanità pubblica) - Catalini, Leonardo (Università del Molise, Medicina Legale) - Laliashvili, Shorena (Tbilisi State University Ivane Javakhishvili, Institute of History and Ethnology) - Bitadze, Liana (Tbilisi State University Ivane Javakhishvili, Institute of History and Ethnology) - Rasia, Piera Allegra (Università Ca' Foscari Venezia) - Rova, Elena (Università Ca' Foscari Venezia)

Abstract format: Poster

This paper wants to offer a preliminary glimpse into a recently discovered human bone assemblage discovered in the area of Borjomi (Georgia) in July 2023. These huge bone assemblages come from three monasteries: Berisaqdrebi, excavated in 2020, Potoleti, recently restored in 2007 and Mtsvane-Chitakhevi or Green Monaster. The human remains from Berisaqdrebi come both from seven early middle age (Xth century AD) burials in stone coffins located along the church's walls and inside the structure and from an underground crypt with few articulated burials on stone shelves and an enormous mass of disarticulated remains in the ossuary. At present they have been removed and preserved at the Nunnery of the Holy Virgin of Borjomi where they are devoutly venerated as witness of martyrdom. Potoleti remains are still preserved in plexiglass case at the site as few remains at the Green Monastery, still site of pilgrimage for the "blood" coloured stones in the river outside the monastery, according to legend left by the monks murdered and tortured by the soldiers of Shah Tahmasp. A preliminary survey of the Berisaqdrebi collection allowed us to number more than 600 skulls and post-cranial remains and around 20% of them shows wounds and injuries consisting in blunt force and sharp force traumas both ante-mortem and peri-mortem and most probably due to episodes of inter-personal violence; decapitated skulls have also been found as also other pathologies have been recorded (tumours, metabolic bone diseases, fractures, ankylosing spondylitis, congenital malformations). Samples have been taken for aDNA and isotope analysis (nutritional patterns and eventually origin of the subjects) and a preliminary sample of around 50 subjects will be diagnosed by traditional (cranial sutures, dental wear) and experimental radiographic Cameriere Method on teeth for age determination.

572 DEPICTING THE EQUINE EMOTIONAL STATES COMPARATIVE ANALYSIS OF THE BEHAVIOUR AND ATTITUDES OF HORSES IN THE ALEXANDER MOSAIC

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Cecconi, Niccolò (Sapienza. Università di Roma) - Sollevanti, Gaia (Università degli Studi di Perugia (graduating student))

Abstract format: Poster

In the Alexander mosaic of the House of the Faun in Pompeii, the relationship between horse and human being is perfectly illustrated. In this mosaic, dated back to 100 BC, but inspired by a painting by Philoxenus of Eretria from the 4th century BC, we can observe the realism, typical of the Hellenistic age, with which horses are represented.

The artists have reproduced in detail the poses of the body, the attitudes (raised tail and rotated head with tensed neck muscles) and the expressions of the muzzle of these animals (flared nostrils, exposed teeth, barred eyes, straight and rotated ears).

Observing the mosaic images, we note that the emotional states of the horses are, together with Alexander, the main characters of the scene.

In this poster we would like to propose an approach to analyzing the emotional states of the horses in the Alexander mosaic.

We will consider ancient sources (e.g. Xenophon), other ancient objects (e.g. horse-jockey from Artemision) and, above all, research in veterinary medicine that analyses the ethology of these animals in situations of excitement, stress, anxiety, and fear.

Through this comparison, we will observe that the attitudes of the horses in the Alexander mosaic have been reproduced in an extremely naturalistic style.

Through this analysis, in fact, we will demonstrate that the body postures and facial expressions of the horses in the Alexander mosaic are not simply caricatured images from the artist's imagination but are the outcome of the symbiotic relationship between ancient humans and horses and the profound knowledge that Greek aristocratic man had of this animal.

573 EXPLORING THE ROLE OF ARCHAEOLOGY AND AFTERSCHOOL ENGAGEMENT: INSIGHTS FROM THE YOUNG ARCHAEOLOGISTS' CLUB

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Stejskalová, Johana (National Museum in Prague)

Abstract format: Poster

What is the potential and the role of archaeology and archaeological heritage with regards to afterschool entertainment for children? The Young Archaeologists' Club, organized by the National Museum in Prague, serves as a weekly afterschool activity targeting pupils interested in classical archaeology. Through this initiative, participants engage in learning about the ancient Greece and Rome, cultivating critical thinking skills while also partaking in crafting activities and games. The initial course centered on archaeological finds from Greece and Rome, while the subsequent course focused on mythology. Collectively, there were nineteen participants enrolled in both courses. A survey conducted in 2023 among club participants sought to gauge their perspectives on archaeology, the club itself, and museums in general. Initial inquiries delved into their motivations for joining the club and their perceptions regarding the relevance of classical archaeology in contemporary society. Subsequently, participants provided comprehensive evaluations of each club meeting's activities and topics. Additionally, changes in attitudes towards museums were measured pre- and post-club participation, comparing participant responses with those of a control group of pupils who did not partake in the club. This comparative analysis aimed to assess the potential influence of archaeology and regular afterschool engagement on attitudes towards museums. Furthermore, parental perspectives on archaeology were also surveyed to elucidate familial attitudes towards the subject matter. The outputs of this survey can not only contribute to the improvement of the presentation of archaeological topics in the context of museum education but also illuminate the relationship of participants with the institution and the effect of a long-term activity related to archaeological heritage on such a relationship.

574 STRONTIUM ISOTOPES IN HUMAN MOBILITY RESEARCH: BASR PROXIES IN AN ANTHROPOLOGICALLY MODIFIED LANDSCAPE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Vytlačil, Zdenek (Národní muzeum) - Ackerman, Lukáš (Institute of Geology of the Czech Academy of Sciences) - Loskotová, Zuzana (Institute of Archaeology of the Czech Academy of Sciences, Brno)

Abstract format: Poster

Establishing local $87\text{Sr}/86\text{Sr}$ range is a vital requirement for identifying non-locals in the bioarchaeological mobility studies using strontium isotopes. In regions heavily influenced by modern human activities, however, obtaining a reliable reference material might be challenging. To establish this range in the Nové Mlýny reservoirs area of the Southern Moravia region of the Czech Republic, 56 reference samples were collected. This included 15 surface water samples, 15 homogenised plant samples, 12 tooth enamel and 1 dentine and bone sample of archaeofauna, 6 snail shells and 6 human bones. The measured $87\text{Sr}/86\text{Sr}$ ratios revealed a major influence of exogenic strontium on the local waterscape, further increased by the changes to the waterscape introduced during the 20th century. Influence of this strontium, carried by the Jihlava river, was also detected in other sample libraries. The presented results demonstrate that a proper care in selection of the reference samples is needed to allow for an understanding of the prevailing conditions in the BASr and to ensure a reliable BASr range estimation.

576 UNVEILING USE-WEAR DEVELOPMENT ON GROUND STONE TOOLS: A DIGITAL APPROACH

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Sorrentino, Giusi (University of Turin; Department of Environmental Sciences, Informatics and Statistics - Ca' Foscari University of Venice) - Remondino, Fabio (3D Optical Metrology Unit, Bruno Kessler Foundation (FBK)) - Paggi, Marco (IMT School for Advanced Studies Lucca) - Longo, Laura (Department of Environmental Sciences, Informatics and Statistics - Ca' Foscari University of Venice) - Borghi, Alessandro (University of Turin) - Re, Alessandro (University of Turin) - Lo Giudice, Alessandro (University of Turin) - Menna, Fabio (3D Optical Metrology Unit, Bruno Kessler Foundation (FBK))

Abstract format: Poster

The digital reproduction of archaeological materials has experienced significant growth in recent decades, owing to the increased accessibility of digitization tools in terms of both user capacity and cost-effectiveness. While there has been a proliferation of 3D replicas of artifacts with cultural and historical significance, the field of "digital archaeology" has primarily focused on information and communication, often overlooking the full analytical potential of the various methods available for digitalizing archaeological evidence. Scientific applications aimed at addressing research questions have been somewhat constrained, in part due to the inherent nature of these tools, which emphasize immediate communication capabilities.

Employing photogrammetric techniques and digitization processes to analyse the surfaces of ground stone tools offers valuable insights into the tribological mechanisms underneath the damage pattern development and support the quantification of wear formation. In our investigation, we developed an analytical protocol using slabs and pebbles to replicate observed use-wear traces on Upper Palaeolithic tools. Testing various photogrammetric acquisition setups and processing methodologies, we assessed alterations in lithic tool geometry and surface depletion after their experimental use. By exploring diverse acquisition strategies, we conducted a thorough evaluation of potential biases in data collection and analysis, adapting our methodology to enhance the reliability of our output. As a result, we devised and implemented a purpose-designed setup to ensure precise analyses and validate robust interpretations.

577 ARCHAEOLOGICAL RESEARCH IN LITHUANIAN MANORS. THE CASE OF THE ŠIAULIAI MANOR

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Ostasenkoviene, Virginija (Klaipeda University Institute of Baltic Region History and Archaeology; Daugvyne Cultural History Museum-Reserve)

Abstract format: Poster

Lithuania's manors are a very important historical and heritage area. More than 3000 surviving manors and their remains were counted, but only about 600 manors are currently protected. The perception of manor complexes as the objects of archaeological investigations has appeared in Lithuanian archaeology science only recently. The archaeological investigation of Lithuanian manors has steadily intensified during recent decades. During 1990-2022, more than 170 manors were investigated, but the nature and extent of their research are very different. Nevertheless, more than half a hundred of the manors have been investigated in more detail (Anykščiai, Dubingiai, Kelmė, Kretinga, Kurtuvėnai, Mantagailiškis, Plungė, Rietavas, Rokiškis, Šiauliai, etc.). On the basis of new and valuable data collected during archaeological investigations, it is possible to make judgments about the structure, material culture, lifestyle and economy at only the better investigated manor complexes. One of them is Šiauliai Manor complex in Northern Lithuania. Its history is connected with the Šiauliai Crown Estate, which were founded in 1589 and were meant to maintain the personal manor of the ruler. During 2010-2022, a total area of 533 m² was excavated in Šiauliai Manor, more than 8,000 16th-18th century every-day finds (coins, sherds of pottery, stove tiles, glass artefacts, roof tiles, etc.) and abundant zooarchaeological material were collected. The most interesting and valuable finds are the remains of 11 archaeological structures - outbuildings and remains of dwellings with stone foundations, and the remains of stoves. Archaeological research shows that in the 16th-18th centuries, residential and commercial buildings were built in the northeastern part of the Šiauliai manor. Both historical and archaeological studies show that in the 19th century the buildings of the manor are moved to the south-western side of the manor.

578 WRITTEN IN THE TEETH: INSIGHTS INTO ENVIRONMENTAL AND SOCIAL DYNAMICS IN PONTECAGNANO (CAMPANIA, ITALY, 7TH-6TH CENTURY BCE) THROUGH DENTAL HISTOMORPHOMETRY

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Germano, Roberto (Department of Environmental Biology, Sapienza University of Rome, Rome, Italy) - Higgins, Owen (Department of Odontostomatological and Maxillo Facial Sciences, Sapienza University of Rome, Rome, Italy; Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Galbusera, Alessia (Department of Odontostomatological and Maxillo Facial Sciences, Sapienza University of Rome, Rome, Italy) - Esposito, Carmen (Department of Cultural Heritage, University of Bologna, Ravenna, Italy) - Bondioli, Luca (Department of Cultural Heritage: Archaeology and History of Art, Cinema and Music, University of Padua, Italy) - Pellegrino, Carmine (Department of Cultural Heritage Sciences, University of Salerno, Salerno, Italy) - Sperduti, Alessandra (Bioarchaeology Service, Museum of Civilizations, Rome, Italy; Asia Africa and Mediterranean Department, University "L'Orientale" of Naples, Italy) - Manzi, Giorgio (Department of Environmental Biology, Sapienza University of Rome, Rome, Italy) - Nava, Alessia (Department of Odontostomatological and Maxillo Facial Sciences, Sapienza University of Rome, Rome, Italy)

Abstract format: Poster

Histomorphometric analysis of dental crowns allows the study of non-specific physiological stress, observable as Accentuated Lines (ALs) in enamel thin sections, with almost daily precision. This approach, when applied to ancient human populations, allows for the correlation of stress prevalence with environmental and subsistence factors, also in terms of diet and health.

This study aims to investigate the prevalence of ALs in a sample of 33 permanent teeth (canines, first and second molars) of 11 adult individuals from the Iron Age necropolis of Pontecagnano (7th-6th century BCE, Campania, Italy) and perform a quasi-longitudinal analysis of non-fatal stress prevalence during the first 6-7 years of each individual's life. All teeth were thin-sectioned and assessed for individual chronologies of ALs across dental series by matching similar ALs intervals.

All teeth show a significant number of ALs. The distribution of stresses increases after the sixth month of life, potentially in relation to the initial phases of weaning, and is then unevenly distributed throughout the following years. The analysis of each tooth class demonstrates a differential recording of stresses within the crowns, with the cervical parts showing less sensitivity to stress recording.

This study offers a contribution to the field of human ecology by enhancing our understanding of the interactions between past communities and their environment and social contexts, providing a detailed image of infancy and development in individuals who survived into adulthood, ultimately overcoming the limitations presented by the Os-teological Paradox and the constraints inherent in inferring general aspects on infancy from individuals who did not survive this early life stage.

580 TRANSHUMANCE AND TRANSFORMATION: THE ENVIRONMENTAL IMPACT OF THE TRANSHUMANCE SYSTEM IN SVARFAÐARDALUR, NORTH ICELAND

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Thorlacius, Snædís (University of Iceland) - Erlendsson, Egill (University of Iceland) - Hreiðarsdóttir, Elín (The Institute of Archaeology of Iceland) - Möckel, Susanne (University of Iceland) - Júlíusson, Árni (University of Iceland)

Abstract format: Poster

For over a millennium, a transhumance system was practised in Iceland where herders brought livestock to shielings for grazing over the summertime. The shielings were usually located in higher elevation and/or further inland and the animals were brought there to spare the hayfields in vicinity to the farms in the lowlands and by the coast. This system has only been researched superficially and its environmental impact on land and ecosystems has not been investigated in any depth. In this research, two shieling sites in Svarfaðardalur, N-Iceland, serve as case studies for an environmental study using palynology, sedimentology and tephrochronology to reconstruct the past environments of the shieling sites and their surroundings. The research is aided by data from archaeological and historical investigations regarding the shielings in question, and their associated farmsteads. Some of the questions we aim to answer are when the shieling sites were established and abandoned, how they operated, if there was continuity in their operation and how the grazing impacted the environment. Peat cores were retrieved from the vicinity of the shieling sites, which yielded palaeoenvironmental data spanning from early modern times back to before human arrival in Iceland in the late 9th century AD. Environmental proxies for the presence of humans and domestic animals, in association with dated tephra layers, are used to estimate the timing of the beginning and end of intensive grazing. Differences and similarities in the environmental, historical and archaeological data between the two sites will be discussed and possible explanations presented.

581 UPDATES ON THE FAUNAL ASSEMBLAGE OF VIA SAN FRANCESCO, SANREMO

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Silvestrini, Sara (Department of Cultural Heritage, University of Bologna, Italy) - Marciani, Giulia (Department of Cultural Heritage, University of Bologna, Italy) - Arrighi, Simona (Department of Cultural Heritage, University of Bologna, Italy) - Armadori, Elena (Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Modena, Italy) - Lugli, Federico (Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia, Modena, Italy; Institut für Geowissenschaften, Goethe-Universität Frankfurt, Frankfurt Am Main, Germany) - Harvati, Katerina (Institute for Archaeological Sciences and Senckenberg Center for Human Evolution and Paleoenvironment University of Tübingen, Germany; DFG Center for Advanced Studies 'Words, Bones, Genes, Tools', University of Tübingen, Germany) - Negrino, Fabio (Dipartimento di Antichità, Filosofia, Storia, University of Genoa, Italy) - Benazzi, Stefano (Department of Cultural Heritage, University of Bologna, Italy)

Abstract format: Poster

The site of Via San Francesco was discovered in 1960 in the heart of the town of Sanremo (Liguria, Italy) during the construction of a new building. Located at the base of the Flysch Unit outcrops near the present seashore, the site was discovered through a stratigraphic test trench conducted during a rescue excavation. This trench exposed a singular occupation layer containing a significant number of lithic artifacts and faunal remains. The initial dating of the site referred to MIS 6 and has recently been validated by a new OSL dating, currently being published. Our reanalysis of the site remains took into account previous studies, incorporating further insights into the faunal assemblage, climatic and environmental reconstructions, and animal exploitation. The faunal assemblage is predominantly characterized by *Cervus elaphus*, in line with the faunal spectrum of other Ligurian sites. However, unlike other sites in the area, no carnivores are attested. The low species diversity suggests a hunting strategy focused on a single species (*Cervus elaphus*) and, consequently, a narrow diet. Carcass transportation data suggests that Neanderthals selectively transported specific parts of the skeleton, such as appendicular elements. Additionally, the presence of numerous

fresh fractures and butchering marks on long bones provides evidence of Neanderthal exploitation of this animal to recover and consume marrow. Both bulk and sequential oxygen ($\delta^{18}\text{O}$) and carbon ($\delta^{13}\text{C}$) stable isotope analyses on the carbonate moiety of enamel hydroxylapatite of different species are currently underway by IRMS. The aim is to better constrain the paleoecology of the animals and the local environment. Preliminary results suggest no significant seasonal climatic fluctuations in an open forest environment.

582 A COMPARISON OF THE TRANSITION AND SPREAD OF AGRICULTURE TO JAPAN WITH OTHER PARTS OF EASTERN AND FAR WESTERN EURASIA

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Stevens, Chris (McDonald Institute, University of Cambridge) - Crema, Enrico (McDonald Institute, University of Cambridge)

Abstract format: Poster

The spread of agriculture marks a major shift in subsistence, laying the foundations of ensuing societies across Eurasia. This poster compares Japan with the British Isles, representing the eastern and northwestern extremes respectively, of Eurasian agricultural diffusion. We examine the stability and robustness of subsistence systems in early agricultural societies, through evidence for diversity (the use of wild foods), the establishment of storage, and evidence for exchange systems.

The 4th millennium BCE spread of millet agriculture into eastern Eurasia, with a single animal domesticate, saw a strong reliance on wild foods, supporting only low levels of demographic growth, which were too small to carry millet agriculture to Japan. The subsequent spread of rice agriculturalists into Korea and across Japan, in the 2nd to 1st millennium BCE was rapid by comparison, and can be related to the higher carry capacity of rice farming over millet farming. As with millet farming in Korea, the initial millennium of rice farming in Japan saw a high reliance on wild foods until the early to mid-1st millennium AD. It is argued that the absorption of pre-existing Jomon peoples helped sustain early rice farming populations, but that Jomon communities themselves never adopted rice cultivation.

A similar situation is seen for early agricultural societies in western Eurasian, where the spread of agriculture, supported by aDNA evidence, was through demic-diffusion not adoption. As with eastern Eurasian initial agricultural subsistence had a strong reliance on wild foods, with delayed dispersal into parts of West and Northwest Europe. For much of the British Isles, reliance on cereal agriculture relative declined in the 4th millennium BCE to the point that cereal agriculture was likely abandoned. It is not until the Early-Middle Bronze Age, that cereal agriculture became fully established, when more established storage facilities, and field systems are evident.

584 VIRTUAL RECONSTRUCTION FOR EDUCATION: THE IBERIAN SITE OF CUEVA DE LA LOBERA (CASTELLAR, JAÉN, SPAIN)

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Sánchez, Alberto (University Research Institute for Iberian Archaeology, University of Jaén, Spain) - Cubero, Inmaculada (University Research Institute for Iberian Archaeology, University of Jaén, Spain) - Segura, Rafael (University Research Institute for Iberian Archaeology, University of Jaén, Spain) - Rueda, Jesús (University Research Institute for Iberian Archaeology, University of Jaén, Spain) - Ogáyar, Carlos (CEATIC, University of Jaén, Spain) - Rueda, Carmen (University Research Institute for Iberian Archaeology, University of Jaén, Spain) - Rísquez, Carmen (University Research Institute for Iberian Archaeology, University of Jaén, Spain) - Fuertes, José (University Research Institute for Iberian Archaeology, University of Jaén, Spain)

Abstract format: Poster

The rapid advancement of new technologies alongside the refinement of 3D modeling tools, sourced from data captured through environmental digitization devices like photogrammetry, structured light scanners, or LIDAR technologies (utilizing ALS or MMS), has notably broadened access to Virtual Reality (VR) infrastructures. This progression, coupled with the emergence of sophisticated 3D modeling software, has significantly bridged the gap between VR infrastructures and society at large.

The University Research Institute for Iberian Archaeology (IUIAI) at the University of Jaén (Spain) is deeply immersed in various research endeavours spanning multiple disciplines, all with the overarching aim of acknowledging and comprehending the significance of Iberian history through an interdisciplinary lens. Within the confines of the IUIAI's Computational Archaeology Laboratory, exploration into VR devices has paved the way for the meticulous reconstruction and immersive simulation of Iberian landscapes, serving to streamline their dissemination and enhance understanding.

This work is developed in the context of the European project 5DCulture (Deploying and demonstrating a 3D cultural heritage space), which aims, among other objectives, to highlight the usefulness and applicability of VR technologies in the digitization of archaeological heritage and its subsequent use in various educational contexts.

An innovative serious game, grounded in VR technology, has been meticulously crafted to showcase the 3D reconstruction of the Iberian sanctuary nestled within La Lobera cave (Castellar, Jaén, Spain). This location was handpicked due to its profound archaeological significance and for being a constant reference for education about the heritage and culture of the Iberians. Through the meticulous construction and museumification of the prototype, the primary objectives are twofold: to underscore the intrinsic value of the site and to catalyse the widespread dissemination of archaeological heritage to a broader audience.

585 POST-MEDIEVAL FUNERARY STRUCTURES IN SOUTHERN ITALY: THE CASE OF THE CHURCH OF SAN PIETRO BARISANO, MATERA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Bruno, Brunella (University of Salento)

Abstract format: Poster

In 1999 the team of Medieval Archaeology of the University of Lecce (now University of Salento) was involved in a restoration project of some churches in the Rione Sassi, the historical centre of Matera, in the southern region of Basilicata.

Excavations in the rupestrian church of San Pietro Barisano revealed the long history of the building. Under the floor of the current eighteenth-century church, archaeological investigations brought to light the burials from the Middle Ages until the mid-19th century.

From the excavation is emerged how the burials of post-medieval period are complex. Due the rise in population, in 15th-16th centuries were built deep rectangular structures divided into sectors by lithic slabs. This typology, the so-called "a caditoio" or "a colatoio", is attested also in other post-medieval cemeteries of Apulia and Lucania.

In Modern Age (18th- mid-19th centuries) were built special crypts for burials, the so-called "strainer rooms", with niches along the walls used to treat the bodies according to a precise and complex funerary ritual. This took place in communicating environments, provided for the double treatment of the body. This particular kind of funerary structures is attested not only in other churches in Matera, but in other regions of Southern Italy. Probably, these funerary crypts were intended for individuals of high status social, families and members of religious institutions.

587 FIELDS OF TRANSFORMATION: THE CASE OF THE FUNERARY FIELD OF KNOSSOS DURING THE LATE MINOAN IIB – IIIA TRANSITION

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Gourgouleti, Eleni (National and Kapodistrian University of Athens)

Abstract format: Poster

The transition towards the Post – Palatial period in Crete, is characterized by successive episodes of destructions, demographic shifts as well as innovations and experimentations on the material culture across the island. Combined with the increasing evidence for the use of Linear B script, they have been all considered indications for the establishment of a new status quo. The only palace surviving after the LM I B period, is the palace of Knossos, although not without deviations from the past. This is why, the question of the "Minoan" or "Mycenaean" origin of the group(s) occupying the palace in its last phase and by extension are buried around it, from early on in the spotlight, continues to divide archaeologists to this day.

Although recent research tends not to equate cultural with population changes, the funerary field of Knossos and especially the changes occurring during the LM IIB – IIIA transition have been systematically employed in favor of either continuity with the past or discontinuity, reigniting the aforementioned question. However, the traditional approaches on change entail interpretational and methodological constraints, since they underestimate the fact that both the terms "Minoan" and "Mycenaean" are modern conventions that are not directly reflected on burials and that their uncritical reproduction leads the research rather to a dead-end.

Consequently, there lies the need for the search of an alternative that would explain the dynamic process of change, the factors and conditions that encouraged firstly its emergence and secondly its incorporation to the final palatial modus vivendi of Knossos. For this purpose, this paper proposes a shift to the funerary ritual itself, stemming from theoretical approaches promoting its crucial role in a more fluid and mutually (re-)constructive model of social reproduction.

589 PALEODEMOGRAPHY AND OLDER ADULTS: ANTHROPOLOGICAL SCIENCE AND HISTOLOGY IN THE DIGITAL AGE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Robbins Schug, Gwendolyn (Department of Biology, University of North Carolina Greensboro) - Love, Emma (Department of Biology, University of North Carolina Greensboro) - Semaan, Michelle (Department of Biology, University of North Carolina Greensboro) - Williams, Kimberly (Department of Anthropology, Temple University) - Douglas, Khaled (Archaeology Department, Hashemite University) - Al-Jahwari, Nasser (Archaeology Department, Sultan Qaboos University)

Abstract format: Poster

Basic questions remain unanswered about older adults in the past - their representation, lifestyles, and contributions to shaping our evolution. One principal barrier to understanding these questions is inaccurate, imprecise age estimation methods for older adult skeletons (50+). Cementum annulations are the only chronometric measure of age, with 98% accuracy and +/- 2 years precision even in older age groups, whose morphological and chronological ages can differ by decades. However, this method is not widely adopted because of perceived difficulty in preparing sections and counting the annulations. Digital approaches to dental histology have the potential to improve the accessibility of this method for archaeologists. Serial sections were prepared for a sample of 10 human teeth from the commingled, fragmentary mortuary context at Dahwa, in Bronze Age Oman (c. 4200-4000 BP). We assessed intra and inter-observer error in counts of cementum annulations using anthroposcopic observations in polarized Light Microscopy, semi-quantitative elemental analysis using SEM EDX, and counts of cementum annulations made by training an AI with deep learning algorithms. Results demonstrate challenges and prospects for using SEM EDX and deep learning models to estimate age at death from cementum annulations, a method with potential to enhance the accuracy of paleodemography and improve our ability to detect, represent, and include older adults in archaeological reconstructions of life and death in past populations.

592 THREE-DIMENSIONAL COMPUTER-AIDED VIRTUAL RECONSTRUCTION OF LATE HELLENISTIC KERNOS FROM VODITSA, NORTHEAST BULGARIA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Raykovska, Miglena (Institute of Information and Communication Technologies, Bulgarian Academy of Sciences) - Petkova, Kalina (National Archaeological Institute with Museum, Bulgarian Academy of Sciences) - Raykovska, Miryana (Institute of Information and Communication Technologies, Bulgarian Academy of Sciences) - Petkov, Nikolay (Institute of Information and Communication Technologies, Bulgarian Academy of Sciences)

Abstract format: Poster

The graphical reconstruction of partially preserved archaeological artefacts poses considerable challenges for researchers. Efforts to restore these artefacts to their original form may take years and often lead to impasses, particularly in cases where there is a lack of comparable or well-preserved artefacts.

In the present case study, the authors aim is to offer an approach towards a three-dimensional computer-aided virtual reconstruction of a Late Hellenistic kernos, found during the archaeological excavations at the Site 5012-West at Voditsa village, Northeastern Bulgaria.

By its characteristics, the site can be defined as a settlement with dug-in dwellings and their synchronous pits, which cover a large chronological period - from the Late Chalcolithic to the end of the Hellenistic era. Structures from the late 3rd to mid-2nd centuries BC predominate. It was in a pit dated to this chronological period that the vessel discussed here was found.

The authors use a methodology designed to generate a precise digital twin of an uncovered fragment of the vessel, thereby establishing a robust basis for the formulation of objective hypotheses. This methodology incorporates a suite of techniques including micro-computed tomography (Micro-CT), 360-degree photogrammetry, and 3D modelling. Past studies have underscored the potential synergy between computer tomography and photogrammetry, as these methods mutually complement each other in terms of the data they yield.

The sample was scanned with a micro-CT and information about the dimensions and structure of the material was extracted. Porosity analysis was conducted and the results were used in the reconstruction of the artefact. The texture information was gathered through photogrammetric documentation. The resulting data was combined and the final model was transferred to three-dimensional modelling software, where a virtual reconstruction was performed based on similar objects from the same period and tailored to the individual characteristics of the studied artefact.

597 GLASS AND FAIENCE BEADS IN CHILD BURIALS: VITREOUS TECHNOLOGY AND FUNERARY PRACTICES IN MYCENAEAN GREECE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Nikita, Kalliopi (Hellenic Ministry of Culture, Ephorate of Antiquities of East Attica)

Abstract format: Poster

Children in Mycenaean Greece were almost always furnished with jewellery and small beads of various materials, amongst which glass and faience have an outstanding position. The case of vitreous jewellery in child burials is examined in its evolutionary perspective, namely from its earliest occurrence in the Shaft Graves at Mycenae throughout the three phases of the Mycenaean Period. Glass and faience beads in child burials are explored with special emphasis on distinctive assemblages from burials in the Peloponnese, namely the Argolid, Corinthia, Elis, Messenia and Laconia. The range of glass colours and bead forms, the diversity of decorative designs on moulded relief plaques as well as the modes of their stringing and arrangement in association with their burial deposition are presented and discussed. To interpret this burial practice a theoretical approach is followed on the basis of technological and archaeological factors that determine the manufacture and prospective function of vitreous artefacts in Mycenaean society. The study aims to elucidate the role of vitreous jewellery that were offered to children and intended for the ritual of dressing and ornamentation of the dead in conjunction with the distinctive predilection for the use of cobalt and turquoise blue glass by the Mycenaean.

598 BEYOND WORDS: USING BIOCODICOLOGY TO READ BETWEEN THE LINES OF PARCHMENT DOCUMENTS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Sacristán, Luisa (Universidad de los Andes) - Rangel, Guillermo (University of Copenhagen) - Reyes, Alejandro (Universidad de los Andes) - Collins, Matthew (University of Cambridge; University of Copenhagen)

Abstract format: Poster

Parchment, a material made of collagen extracted from animal hides, was the primary writing support for manuscript production in the Middle Ages in Europe. Parchment production methods depend on the geographic region and the era in which it was produced. Researchers have been able to reconstruct human history, and study the culture of civilizations by using the information contained in these ancient documents. The development of Next-Generation Sequencing (NGS) techniques prompted the establishment of a new research field: biocodicology, which involves the study of the biological information found in these manuscripts. In this study, we analyzed and compared the bacterial communities present in 57 parchment manuscripts (dating from the 10th to the 18th century) from archives located in Iceland, England, and Spain. We found that microbiome analysis serves as a predictor of parchment-making methods, as evidenced by the clustering of bacterial communities from manuscripts that had undergone similar production methods. The bacterial communities provided valuable insights into the parchment-making processes, including the use of salt, evidence of manipulation, and distinctions in processing techniques, while also indicating the potential presence of pathogens. Based on the analysis of all processed samples, microbiome analysis holds a promising future for advancing our understanding of parchment characteristics and origins.

600 THE PREHISTORIC SETTLEMENT "DASKA" IN NW PELOPONNESE: DECODING THE ANIMAL BONES IN AN ISOLATED SITE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Argyropoulos, Vassilios (Ephorate of Antiquities of Achaia, Greece) - Papagiannopoulou, Artemis (Museum National d' Histoire Naturelle Paris)

Abstract format: Poster

The unveiling of the prehistoric settlement of Ntaska in the rugged terrain of mountainous Achaia, located on the foot of Mount Erymanthos in the northwestern Peloponnese, stands as a remarkable witness to the region's archaeological narrative. The remote location of this settlement, dating from the late Middle Helladic to the peak of the Late Helladic period, located far from established communication routes, in an isolated gorge, invites us to investigate the motives behind its selection.

The initial archaeological findings, which include pottery and fragments of animal bones, suggest a flourishing community primarily dedicated to animal husbandry.

In particular, comparative, taphonomic and morphometrical analysis techniques were applied on the recorded animal remains. This analysis reveals:

1. A diverse range of identified osteological remains encompassed both young and old animals, as well as different species (Caprinae being the dominant one) pointing towards a substantial production of various animal products.

2. The taphonomic markers and bone location during excavation, along with the fact specific bone parts that were pointed to household waste.

3. Differentiated size of bone fragments indicates either different animal breeds of the same species or wild ones.

4. Specific bone elements suggested that sorting occurred at the slaughter site, followed by the subsequent transport of bones to the settlement.

This approach aims not only to yield information about the dietary patterns of the Ntaska inhabitants, but also to decode the economic dynamics of the settlement, and to reveal its character and significance.

602 LOCAL AND ALLOCHTHONOUS CHERT SUPPLIES IN THREE EARLY NEOLITHIC SETTLEMENTS IN THE MATERA AREA (BASILICATA, SOUTHERN ITALY)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Muntoni, Italo (Soprintendenza ABAP BAT-FG, Ministry of Culture) - Conforti, Jacopo (Dipartimento di Scienze della Terra e Geoambientali, Università degli Studi di Bari "Aldo Moro", Bari, Italy) - Allegrretta, Ignazio (Dipartimento di Scienze e Tecnologie Biologiche ed Ambientali, Università del Salento, Lecce, Italy) - Delluniversity, Emanuela (Dipartimento di Scienze della Terra e Geoambientali, Università degli Studi di Bari "Aldo Moro", Bari, Italy) - Terzano, Roberto (Dipartimento di Scienze del Suolo, della Pianta e degli Alimenti, Università degli Studi di Bari "Aldo Moro", Bari, Italy) - Angeli, Lucia (Dipartimento SAGAS, Università degli studi di Firenze, Firenze, Italy) - Eramo, Giacomo (Dipartimento di Scienze della Terra e Geoambientali, Università degli Studi di Bari "Aldo Moro", Bari, Italy)

Abstract format: Poster

In the Matera area several evidences of prehistoric human presence since Paleolithic. Numerous settlements, located on the eastern side of Matera, show a frequentation since the Early Neolithic.

In this contribution we focus on the knapped lithic industries from the sites of Giavarra, Murgia Timone and Trasanello as indicators of the chert supply during the Early and Middle Neolithic.

The Giavarra site is located near the SP51 Matera-Gioia del Colle. The excavation context is represented by five sub-circular pits. Based on the typological characteristics of the pottery and the radiometric dating, the site can be framed in an archaic phase of the Early Neolithic Impressed Ware, between the end of the 7th millennium and the beginning of the 6th millennium BCE.

All the 86 Early Neolithic knapped chert artefacts are analyzed.

The settlements of Trasanello and Murgia Timone (Matera, Basilicata) are two ditched villages typical of the Early and Middle Neolithic of the Southern Italy. The Early Neolithic phase of Trasanello (first half of VI millennium cal BC) provided 100 chert artefacts consisting mainly of unretouched and common tools with a low number of cores. As for Murgia Timone only 12 chert artefacts were attributed to the Early Neolithic phase of settlement occupation.

All the samples were investigated underwent nondestructive petrographic and chemical (pXRF) analyses to understand the provenance of raw materials according to NM-PCI protocol.

The chert lithotypes identified show different chert supply patterns in three investigated sites. If at Giavarra we have the prevalent use of cherts from Gargano promontory formations, at Murgia Timone et Trasanello the main component is produced using local secondary chert sources (radiolarite, silicified calcarenites and nodular chert) originated from the outer geological units of the Southern Apennine. These evidences fit well the archaeological hypothesis of occupation strategies of the neolithization of this area.

603 EXPLORING THE SPATIAL-TEMPORAL VARIABILITY OF BIFACIAL POINT TECHNOLOGY IN THE TERMINAL PLEISTOCENE OF NORTHERN JAPAN AND ITS IMPLICATIONS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Takakura, Jun (Archaeological Research Centre, Hokkaido University) - Hashizume, Jun (Niigata Prefectural Museum of History)

Abstract format: Poster

A widespread distribution of the bifacial points, including leaf-shaped and stemmed types, can be seen in the terminal Pleistocene of northern Japan. Many researchers have argued that bifacial point technology characterises the adaptation strategy of the terminal Pleistocene hunter-gatherers in northern Japan. However, no consensus has been established on the emergence and development of bifacial point technology, particularly with regard to the transition of subsistence and hunting weapon technologies. This paper explores the behavioural variability of bifacial point technology in the terminal Pleistocene of northern Japan by focusing on spatial-temporal changes in the manufacturing technology and use of bifacial points. To address this issue, we attempt to reveal the interrelationships between the lithic production technology involving reduction methods and techniques and morphometric features of the bifacial

points indicating projectile weaponry. The results of analysis suggest that significant changes in bifacial point technology occurred at the onset of the Late Glacial period. This may have important implications not only for the technological changes reflected in bifacial point technology but also for the relationships between human behavioural system and environmental change during the terminal Pleistocene.

608 **DOMUM SERVAVIT, LANAM FECIT - WOOLWORKING AND OTHER EVERY DAY OCCUPATIONS OF WOMEN IN ROMAN SALONA BASED ON EPIGRAPHIC EVIDENCE**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Banovac, Ivana (Independent researcher) - Jadrić-Kučan, Ivana (University of Zadar)

Abstract format: Poster

Women in Roman Salona (Dalmatia), just like in other parts of the Roman Empire, engaged in different everyday jobs and occupations in accordance with their social status, opportunities, and necessities. Their primary occupation was their family and household management, within which their duties were determined according to their status. Spinning wool was considered one of the more noble occupations, which was, above all, the task of every Roman matron and respectable woman. Women of the lower classes, in addition to household duties, opted for certain professions, which mainly included traditionally female occupations such as nursing (nutrices), midwifery (obstetrices), and hair-dressing (ornatrices). Besides the matrons, we learn the most about these women from epigraphic monuments, and in most cases they are freedwomen and slaves. Moreover, it was not uncommon for women to engage in occupations dominated by men, such as medicine, education, crafts, commerce, and management. In Salona, women were not only their husbands' co-workers in the workshops and on the estates, but they were also owners and managers. This contribution will focus on those Salonitan women of different social statuses who represent the majority of working women of ancient Roman society, and whose lives, especially those from low-ranking classes, were regularly neglected or even misinterpreted in ancient and contemporary sources. Thanks to the epigraphic evidence that gives us information about these women and their occupations, we can learn more about women's social identities and their important contributions within the city community.

609 **DIGITAL MAPPING TECHNIQUES AND GIS APPLICATIONS FOR SCATTERED MICROLITHIC FRAGMENTS RECORDING AND SPATIAL ANALYSIS: ARCHAEOLOGICAL SURVEY AT ONGASAKI, TSUSHIMA (JAPAN)**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Avola, Giuseppe (International Research Institute for Archaeology and Ethnology (IRIAE)) - Ciulla, Irene (International Research Institute for Archaeology and Ethnology (IRIAE)) - Mezzapelle, Diego (International Research Institute for Archaeology and Ethnology (IRIAE))

Abstract format: Poster

Archaeological investigations at the Early Neolithic site of Ongasaki (Tsushima, Japan) are currently conducted as part of the project "Jomon Sea - Navigation in the Origins of Japan", a research initiative conceived and directed by the International Research Institute for Archaeology and Ethnology (IRIAE), funded by the Ministry of Foreign Affairs and International Cooperation of the Italian Republic, in collaboration with the Asian Research Institute for Underwater Archaeology (ARIUA) and the Tokyo University of Marine Science and Technology. Since 2023 the project is focusing on the study of seafaring, maritime networks and fishing economy in Japanese prehistory through advanced methodological and technological approaches. Investigations at Ongasaki aimed to survey with systematic sampling methodology concentrations of scattered obsidian and quartzite microlithic fragments, residuals from the activity of fishing tool production as evidenced from complete artefacts found (mainly harpoons). The panel will discuss the results of applied experimental digital mapping techniques which combined drone georeferenced topographic survey, detailed direct and GPS recording and the use of multiple, interactive GIS softwares (Google Earth, Global Mapper, ArcGIS) to acquire accurate microlithic fragments positioning. Integrating quantitative and material-class featured spatial analysis to recorded microarchaeological data allowed to interpret post-depositional dynamics and intensity of fragments scattering by environmental-based visibility, advancing further hypothesis on the topography of site use. Future investigation goals include the study of site formation processes, changes in lithic tool production and its intensity by diachronic trends.

611 **WALL-FARE. THE EARLIEST CITADELS. WALLED LANDSCAPES, CONFLICT AND SOCIAL CHANGE IN BRONZE AGE SOUTH-EASTERN ITALY**

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Gori, Maja (National Research Council of Italy) - Kaplanis, Panagiotis (National Research Council of Italy) - Magri, Alessandra (National Research Council of Italy) - Perrone, Nicoletta (University of Salento) - Scardozi, Giuseppe (National Research Council of Italy) - Vandelli, Alessandro (University of Salento) - Scarano, Teodoro (University of Salento)

Abstract format: Poster

Along the Adriatic and Ionian coasts of Apulia, numerous multi-phase settlements defended by dry-stone fortifications were established during the Middle Bronze Age (c. 1700 to 1500 BC), making it the most extensively militarised region of the Italian peninsula during that period. It was previously thought that such fortifications spread across Italy from the 17th century BC, with the Protoappennine enceinte at Coppa Nevigata being the oldest known example. However, new data from aerial and terrestrial surveys in Salento suggest an earlier appearance of this phenomenon. The recently launched WALL-Fare project (2024-2025), a joint research between the University of Salento and the CNR, aims to investigate the early appearance of walled enclosures and the formation of a militarised landscape as an earlier marker of settlement hierarchy and increased social conflict. The results of this 2-year project will provide crucial clues to the overall social history of the Mediterranean during the period between the late 3rd and early 2nd millennium BC.

The project takes a multidisciplinary approach. For the first time, legacy data will be integrated into a systematised, open-access GIS-based database. The combination of traditional and innovative remote/proximal sensing techniques, field surveys, non-invasive geo-archaeological prospection, small-scale excavations on 6 sites and a large-scale absolute dating campaign (50 samples) will allow the reconstruction of settlement patterns, hierarchies and catchment areas.

615 **BESIEGING AN ISLAND: AN INTEGRATED APPROACH TO WARFARE IN THE PHOENICIAN-PUNIC SITE OF MOTYA (ST. PANTALEO, TP ITALY)**

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Leprai, Francesco (University of Palermo)

Abstract format: Poster

In the context of battlefield archaeology, the comparison between historical sources and archaeological evidence often highlights aspects that require a systematic archaeo-historiographical process. The Phoenician outpost of Mozia (Italy), the scene of one of the best-known events in the history of ancient warfare, represents a particularly significant case study in this sense. The siege and subsequent destruction of the city by the Syracusan armies in 397 BC have in fact been attested in detail by historical literary sources (Diodorus Siculus, Book XIV), which in this circumstance attribute to the Greeks the use of innovative devices designed specifically for siege warfare. The research of the University of Palermo in the northern sector of the island seems to somehow substantiate this source: extensive destruction contexts associated with some of the main buildings have yielded a repertoire of weapons significant in terms of quantity and typological variety. Through a multidisciplinary approach that integrates GIS spatial analysis, volumetric reconstructions of the deposits and 3D modelling, the first results relating to the distribution of some of the weapons used during the siege and some hypotheses on their trajectories will be presented.

618 **FROM TURKEY REMAINS IN THE EARLY MODERN PERIOD TO THE CULTURAL HERITAGE IN THE CONTINENTAL CROATIA**

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Kolenc, Magdalena (PhD student, Faculty of Veterinary Medicine, University of Zagreb) - Korpes, Kim (PhD student, Faculty of Veterinary Medicine, University of Zagreb) - Trbojević Vukičević, Tajana (Faculty of Veterinary Medicine, University of Zagreb)

Abstract format: Poster

Turkey (Meleagris gallopavo) was first introduced to Europe during the early 16th century and became widely accepted as a protein source, first among nobility and then it spread to all social classes. Historical records document that the turkey was introduced to the Zagorje region around 1523, believed to be a gift from bishop Alessandro Geraldini and first turkey was on menu of Pauline monks in 1561 in Lepoglava, both within northern Croatia. Archaeozoological records from the Castle Čanjevo also support turkey presence in the 16th century in Croatia. In this research, we analysed avian remains from three archaeological sites in Continental Croatia: the nobility castle Stari Grad Milengrad, the Pauline monastery of All Saints in Streza, both built in the 14th century and the prestigious urban block Banski

dvori in Zagreb, established in the 13th century. Avian remains are dated to the 16th century. Turkey remains were isolated and skeletally determined. Age group was determined based on the fusion and porosity of the bones, while the presence of medullary bone determined sex. A total of eight turkey remains were found. Most of the turkey remains were found at castle Stari grad Milengrad, while only one remain was found at the Pauline monastery of All Saints and Banski dvori, respectively. All remains were from adult animals except one immature individual from the castle. Medullary bone was not determined. From the presented data we can conclude that turkey was accepted as a food source in Croatia quickly, especially in the Zagorje where castle Stari grad Milengrad is. It became more popular than already known and used poultry species. Over the centuries, turkey slowly became the regional pride of Zagorje, and the meal prepared with the bird Zagorski puran has been protected as a recognised cultural heritage food.

619 MILLET STABLE ISOTOPES REVEAL THE ADVANCE OF FARMLAND MANAGEMENT PRACTICE IN THE CAPITAL CITY OF THE HAN EMPIRE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Liao, Jingwen (Leiden University) - Allen, Edward (Fudan University) - Henry, Amanda (Leiden University) - Laffoon, Jason (Leiden University) - Li, Ming (Hanyang Mausoleum Museum) - Liu, Daiyun (Shaanxi Provincial Institute of Archaeology) - Sheng, Pengfei (Fudan University)

Abstract format: Poster

The Han Dynasty saw agricultural technology in ancient China advance dramatically. Archaeology has suggested significant intensification in agricultural practices in the prehistoric period, but not in this critical dynastic time frame, nor for Imperial China generally. Here, we analyzed carbon and nitrogen stable isotopes of 35 samples of common millet (*Panicum miliaceum*) and 19 samples of foxtail millet (*Setaria italica*) recovered from four Han Dynasty tombs (Longzaocun, 2002CSX, 2008XJG, and Sanyaocun) and one Late Neolithic settlement site (Ziweitianyuan) in the Guanzhong Basin, Central China. Our results, when compared with the available millet isotope data from the Late Neolithic through Han Dynasty periods, show the long-term trajectory in soil and water conditions in the Guanzhong Basin from about 3625 BC to AD 220. Compared to the previous, the $\delta^{13}C$ values of common and foxtail millets decreased by 2.7‰ and 3.0‰, respectively, while the $\delta^{15}N$ values increased by approximately 8.3‰ and 4.3‰, respectively, in the Han Dynasty capital and surrounding areas. We also find an offset of about 0.8‰ and 1.8‰, respectively, between husks and seeds in the $\delta^{13}C$ and $\delta^{15}N$ values of modern millet crops. In this paper, it is argued that the advance of fertilization and irrigation practices in the Han period are the key causes of the variations in nitrogen and carbon stable isotope values of archaeological millet crops. We suggest that the first major agricultural revolution in early China most likely occurred in the powerful Han Empire.

621 ARCHAEOLOGICAL MISSIONS AS A TOOL FOR THE VALORIZATION AND PROMOTION OF "FORGOTTEN HERITAGE": THE ARMENIAN-ITALIAN MISSION IN ARUCH

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Fausti, Elena (Sapienza Università di Roma) - Galanti, Francesca (Sapienza Università di Roma) - Ferdinandi, Sergio (ISMEO) - Babajanyan, Astghik (IAE NAS RA) - Petrosyan, Artur (IAE NAS RA) - Dan, Roberto (ISMEO) - Vitolo, Priscilla (ISMEO)

Abstract format: Poster

This poster presents the work carried out by the Archaeological Mission of "Aruch e l'incastellamento della Via della Seta" which represents a collaborative project between Armenian and Italian specialists aimed at uncovering and preserving the rich archaeological heritage of Armenia along the Silk Road. Central to this Mission is the excavation of areas with a very high historical and archaeological value that have been forgotten and abandoned, with the active involvement of the local population in the archaeological activities. The Mission also aims to raise awareness and cultural identity as well as to create a deeper sense of belonging among community members, but also to revitalise neglected areas and turn them into symbols of the past heritage and historical relevance of the village of Aruch, a small town in Armenia's Aragatsotn province.

The combined action of community involvement and excavation activities has created a collective effort to preserve the archaeological "treasures" and instilled a newfound appreciation for the region's rich heritage not only in the villagers, but also in the valorization of the archaeological remains for the future generations and the promotion of tourism and economic development of the area.

622 MODELLING THE ORIGIN AND DISPERSAL OF POTTERY IN EARLY HOLOCENE AFRICA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Rotunno, Rocco (McDonald Institute for Archaeological Research, University of Cambridge, United Kingdom; The Archaeological Mission in the Sahara, Dept. of Ancient World Studies, Sapienza University of Rome, Italy) - Crema, Enrico (Dept. of Archaeology, University of Cambridge, United Kingdom)

Abstract format: Poster

Ceramic technology appeared in sub-Saharan Africa and spread towards the central Sahara during the early Holocene, sometime around the end of the 10th and the beginning of the 9th-millennium cal BC, coinciding with a greening trend in the desert zone. The possible origin point(s) of this technology remains, however, open to debate, with different hypotheses claiming single or multiple and independent episodes of innovation.

Here we have compiled an extensive literature-based radiocarbon database of archaeological evidence for pottery across Early Holocene Africa, including the whole central and south Sahara and the Nile Valley, which we used to test three competing hypotheses on the geographical origins of pottery. In particular, we consider a southern Saharan/Sahelian origin, a Nile Valley origin, and a dual-origin theory. We formally compare the three hypotheses by developing a custom Bayesian statistical model based on spatiotemporal diffusion curves fitted on dated contexts with the presence/absence of ceramics.

623 DOCUMENTING TRADITIONAL ECOLOGICAL KNOWLEDGE FOR MITIGATING CLIMATE AND ENVIRONMENTAL CHANGE: PRESENTING AN EMERGING INITIATIVE

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Rose, Thomas (Deutsches Bergbau-Museum Bochum) - Lerski, Martha (Leonard Lief Library, Lehman College|CUNY, Bronx, NY, USA) - Mwale, Frank (KEYS Organization, Kapyanga Village, Malawi)

Abstract format: Poster

The climate and environment are constantly changing and constantly require mankind to adapt. The most sustainable mitigation strategies are often conserved in traditional knowledge which is deep-rooted in the cultural context of the local communities. The strategies do not require the use of modern technologies or materials, are often easy to implement by means of local resources, and were tested and refined over time. Nevertheless, nowadays, they often fail due to the unprecedented speed of man-made climate and environmental change. In addition, traditional knowledge that has not already been lost due to displacement or political and economic suppression is now at risk of getting lost because of disinterest among the younger generation or the adoption of western ways of life.

This initiative aims to preserve this traditional knowledge in a digital infrastructure. In addition to documenting this immaterial cultural heritage, it will be made available to other communities to help them find new strategies for mitigating climate and environmental changes. During all steps, the owners of the traditional knowledge will keep full control over their knowledge, to whom, and under which conditions it will be shared as per local safeguarding policies.

For our pilot study, we have partnered with the KEYS organization in Malawi, who has agreed to grant us access to their knowledge, valued cultural elements, and further provide in-country research cooperation. However, limited funding and time are hampering our progress. With this poster, we, therefore, reach out to colleagues and interested persons by presenting our approach and seeking support to further advance this initiative.

624 MOVING IN THE LOWER TRENT BASIN: ANALYSING THE DIFFERENT INTERACTIONS BETWEEN HUMANS AND LITHIC RAW MATERIALS DURING THE MESOLITHIC PERIOD

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Zhang, Ziliang (Department of Archaeology, University of York)

Abstract format: Poster

There are abundant Mesolithic remains and several renowned Mesolithic sites in the lower Trent basin, England. A few famous sites are often selected to establish the behaviour patterns and the interaction model between people and landscapes. However, scholars lack a systematic analysis of other Mesolithic locations in the area. Additionally, past Mesolithic studies in this region have not included landscape archaeological studies at the basin level. This study aims to analyse the interaction between people and lithic raw materials based on information from 579 Mesolithic locations. A database of Mesolithic locations is established. The data are sourced from the local archaeological databases of nine counties. The effectiveness of the database is evaluated based on the positions and the types of archaeological interventions recorded. Subsequently, the distribution patterns of these locations, including period, function types, number, and lithology of remains contained within these locations, are analysed. Finally, this study reconstructs the interaction between local people and raw materials during the Mesolithic period in the lower Trent basin, alongside the behavioural patterns of sourcing raw materials. The maximum sourcing range and the least-cost path, established

based on the least-cost method, generate new insights into the interaction between people and raw materials. A possible "relay station" model for long-distance sourcing is proposed and discussed.

625 AMINO ACID $\delta^{15}\text{N}$ PATTERN CAN ENHANCE THE PALEODIETARY RECONSTRUCTION OF A MARINE-BASED NEOLITHIC POPULATION IN KOREA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Yun, Hee Young (Hanyang University) - Choy, Kyungcheol (Hanyang University)

Abstract format: Poster

Recent studies show that there have been increasing evidences from $\delta^{15}\text{N}$ values of amino acids (AAs) in bone collagen to refine dietary patterns of past populations from archaeological sites, using amino acid $\delta^{15}\text{N}$ values of diverse food sources (cereals, terrestrial animals, and marine animals). This compound specific stable isotope analysis (CSIA) approach has assumed that there are (i) the consistent ^{15}N -enrichment patterns between human collagen and dietary sources, and (ii) the robust $\delta^{15}\text{N}$ difference of two AAs such as glutamic acid and phenylalanine ($\delta^{15}\text{NGlu-Phe}$). However, it is not tested how $\delta^{15}\text{N}$ values of AAs in bone collagen are consistent within different food sources (cereals, terrestrial animals, marine animals). In order to estimate the contribution of animal proteins in human diets more accurately, we selected human and faunal bones from the Neolithic sites in Korea. Our AA results from Neolithic sites in Korea show that most $\delta^{15}\text{NGlu-Phe}$ values were lower in terrestrial animals (i.e. livestock) than marine animals (i.e. fish and marine mammals). This is potentially due to the different nitrogen sources at the trophic base of terrestrial and marine environments. Moreover, $\delta^{15}\text{NGlu-Phe}$ values in terrestrial animals showed significant increase with trophic levels (based on ecological niche). However, the increase of $\delta^{15}\text{NGlu-Phe}$ pattern associated with the trophic levels was not detected in marine animals. Rather, $\delta^{15}\text{NGlu-Phe}$ patterns in marine mammals was lower than these in marine fish. This discrepancy in TP estimates between terrestrial and marine animals might be related to distinct nitrogen excretion modes in marine animals that can influence AA $\delta^{15}\text{N}$ values, such as Glu and Pro. These findings could provide more enhanced dietary reconstruction of prehistoric populations who has mainly marine-based diets.

626 PROSPECTING FOR EARTH RINGS ON WURUNDJERI WOIWURRUNG COUNTRY, SOUTHEASTERN AUSTRALIA, USING AIRBORNE LIDAR

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Kurpiel, Rebekah (La Trobe University) - Rachcoff, Jamie (La Trobe University) - Meredith-Williams, Matthew (La Trobe University) - Spry, Caroline (Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation; La Trobe University) - Jones, Ron (Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation) - Mullins, Bobby (Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation) - Wandin, Allan (Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation)

Abstract format: Poster

The investigation of sacred, ritual and ceremonial sites and landscapes is essential to our understanding of the human social past. Moreover, the need to identify and conserve these places and their broader cultural landscapes is critical in increasingly urbanised and developed environments. On Wurundjeri Woiwurrung Country, current knowledge about ceremonial earth ring features is centred on the archaeological evidence from five earth rings situated in Sunbury, southeastern Australia. This study investigates the potential for identifying similar earth rings elsewhere on Wurundjeri Country through an archaeological remote sensing approach. In a first for Australian archaeology, visual prospection of high-resolution airborne LiDAR processed with the Visualization for Archaeological Topography relief visualisation technique developed by Kokalj and Somrak (2019) identifies 28 potential earth ring features on Wurundjeri Country, including eight features considered highly likely to be of Aboriginal cultural origin. These potential earth rings share similar characteristics to previously recorded earth rings, including a characteristic cleared centre with raised edges. The identified features are present in four geographic regions: (1) Springfield, Lancefield and Goldie; (2) Sunbury, Gisborne South and Clarkefield; (3) Wallan, Whittlesea; and (4) Seville and Launching Place. The broad distribution of identified features across Wurundjeri Country highlights the imperative to consider earth rings, and any Aboriginal cultural heritage places, as components of a cultural landscape synonymous with the concept of Country. Clearly, heritage and planning laws must better respond to the pressures of urban development on Aboriginal cultural landscapes, and ensure they are recognised and protected into the future.

627 COMPREHENSIVE DATA COLLECTION METHODS OF THE PAINTED TEMPLE'S COMMINGLED HUMAN REMAINS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Murphy, Kara (Ministry of Culture: Peru)

Abstract format: Poster

Pachacamac was one of the primary and most respected oracles of the pre-Hispanic central coast. Located in the region of Lima, Peru, it has a history of more than a thousand years of continuous occupation. During 2017-2019, excavations were conducted on the north frontier of the Painted Temple (900 AD - 1533 AD) as part of the Research and Conservation Program of the Pachacamac Sanctuary 2015-2016. A large accumulation of commingled human remains was recovered, historically disturbed by looting and architectural destruction. Part of this debris covered an area of the Uhle cemetery, where teams were able to identify and record a series of disturbed bundles, 10 bone conglomerates, and bone fragments associated with Late Horizon (1470-1533 AD) cultural material.

We present here the data collection documenting and coding methods from a context of mixed and fragmented skeletal remains. We have been able to identify approximately more than 50 individuals through the use of accessible materials, standardized variables, and anatomy guides, which allowed us to assign a life history, as well as assess MNI, pathologies, and age at death. The goal of using these methods is to maintain context integrity, avoid bone damage, and digitize complete and accurate demographic data for future collection studies. The methods used in this commingled sample could serve as a model for other cases of studies that present considerable mixing and fragmentation of skeletal remains, taking into account the limitations of time and resources.

629 STRONTIUM ISOTOPE ANALYSIS OF THE 4TH CENTURY HORSE BONES RECOVERED AT A DAESEONG-DONG ROYAL TOMB OF GAYA CONFEDERATION IN KOREA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Hong, Jong Ha (Institute of Korean Archaeology and Ancient History, Kyung Hee University, Seoul, Republic of Korea) - Ko, Young Min (Daegu National Museum, Daegu, South Korea) - Yi, Yang Su (Cheongju National Museum, Cheongju, South Korea) - Go, Ala (Institute of Korean Archaeology and Ancient History, Kyung Hee University, Seoul, Republic of Korea) - Ko, Eun Byul (Department of Archaeology and Art History, Seoul National University, Seoul, South Korea) - Kang, In Uk (Institute of Korean Archaeology and Ancient History, Kyung Hee University, Seoul, Republic of Korea) - Shin, Dong Hoon (Department of Anatomy and Cell Biology, Seoul National University College of Medicine, Seoul, South Korea)

Abstract format: Poster

During the late 4th century CE, the situation on the Korean Peninsula was in a state of flux. Cavalry tactics in warfare, for example, were actively adopted, and the horse-riding tradition was transmitted to Japan, along with other aspects of culture and practice. The two horse tooth fragments found in Daeseong-dong tombs dating to the 4th century Gaya Confederacy, therefore, can be of great significance to animal archaeology. In gross-morphological and ancient DNA (aDNA) analyses, we confirmed that the teeth from Tomb #1 were of a horse. To determine the breeding pattern for horses in the 4th century Gaya Confederacy, we subjected the teeth to strontium isotope ($^{87}\text{Sr}/^{86}\text{Sr}$) analysis. The $^{87}\text{Sr}/^{86}\text{Sr}$ values were 0.710083 ± 0.000018 (KH-30) and 0.710263 ± 0.000018 (KH-34), respectively, and are mostly in close agreement with the herbaceous plant $^{87}\text{Sr}/^{86}\text{Sr}$ values representative of the southeastern part of the Korean Peninsula where the Gaya Confederacy and, later, the Silla Kingdom gained the ascendancy. We speculate that it was probably only after Korea was unified by the latter that horse breeding was deployed to the entire Peninsula by the central government. This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea [NRF-2019S1A5C2A01083578]

630 THE SOUND OF THE RATTLE. FROM ARCHAEOLOGICAL FIND TO ARCHAEOLOGICAL EXPERIMENT AND BACK

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Vinazza, Manca (Department of Archaeology, University of Ljubljana) - Korat, Lidija (Slovenian National Building and Civil Engineering Institute) - Korošec, Paola (Sculptor) - Perovšek, Boštjan (Musician, composer)

Abstract format: Poster

In Slovenia, ceramic rattles were discovered by Karl Dežman during the excavation of one of the most renowned pile dwellings in Ig. These rattles represents some of the oldest musical instruments found in Slovenia.

The rattles were discovered intact, presenting a challenge for archaeological research due to the concealed interior. Consequently, a micro-CT scan was employed to visualize the inner structure and the ceramic beads responsible for producing the distinctive sound.

To comprehend the functionality of the rattle and replicate its sound, an archaeological experiment was conducted. This experiment involved recreating the rattle using the same manufacturing techniques employed in its original production, from clay collection to firing in a replica kiln. Subsequently, the final step involved reproducing the sound and comparing it with the original. Maintaining fidelity to ancient production techniques was crucial for accurately recreating the sound, which was recorded by bioacoustic musicians both in studio settings and within the reconstruction of the pile dwelling.

This study unveils both the technological and musicological aspects of the instrument from the Copper Age.

631 **ARCHAEOACOUSTICS AND NEW TECHNOLOGIES: THE CASE OF GROTTA PAGLICCI (APULIA - SOUTHERN ITALY)**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Crezzini, Jacopo (Department of Biology - Laboratory of Anthropology, Molecular Anthropology/Paleogenetics Unit - University of Florence, via del Proconsolo 12, 50122, Firenze, IT; Department of Physical Science, Earth and Environment - Research Unit of Prehistory and Anthropology - University of Siena, Italy, Strada Laterina 8, 53100 Siena, IT) - Picciolo, Francesco (Department of Physical Science, Earth and Environment - University of Siena, 53100 Siena, IT; Health Service of Tuscany, South-East Tuscany Health Unit, 53100 Siena, IT) - Salvini, Riccardo (Department of Physical Sciences, Earth and Environment and Centre of Geotechnologies, Via Vetri Vecchi 34, 52027 San Giovanni Valdarno (Arezzo), IT) - Ronchitelli, Annamaria (Department of Physical Science, Earth and Environment - Research Unit of Prehistory and Anthropology - University of Siena, Italy, Strada Laterina 8, 53100 Siena, IT) - Ricci, Stefano (Department of Physical Science, Earth and Environment - Research Unit of Prehistory and Anthropology - University of Siena, Italy, Strada Laterina 8, 53100 Siena, IT) - Boschini, Francesco (Department of Physical Science, Earth and Environment - Research Unit of Prehistory and Anthropology - University of Siena, Italy, Strada Laterina 8, 53100 Siena, IT) - Bogi, Andrea (Health Service of Tuscany, South-East Tuscany Health Unit, 53100 Siena, IT) - Mariotti, Emilio (Department of Physical Science, Earth and Environment - Section of Physics - University of Siena, 53100 Siena, IT) - Armelloni, Enrico (AIDA a University of Parma - Department of engineering and architecture, Parma, IT.) - Farina, Adriano (E-MUSE SRLS, via Vito Salmi 3, 43123, Parma, IT)

Abstract format: Poster

We present an analytical approach and a methodological protocol for the modeling of the acoustic parameters of cave sites with evidence of symbolic activities by prehistoric human. The investigated cave is Grotta Paglicci located on the western slope of the Gargano promontory (Apulia, southern Italy). In addition to a rich and thick stratigraphical sequence (it spans from Aurignacian to late Epigravettian) the site is remarkable for the found of some portable art objects and for the presence of wall paintings in an internal room of the cave. The paintings include two horses and a series of "positive" and "negative" depictions of hands. We realized an editable 3D model of the whole cave created using SLAM-based LiDAR technology that combines two methods: LiDAR (Light Detection and Ranging) and SLAM (Simultaneous Localization and Mapping). The 3D point cloud produced was then processed to build the textured model of the cave in mesh format that is the starting point for an acoustic reconstruction effort. Then we applied on the 3D model an acoustic CAD that permitted to capture cave's acoustic properties facilitating comprehensive analysis and interpretation. Furthermore auralization, the synthesis of sound inside the cave, enables to perceive and study the auditory ambiance of Grotta Paglicci. This acoustic dimension adds a new layer of understanding to the reconstructed environment on the acoustic dynamics and potential uses of the cave by the palaeolithic hunter-gatherers. At this regard, the editable 3D model permitted to reconstruct the layout of the investigated spaces during the period when human activities occurred, allowing the collecting of more reliable data. Moreover, the adoption of this method could be useful to reduce the accesses to these peculiar areas ensuring a better preservation of the archaeological records.

633 **A PRELIMINARY ARCHAEOBOTANICAL STUDY OF CHARRED REMAINS FROM THE ARCHAEOLOGICAL SITE OF TELL ES-SULTAN (JERICHO, PALESTINE)**

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Armenio, Cecilia (Department of Science of Antiquities, Sapienza University of Rome, Rome, Italy; Department of Environmental Biology, Sapienza University of Rome, Rome, Italy) - Nigro, Lorenzo (Department of Oriental Studies, Sapienza University of Rome, Rome, Italy) - Sadori, Laura (Department of Environmental Biology, Sapienza University of Rome, Rome, Italy) - Moricca, Claudia (Department of Environmental Biology, Sapienza University of Rome, Rome, Italy)

Abstract format: Poster

The present work concerns the study of charred botanical (seeds/fruits and wood) finds from the site of Tell es-Sultan, the ancient city of Jericho, considered as one of the most significant archaeological sites for the study of South Levantine cultures. The macro-remains were retrieved from layers datable between the Early Bronze Age (EBA) and the Middle Bronze Age (MBA) (3000-1650 BC), collected during the 2019-2023 excavation seasons carried out by Sapienza University of Rome and the Palestinian MoTA-DACH. The aim of this study is to investigate the use of plants by one of the first agricultural urban communities and how this allowed the development of Jericho as an urban center from the 3rd millennium BC. In fact, the favorable past environmental conditions of this area allowed a great economic revolution through agriculture, leading to technological and social developments. This research, therefore, aims to answer questions concerning the exploitation of the environmental resources in Jericho during the Bronze Age, focusing on the cultivation practices and agricultural products. Preliminary results show that *Hordeum vulgare* L. (barley) and taxa belonging to the genus *Triticum* are the most abundant, mostly collected from Middle and Early Bronze Age residential and palatial areas. The high concentration of cereals was expected: they were one of the main sources of food, even before their domestication, and among the first crops intensively and systematically cultivated to increase their production, which is the basis of agriculture. Remains of pulses and fruit plants were also found, allowing to hypothesize a richer diet and a more varied agriculture. Charcoals, instead, provide information about the past arboreal vegetation of the area and the exploitation of local resources, such as *Acacia* sp. (*acacia*) and *Populus* sp. (*poplar*).

635 **ADAPTATION AND RESILIENCE: SUSTAINABLE SUBSISTENCE STRATEGIES IN VOLCANIC CAPPADOCIA THROUGH ETHNOGRAPHIC PERSPECTIVE**

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Falay, Burak (Tekirdağ Namık Kemal University)

Abstract format: Poster

The communities of the Melendiz region (Nigde province), bordering Turkey's Volcanic Cappadocia, have developed a livelihood strategy combining animal husbandry and limited agricultural activities in a challenging mountainous geography. This strategy supports a sustainable food production system by utilizing seasonal grazing areas and following migration routes that match the feeding rhythm of the herds. These traditional practices are important for understanding how local communities adapt to environmental conditions and their contribution to sustainability. This study focuses on key concepts such as climate, resilience and sustainable livelihood strategies. Through the combination of historical records and interviews with local people, the research highlights the role of cultural practices and socio-economic systems of Melendiz region communities in their adaptation to environmental conditions. From this point of view, the study transcends the mere documentation of traditional lifestyles within a region; it proposes general principles and practices on how sustainable living can be encouraged on a global scale.

637 **EARLY CERAMIC TECHNOLOGIES AND TRADITIONS IN THE EDMOM LOWLANDS REGION OF SOUTHERN JORDAN FROM A DIACHRONIC PERSPECTIVE**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Carrion Anaya, Sara (UCL Institute of Archaeology, London UK) - Quinn, Patrick (UCL Institute of Archaeology, London UK) - Burton, Margie (UC San Diego Levantine and Cyber-Archaeology Laboratory, Department of Anthropology, California USA) - Levy, Thomas (UC San Diego Levantine and Cyber-Archaeology Laboratory, Department of Anthropology, California USA) - Najjar, Mohammad (UC San Diego Levantine and Cyber-Archaeology Laboratory, Department of Anthropology, California USA)

Abstract format: Poster

The Early Bronze Age and Early Iron Age in the Edom Lowlands Region in southern Jordan is characterised by socio-cultural, economic and political changes that were part of a shifting process that was deeply linked to the organisation of copper metallurgical production in the Faynan district over time.

The aim of the present project is to document and study the traditions of ceramic manufacture and usage at several previously surveyed and/or excavated settlement sites dating from the Early Bronze Age III-IV and the Early Iron Age located in the Faynan district. The research will focus on characterising the chemical and mineralogical composition and determining the provenance and examining the technological steps and skills involved in the manufacture of the ceramics. An 'integrated approach' will be taken to combine the data obtained by several different scientific techniques including the macroscopic study of the ceramics, thin section petrography analysis and other compositional analytical techniques (i.e. pXRF, LA-ICP-MS, SEM-EDS, XRD). The aim is to shed light onto the organisation of pottery production at a local (site) and regional (Edom Lowlands Region) levels at every given period, which will contribute to better understand the evolution of pottery-making traditions over time. The observations made are also expected to address the nature of any possible trade and exchange networks with other communities from an intra-regional and supra-regional perspective by comparing the published data from that of other southern Levantine sites. The role played by pottery production in the development of copper metallurgical production and in the configuration of the so-called 'complex' societies will also be discussed by incorporating the data obtained into the theoretical debate and interpretations of the sociopolitical structure and socioeconomic dynamics of southern Levantine communities in each period.

639 METALS AND METALLURGICAL REMAINS AT THE 3000-1500 BCE SITE OF CASTANHEIRO DO VENTO (NE PORTUGAL)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Muralha, João (Department of History, School of Social Sciences and Humanities, NOVA University of Lisbon (NOVA FCSH); Centre for the Humanities (CHAM), NOVA FCSH) - Garrido, Tiago (Department of History, School of Social Sciences and Humanities, NOVA University of Lisbon (NOVA FCSH)) - Serrano, Sofia (Department of Conservation and Restoration, School of Science and Technology, NOVA University of Lisbon) - Elin, Figueiredo (Department of Conservation and Restoration, School of Science and Technology, NOVA University of Lisbon; Centre of Materials Research (CENIMAT/i3N), School of Science and Technology, NOVA University of Lisbon (NOVA FCT))

Abstract format: Poster

Archaeological research of later pre-historic sites in north-western Iberia has focused mainly in megalithic tombs, settlements and rock-art sites. In northern Portugal archaeological systematic studies began in the 1970's. In 1990's the Copper and Bronze Age monumental site of Castanheiro do Vento (Vila Nova de Foz Côa, Portugal) was discovered, located in a prominent hill in the hinterland, 10 km south of the Douro River. Around 20 archaeological excavation campaigns have been performed since 1998 which revealed enclosure with an area of around 10.000 m², with a time span occupation that covers ca. 1,500 years, from 3,000 BCE to 1,500 BCE (radiocarbon dates).

During the archaeological campaigns a collection of metals and metallurgical remains were recovered from different archaeographic contexts and chronologies. Only a very small part of this collection was studied and published, in contrast to the studies on the site's structures and in relation to the monumentality and importance that the site may have had for the prehistoric communities.

In this work we will present the preliminary results of elemental analyses by X-ray fluorescence spectrometry (XRF) performed on all the metal artefacts and metallurgical remains recovered during the archaeological campaigns. We will relate the type of metal and metallurgical vestige with the archaeological context and discuss their significance in terms of the emergence of copper metallurgy, arsenical copper and bronze (alloy of copper and tin) in the region and in a wider, Iberian context. Provided that northern Portugal is rich in various metal sources, such as tin and gold, and that Castanheiro do Vento is the only monumental site with extensive archaeological work in the hinterland region, the present data is of major importance for the study of the adoption and continuity of the use of specific metals and alloys in the northern Portuguese territory.

642 WINDOW GLASS CONSUMPTION AT MONASTIC SITES IN MEDIEVAL ENGLAND

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Stone, Bronwen (University of Sheffield / Historic England) - Jackson, Caroline (University of Sheffield) - Paynter, Sarah (Historic England) - Gherardi, Francesca (Historic England) - Tyson, Rachel (c/o Historic England) - Merrony, Colin (University of Sheffield)

Abstract format: Poster

Around 1000 monasteries were built in England during the medieval period. From the C12 these were soaring, gothic structures with the structural strength to carry expansive glazing. It is known from documentary evidence that the glazing was imported from the continent, particularly from France. During the C13 a glassmaking industry developed in England, in The Weald and in Staffordshire, and window glass produced here may have also been used to glaze the windows of the monastic buildings.

The poster reviews PhD research into the consumption of window glass from seven monastic sites in England from two distinct orders, Benedictine and Cistercian. This work is being carried out at the University of Sheffield in collaboration with Historic England. Approximately 300 fragments of unpublished, excavated window glass are used in the study. The results of investigations into both stylistic imagery and chemical analysis of the glasses, indicating dates and provenance, are used to elucidate the complex nature of the use of glazing in a monastic setting in medieval England. Excavated window glass is generally under studied and published in part because of the difficulties in working with small and often corroded fragments. The project has devised novel ways of interpreting and recording indistinct applied decoration, and combining stylistic evidence with historical information in a framework that helps understand the chronological structure of each assemblage.

643 POWERFUL WOMEN AND CHILDREN IN PRE-ROMAN UMBRIA: UNDERSTANDING INCLUSIVE SOCIETIES WITH FOREIGN PEOPLES THROUGH MOLECULAR ANTHROPOLOGY AND ARCHAEOLOGY

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Weidig, Joachim (Albert-Ludwigs-Universität Freiburg, Institut für Archäologische Wissenschaften, Abteilung für Urgeschichtliche Archäologie) - Pauselli, Rebecca (Università degli Studi di Urbino Carlo Bo, Dipartimento di Studi Umanistici) - Pusceddu, Allegra (Università degli Studi di Roma Tor Vergata, Dipartimento di Biologia) - Ottoni, Claudio (Università degli Studi di Roma Tor Vergata, Dipartimento di Biologia) - Casciarri, Silvia (Ministero della Cultura, Museo Archeologico Nazionale e Teatro Romano di Spoleto) - Coen, Alessandra (Università degli Studi di Urbino Carlo Bo, Dipartimento di Studi Umanistici) - Micozzi, Marina (Università degli Studi della Tuscia Viterbo, Dipartimento di Scienze Umanistiche, della Comunicazione e del Turismo) - Martinez-Labarga, Cristina (Università degli Studi di Roma Tor Vergata, Dipartimento di Biologia)

Abstract format: Poster

Bioarchaeological studies of the last decade have demonstrated the value of digging into our past through multidisciplinary approaches, revealing biological and cultural trajectories in human evolution previously completely unexplored. The pre-Roman era, when the Italian territory was inhabited by the Italic population with its distinctive languages and traditions, represents a crucial period in the history of the Italian peninsula. Through multidisciplinary approach, archaeology and ancient biomolecules, this project aims at shedding light on the genetic ancestry, lifestyle, diet, and health of the inhabitants of pre-Roman Central Italy. The treasure trove of funerary evidence gathered through archaeological investigations at the Necropolis of Piazza d'Armi at Spoleto (PG) (2008- 2011), shed new light on the role of women and children in this society between the end of the 8th and the middle of the 6th century BCE.

Furthermore, evidence of allogenic nuclei within the community seems to prove the role of Spoleto as bridge with other Italic populations from Central Italy. The material culture originating from the necropolis of Spoleto revealed many non-local objects, giving rise to the assumption among archaeologists that they belonged to individuals who grew up far away. It is plausible that Spoleto embraced numerous influences that shaped its culture and possibly even its language. The unique features of the necropolis of Piazza d'Armi are testimony to the inclusive nature of this pre-Roman center, open to accept foreign people into the upper classes of the society and to confer symbolic power to children. For this reason, only a multidisciplinary approach can uncover the Umbrian people from Spoleto.

(This project is supported by PRIN 2022 PNRR Cod. P2022LATB9 allotted to A.C., M.M. and C.M.-L.)"

645 THE BEGINNING OF COPPER METALLURGY IN OMAN: THE CASE OF WADI SHAB GAS-1

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Rivoltella, Rosa (University of Salento) - Giardino, Claudio (University of Salento)

Abstract format: Poster

The significance of the Wadi Shab GAS-1 site is reconsidered with the aim of improving our knowledge of the development of early metallurgy and the circulation of metals in Central Asia and the Near East. This prehistoric site, dated to the 4th millennium BC, is located on the north-eastern coast of the Sultanate of Oman and was excavated in the early 2000s as part of the Join Hadd Project by S. Cleuziou and M. Tosi. It is one of the oldest sites on the Arabian Peninsula where copper tools have been documented. Taking into account the data obtained thanks to the analyses already carried out on some of the copper artefacts from the site, and in the light of the recent discovery of the chronologically contemporary site of Al Khashbah, where copper smelting activity is attested, new analyses on unpublished materials will be presented for a better understanding of the role of this site in the emergence and diffusion of metallurgical technologies in the Omani territory.

650 IDENTIFYING ANCIENT SOURCES AND PROCESSING METHODS OF CINNABAR

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Lewis, Jonathan (Free University of Berlin) - Alexandra, Rodler-Rørbo (Austrian Archaeological Institute of the Austrian Academy of Sciences)

Abstract format: Poster

Cinnabar (HgS), a pigment widely used in antiquity, was mined from geological sources and traded across the ancient world. Some sources of this material have been identified, but whether other geological sources were exploited in antiquity is unclear. Raw cinnabar was purified via roasting before it was used as a colorant, though no sites of cinnabar processing have so far been identified. This research aims to support ongoing efforts to connect cinnabar found in the archaeological record in Europe and the Mediterranean region to potential documented and as-yet undocumented sources via S and Pb isotope analysis. Additionally, this research will compare the Hg isotope composition of cinnabar found in archaeological contexts to geological sources in order to identify the extent of Hg fractionation caused by roasting. This, potentially combined with experimental roasting of unprocessed cinnabar samples, will provide constraints on the intensity of cinnabar roasting in terms of temperature and roasting time, and how these parameters may have varied across locations and time in history. This research will also attempt to locate cinnabar processing sites near locations of ancient cinnabar mining and utilization by investigating nearby soil for burned layers and elemental enrichment. Additionally, lacustrine sediments near potential sites of cinnabar mining and processing will be sampled and investigated for evidence of associated runoff and airborne pollution. Intervals of elevated Hg and other heavy metals in such sediments may allow ancient cinnabar exploitation to be identified even in the absence of direct archaeological evidence, and may allow this exploitation to be constrained in time.

652 TOO MANY HANDS FADED AWAY WITH TIME. A COLLECTIVE (AND DISTURBED) TOMB FROM A LATE ANTIQUE ITALIAN CATACOMB

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Cecconi, Viola (Collaboratore esterno, Servizio di Bioarcheologia, Museo delle Civiltà, Rome, Italy) - Braconi, Matteo (Dipartimento di Studi Umanistici, Università degli Studi Roma Tre, Rome, Italy) - Guidi, Eveline (Scienze dell'Antichità, "La Sapienza" Università di Roma) - Di Tomassi, Alessandro (Dipartimento di Studi Umanistici, Università degli Studi Roma Tre, Rome, Italy) - Sperduti, Alessandra (Servizio di Bioarcheologia, Museo delle Civiltà, Rome, Italy; Università degli Studi "L'Orientale" di Napoli, Naples, Italy)

Abstract format: Poster

The Catacomb of Santa Mustiola (Chiusi, Italy) is a large Early Christian hypogeum currently investigated by the Pontifical Commission for Sacred Archaeology and Roma Tre University, with the collaboration of the Museum of Civilizations. So far, 61 tombs have been excavated; they can be distinct in three main typologies: arcosolium, loculus, and pavement tombs. Among the arcosolia, most of the sepulchres contained several individuals (4 up to 33); their stratigraphic excavation revealed an intense use of the space, with both contemporary and subsequent depositions within the same structure. We also recognized clear evidence of ancient operations of skeletal reduction and isolated elements rearrangement to make room for more bodies.

The recently excavated tomb A2b differed from the others in several specific features. In the first, it was missing the original closure and the clayey sediment that typically filled all the other structures. Moreover, unlike the other graves, all bone elements were rather well preserved but highly commingled with complete loss of any anatomical connection.

The osteological analysis documented the presence of at least 25 individuals: 18 nonadults and 7 adults. While this number is in line with other tombs, Bone Representation Indexes indicate a strong inconsistency. For instance, in the adult sample, the survival rate is 71.4% for humeri and 92.8% for femurs and tibiae, whereas, elements known to have relatively good survivability are extremely rare (patella BRI = 7.1% and metacarpals BRI = 21.4) or even missing, as in the case of carpal bones.

Overall, this concurrence of evidence led us to hypothesize that the assemblage represents a selective and casual relocation of remains coming either from the same structure or from other tombs within the Catacomb.

654 THE CIRCULATION OF CERAMIC MATERIAL: MEDIEVAL TRADE ITEMS OF THE ARUCH FORTRESS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Galanti, Francesca (Sapienza Università di Roma) - Fausti, Elena (Sapienza Università di Roma) - Ferdinand, Sergio (ISMEO) - Babajanyan, Astghik (IAE NAS RA) - Petrosyan, Artur (IAE NAS RA) - Dan, Roberto (ISMEO) - Vitolo, Priscilla (ISMEO)

Abstract format: Poster

This poster is about the analysis of the ceramic material that came from the excavation and research activity conducted by ISMEO – Associazione Internazionale di Studi sul Mediterraneo e l'Oriente, in collaboration with IAE NAS RA - Institute of Archaeology and Ethnography of the National Academy of Sciences of the Republic of Armenia as part of the "Archaeological Mission to Aruch and the Silk Road Fortress". The aim is to open through pottery an overview of the commercial dynamics that involved, during the late medieval times, the Fort of Aruch (Aragatson region), a strategic castrensian site located along the main communication route between East and West: the Silk Road. The ceramic here is studied on different levels: it is studied as "life product" that suggest the function of the fortress' rooms, and that illustrate the local cultural traditions, but also as a "trade item" which testifies to the fact that the site of Aruch was reached by Iranian, Iraqi, and Georgian imports. The study of this context has also offered an opportunity to reflect on methodology: opinions about future developments in the method of studying the archaeological record must always clash with the reality to which they refer. Lack of systematic studies of medieval ceramic materials in Armenia, which local scholars have only recently been filling, makes it clear that in this case a more traditional typological approach to the study of ceramic record was necessary, but at the same time demonstrates how the right, even if traditional, methodological choice adapted to the scientific context in which it is embedded can bring 'new' results.

657 SEQUENTIAL ISOTOPIC ANALYSIS OF ATLANTIC COD (GADUS MORHUA) VERTEBRAE: APPLYING A DEVELOPING METHOD FOR LIFE-HISTORY RECONSTRUCTION FROM "ACELLULAR" FISH REMAINS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Noble, Emma (University of York) - Orton, David (University of York) - Alexander, Michelle (University of York) - Craig, Oliver (University of York)

Abstract format: Poster

Sequential isotopic analysis of fish vertebrae (SIAV) is a novel method for obtaining stable isotopic data representing multiple periods across an individual animal's life history. Such a sampling approach has significant potential for reconstructing the ontogenetic development of ancient fish, but there remains some uncertainty regarding the period over which accurate isotopic data may be retained in fish vertebrae. Material turnover through remodelling would alter the isotopic composition of bone deposited during early life and thus preclude assessment beyond the last few years of life. It is known that bone remodelling does occur in fish bone containing osteocytes and prior SIAV studies have shown this "cellular" fish bone to only retain material deposited in the last few years before death. Whether an equivalent process occurs in "acellular" bone lacking osteocytes is less certain. We applied SIAV to the remains of Atlantic cod ranging from approximately one to ten years of age at death; in doing so, this study represents the first application of SIAV to investigate "acellular" fish bone from individuals old enough for remodelling to be a concern. As with "cellular" vertebrae, samples representing later life yielded isotopic data consistent with the expectations established from each individual's catch-location and size-at-death. Additionally, the "early-life" data obtained from individuals caught as adults were more consistent with the expectations for habitat and dietary variation of the studied population than that of remodelled bone. Still, interpretation was limited by the combined influences of ontogenetic diet and habitat shifts yielding equivocal results in the isotopic sequences. With the applicability of SIAV to various fish taxa now becoming understood, this study hopes to offer recommendations for how future SIAV studies of archaeological material may be planned to maximise research yield from this developing research method.

659 LATE ANTIQUE POTTERY TYPES, CHARACTERISTICS: CASE OF KOSOVO

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Shipoli, Elza (Pázmány Péter Catholic University; Institute of Albanology - Prishtina)

Abstract format: Poster

Late Antiquity was a very complex period due to the significant challenges that occurred during this time, as well as various changes in structural, political, administrative, economic, and social views.

Various artifacts compared with earlier periods, such as ceramics from late antiquity, show changes in particles in social life.

Apart from the diet, economic, and social aspects of a place, art, decoration, types, and the food used in a particular era, pottery has a wide range of distribution and a long duration compared to other materials, making it a valuable resource for the past of human life, has given pottery fundamental importance for reconstructing past periods of human life.

The purpose of this poster is to identify the main variations, types, characteristics, and forms of Kosovo pottery during late antiquity in comparison with other countries in the region, and to find out which pottery was most frequently used, reflecting the major changes in ceramic types.

661 OLD WOMEN WHO SLEEP, DEAF OLD MEN: BIOARCHAEOLOGICAL GLIMPSES OF THE ELDERLY FROM THE CENTRAL COAST OF PERU

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Murphy, Melissa (University of Wyoming)

Abstract format: Poster

Spanish chroniclers writing during the sixteenth and seventeenth centuries describe the Inca administrative system and the census. The Incas collected taxes as labor from their subjects and so the census categories reflected the capacity for labor by gender and age. The chroniclers had different classifications and categories of age classes and not all of them had chronological years associated with their categories, but the consensus among them was a prime of life category for men and women and then two categories for the elderly, "old" and "very old". Here I conducted a bioarchaeological and mortuary analysis of individuals fitting these categories from a sample of Late Horizon (AD 1570-1532) burials from the central coast of Peru. I hypothesize that the mortuary treatment of the elderly may be distinct from the mortuary treatment of individuals classified in the younger adult age categories. I then explore how they are different and why and assess if this is associated with state's labor expectations.

663 UNDERSTANDING THE SPATIOTEMPORAL PATTERNS OF THE EARLIEST OCCUPATIONS OF WESTERN EUROPE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Cucart-Mora, Carolina (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France.) - Hall, Harry (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France.; Department of Archaeology, Classics and Egyptology, University of Liverpool, 8-14 Abercromby Square, Liverpool L69 7WZ, UK) - Reschke, Jan-Olaf (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France.; ROCEEH Research Center, Senckenberg Research Institute, Senckenberganlage 25, 60325 Frankfurt am Main, Germany; Institute for Ecology, Evolution and Diversity, Goethe University, Frankfurt am Main, Germany) - Longborg, Kamilla (CNRS UMR 5602 GEODE Géographie de l'Environnement, Maison de la Recherche, Université Toulouse 2 Jean Jaurès, 5, Allées Antonio Machado 31058 Toulouse, France) - Grove, Matt (Department of Archaeology, Classics and Egyptology, University of Liverpool, 8-14 Abercromby Square, Liverpool L69 7WZ, UK) - Hertler, Christine (ROCEEH Research Center, Senckenberg Research Institute, Senckenberganlage 25, 60325 Frankfurt am Main, Germany) - Saqalli, Mehdi (CNRS UMR 5602 GEODE Géographie de l'Environnement, Maison de la Recherche, Université Toulouse 2 Jean Jaurès, 5, Allées Antonio Machado 31058 Toulouse, France) - Moncel, Marie-Hélène (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine, Rue René Panhard, 75013 Paris, France.)

Abstract format: Poster

Understanding the interplay between ecological dynamics and early hominin behaviour, and how it may have affected the colonization and occupation of new territories, is a challenging archaeological enterprise. The archaeological record suggests that during the first Out of Africa dispersal, Western Europe stayed at the limit of the human "Oikoumene" for almost 1 million years. The earliest evidence of hominin diffusion out of Africa is dated to 2.1 million years in Eurasia (Levant and China. Hominins reached the gateway of Europe (southern Caucasus) around 1.8 million years ago, but the first human occupations of Western Europe are dated to around 1.2-1-4 million years ago (Italy and Spain).

The Lateurope ERC project devotes a whole work package to reconstructing and studying environmental dynamics and how they affected hominin populations in Eurasia between 1.5 and 0.5 million years ago. In our project we have opted for an interdisciplinary approach, bringing together specialists in archaeology, ethnography, biology and climatology, to apply different computational modelling techniques (i.e., paleoclimatic and environmental reconstructions and agent-based modelling). It is our objective to shed light on the complex interplay of dynamics and variables that influenced the colonization of Western Europe during the Early and Middle Pleistocene and get a better understand-

ing of the current spatiotemporal pattern. In this poster, we present our hypotheses, data management protocols and modelling strategies.

664 SMALL SACRED OBJECTS IN THE LANDSCAPE - THE CONTEXT OF EVERYDAYNESS, MYSTERY, AND SPIRITUALITY

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Bešina, Daniel (Constantine the Philosopher University in Nitra) - Bönde Gogová, Stanislava (Constantine the Philosopher University in Nitra) - Borzová, Zuzana (Constantine the Philosopher University in Nitra) - Fottová, Eva (Institute of Archaeology SAS)

Abstract format: Poster

Landscape for archaeology means a space in which there are elements that have a system between them. It is a space to which man attaches meaning and a certain practical function. Small sacred objects (divine torments, crosses, chapels), insignificant in size, belong to the characteristic elements of the neo-medieval cultural landscape. They stand mostly in places where people moved, lived, and worked. In villages they were built near churches, in cemeteries, near water sources, on communal or private land. Outside the villages in open countryside, near roads, dirt, and forest tracks. Apart from being a kind of memento mori - so that man would not forget the transience of his own life, they had the role of a profane topographical object in defining the boundaries of land and a landmark at the crossroads. A certain specificity was the placement of the divine torments on the roads leading to the execution sites. In exceptional cases, they were also located directly on the execution site. At this place, the procession could stay with the condemned in the last prayer or perform the function of a memorial to the executed. They are also found on the banks of watercourses, bridges, and vineyards, where they served a protective function against natural disasters.

Their meaning and symbolism have changed over time, but their overall genius loci and their memory in the country persists to the present day. They include not only artistic, historical, and aesthetic values, but they are also important landscape elements, cultural objects that are reminders of various human destinies and events, as well as their religious and spiritual legacy. They form a kind of symbols in the landscape that help us to read its past.

665 TALALATI - NEW INSIGHTS INTO THE CASTRUM OF RAS EL AÏN AND THE ROMAN NORTH AFRICAN FRONTIER

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Millin, Thomas (Durham University) - Racine, Karl (Durham University)

Abstract format: Poster

This presentation analyses new data from the Roman Fort of Talalati at Ras El Ain, Tataouine, Tunisia. The new Data was collected during excursions by the Aliph funded project the "Partnership for Heritage", led by British and Irish universities (Durham, UWE Bristol, Dublin), and facilitated and run by the Institut national du patrimoine of Tunisia.

Utilizing UAV photography, survey data, and ceramic analyses, the presentation illuminates the economic, cultural, and political life of an important castrum upon the Limes Tripolitanus. Through high-resolution aerial imagery and ground surveys, we produced a new plan of the fort, allowing for more insight into the development of the Vicus and the scale of the settlement. Additionally, newly acquired ceramic data through macroscopic fabric analysis and scanning electron microscopy provides insight into the occupation timeline of the settlement, contextualising the site's evolution amidst political unrest and the provenance of the ceramics found on site.

Finally, our new study offers an exciting and new nuanced understanding of the fort's importance in the Roman frontier. It explores the "vicus-castra" dynamic as well as daily life along the frontier. The new study aims to rejuvenate and restore energy to the field of North African frontier research, through a multiscalar approach, focusing on the data collected at the site and placing it within its wider landscape context.

666 CREATURES OF HABIT: A COMPARATIVE MULTI-PROXY STUDY OF THE ZOOARCHAEOLOGICAL REMAINS FROM RELIGIOUS ESTABLISHMENTS IN LATE MEDIEVAL ULSTER

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Montgomery, Ryan (Queen's University Belfast) - Murphy, Eileen (Queen's University Belfast)

Abstract format: Poster

The reform of the Church in Medieval Ireland during the Late Medieval brought about the establishment of new religious orders and monastic complexes that would become crucial hubs of religious and economic activity. This project aims to apply a multi-proxy approach combining zooarchaeological analysis, multi-isotope techniques and aerial surveys to provide new insights into the human-animal-environment interactions that enabled key monastic foundations in Late Medieval Ulster to function and thrive.

A number of assemblages from Late Medieval Ulster ecclesiastic foundations, including the high-profile monastic sites of Cathedral Hill, Downpatrick and Devenish Island, Fermanagh will be the focus of investigation. Substantial zooarchaeological assemblages from these sites hold critical information about livestock exploitation patterns and husbandry practices. Using age/sex profiles, and palaeopathological indicators within these faunal assemblages along with the application of strontium, oxygen, sulphur, carbon, and nitrogen isotope analyses, this project will compare how the monastic communities engaged with and relied upon their local ecosystems.

Integrating these multi-proxy datasets will enable a more nuanced understanding of how human-animal-environment interactions underpinned the survival and sustainability of these important religious establishments, particularly in the face of major social, political, climate and religious instability in Late Medieval Ireland. Comparative analysis of the data will provide a better understanding of how the farming practices may have been influenced by the regulations or beliefs of the various religious orders.

Ultimately, this project will enrich archaeological narratives by foregrounding the crucial role of animals in the functioning of Late Medieval monastic communities. By doing so, it will also feed into current debates concerning the long-term environmental impacts of historical livestock husbandry practices and their relevance to understanding sustainable farming methods in the context of modern climate change.

667 GEOMETRIC MORPHOMETRICS TO THE STUDY OF CERAMIC FROM THE 15TH AND 16TH CENTURIES IN THE SOUTHEAST OF THE IBERIAN PENINSULA

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Piñera, Francisco (UNED) - Busto-Zapico, Miguel (Universidad de Granada) - Maldonado Ruiz, Alexis (University of Santiago de Compostela; Universiteit Leiden)

Abstract format: Poster

Between the end of the Nasrid Emirate and the formation of the Kingdom of Granada, significant changes occurred marking the transition from an Andalusian and medieval society to a Castilian and modern one. These transformations are clearly reflected in ceramics, a material element that can be studied through geometric morphometrics. This technique is presented as an effective tool for analyzing differences in forms, which has been rarely used in contexts of this period, making this study pioneering.

The objective of this work is to analyze the transformations or continuities in the ceramic repertoire of the 15th and 16th centuries in the southeast of the Iberian Peninsula. The study focuses on two specific ceramic forms of the period: atafores and plates. These are chosen because they are pieces of social representation and changes are particularly evident in them. The analyzed sample consists of 100 pieces from archaeological contexts, with complete profiles, typology, chronology, and production center determined in previous studies.

The methodology used involves the identification of the defining landmarks of each of the forms. Subsequently, their statistical analysis includes morphological classification through cluster grouping, covariance matrix, principal component analysis, and canonical variation analysis. With this approach, we seek to obtain precise morphological classifications and, through them, understand the possible evolution of the forms. This will enable us to establish relationships between a specific form, its chronology, and its determined production center.

This study could help identify validated formal groupings associated with certain groups. At the same time, the exhaustion of some forms is observed through the loss of their function and meaning, as demonstrated in the transformations of the ataifor until its gradual disappearance. In this way, we identify specific territorial and cultural units.

670 THE BIOARCHAEOLOGICAL STUDY OF MIGRATION PERIOD ELITE GRAVES FROM DROUŽKOVICE (CZECH REPUBLIC) - PRELIMINARY REPORT

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Witan, Joanna (University of West Bohemia in Pilsen; Institute for Preservation of Archaeological Heritage of Northwest Bohemia) - Doležalová, Jana (Institute for Preservation of Archaeological Heritage of Northwest Bohemia) - Szostek, Krzysztof (Cardinal Stefan Wyszyński University in Warsaw) - Lisowska-Gaczorek, Aleksandra (Cardinal Stefan Wyszyński University in Warsaw) - Molak, Martyna (University of Warsaw) - Pospieszny, Łukasz (University of Gdańsk; University of Bristol) - Blažek, Jan (Institute for Preservation of Archaeological Heritage of Northwest Bohemia)

Abstract format: Poster

The occurrence of complex constructions of burial chambers during the Migration Period is usually associated with male elites. An individual buried in grave No. 52 with a wooden structure, along with two graves at the Doužkovice site, may offer a different perspective. As the graves had been robbed of artifacts, bioarchaeological methods were used to provide information about the possible origins of those buried and their social status.

Genetic and stable oxygen isotope analyses were used to establish the origin of the studied individuals and to determine their biological sex. Moreover, reconstruction of their diet based on carbon and nitrogen isotope analysis was attempted. For this purpose, enamel and bone samples were taken to trace potential migrations and changes in diet over the lifespan of the women buried at Doužkovice site.

Genetic analysis revealed that the women buried at the site were not related to each other and had X2c1, T1a1, H2a mitochondrial haplogroups. Oxygen isotope analysis of the enamel indicated that they were not local, but the last years of their lives were probably spent in the region close to the burial site. Dietary reconstruction showed that the studied females had a typical C3 diet with a relatively high proportion of animal protein. The percentage of dietary protein intake in childhood was between 10% and 20% higher than in adulthood. Moreover, they probably did not consume millet or products with a high carbon isotopic value, or the value was marginal. The potential geographical origin of the buried females and their migration path have not yet been determined.

The goal for future research is to extend the analysis to other sites in the region and to conduct a more comprehensive study of social and migration processes during the Migration Period in northwestern Bohemia.

673 CHANGING ROLES AND MORPHOLOGY OF DOGS IN LATER PREHISTORIC, ROMAN AND MEDIEVAL SOUTHEAST EUROPE

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Everett, Sarah (BioArCh, Department of Archaeology, University of York)

Abstract format: Poster

Dogs played a wide variety of roles in past societies — utilised for hunting, herding and guarding, for pest control, and kept as pets. While distinct dog breeds only emerged within the last few centuries, human-induced change in dog morphology as a result of selection for particular traits has a much longer history. Analysis of spatial and temporal variation in dog morphology provides important insights into changing human-dog interactions over time.

This poster presents the meta-analysis of published data from archaeological sites across southeast Europe, with a temporal scope spanning from later prehistory to the medieval period. The poster explores changes in dog morphology across key political transitions — such as the Roman conquest of southeast Europe in the last centuries BCE, and the transition from late Antiquity to the medieval period — examining changing human-dog interactions and relationships over time and space. Diachronic change in dog stature and robustness is considered, as is intraperiod spatial variation, and variation across different site types. A key focus of the study is the impact of the Roman occupation on dog morphology, and the emergence of particularly small dogs in the Roman period. Morphological data from Roman-period sites are presented from three regions subject to very different levels of direct Roman control — (a) the Balkan provinces, under long-term Roman occupation, (b) Dacia, a Roman province from 106-271/275 CE, and (c) regions to the north that remained beyond the borders of the Empire.

674 FIRE, COLOUR AND SOIL. A SOIL THERMOMETER AS A PRACTICAL TOOL FOR LANDSCAPE HISTORY

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Schulz, Erhard (Institut für Geographie und Geologie Universität Würzburg) - Bencik, Attila (Department of mineralogy, geochemistry and petrology, University of Szeged, Hungary) - Cacovean, Horea (Office for pedologic and agrochemical studies, 4000483 Cluj-Napoca, Romania) - Herrmann, Ludger (Institut für Bodenkunde und Standortkunde, Universität Hohenheim, Germany)

Abstract format: Poster

Charred material, colour and transformation of soil material are indicators of burning.

However, an estimation of the fire temperature is difficult - even it is important information for archaeology and landscape history. The experimental burning in a slash and burn project in Forchtenberg/SW-Germany as well as observation of forest and open land fires at Leghia/Romania evidenced different types of colour and soil transformation. A systematic burning of soil material (loess and Keuper) from the Forchtenberg site and Bullenheimer Berg (NW-Bavaria) at regular temperature intervals up to 1000 °C and micromorphological observations evidenced a systematic change in colour and nature of the soil material. A first stage is at 400°C when the organic material got burned and the soil was black in colour. Afterwards the soils colours changed into brown and the material got more and more compacted up to 600°C as the next stage. Orange colours prevailed up to 900°C with a preponderance of Fe₃-oxides and a cementation of the soil material. At 1000°C the colour was reddish, the material was completely cemented and first stages of smelting could also be observed. In all, it gave a practical field guide to estimate fire temperatures by the Munsell colours. These results were compared with the burned material from the Forchtenberg experiment site and the Bullenheimer Berg excavations.

675 BRONZE AGE TEXTILE PRODUCTION IN IBERIA. ANALYSIS OF A WARP-WEIGHTED LOOM FROM THE SETTLEMENT OF CABEZO REDONDO (SE, SPAIN)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Basso Rial, Ricardo (University of Alicante) - García Atiénzar, Gabriel (University of Alicante) - Martín de la Sierra Pareja, Paula (University of Alicante) - Carrión Marco, Yolanda (University of Valencia) - Barciela González, Virginia (University of Alicante) - Hernández Pérez, Mauro (University of Alicante)

Abstract format: Poster

Evidence of textile activities in prehistoric societies is scarce. However, in certain contexts, the quantity and variety of evidence, both direct and indirect, allows us to propose the importance of weaving as part of craft activities. In this communication, we present the analysis of a warp-weighted loom documented at the site of Cabezo Redondo (Villena, Spain). This settlement, inhabited between 2100 and 1250 cal. BC, stands out for the exceptional preservation of its archaeological remains, including numerous tools related to textile activity. An outstanding find is a concentration of 49 loom weights associated with remains of charred wood, interpreted as the structure of a warp-weighted loom. This was documented in a semi-covered external platform, annexed to a circulation space and various residential units, which suffered a fire event dating to around 1450 cal. BC.

This work has two aspects: the systematic analysis of the loom weights to assess their use and the types of fabrics that could have been woven, and an anthracological study of the charred wood to identify the plant species used. The analysis of the loom weights suggests that most of them would have worked together on the loom. This has led to various hypotheses about their use, including their placement on a multi-shaft loom to produce twill weaves. Furthermore, the spatial analysis of the platform has allowed us to interpret it as a projection of several domestic spaces to the outside, creating a shared space where diverse groups could work together to carry out different activities, such as weaving.

In short, it is a context that constitutes a first-rate archaeological document for the study of textile production and its changes during the second half of the 2nd millennium BC. It also gives us the opportunity to study the domestic and social structures hidden behind the textiles.

676 ARCHAEOLOGICAL HUMAN HAIR DISCOVERED IN A NECROPOLIS OF 15TH-19TH CENTURIES FROM NICULITEL (TULCEA COUNTY, ROMANIA)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Donciu, Paul (“Alexandru Ioan Cuza” University of Iași, Faculty of Biology, Iași, Romania) - Groza, Vasilica (Romanian Academy, Iași Branch, “Olga Necrasov” Center of Anthropological Research, Iași, Romania) - Ciorpac-Petraru, Ozana (Romanian Academy, Iași Branch, “Olga Necrasov” Center of Anthropological Research, Iași, Romania) - Stănică, Aurel (“Gavrilă Simion” Eco-Museum Research Institute, Tulcea, Romania) - Crețu, Eliza (“Alexandru Ioan Cuza” University of Iași, Faculty of Biology, Iași, Romania) - Bejenaru, Luminița (“Alexandru Ioan Cuza” University of Iași, Faculty of Biology, Iași, Romania; Romanian Academy, Iași Branch, “Olga Necrasov” Center of Anthropological Research, Iași, Romania)

Abstract format: Poster

The present research is focused on the remains of human hair discovered on the skeleton codified M32/S5, recovered during the archaeological excavations carried out in the necropolis of 15th-19th centuries near the “Sf. Athanasie” Church from Niculitel (Tulcea County, Romania). The church was built at the beginning of the 14th century by a local ruler, with the purpose of a familiar necropolis. The church was built in the middle of the 14th century, then in the 15th, 17th, and 18th centuries it underwent various renovations and served a small rural community. The preventive archaeological researches during 2022-2023 documented a number of 348 inhumation graves/funeral complexes covering a chronological interval between 15th and 19th century.

The skeleton under study (M32/S5) is incomplete and quite fragmented, belonging to a female aged 30-35 years old. The associated inventory items, including a metal comb and fragments of vestments, indicate a relative dating for the 19th century. At the level of the skull, in the occipital region, hair remains attached to the bone were identified. After sampling, the hair remains were evaluated macroscopically, then they were analyzed using optical microscopy and scanning electron microscopy (SEM). As resulted from the degradation score analysis, most hairs show intermediate and severe postmortem changes of the cuticle. The observations mainly reveal the presence of several ovoidal lesions produced by keratinolytic fungi, known as fungal tunnels. Also, mycelial hyphae were observed on hair surfaces. The taphonomic analysis was limited by the precarious conservation status of the material.

677 WOOL PROJECT: FARMING, TRANSHUMANCE AND TEXTILE PRODUCTION IN CENTRAL-NORTHERN APULIA DURING THE 1ST MILLENNIUM BC

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: de Sio, Matteo (Università degli Studi di Bari)

Abstract format: Poster

This research project, financed to University of Study of Bari in a PNRR project: CHANGES “Cultural Heritage Active Innovation for Sustainable Society”, aims to contribute for a reconstruction of the historical and archaeological landscapes linked to the world of sheep farming, transhumance and related textile activities in central-northern Apulia during the 1st millennium BC. The impetus for this thematic investigation stems from the resurgent interest in the study of ancient fabrics and is underpinned by a holistic approach to archaeological datum. The purpose, through a systematic investigation, is the reconstruction of the wool supply chain between the end of the Bronze Age and the Roman Republican period; in a geographical area that held significant prominence in sheep farming and in the production of valuable vellera.

The integrated analysis of tools for textile production and fragments of mineralized fabric, employing a multidisciplinary approach - archaeological and archaeometric - and subsequent comparison with literature on zooarchaeological data, has allowed the systematic investigation of the archaeological record from various inhabited, productive, and funerary contexts in central-northern Apulia, such as Monte Sannace, Jazzo Fornasiello, Gravina, Altamura, Ascoli Satriano, and Herdonia.

This poster presents the preliminary results of the research based on the study of over 6000 tools for textile production and approximately 50 fragments of mineralized fabrics. The integration of these data has provided new insights on weaving techniques, the nature and quality of the raw materials used, and the economic, social, and productive dynamics associated with wool production in central-northern Apulia during the 1st millennium BC.

679 NAMES, THINGS, PLACES. INTERACTIONS AND ENACTIVE LOGICS BETWEEN PEUKETIAN AND BRADANIC AREAS, AN INTERDISCIPLINARY APPROACH

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Fanizzi, Federica (Università degli Studi di Bari)

Abstract format: Poster

The study of roof tile stamps is a multifaceted topic that bridges archaeology, epigraphy, and linguistics, offering new avenues of research to illuminate the intricate socioeconomic and productive dynamics of the ancient world.

Research conducted in 2019 within the indigenous settlement of Monte Sannace, located approximately 5 km north-east of Gioia del Colle in central Apulia, has revealed several environments adjacent to the defensive wall circuit. Among these, a Laconian-type roof tile bearing an impressed stamp emerges as a crucial element in analyzing the actors involved in production, their mobility, the origins of production facilities, and the distribution of products. Indeed, another Laconian-type tile with a very similar stamp was discovered in the late 1990s within a space located adjacent to the defensive wall circuit of the indigenous center of Difesa San Biagio, situated near the Bradano River in eastern Basilicata.

This contribution, stemming from data comparison, enables the tracing of the “enactive logics” connecting the Peuketian hinterland with the Bradanic area, whose people possess a hybrid culture showing, between the 4th and 3rd centuries BCE, that while they continued to exhibit typical customs of the Apulian populations, they also manifested practices entirely assimilable to those of Lucania.

681 AROUND THE WATERING HOLE: AN IN-DEPTH ANALYSIS OF POMPEII'S FOUNTAINS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Trusler, Kate (Wright Paleohydrological Institute; University of Missouri) - Lorenz, Wayne (Wright Paleohydrological Institute)

Abstract format: Poster

Drinkable water and the strategies used to get it are at the heart of every sustainable society. Pompeii's remarkable water distribution system shaped the very character of the city from its network of water towers to its overflowing fountains. By the 1st century CE the Aqua Augusta, or Serino Aqueduct, dramatically altered the urban development of Pompeii and served to provide water to many poorer citizens who otherwise would have had little to no access to potable water.

In the summers of 2018 and 2019, the authors conducted fieldwork in order to investigate the fountain and water tower system found at Pompeii. Results include updated and more accurate measurements pertaining to the overall

volume and construction of the fountains, detailed accounts of the wear patterns found on the fountain surfaces and proposed explanations for their presence, and layouts of the stone “supports” that surround many of the basins. This poster aims to increase the knowledge on use and construction of public fountains in Pompeii.

684 RETURN OF THE GODS: UNDERSTANDING THE SOCIO-CULTURAL SIGNIFICANCE OF RESTITUTION TO THE COMMUNITIES IN THE KATHMANDU VALLEY

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Borkar, Taramati (University of Durham)

Abstract format: Poster

John Henry Merryman encouraged discussions surrounding cultural heritage ethics. The emotional engagement often attached to an object is critical in ensuring its return to the community. The complexity of this interdependence of emotion and reason plays a significant role in understanding restitution as a process for the traditional communities in Nepal.

The socio-cultural characteristics of illegal trade in antiquities distinguish it from other forms of trade. The tangibility of cultural heritage is the contribution of its intangible values, a thought central to Nepal's restitution cases. Although a processual challenge, it is imperative to investigate if restitution changes an object's significance in traditional communities.

The methods undertaken are qualitative. Conversational communication is critical, allowing investigation of the object's post-restitution condition and an understanding of the motivations. Case study research, in-depth interviews, and community surveys are primary for this purpose.

An investigation of objects returned to Nepal in the last two decades revealed that these are medieval stone sculptures stolen from their original locations. They are prime examples of Nepal's illustrious iconography, trafficked out of the country between the 1960s-1980s, called the period of “endemic thievery” by Lain Singh Bangdel. Only five objects are returned to the communities. Conducting on-site community surveys and interviewing stakeholders is critical. The expected result is to collect over a hundred surveys and twenty-five interviews.

The return of cultural objects is an emotionally charged discussion. Even with international dialogues with geographically innovative solutions, the debate surrounding changing custodianship struggles to re-establish and maintain identities. Nepal imbibes that an object's aesthetic must be admired within its original context, whether in temple or in-situ. Therefore, the interdisciplinarity of this research integrates with an entire experience of spirituality, aesthetics, history, and art. Thus, this research aspires to produce intangible benefits in the current dynamic and competitive archaeological landscape.

685 SURPRISE SARCOPHAGUS IN AQUINCUM

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Polgár-Nyerges, Anita (Budapest History Museum) - Mende, Balázs (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities) - Gerber, Dániel (Institute of Archaeogenomics, HUN-REN Research Centre for the Humanities)

Abstract format: Poster

In 2015 a Roman era sarcophagus was found on the southern slope of Aranyhegy (Budapest, Hungary). The grave contained two female skeletons. The sarcophagus, which had no inscription, contained numerous grave goods, but the real curiosity were the remains of textiles of various qualities and other organic materials. Prominent amongst these are the remains of a linen bandage seeped in resin, the golden thread decorating the silk shroud, and the leather remains decorated with golden foil in a pattern, which once made up the funerary footwear. The bioarchaeological examination of the skeletons was also performed, for which petrous bone (Individual "A") and teeth (Individual "B") were sampled. There was no detectable blood relationship between these individuals. The results of the analysis showed that the genomic makeup of individual "A" blends better to Southwest European, individual "B" with Central-Eastern European genetic pool. The bandage, the textiles of luxurious quality, and the funerary footwear were observable at other mummification burials in Aquincum and other parts of Pannonia (Brigetio, Carnuntum, Intercisa) as well. Within Aquincum, such graves have been found in Táborhegy, Testvérhegy, and Aranyhegy, which, based on their location, must have belonged to the private burials of the hillside villa complexes. The shared characteristic of these burials is that the bodies were preserved and then wrapped up multiple times in textile seeped in resin, and then attempted to hermetically close the sarcophagus. The persons buried this way belonged to the exceptionally wealthy social classes of the early 4th century A.D. Aquincum.

686 A LATE BRONZE AGE FORTIFIED SETTLEMENT NEAR MEDGYESEGYHÁZA, SE HUNGARY

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Szevényi, Vajk (Déri Múzeum) - Priskin, Anna (Déri Múzeum) - Wieszner, Balázs (Hungarian National Museum) - Czukor, Péter (Móra Ferenc Múzeum)

Abstract format: Poster

The aim of our poster is to present the preliminary results of our research at a recently discovered Late Bronze Age multivallate fortified settlement in southeastern Hungary carried out during the past few years. The site of Lagzi-dűlő lies south of the modern town of Medgyesegyháza and covers ca. 30 hectares. It is part of a larger network of fortified sites that emerge during the first half of the Late Bronze Age in the southern Great Pannonian Plain. Our multiyear, multiphase project is aimed at the study of the various levels of this network of settlements ranging from ‘mega-forts’ through larger or smaller fortified settlements to small unfortified hamlets. Here we describe the results of our non-invasive research including remote sensing, extensive and intensive, systematic field surveys, geophysical prospection, and geological coring, and the results of our small-scale, targeted excavations aimed at the investigation of multiple enclosures of a ‘mid-sized’ fortified settlement. (The research is financed by the “Settlement, economy and society in the Late Bronze Age of Eastern Hungary” NKFI “OTKA” FK-135805 project).

689 AND WHAT NOW? A RECORDING PROTOCOL FOR THE STUDY OF HUMAN REMAINS AND MORTUARY PRACTICES THROUGH EXCAVATION PHOTOGRAPHS AND DRAWINGS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Solomou, Anastasia (Independent Researcher)

Abstract format: Poster

This poster attempts to present a method that can be used in circumstances where the skeletal remains are not preserved, or access to the material is not possible, with a view to maximising the extractable data in poorly recorded or preserved contexts. The method devised uses excavation photos and drawings for the analysis of the human skeletal remains. The recording protocol focuses on an archaeoethnological approach, for which a flowchart is created, structuring the recording process, and ensuring comparability and repeatability. The protocol is showcased through the analysis of the available mortuary deposits from three Early Bronze Age cemeteries in the Greek mainland and six contemporaneous cemeteries in the Cyclades. The results show how the protocol implemented allows the identification of the primary deposits, the categorisation of the secondary interferences, and the sequencing of the deposits, shaping the skeletal assemblages, and elaborating on the processes of their formation. Furthermore, new data is added to the corpus of Early Bronze Age funerary contexts regarding the grave environment, which has been largely assumed by the excavators rather than evidenced. Indeed, despite the evident resolution deficit resulting from the limitations of the photographic materials, which is to be anticipated, by using the recording protocol devised, new data is obtained, giving way to further discussions.

690 ANALYSIS OF LATE BRONZE AGE GRINDING STONE DEPOSITIONS FROM SE HUNGARY

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Priskin, Annamaria (Déri Múzeum) - Pető, Ákos (Hungarian University of Agricultural and Life Sciences, Department of Nature Conservation and Environmental Management) - Torma, Andrea (University of Szeged, Department of Geology and Paleontology)

Abstract format: Poster

Most of the macrolithic tools discovered at the Pre-Gáva/Cruceni-Belegiš II type settlements in eastern Hungary are grinding stones used for grinding and pulverizing. It is generally characteristic that besides the large number of fragmentary finds there are few intact grinding slabs and handstones, which may have been mainly due to the lack of nearby raw materials. However, during the excavation of an LBA settlement at Biharkeresztes (ca. 1350-1100 BC), a large amount of high-quality, well-preserved ceramic and macrolithic artefacts came to light, based on which it is possible to reconstruct almost the entire process of food storage, food preparation and consumption. The macrolithic implements were excavated, documented and collected carefully in large quantities. Most of them are fragmentary and have rather varied contexts. However, in a few pits, several grindstones were placed together, so the possibility of intentional deposition, as well as the existence of special grinding pits in the settlement. In our presentation, we examine these possibilities based on the results of archaeological, archaeobotanical and phytolith analyses. Since these tools usually represent the first stage of the food preparation process, by examining them from several aspects, we can get answers not only about the way of usage, the grinding technique, but also about the types of processed plants and the degree of processing. The analysis is carried out within the framework of NKFI “OTKA” FK-135805 project (“Settlement, economy and society in the Late Bronze Age of Eastern Hungary”).

692 THREE LATVIAN CASTLES IN THE LIGHT OF SPATIAL ANALYSIS**Abstract theme:** 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps**Abstract authors:** Garstka, Anna Maria (Doctoral School of Humanities, University of Łódź)**Abstract format:** Poster

Recently, the use of the GIS technology is becoming increasingly popular. This also includes the spatial analysis of past landscapes. An example of this can be the analysis of line-of sight (intervisibility), field of view (viewshed) and potential time of movement from one place to the another (mobility). During the researches, conducted as a part of the international project INHILLDAUGAR (related to the Latvian hillforts along Daugava river), it was noticed that in several cases hillforts were replaced with the castles, such as: Koknese, Aizkraukle and Sēlpils. The Koknese castle was erected in 1209 by Bishop Albert of Riga and was abandoned in 1701. Castles in Aizkraukle and in Sēlpils, both were built by the Livonian Order in the first half of the XIII century. Both were also destroyed during the battles – Aizkraukle castle in the end of the XVI century by Russian and Polish army and Sēlpils castle in 1704 by Swedes.

Thus, the chronology of these three castles overlaps and they were located close to each other, so they could communicate or be part of a fortification system. Therefore, using GIS program, the above-mentioned spatial analysis were performed for these three sites.

The purpose of poster will be to present (in form of the images) the results of the viewshed, intervisibility and mobility analysis conducted for castles: Koknese, Aizkraukle and Sēlpils. An attempt will also be made to interpret these results and to answer the research questions whether it was possible to see the tower of the neighbouring castle from a particular castle tower and what the visibility from individual castles might have looked like.

695 VIRTUAL ARCHAEOLOGY. LATTE BULDINGS IN THE MARIANA ISLANDS**Abstract theme:** 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps**Abstract authors:** Berrocal-Maya, Luis (Universitat Pompeu Fabra)**Abstract format:** Poster

This poster focuses on the virtual archaeology of the Mariana Islands, an archipelago located in the northwest of the Pacific Ocean, near the equator. It is about 1500 km from the Philippines and a slightly greater distance from southern Japan. Since the 1500 BC, it has been inhabited by the CHamoru. Apparently, they lived here without much alteration until their colonization by the Spanish Crown in the 17th century. However, since 900 AD, a megalithic architecture appeared, probably related to social changes.

This architecture is named latte and gives its name to a new phase, the Latte Period. The preserved remains show groupings of pillars between 1.2 m and 5 m high. However, the upper part of these buildings has been completely lost. This must have been due to a perishable characteristic of its materials. In this research, different reconstructive proposals have been evaluated. To make the reconstruction tangible, a latte structure has been modeled in 3D through Blender. This has allowed us to better understand the functioning and socio-cultural characteristics of these buildings, which must have had a communal character.

699 NOT ONE BEFORE ANOTHER: A MULTI-ISOTOPE APPROACH TO THE LIFE-HISTORIES OF LA BRAÑA-ARINTERO MESOLITHIC BROTHERS (NORTHERN IBERIA)**Abstract theme:** 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps**Abstract authors:** Fernandez-Crespo, Teresa (Universidad de Valladolid) - Czermak, Andrea (University of Oxford) - Le Roux, Petrus (University of Cape Town) - Ordoño, Javier (Arkikus) - Schulting, Rick (University of Oxford) - Vidal Encinas, Julio (Junta de Castilla y León) - Fano, Miguel Ángel (Universidad de La Rioja)**Abstract format:** Poster

La Braña-Arintero site in the León province of northern Spain provides a unique context to explore variability in Mesolithic dietary and mobility patterns in strictly coeval and close relative individuals. In 2006, two human skeletons were recovered from the surface of the cave. After radiocarbon, anthropological and genetic studies, they were defined as two Mesolithic adult male brothers. It is likely that, as full siblings, they grew up together and were raised similarly, but also that from boys to men –when becoming more independent– they chose different pathways. Within the framework of the HunTran project (PID2020-112915GB-100), sequential stable carbon and nitrogen isotope analysis of primary dentine and strontium isotope analysis of enamel have been conducted in one of their lower permanent third molars to reconstruct their life-histories during late childhood and adolescence. The resulting data, with sub-annual temporal resolution, suggest a broadly stable high-trophic-level diet and the exploitation of exclusively or predominantly terrestrial resources, from a relatively restricted landscape for both individuals. This is consistent with the stability within broad-spectrum diets and high degree of territoriality suggested for the last hunter-gatherers of interior Iberia, although this does not preclude contacts with or mobility to other regions (e.g., the Cantabrian

coast), as attested through the study of lithic raw material and shellfish procurement in nearby Mesolithic sites. At a finer scale, the brothers' stable carbon and nitrogen isotope sequences show non-coincident patterns of opposite covariance, which suggests that they suffered from different catabolic and anabolic processes throughout juvenility. Moreover, they both show a short, marked change in diet around age 14, followed by a sustained divergence in nitrogen isotope data until the end of their available isotope sequences that may be attributable to a distinct protein intake. This evidence may tentatively suggest a change related to social age and/or family independence.

701 THE BUILDING SITE OF THE TEMPLE OF DIONYSUS IN TEOS: SOME PRELIMINARY RESULTS FOR THE RECONSTRUCTION OF THE CHAÎNE OPÉRATOIRE**Abstract theme:** 1. The Material Record: Current Trends and Future Directions**Abstract authors:** Bozza, Sara (CNR-Istituto di Scienze del Patrimonio Culturale) - Kadioğlu, Musa (Teos Archaeological Project - Ankara University) - Casa, Giacomo (Sapienza Università di Roma) - Ismaelli, Tommaso (CNR-Istituto di Scienze del Patrimonio Culturale)**Abstract format:** Poster

The Temple of Dionysus in Teos in Asia Minor (Izmir, Turkey), whose construction began in the late 3rd century BC and ended in the imperial period under Hadrian's reign, is one of the most significant buildings for the study of ancient architecture, as it is mentioned in the famous work *De Architectura* by Vitruvius as an example of eustyle temple, designed by the architect Hermogenes during the Hellenistic time. An ongoing research project, thanks to the collaboration between the Teos Archaeological Project (Ankara University), Sapienza University of Rome, and CNR-ISPC, focuses on the Temple to reconstruct its biography, from the architectural project to the building site, its various phases, and its decoration.

A detailed analysis of the ancient construction practices adopted in the building site is conducted through the innovative application of the traceological method to the study of ancient architecture: thousands of blocks scattered in the temple area are investigated through the systematic cataloguing of traces of tools on the marble surfaces, and the morphological and dimensional features of clamp-, dowel- and pry hollows. This analysis allows the reconstruction of technical procedures (chaîne opératoire) (for moving, lifting, carving and connecting the blocks) and is intended to assess i) the relative and absolute chronology of the different sectors of the temple, ii) the organization of various working groups; iii) the technical know-how shared by the stonemasons; iv) the socio-economic implications of the project in terms of time, workforce and materials. The poster will present some preliminary results of the research on the organisation and temporal development of the building site of the Temple.

704 PAST IN PRESENT SOILS: LEVERAGING DEVELOPMENT-LED ARCHAEOLOGICAL DATA TO GENERATE INSIGHTS INTO URBAN SOIL DEVELOPMENT AND SOIL HEALTH**Abstract theme:** 7. Archaeology of Sustainability through World Crises, Climate Change and War**Abstract authors:** Bekesi, Anna (University of Glasgow; Museum of London Archaeology (MOLA))**Abstract format:** Poster

Urban soils play a fundamental role in the lives of cities. It is essential for the future to preserve it in a state where it can fulfil its ecological and economical functions as well as meet the needs of all its stakeholders. Human interactions leave significant impact on soils. Short-term or immediate effects have been a focal point in scientific research. Archaeology is in a unique position to compliment this rapidly expanding knowledge pool due to its unique ability to offer insights into long term human activity, environmental change and human-environment interactions.

This poster presents the preliminary stages of a collaborative research project, "Past in Present Soils". It uses development-led archaeology data and aims to enable interdisciplinary collaboration between archaeologists, soil scientists, development companies, urban farming communities and local authorities within Greater London. By cross-mapping the archaeological and soil science domains using semantic modelling methods, it allows for a more holistic understanding of soil. The proposed data model illustrates creating and disseminating data in a way that holds benefit within the discipline and beyond. The case study aims to illustrate how archaeological data can be implemented successfully and used beyond archaeology, on projects concerned with soil health, sustainability and climate change.

706 DISTRIBUTION PATTERN OF ELITE TOMBS OF THE XIONGNU EMPIRE AND ITS IMPLICATIONS AS SEEN THROUGH GIS SURVEY OF GOL MOD-2

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Han, Jinseong (Kyung Hee University)

Abstract format: Poster

The Gol Mod-2 site are characterized by the largest size, the largest number of tombs, and the excavation of various burial products among the ancient tombs of the Xiongnu Empire. The analysis of individual ancient tombs is actively underway, but studies on the formality of the distribution of tombs in the ancient tombs are somewhat insignificant. This poster presentation is based on GIS data collected through aerial (drone) surveys from the Gol Mod-2 cemetery site in 2022, and the purpose of this presentation is to poetically examine the distribution formality of aristocratic tombs of the Xiongnu Empire and their implications. As a result of the preliminary results, (1) the Gol Mod-2 cemetery is located at an altitude of 1800-1860m, and 500 tombs are concentrated in the range of 5 km². (2) The tombs are distributed in groups of at least two areas, of which the largest tombs are characterized by being located at the point of low elevation. (3) Most of these burials are square stone tombs with terrace, and the terrace are set in the southeast direction. In addition, the satellite graves tend to be located to the east of square stone tombs with terrace tombs. (4) Particularly noteworthy part of this survey is the confirmation of the traces of the tomb's mound and the existence of ditch around the tomb, and it seems necessary to reconsider the study of the previous tomb construction. I think this study will not only contribute to the understanding of the burial culture of the Xiongnu Empire, which was a huge axis of the Eastern Eurasian grasslands, but also help to examine the empires formed throughout Eurasia in the 8th and 3rd centuries BC.

707 HEALTH PROFILES OF ROYAL TOMB KEEPERS OF THE WESTERN HAN CHINA (202 BC TO 8 AD)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Zhan, Xiaoya (Nanyang Technological University) - Shao, Jing (Shaanxi Academy of Archaeology, China) - Zhu, Yingpei (Shaanxi Academy of Archaeology, China) - Yeh, Ivy Hui-Yuan (Nanyang Technological University)

Abstract format: Poster

The health profiles of royal tomb keepers in ancient Chinese contexts are seldom discussed due to limited skeletal remains. The recent excavation at Dabuzi Cemetery, Shaanxi, China, revealed a group of royal tomb keepers for Emperor Gaozu of Han (reigning from 202 to 195 BCE) and Empress Lü. The specimen, coded as North II M68, was believed to be one low-ranking official of the tomb keepers. Hundreds of burial goods were unearthed, including pottery, jade, bronze artifacts, and iron swords. With 90% of bones preserved, M68 was believed to be an adult man between 25-32 years old. Integrated research has been done to piece together the lives of M68. Compared with the other 85 human skeleton remains studied, M68 exhibited robust bones and muscular attachments on limb bones and torso. There is a well-healed fracture at the left fibula distal end. Bony outgrowth, porosity changes, osteochondritis dissecans, and osteoarthritic changes are exhibited on the lower limbs and feet. The joint changes are more exaggerated compared to the other individuals. It is possible that the fracture contributed to the joint changes. It is also possible that M68 was actively engaged in physical activities, potentially military, regarding the iron swords in his burial goods, which contributed to the joint changes. M68 also exhibited several dental conditions, including caries, abscesses, and LEH. Paleoparasitology analysis indicates a possible dog roundworm (*Toxocara* sp.) in the soil sample of M68's pelvic region, indicating close contact with domestic animals. Archaeobotany indicated that the grains in the pottery barns were rice and millet, providing information on the diet of M68. These pieces of information draw a more integrated picture of the Han tomb.

708 MAPPING ARCHAEOLOGICAL HERITAGE IN SOUTH ASIA

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Roberts, Rebecca (University of Cambridge) - GS, Abhayan (University of Kerala) - Hameed, Mohammad (University of the Punjab) - Mushtaq, M. Waqar (Islamia University Bahawalpur) - Prabhakar, VN (IIT Gandhinagar) - Samad, Abdul (Directorate of Archaeology and Museums, Khyber Paktunkhwa) - SV, Rajesh (University of Kerala) - Kumar Singh, Vikas (Banaras Hindu University) - Project, MAHSA (University of Cambridge) - Petrie, Cameron (University of Cambridge)

Abstract format: Poster

Archaeological heritage in India and Pakistan is rich, diverse and ubiquitous. Ancient settlements, monuments, buildings and other features of cultural importance are part of the living landscape, and often their existence does not fit comfortably with contemporary development needs. Rapid urban and agricultural development in both countries has led to the destruction of many archaeological sites, the existence of which may not be recorded in formal registers.

The Mapping Archaeological Heritage in South Asia (MAHSA) project is working alongside a range of stakeholders, including museums directorates, universities and government departments, in order to create a comprehensive open access online database of protected archaeological heritage in combination with a management tool for the documentation of vulnerable sites to be used by heritage professionals in Pakistan and India. Using the Arches database platform, MAHSA is helping to transform the way heritage is managed at both local and national levels. Sources of data about sites includes published site gazetteers, existing sites and monuments lists, historic maps, and results of archaeological groundtruthing. In addition to the creation of the database tool, MAHSA is also developing documentation tools and training sessions for digital heritage documentation using open source software such as QGIS and Open Data Kit to ensure that stakeholders have the tools required to produce, analyse and manage born-digital heritage data, while also critically evaluating our workflow in relation to the 'digital divide' and the hidden costs of digital data, such as infrastructure, technical know-how and inherent post-colonial knowledge imbalances.

709 BONE BROOCHES FROM PANNONIA (HUNGARY): MANUFACTURE AND USE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Sáró, Csilla (HUN-REN-ELTE Research Group for Interdisciplinary Archaeology, Budapest, Hungary; Institute of Archaeological Sciences, ELTE Eötvös Loránd University, Budapest, Hungary) - Tóth, Zsuzsanna (Hungarian National Museum, National Institute of Archaeology, Budapest, Hungary) - Borel, Antony (Histoire Naturelle de l'Homme Préhistorique (HNHP), Muséum national d'histoire naturelle (MNHN), CNRS, UPVD, Alliance Sorbonne Université, Département Homme et Environnement, Paris, France; Institute of Archaeological Sciences, ELTE Eötvös Loránd University, Budapest, Hungary)

Abstract format: Poster

Roman period brooches were typically made of copper-base alloy, while precious metals (gold, silver) and iron were less common. However, bone brooches were a rarity, and their manufacturing process was distinct from that of metal brooches, often requiring the collaboration of workshops. Such brooches are known from Pannonia (Hungary). We present here the analysis of two bone brooches with metal pin constructions from Aquincum (Budapest). First, our investigations showed that their form is not unique, similar artefacts have been found in the region, and their raw material, large mammalian long bone, was present locally in the area. The surface of the artefacts was then examined at different scales using a stereomicroscope and a Laser Scanning Confocal Microscope (LSCM) to document the traces related to different manufacturing and use phases. During the manufacturing process, the rectangular preform was sawn out of the bone. After that, fine sawing was used to create a basic outline and details, while the surface was scraped with a knife to shape it. The final surface was smoothed by abrasion. Also, high resolution measurements of the catchplates through LSCM allowed differentiating striations related to this manufacturing processes from others demonstrating the use of these brooches.

710 MEDIEVAL SKELETAL REMAINS CHALLENGE MEDICAL EXPERTS' EXPECTATIONS OF LIFE EXPECTANCY FOR THOSE WITH EXCESS PRESACRAL VERTEBRAE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Rieber, Riley (University of Aberdeen)

Abstract format: Poster

The human skeleton is comprised of 24 presacral vertebrae, with an axial formula of 7 cervical, 12 thoracic, 5 lumbar. However, normal human variation can range from 23-25. In rare cases, segmentation defects of the spine occurring during fetal development can result in vertebral variations outside of this accepted range, although, these abnormal variations are deemed "incompatible with life" by embryologists.

Macroscopic analysis was conducted on a set of medieval skeletal remains, and a differential diagnosis was developed based on observable pathological conditions. The identification assigned to the remains is LC84 SK181 and were discovered during the 1980's excavation of the interior floor of the Linlithgow Carmelite Friary in Scotland. The remains date to the late 15th century.

The differential diagnosis concludes that LC84 SK181, an elderly female, suffered from segmentation defects of the spine resulting in an unusual number of presacral vertebrae, and unilateral hip dysplasia. Excess vertebrae were observed in the thoracic and lumbar regions, while a block vertebra was present in the cervical spine. The burial context was also of interest as her burial was located below the floor of the claustral area of the friary.

Despite the belief that excess vertebrae are "incompatible with life", this case study seeks to challenge this notion, as well as highlight four other known examples spanning 123 years. Though rare, this condition is not impossible among adults as the evidence suggests. There also appears to be a possible correlation between excess vertebrae and Klippel-Feil Syndrome, as 4 out of the 5 known cases of 26 presacral vertebrae also meet the diagnostic criteria for Klippel-Feil Syndrome.

THE PALEOGENOMICS OF WILD AND DOMESTIC CATS IN THE ANCIENT LEVANT AND NORTH AFRICA

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Rovelli, Valentina (Centre of Molecular Anthropology for Ancient DNA Studies, Department of Biology, University of Rome Tor Vergata, Italy) - De Martino, Marco (Centre of Molecular Anthropology for Ancient DNA Studies, Department of Biology, University of Rome Tor Vergata, Italy) - Serventi, Patrizia (Centre of Molecular Anthropology for Ancient DNA Studies, Department of Biology, University of Rome Tor Vergata, Italy) - De Cupere, Bea (Royal Belgian Institute of Natural Sciences, Brussels, Belgium) - Peters, Joris (ArchaeoBioCenter and Institute of Palaeoanatomy, Domestication Research, and the History of Veterinary Medicine, Ludwig Maximilian University Munich, Munich, Germany) - Mattucci, Federica (Unit for Conservation Genetics (BIO-CGE), Italian Institute for Environmental Protection and Research (ISPRA), Ozzano dell'Emilia, Italy) - Caniglia, Romolo (Unit for Conservation Genetics (BIO-CGE), Italian Institute for Environmental Protection and Research (ISPRA), Ozzano dell'Emilia, Italy) - Van Neer, Wim (Royal Belgian Institute of Natural Sciences, Brussels, Belgium) - Ottoni, Claudio (Centre of Molecular Anthropology for Ancient DNA Studies, Department of Biology, University of Rome Tor Vergata, Italy)

Abstract format: Poster

Located at the crossroads of Africa, Asia, and Europe, the Levant is considered the cradle of cat (*Felis silvestris*) domestication, a process that most likely started around 11 thousand years ago with the onset of farming. Zooarchaeological and iconographic evidence suggests that ancient Egypt could be a possible second, later center of domestication. This narrative is corroborated by genetic analyses of modern wild and domestic cats, which demonstrated that domestic cats derived from *Felis silvestris lybica*, the North African and Near Eastern wildcat. Previous ancient DNA (aDNA) investigations showed that cats in ancient Egypt possessed two mitochondrial lineages commonly found in modern domestic cats. Haplotype-C, which spread all over the Old World since Classical Antiquity from Northern Africa, and haplotype-A, associated with an earlier cat dispersal from the Levant during the Neolithic. However, the exact contribution of Egypt is controversial due to the paucity of data, especially because the majority of Egyptian samples are represented by cat mummies, from which the retrieval of authentic aDNA is challenging.

Here, we show the results of paleogenomic analyses conducted on more than 100 cat remains from North Africa, Israel, Saudi Arabia, Oman, Syria, and Turkey, dated from the Neolithic to the 15th century AD. We generated whole mitochondrial genomes and low-coverage ancient nuclear genomes (0.1x-0.6x). In addition, to provide a broader view of modern wildcat genetic variation, we produced whole mitogenomes and low-coverage nuclear genomes (0.4x-1.2x) from eight museum samples from central Africa and five modern high-coverage genomes (12.3x-15.3x) of wildcats from Tunisia, Morocco, Mauritania, Western Sahara, and South Africa. Our paleogenomic dataset provides an outline of ancient DNA preservation in cat remains across time and space. Furthermore, it lays out a key background to unravel the individual contribution of Egypt and the Levant to cat domestication.

ACCURACY ASSESSMENT OF DENTAL MORPHOLOGICAL TRAITS IN SEX ESTIMATION, ON ARCHAEOLOGICAL HUMAN GROUPS OF 16TH-19TH CENTURIES FROM EASTERN ROMANIA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Popovici, Mariana (Alexandru Ioan Cuza University of Iasi, Faculty of Biology (Romania); Romanian Academy, Iasi Branch, "Olga Necrasov" Center of Anthropological Research (Romania)) - Ciorpac-Petru, Ozana-Maria (Alexandru Ioan Cuza University of Iasi, Faculty of Biology (Romania); Romanian Academy, Iasi Branch, "Olga Necrasov" Center of Anthropological Research (Romania)) - Groza, Vasilica-Monica (Alexandru Ioan Cuza University of Iasi, Faculty of Biology (Romania); Romanian Academy, Iasi Branch, "Olga Necrasov" Center of Anthropological Research (Romania)) - Bilavski, George (Alexandru Ioan Cuza University of Iasi, Faculty of Biology (Romania); Romanian Academy, Iasi Branch, Institute of Archaeology (Romania)) - Bacumenco-Pîrnău, Ludmila (Alexandru Ioan Cuza University of Iasi, Faculty of Biology (Romania); Romanian Academy, Iasi Branch, Institute of Archaeology (Romania)) - Bejenaru, Luminita (Alexandru Ioan Cuza University of Iasi, Faculty of Biology (Romania); Romanian Academy, Iasi Branch, "Olga Necrasov" Center of Anthropological Research (Romania))

Abstract format: Poster

Due to the great phenotypic variability, and the difficulty to establish some morphometric or morphological boundaries between the males and females, the sex estimation can be difficult steps in the reconstructing the biological profile of human skeletons from archaeological contexts. As human remains from archaeological excavations, the teeth have a distinct importance as they have a very good preservation, thus being frequently recovered.

The present paper focuses on the evaluation of sexual dimorphism by combining some dental morphology variables (i.e., dental shape and non-metric traits) in the discriminant functions.

The dental material is represented by mandibular second molars coming from several archaeological sites of 16th-19th centuries in Eastern Romania. The teeth were analysed by Geometric morphometrics and by quantifying nonmetric traits (i.e., anterior fovea, groove patterns, cusp numbers). The obtained data were used to the principal component analysis, canonical variate analysis, allometry, discriminant function analysis.

The results show that the covariation of shape and dental traits contributes to the sex estimation, and that the geometric morphometrics is a suitable technique to highlight even the most discrete aspects differentiating the sexes. Allometry has a minor impact, but statistically significant in the sexual dimorphism. Multivariate regression within the dental configuration reveals how the occlusal outline and the intercuspidal grooves influence each other. Discriminant functions, based on shape variables and dental traits, highlight the significant role of the talonid in the sex estimation on archaeological medieval human groups (i.e., cross-validation classification: 72.3% for males, and 63.2% for females).

This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P4-PCE-2021-1180, within PNCDI III.

EXPLOITATION OF ANIMAL RESOURCES IN COMMUNITIES OF EARLY IRON AGE (HALLSTATT, BABADAG CULTURE) AT THE LOWER DANUBE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Cretu, Eliza ("Alexandru Ioan Cuza" University of Iași, Faculty of Biology, Iași, Romania) - Stanc, Simina ("Alexandru Ioan Cuza" University of Iași, Faculty of Biology, Iași, Romania) - Ailincăi, Sorin ("Gavrilă Simion" Eco-Museum Research Institute, Tulcea, Romania) - Donciu, Paul ("Alexandru Ioan Cuza" University of Iași, Faculty of Biology, Iași, Romania) - Bejenaru, Luminița ("Alexandru Ioan Cuza" University of Iași, Faculty of Biology, Iași, Romania; Romanian Academy, Iasi Branch, "Olga Necrasov" Center of Anthropological Research, Iasi, Romania)

Abstract format: Poster

This study contributes to the knowledge of relationships between animals and human communities of Iron Age (Hallstatt, Babadag culture), according to the faunal remains discovered in archaeological sites from Southeastern Romania. This work is based on the archaeozoological data of five samples dated to 10th-9th centuries BCE, and coming from Jijila-Popa Isac, Garvăn-Mlăjituț Florilor, Rasova-Malul Roșu, Satu Nou-Valea lui Voicu, and Niculițel-Cornet.

Animal resources used in these communities, as well as related occupations, were evaluated by the main archaeozoological methods (e.g., anatomical and taxonomic identifications, estimations of age and sex, quantification, taphonomic evaluation). The identified faunal remains belong to mammals, birds, reptiles, fish, and molluscs.

The preponderance of domestic mammals is observed in all five samples, and the species list includes: cattle, sheep/goat, pig, horse, and dog. In four samples, cattle remains has the higher frequency, ranging from 40% in Garvăn to 71% in Jijila; in Satu Nou, cattle remains represent only 14.4%, while sheep/goats 47%, and pig 34%.

Among identified wild mammals, red deer and wild boar are the best represented, found in all samples; other wild mammals are roe deer, badger, hare, aurochs and fox.

A significant number of fish remains were found in the samples of Niculițel (30.7%), and Garvăn (26.3%); lowest proportions were recorded in Rasova and Satu Nou. Fish species identified are catfish, pile, sander, carp, and tench. Reptiles (i.e., pond turtle, and tortoises) were identified in all the samples, most remains in the Niculițel sample (0.67%). Birds are poorly represented or even missing in the samples of Jijila and Rasova.

From archaeozoological perspective it is to remark that animal husbandry, fishing, and even hunting were important components of the local economies in the Lower Danube area during Early Iron Age.

BRIDGING ARCHAEOLOGY AND AI: INTRODUCING THE AI-ON-DEMAND PLATFORM (AIOD)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Lozic, Edisa (ZRC SAZU) - Štular, Benjamin (ZRC SAZU)

Abstract format: Poster

Archaeologists' interest in artificial intelligence (AI) is rapidly increasing. We recognize the need to move beyond isolated case studies and foster collaboration within our community. Our initiative, the AI-on-Demand platform (AloD) (<https://aiod.eu>), has been in development since 2019 and is now part of the AI4Europe project.

The objective of AloD is to support solutions and tools that enhance the ecosystem of excellence and trust. We continually add AI assets and tools to empower the wider community to upskill and share knowledge across various innovation sectors. Our platform offers new services and a marketplace for non-experts to explore and utilize AI solutions in their work. AloD is a community resource, and its success hinges on active engagement from end users. Cultural heritage, including archaeology, plays a crucial role in AloD's mission.

Our poster aims to present key information about the ALoD platform, highlighting its features and benefits. Additionally, we will showcase one of our tools titled "Data Conversations Made Easy: Build my RAG". Many archaeologists have contemplated using AI for data analysis but have been deterred by its complexity. Our free online tool addresses this challenge by simplifying the process of building a Retrieval Augmented Generation (RAG) AI system tailored to individual needs. To facilitate decision-making, we've streamlined the process into five key questions.

The poster will prioritize presenting essential information and include QR links for further details and access to the tool.

716 ARCHAEOLOGICAL HERITAGE AND EDUCATION ON DEPARTMENT OF ARCHAEOLOGY IN CONSTANTINE THE PHILOSOPHER UNIVERSITY IN NITRA

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Borzová, Zuzana (Constantine the Philosopher University) - Bešina, Daniel (Constantine the Philosopher University) - Gogová, Stanislava (Constantine the Philosopher University) - Fottová, Eva (Institute of Archaeology SAS)

Abstract format: Poster

The education at the Department of Archaeology in Constantine the Philosopher University in Nitra includes education of our students in popularization of archaeology, presentations of archaeological monuments, archaeological sites, historical monuments and cultural heritage. The theoretical level of this education at the department is executed mainly in the subjects of: Public Archaeology, Digitalization and virtualization of the cultural heritage and Monument presentation and cultural heritage education. Their main goal is adoption of the methodological and theoretical basics of public archaeology and their subsequent application in practice. The students of our department can test their theoretical knowledge of these subjects by means of numerous popularization activities carried out by the Department of Archaeology in the project of Public Archaeology at the Department of Archaeology. It consists of creative workshops for general public, interactive exhibitions, colloquia, educational (tourist) trails focused on archaeology, creation of leaflets, brochures, guide texts, websites, creation of material for documentaries, 3D visualisations, such as visual materials for websites or exhibitions, etc. We would like to present these by means of our poster. Our second goal is to mention education of children at primary schools (with the topic of history, archaeology and cultural heritage), which is supported by the Department of Archaeology in form of workshops, interactive lectures, exhibitions, day-long programmes or day summer camps. Their main ambition is to stimulate interest in our cultural heritage in children, extend their knowledge of history of their region and country, provide a review of artifacts and monuments and their importance for the society as well as teach them about the work of archaeologists and other experts dealing with protection of the cultural heritage.

718 BIODEGRADATIVE POSTMORTEM CHANGES IN A HUMAN HAIR SAMPLE OF 19TH CENTURY FROM IASI CITY (ROMANIA)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Ciropac-Petraru, Ozana-Maria ("Alexandru Ioan Cuza" University of Iasi, Faculty of Biology, Iasi, Romania; Romanian Academy, Iași Branch, "Olga Necrasov" Center of Anthropological Research, Iași, Romania) - Bacumenco-Pîrnău, Ludmila ("Alexandru Ioan Cuza" University of Iasi, Faculty of Biology, Iasi, Romania; Romanian Academy, Iași Branch, Institute of Archaeology, Iași, Romania) - Groza, Vasilica-Monica ("Alexandru Ioan Cuza" University of Iasi, Faculty of Biology, Iasi, Romania; Romanian Academy, Iași Branch, "Olga Necrasov" Center of Anthropological Research, Iași, Romania) - Popovici, Mariana ("Alexandru Ioan Cuza" University of Iasi, Faculty of Biology, Iasi, Romania; Romanian Academy, Iași Branch, "Olga Necrasov" Center of Anthropological Research, Iași, Romania) - Popovici, Ovidiu-Alin ("Alexandru Ioan Cuza" University of Iasi, Faculty of Biology, Iasi, Romania) - Bejenaru, Luminița ("Alexandru Ioan Cuza" University of Iasi, Faculty of Biology, Iasi, Romania; Romanian Academy, Iași Branch, "Olga Necrasov" Center of Anthropological Research, Iași, Romania)

Abstract format: Poster

During the archaeological excavations at the "Vovidenia" Church from Iasi city (Romania), several human skeletons were discovered. Among them, a female human skeleton of 19th century, preserving textile fragments and several hairs strands, was found. In burial context, hairs are rare findings that can offer valuable information to both bioarchaeology and forensic science through different investigative approaches including taphonomy. Although the taphonomic process has been intensely studied on the skeletal human remains, there are few studies regarding postmortem degradation of human hair in archaeological context.

The aim of this study is to characterize the postmortem biodegradative changes of the human hair fibers discovered during the archaeological excavations from "Vovidenia" Church, Iasi city (Romania). The hairs were evaluated using optical microscopy, scanning electronic microscopy (SEM), and scoring technique for taphonomic assessment. Dur-

ing the stereomicroscopic inspection of hairs, adherent deposits and several puparia were observed. Based on the peculiarity of the puparium later stage (i.e., respiratory horns and well visible carapace), some of the insect remains were identified as belonging to scuttle fly (*Megaselia scalaris*, Diptera: Phoridae). On the hair shafts several concave lesions were identified, probably due to gnawing activity of insects. The evaluation of external degradation by SEM imaging and histological scores reveals that most analysed hair shafts are in a good preservation state with the minor and intermediated changes in the cuticle cells. Indicators of fungal lytic activity (i.e., fungal tunneling) were observed in almost all hairs. This work contributes with data regarding the preservation of human non-skeletal remains and biological taphonomic factors in funerary archaeological context. This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS-UEFISCDI, project number PN-III-P4-PCE-2021-1180, within PNCDI III.

719 ANCIENT DNA EXTRACTION: ENHANCING ENDOGENOUS MATERIAL YIELD THROUGH TISSUE SOURCE OPTIMIZATION AND DISSOLUTION TECHNIQUES

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Lubacki, Kajetan (Institute of Human Biology and Evolution, Faculty of Biology, Adam Mickiewicz University) - Kulesza, Maria (Institute of Human Biology and Evolution, Faculty of Biology, Adam Mickiewicz University) - Breszka, Agnieszka (Institute of Human Biology and Evolution, Faculty of Biology, Adam Mickiewicz University) - Chyleński, Maciej (Institute of Human Biology and Evolution, Faculty of Biology, Adam Mickiewicz University) - Juras, Anna (Institute of Human Biology and Evolution, Faculty of Biology, Adam Mickiewicz University)

Abstract format: Poster

A predominant challenge in ancient DNA studies pertains to the amount of endogenous genetic material derived from skeletal remains. In archaeogenetic analyses, it is frequently observed that significantly less than 10% of the obtained DNA sequences originate from endogenous genetic material. Since the preservation of human DNA varies according to the specific bones selected, exploring optimal tissue sources can serve to augment both the ratio of endogenous DNA and the quality of the extracts.

In this study, we examined not only the commonly used teeth and inner ear fragments from the petrous portion of the temporal bone but also auditory ossicles which have recently been proposed as an alternative source of ancient DNA. In contrast to existing research methodologies, we standardized the extraction process across all tissue types by employing dissolution instead of the mechanical homogenization. Furthermore, we tested the extent to which the observed variability in the amount of obtained endogenous DNA could be attributed to the exclusion of heat and friction resulting from mechanical homogenization of the bone tissue.

The obtained results reveal variability in the amount of recovered endogenous DNA, which depends on the type of tissue used and the presence of mechanical homogenization in the protocol. We contend that these factors along with the varying degrees of destructiveness imposed on skeletal remains by each method, must be carefully considered when designing ancient DNA studies involving valuable human bone remains.

721 GEOMETRIC MORPHOMETRICS AND LITHIC STUDIES: A MATCH MADE IN HEAVEN? ADDRESSING SOME 2D AND 3D QUESTIONS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Romagnoli, Francesca (UAM - Universidad Autónoma de Madrid) - Pérez, Guillermo (UAM - Universidad Autónoma de Madrid) - Gravina, Brad (Musée national de Préhistoire, Les Eyzies de Tayac; Université Bordeaux) - Brenet, Michel (INRAP Grand Sud-Ouest; Université Bordeaux)

Abstract format: Poster

Recent research on lithic studies have focused on the application of Geometric Morphometrics (GM) for quantifying differences in the morphology of lithic artifacts. In combination with Principal Components (PCs) and Machine Learning models, GM provides a powerful methodology for the analysis of stone tools. However, questions regarding methodology (number of landmarks necessary to capture an object shape, different degree of resolution between 2D and 3D GM, effects of using limited number of PCs), and type of application to archaeological assemblages persist. A sample of 40 cores belonging to three different reduction sequences (Levallois, discoidal and Hierarchical Discoid) were used to evaluate how many landmarks are necessary to reliably characterize the shape of a stone tool core. Three categories of backed flakes were employed to test the degree of resolution between 3D and 2D GM and the effects of different number of PCs on Machine Learning algorithms. 3D GM were employed to differentiate knapping strategies among backed products obtained from discoidal and Levallois reduction sequences. Results concerning the number of landmarks shows that shapes can be reliably captured with a limited number of landmarks. Results from the comparison between 3D and 2D GM show that, when analyzing volumetric objects, 3D GM provide a higher resolution of analysis. Additionally, tree-based algorithms (Random Forest, GBM and E5 Decision tree) are less affected

by the use of limited number of PCs. Results of knapping strategy identification indicate an AUC near 0.8, indicating the potential of 3D GM, machine learning models and experimental reference collections for the identification of knapping strategies among archaeological collections.

722 THE DENTAL DECODER: MAXIMISING INSIGHTS IN PAST POPULATIONS' LIFEWAYS THROUGH TOOTH SAMPLING IN BIOARCHAEOLOGY

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Robert, Prudence (Ghent University) - Bodé, Samuel (Ghent University) - Boeckx, Pascal (Ghent University) - Vanhaecke, Frank (Ghent University) - De Groot, Isabelle (Ghent University)

Abstract format: Poster

In archaeology, biological and chemical analysis provides a variety of information on past populations. The conclusions' validity is intricately linked to the quality and nature of the biological samples analysed. Dental samples, with their remarkable preservation and age representation, offer a veritable archive of individual life histories, making them especially valuable when skeletal remains are fragmented or commingled. This research delves into the strategic values of dental sampling within such challenging archaeological contexts. However, it can also be helpful whenever sampling multiple skeletal remains is undesirable.

Teeth not only survive extensive post-depositional processes but also encompass a wide array of biological and archaeological data. This includes genetic information through ancient DNA and dental non-metric traits analyses; stable isotope ratios for dietary and mobility information, direct markers of diet and disease; health and biological sex information through proteomics analysis and radionuclides for dating (e.g. 14 dating). This material is pivotal for reconstructing comprehensive narratives of past human lives and societies.

This study outlines optimised methodologies for tooth sampling and preparation for subsequent analyses, but also practical guidelines for both field archaeologists and biological anthropologists. The focus is on maximising the information that teeth yield, ensuring that even when the material is scarce, the potential for discovery remains vast.

724 PRESERVING THE ARCHAEOLOGICAL REMAINS OF EARTHEN CONSTRUCTION: PATHOLOGIES IN THIS FREQUENTLY OVERLOOKED PART OF ARCHITECTURAL HERITAGE

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Pastor Quiles, María (University of Alicante) - González Donado, María Laura (University of Alicante)

Abstract format: Poster

The handling of earthen archaeological remains poses significant challenges, in the field, in the laboratory but also later, on the storage phase.

This material is an invaluable source of historical and cultural information, but due to various factors associated with its nature, it is often neglected. The lack of attention and recognition it receives leads to poorer conservation, that is complicated enough in itself.

Not treating those earthen pieces properly and preventively addressing the pathologies they may develop, can lead to their significant deterioration, impacting their internal and external structure, and compromising vital information. In the case of construction remains, it means important losses in past architectural history, causing considerable damage, affecting research and the public perception of these elements as historical and architectural heritage.

Improving the practices involved in their treatment and management cannot be separated from fighting the common underestimation these materials suffer and the need to promote awareness of their importance in archaeology. It is essential to recognise their value and to take appropriate measures for their preservation to ensure their future availability for the advancement of scientific knowledge.

This poster presents a transversal approach to this problem, addressing the most common pathologies found in earthen heritage remains so it can bring light in ways to better prevent them.

726 APPLICATION OF ANCIENT DNA ANALYSIS IN THE STUDIES OF THE 8TH CENTURY COLLECTIVE GRAVE FROM THE LEJASBITĒNI CEMETERY IN LATVIA

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Kimsis, Janis (Latvian Biomedical Research and Study Centre) - Pokšāne, Alise (Latvian Biomedical Research and Study Centre) - Pētersone-Gordina, Elina (Institute of Latvian History, University of Latvia) - Vilcāne, Antonija (Institute of Latvian History, University of Latvia) - Molls, Kaspars (Institute of Latvian History, University of Latvia) - Gerhards, Guntis (Institute of Latvian History, University of Latvia) - Ranka, Renāte (Latvian Biomedical Research and Study Centre)

Abstract format: Poster

Identification of gender and sex is an important part of archaeological research. Gender is a social category, while sex is biological. Gender and sex can match, but it is not always the case. Gender is characterised by grave inventory and occasionally, by grave orientation. This study focuses on sex, gender and genetic characterization in a collective grave from the Lejasbitēni cemetery (Burials 111-115), which is from the beginning of the Viking Age, based on C14 dating. This grave contains five adult individuals, but the poor preservation of bone does not allow to assess the possible cause of death. Two female gender burials (No 111 and 112) contained an axe, which is not usually associated with female gender. Another female gender burial (No 113) contained artefacts typical for female gender, but the orientation of the grave was the same as the adjacent male gender burials (No 114 and 115), which contained weapons. Moreover, the skull of the Burial 113 suggests that their biological sex was male. To better understand the context of this collective grave, we performed ancient DNA analysis using next generation sequencing techniques to assess the chromosomal sex of the individuals and their genetic affiliation on a local and regional scale. The results indicated poor DNA preservation, however, in several cases the gender corresponded to the chromosomal sex, thus providing the necessary additional evidence. Overall, our findings help to explore burial traditions in the Lejasbitēni cemetery, and relationship between sex and gender during the Viking Age in the territory of contemporary Latvia.

This study was funded by the Latvian Council of Science grant No. lzp-2022/1-0059.

727 CHARACTERISATION OF ANCIENT DNA PRESERVATION IN HUMAN BONE AND TEETH SAMPLES FROM LATVIA WITH COPPER PATINATION

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Pokšāne, Alise (Latvian Biomedical Research and Study Centre) - Kimsis, Jānis (Latvian Biomedical Research and Study Centre) - Pētersone-Gordina, Elīna (Institute of Latvian History, University of Latvia) - Vilcāne, Antonija (Institute of Latvian History, University of Latvia) - Gerhards, Guntis (Institute of Latvian History, University of Latvia) - Ranka, Renāte (Latvian Biomedical Research and Study Centre)

Abstract format: Poster

Bronze and other copper containing alloys are known to possess antibacterial properties, which might partly explain the observation of better preservation of bone, teeth, and other organic materials in close proximity to bronze artifacts in archaeological contexts. The selection of bone and teeth samples for ancient DNA (aDNA) analysis often can be limited due to excavation techniques used in the past, whereby only selected bones were removed from the burial for curation, and poor preservation of osteological material in general. The aim of this study was to compare the metagenomic profiles and endogenous DNA preservation between osteological samples with and without copper patination obtained from different burials in Lejasbitēni cemetery (7th-10th centuries CE). Sequencing data obtained from patinated samples showed much lower human genome aligning read percentages than non-patinated samples. Most of the analysed samples did not have enough reads for aDNA authentication or did not display the characteristic aDNA damage patterns at the ends of sequences. Metagenomic analyses indicated that one of the samples (an intensively patinated and highly porous hand phalanx) also had an increased proportion of sequencing reads aligning to *Sphingomonas* – a genus of Gram-negative, chemoheterotrophic, strictly aerobic bacteria with biodegradative capabilities including organometallic compounds. Overall, despite the apparently good preservation of bones and teeth located in close proximity to metals and alloys with antibacterial properties, sequencing data suggests poor endogenous human DNA preservation and a possibility of changes in metagenomic profiles in favour of more metal-resistant bacteria. For determination of specific causes of lower endogenous DNA percentage in patinated samples, further research is required.

This study was funded by ANM academic career doctoral student grant ANM_K_DG_05.

REDISCOVERING MOUNTAIN IDENTITY: ARCHAEOLOGY OF HISTORIC BUILDING FOR THE REGENERATION OF BERGAMO'S MOUNTAINS

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Pupella, Chiara (Università Cattolica del Sacro Cuore di Milano)

Abstract format: Poster

As well evidenced by studies conducted since the 1930s, the depopulation phenomenon of the Lombard mountains - and generally Italian - in favor of the urban context reflected a clear signal of unease in mountain areas. The latter, physically separated from the city, represent both distinct geographical spaces and valuable contexts of our cultural and historical heritage. However, their physical distinction shouldn't result in a conceptual division, but rather in a harmonious continuum where past and present intertwine in a fruitful dialogue.

A direct consequence of depopulation are the so-called "landscapes of abandonment," in which the identity bond between the local community and its home territory is broken, especially by the decrease in agroforestry activities that define both the village economy and the connotative historical physiognomy of the mountain building.

This is where the archaeology of historic buildings comes in: through interdisciplinary methodologies, it offers tools to reinterpret and enhance the historical heritage with the aim to restore its own meaning to that spontaneous and vernacular architecture, seen as the result of centuries of adaptation to the environmental, social and cultural conditions of a given context. Its preservation and enhancement must go beyond mere static conservation to embrace a more dynamic idea of reappropriation and reuse, in which even ruins can become places of vitality, capable of accommodating new functions and meanings in the contemporary context.

Aiming at a participatory archaeology, the research conducted as part of the project "Archeologia dell'edilizia storica in provincia di Bergamo," promoted by Università Cattolica di Milano and Fondazione Lemine di Almenno San Bartolomeo (BG), in synergy with local administrations, is focused on the census and mapping of medieval buildings still preserved, both to reconstruct the urban evolution of settlements and deepen knowledge on those architectures considered minor by focusing on their preservation.

NEW INSIGHT ON OCHRE USE DURING THE BRONZE AGE OF MOLISE REGION: THE REMAINS OF PIANA DI LARINO (CAMPOBASSO, ITALY)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Catelli, Eliana (Independent researcher) - Santone, Maria Chiara (SOPRINTENDENZA ARCHEOLOGIA, BELLE ARTI E PAESAGGIO PER IL MOLISE)

Abstract format: Poster

Although ochre is well-documented in several domestic and funerary contexts for functional purposes and/or in symbolic-ritual activities with a powerful cultural significance, ochre pieces were still missing from the Molise archaeological record. Some ochre traces are cited in literature from Isernia La Pineta site (Cremaschi & perfetto, 1988), one of the key sites in the Italian prehistoric panorama, but no anthropically modified ochre pieces have currently been documented in Molise. Here we present some ochre remains found at the site of Piana di Larino (CB) from Bronze Age layers in association with lithics, pottery, faunal remains and fragments of pisè with traces of impressed reeds proving the existence of hut structures unfortunately not found in situ. These anthropically modified ochre pieces represent the first clear evidence of ochre exploitation in the Prehistory of Molise. The use-wear traces on surfaces and the presence of crayon-like shaped pieces provide an intentional use of this mineral resource during of Bronze Age. This confirms the importance of this raw material for ancient communities and documents ochre exploitation over time. Furthermore, the presence of these findings highlights the importance of ancient pigment analysis focused on materials that are not always readily accessible in open-air settings and even more so in emergency archaeological excavations, as is the case here. For this reason, here we will report the results of an integrated study combining macro use-wear analysis and mineralogical and geochemical characterization in order to establish raw materials and how they were used.

ARCHAEO LAB: UNVEILING ARTEFACT HISTORIES IN DEVELOPMENT-LED ARCHAEOLOGY

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Bye Jensen, Peter (Vejle Museer) - Ravn, Mads (Vejle Museer)

Abstract format: Poster

ArchaeoLab specialises in archaeological analysis within development-led projects, utilising the artefact biography concept to achieve a deep understanding of artefacts and their historical contexts. Our primary analytical techniques include use-wear analysis of stone artefacts and archaeometallurgy, which enrich our comprehension of prehistoric human activities and technological evolution.

Our research is highlighted through two key studies. The first examines use-wear and post-depositional surface modifications on flint tools from Early Neolithic causewayed enclosures in Southern Britain and Southern Scandinavia. This study provides insights into the lifecycle of these tools—from production to disposal—and their functional and societal roles within Neolithic communities, thereby revealing depositional practices and broader cultural implications.

The second study focuses on a late mediaeval-early modern smithy in Stouby, Denmark (AD 1486-1573). It investigates diverse smithing techniques, the coexistence of local and imported iron, and the early use of mineral coal, offering insights into the technological and economic dynamics of the period.

Our methodological framework, centred on the concept of artefact biography, extracts extensive data from each artefact, constructing a comprehensive narrative of its historical journey. This analysis enhances our understanding of the artefacts' utilitarian and cultural significances within their broader historical contexts. Through these detailed artefactual studies, ArchaeoLab contributes significantly to the field of development-led archaeology, demonstrating how artefact life narratives can illuminate the complexities of past human societies across various timelines and geographies.

GENETIC ANALYSIS OF PRE-COLUMBIAN INDIVIDUALS FROM SOUTHEASTERN SOUTH AMERICA: INSIGHTS FOR EVOLUTIONARY HISTORY AND CULTURAL HERITAGE PROTECTION

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Ciervo, Micaela (University of Florence) - Modi, Alessandra (University of Florence) - Lari, Martina (University of Florence) - Caramelli, David (University of Florence) - Marciani, Giulia (University of Bologna) - Higgins, Owen (University of Bologna) - Carbonera, Mirian (Universidade Comunitária da Região de Chapecó) - Loponte, Daniel (Região de Consejo Nacional de Investigaciones Científicas y Técnicas - Instituto Nacional de Antropología y Pensamiento Latinoamericano.) - Benazzi, Stefano (University of Bologna) - Milheira, Rafael (Departamento de Antropologia e Arqueologia e Programa de Pós-graduação em Antropologia da Universidade Federal de Pelotas. Laboratório de Ensino e Pesquisa em Antropologia e Arqueologia (LEPAARQ/UFPel), Pelotas, RS, Brasil)

Abstract format: Poster

The Southeastern region of South America is currently undergoing a significant anthropogenic changes due to the large agro-industrial growth in recent decades. However, this is an extremely important region for studying the evolutionary dynamics and settlement of pre-Columbian societies. As a consequence, several projects to preserve the cultural and archaeological Heritage of the area are carried on. In this contest, ASSA program (Archaeology of Southeastern South America) aims to reconstruct the history and evolution of pre-colonial societies and to introduce different strategies for the protection of the archaeological and cultural heritage. In this perspective, paleogenetic studies provide an important contribute for reconstructing the genetic history of the indigenous peoples, and play a significant role to promote their cultural heritage. Here we present a paleogenetic study carried out on 39 individuals excavated in 10 different archaeological site from Argentina and Brazil, dated from 1880 BP to 350 BP. After a preliminary genetic analysis of the remains, we were able to assess the preservation of genetic material in an unfavorable environment, such as the sub-tropical region. Based on these results, 25 individuals were enriched for human mitochondrial DNA. Despite a certain degree of modern human DNA contamination in some individuals, we were able to reconstruct the complete mitochondrial genome from the majority of the individuals. All sequences fall within the variability of the A, B, C, and D haplogroups that are mitochondrial lineages typical of Native American populations. Phylogenetic trees were constructed in order to confirm the phylogenetic position of the newly reported sequences in the frame of modern and ancient mitochondrial variability of South America.

ECOLOGIES OF VIOLENCE: HERITAGE AND CONFLICT IN MORE-THAN-HUMAN-WORLDS

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Breithoff, Esther (Birkbeck, University of London) - Leonard, Matthew (Birkbeck, University of London) - Renshaw, Layla (Kingston University)

Abstract format: Poster

This poster presents the international multidisciplinary research project Ecologies of Violence: Heritage and Conflict in More-Than-Human Worlds, which uses archaeological, historical and ethnographic research as well as vitalist/'more-than-human' frameworks to critically investigate how landscapes remember past violence against both culture and nature, and how these social, material and biological scars persist in the contemporary world in the form of toxic landscapes, alongside varied attempts to regenerate them. It does so by exploring three case studies: 1) the continuing impacts of the US bombing of Laos during the 'Secret War' (1964-73), and ongoing consequences of UXO clearing activities on natural and cultural heritage in Laos to understand how both nature and culture have been and continue to be shaped by both exploded and unexploded ordnance; 2) the enduring consequences of infrastructural violence undertaken during Paraguay's dictatorship (1954-89) on natural and cultural heritage in the country via the

widespread clearance for agriculture, and the associated destruction of forests, Indigenous territory, flora and fauna; 3) the ongoing challenges of the conservation and management of First World War military heritage in France's 'Zone Rouge' – an area deemed too geographically and ecologically annihilated and contaminated for human occupation – and the repercussions of this heritage for contemporary agricultural landscapes in the region. In collaboration with a range of local and international organisations and NGOs, Ecologies of Violence uses a holistic and comparative approach to explore the lasting impacts of twentieth century violence on both natural and cultural heritage across three different continents, and how this in turn affects local communities. In doing so, the project investigates how these past/local impacts relate to issues of present/planetary concern, including the climate emergency, environmental pollution, and ongoing issues of global social and economic inequality.

735 UNVEILING THE MYSTERIES OF AN EGYPTIAN FELINE MUMMY THROUGH CT EXAMINATION

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Amendola, Michela (Institute of Applied Physics) - Ikram, Salima (Department of Sociology, Egyptology and Anthropology - The American University in Cairo, Egypt) - Lippi, Donatella (Department of Experimental and Clinical Medicine - University of Florence, Firenze, Italy) - Argenti, Fabrizio (Department of Information Engineering - University of Florence, Firenze, Italy) - Carpi, Roberto (Department of Radiology, Azienda USL Toscana Centro, Firenze, Italy) - Cucci, Costanza (Institute of Applied Physics) - Fattorini, Valter (Museo Etnologico Missionario Francese di Fiesole, Firenze, Italy) - Prates, Carlos (IMI / Affidea, Lisbon, Portugal) - Zini, Chiara (Department of Radiology, Azienda USL Toscana Centro, Firenze, Italy) - Barucci, Andrea (Institute of Applied Physics)

Abstract format: Poster

Much of the fascination surrounding Egyptian civilization is linked to the practice of mummification. Indeed, to ensure the preservation of the body, the ancient Egyptians mummified both human and animal subjects. Despite their integral role in Egyptian material culture and history, mummified animal remains have often been overshadowed by their human counterparts in academic investigation. However, recent advancements in non-invasive imaging techniques, notably computed tomography (CT), have revolutionized the study of these enigmatic artifacts. This study centers on the analysis of a cat mummy housed at the Museo Etnologico Missionario di San Francesco di Fiesole in Florence, Italy—an exemplar of the broader significance of Egyptian mummification practices. Through CT examination, the once-obscured contents of the mummified bundle are revealed, showcasing the complete skeletal structure of the feline subject. Notably, the CT scans unveil evidence of fractures, particularly in the cervical region, hinting at possible causes of death. Furthermore, the anthropological analysis has allowed to identify the age-at-death of the cat, providing further information about the story of the mummy. This research not only advances our understanding of mummification practices but also underscores the crucial role of CT imaging in elucidating the mysteries of ancient Egyptian mummies. By emphasizing the importance of CT scans in humanistic studies and museum contexts, this study contributes to the ongoing exploration of Egypt's rich cultural heritage.

738 CONCEPTUALISING TIME AND SPACE IN THE MORPHOLOGY OF HISTORIC URBAN CENTERS: THE CASE STUDY OF NW HISPANIA ROMAN WALLS

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Machado, Diego (Unidade de Arqueologia da Universidade do Minho; Laboratório de Paisagens, Património e Território; Laboratório Associado para a Investigação e Inovação em Património, Artes, Sustentabilidade e Território; Fundação para a Ciência e Tecnologia) - Magalhães, Alexandre (Universidade do Minho) - Folgueira Ríos, Francisco (Universidade de Santiago de Compostela) - Fernandes, João (Universidade do Minho) - Back, João Vinícius (Universidade do Minho; ERGANE Arqueologia Digital/Universidade Federal do Rio Grande do Sul; Universidade de Évora) - Moura, Ruben (Universidade do Minho) - Dias, Bruno (Universidade do Minho)

Abstract format: Poster

Archaeological activity in urban centres, especially from the second half of the 20th century onwards with the expansion of construction activity in the cities affected during the Second World War, called for greater reflection on the part of various scientific areas, such as Archaeology, Urban Planning, History, Geography and Architecture, in order to develop a theoretical and conceptual approach that would provide useful tools for analysing the historical construction of urban centres. At that time, the concept of palimpsest was used as a metaphor to express the preservation and permanence of the past under the guise of the present, as well as the reading and explanation of the process of formation and historical development of the urban landscape inscribed in the subsoil of cities through successive layers that document the passage of time.

Although undeniably positive for the theoretical and instrumental framework of archaeological action in urban environments, the concept of palimpsest has its limits. While it can conceptually explain the phenomena of overlapping layers and structures, such as the fills that fill in an abandoned building, it cannot provide answers to the processes

in which the past and the present are arranged differently. An alternative to the palimpsest is brecciation, proposed by Nadia Bartolini, who uses the process of consolidation of breccia as a metaphor capable of explaining situations in which transformations in urban landscapes occur through the juxtaposition of their built elements.

In this poster we propose analysing the historical evolution of the Roman walls of the cities of Bracara Augusta and Lucus Augusti, in north-west Hispania, considering the concepts of palimpsest and brecciation. We believe that using this conceptual framework makes it possible to better analyse the transformations of these structures and provides more effective tools for their historical and urban planning framework.

739 DIGGING DEEPER: INVESTIGATING MICROBIAL COMMUNITIES AND ANTIBIOTIC RESISTANCE IN THE ENVIRONMENT OF AN 18TH-CENTURY SLAUGHTERHOUSE, TURKU, FINLAND

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Maunula, Minna (University of Helsinki) - Mäkinen, Taru-Marja (University of Helsinki) - Uotila, Kari (Muuritutkimus Oy.) - Hultman, Jenni (Natural Resources Institute Finland) - Bogdanov, Kirill (University of Otago) - Virta, Marko (University of Helsinki) - Bläuer, Auli (University of Turku) - Auvinen, Petri (University of Helsinki) - Muurinen, Johanna (University of Helsinki)

Abstract format: Poster

Microbes are considered the first living organisms on Earth, slowly evolving and adapting to different environments. However, a much more recent inhabitant of the planet, Homo sapiens, has influenced their evolution. This influence has caused and still causes many environmental changes, the most significant of which has been the introduction of agriculture. The role of anthropogenic activities in the evolution of microbial communities and antibiotic resistance is unclear. Antibiotic resistance is also known to be ancient, as microbes have always produced antibiotics. However, the role of antibiotic-producing bacteria in the development of resistance is unknown. Manure and garbage piles are habitats where both antibiotic producers and bacterial pathogens thrive, providing an excellent opportunity to study the role of producers in the emergence of antibiotic resistance.

This study aims to shed light on the evolution of antibiotic resistance through the history of agriculture. Here, we investigate microbial communities, antimicrobial resistance genes (ARGs), and potential antibiotic-producing bacteria (APB) from the environment of an 18th-century slaughterhouse in Turku, Finland.

A total of 12 samples were collected from archaeological excavations, from which total environmental DNA was isolated and shotgun sequenced to determine the microbial communities and antibiotic resistance profiles. In addition, APB, which can remain as dormant spores for centuries, were cultivated from the samples. A total of 29 APB were isolated for whole genome sequencing, which will allow us to analyze the genomes of these isolates and identify the ARGs the bacteria harbor. By examining the genetic environment of the ARGs in the isolates, we can determine whether these genes are mobile and thus linked to the evolution of antibiotic resistance. In this poster, we present our current and developing results, which will elaborate our understanding of the impact of agriculture on the emergence of antibiotic resistance.

740 DECIPHERING HISTORICAL LANDSCAPES: A MULTI METHODOLOGICAL ARCHAEOGEOGRAPHICAL INVESTIGATION IN CASTRONOVO DI SICILIA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Carver, Martin (University of York) - Orecchioni, Paola (University of Rome Tor Vergata) - Ciccone, Gabriele (University of Rome Tor Vergata)

Abstract format: Poster

The ERC Sicily in Transition project undertook an archaeogeographical study of the area pertaining to the current municipality of Castronovo di Sicilia in central Sicily, aiming for a comprehensive landscape analysis in order to identify possible dynamics of transformation of the historical landscape attributable to different political regimes, 3rd-13th century CE. The investigation employed diverse methodologies, including statistical road network analysis (Least Cost Path Analysis), fortification site visibility studies (Viewshed Analysis), parcel system examinations through historical cartography and aerial imagery, and the innovative use of drones with advanced sensors for the identification of new archaeological elements through multispectral, thermal, and microtopographic analysis. These approaches not only deepened our understanding of Castronovo's pivotal role in Sicily's road network, highlighting distinct differences between Roman, Byzantine, Islamic and Norman periods but also provided a more detailed picture of the topography of the Byzantine fortification of Kassar, a key feature of the landscape of Castronovo di Sicilia. This comprehensive study significantly advances our study of the historical, political, and geographical factors that have defined this region, a core aspect of the ERC project.

741 PUBLIC ARCHAEOLOGY AT THE PILE-DWELLING SITE OF SAN GIORGIO AND SANTA MARIA (REVINE-LAGO, TARZO, TREVISO, ITALY)

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: MODOLO, MARTA (University of Ferrara) - FATTOREL, LORENZO (Freelance Architect) - ZAMBON, EMMA (University of Padua) - GHELLI, ALESSANDRO (University of Padua) - SPERI, RICCARDO (University of Padua) - TONELLI, LUDOVICO (University of Padua) - ORTONE, NICOLE (University of Padua) - CONTE, GIULIA (Freelance archaeologist)

Abstract format: Poster

The lakes of San Giorgio and Santa Maria are two basins located in a glacial valley at the Veneto Pre-Alps' foothills in the Revine-Lago and Tarzo municipalities (Treviso, Italy). Archaeological pre-existence dates to 1923, when a Sauberbrunn bronze sword was found while excavating an artificial canal, followed by other artefacts. In 1987, the first pile-dwelling remains were discovered, and during the 1990s, several excavation campaigns documented a peri-lacustrine settlement dating to the late Neolithic-Eneolithic. Since 2019, as part of the reLacus project, the University of Ferrara has undertaken a new phase of multidisciplinary research in collaboration with the University of Padova. A series of non-invasive geophysical surveys, underwater prospections, geoarchaeological cores, and archaeological excavations were carried out to identify new settlement areas and reconstruct formation processes and paleoenvironment.

Beyond scientific research, dissemination and understanding of archaeological heritage among non-professionals represents one of the objectives of our work. Consciousness toward scientific research, the protection of cultural heritage, and the opportunities offered by culture for territorial sustenance allow the creation of awareness and various collaboration possibilities. We regularly organise workshops and guided tours to the excavation area for the regional territory's schools and groups from the Parco Archeologico Didattico del Livelet. One of the latest activities, in partnership with a surroundings association, allowed even the most vulnerable people to learn about this important archaeological context through a specially dedicated guided tour. Constant contact with cultural media, whether regional, national, or international, further contributes to disseminating research status, progress, and the findings' singularity. Furthermore, these topics and the planned initiatives are regularly made known through the project's website and Facebook and Instagram pages.

744 LIVING CONDITIONS PRIOR TO ROMAN CONQUEST: BIOARCHAEOLOGICAL EVIDENCE FROM THE CASTEL DI DECIMA NECROPOLIS

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Guidi, Eveline (Department of Antiquities, Sapienza University of Rome, Italy) - Cecconi, Viola (Independent researcher, Museo delle Civiltà, Italian Ministry of Culture, Rome, Italy) - Coppa, Alfredo (Department of Environmental Biology, Sapienza University of Rome, Italy) - Fiore, Ivana (Department of Environmental Biology, Sapienza University of Rome, Italy) - Rossetti, Daniele (Museo delle Civiltà, Italian Ministry of Culture, Rome, Italy) - Candilio, Francesca (Museo delle Civiltà, Italian Ministry of Culture, Rome, Italy)

Abstract format: Poster

The necropolis of Castel di Decima (Rome, Italy) was identified in 1953 along the route of the Via Pontina (SS 148) in a suburb that now falls within the municipality of Rome. The settlement enjoyed a strategic position along the route that connected Rome and Lavinium, a location that suggested its identification with the ancient city of Politorium. This hypothesis was further supported by studies of the grave goods of the necropolis, which denote a period of use between 750 and 600 BCE, the latter date that historically corresponds to the one attributed to the conquest of Politorium by Rome under Anco Marzio. The particular significance of the site lies in the articulation of the funerary ritual and the richness of its grave goods, which include imports as well as symbols of social status, such as war chariots. The distribution of the burials and the nature of the grave goods help identify the eminent individuals in the community and the possible familial organization of the funerary space.

To initiate the characterization of the population burying their deceased at the necropolis of Castel di Decima, the present study analyzes the osteological remains preserved at the Museo delle Civiltà in Rome. Despite the compromised conditions by which individuals are, in most cases, represented exclusively by dental crown fragments, data were collected for demographic parameters as well as dental morphology, oral health, early stress indicators, and non-masticatory use, through both macroscopic and microscopic analyses.

745 MARINE MAMMALS AND BODY ORNAMENTS IN THE UPPER PALAEOLITHIC: RARE EXAMPLE OF A SEAL TOOTH PENDANT FROM KENT'S CAVERN, U.K

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Crété, Lucile (Natural History Museum London) - Bello, Silvia (Natural History Museum, London) - Parfitt, Simon (Natural History Museum, London; Institute of Archaeology, University College London)

Abstract format: Poster

While personal ornaments, such as beads and pendants, played a crucial role in Upper Palaeolithic societies to represent social status, cultural identity, and individual expression, Palaeolithic marine mammal tooth pendants are exceptionally rare objects. This study describes an extensively worked, polished, and perforated grey seal tooth (*Halichoerus grypus*) discovered in 1867 at Kent's Cavern (Devon, UK). This is a unique find within the British Upper Palaeolithic archaeological record, although it bears similarities with a few other artefacts found in Magdalenian contexts in France. Our analysis of the Kent's Cavern seal tooth pendant integrates zooarchaeological methods with 3D surface imaging and micro-CT scanning techniques to shed light on the manufacturing process, use, and post-depositional history of this artefact. It shows the specimen displays extensive bilateral thinning of the root and a perforation made with a hand-held flint boring-tool, and bears wear patterns suggesting that the tooth was worn as a pendant suspended from a cord and used as a necklace for an extended period before its deposition at the cave's entrance. While today Kent's Cavern overlooks the English Channel, seal colonies may have been located up to 400 km to the southwest during the glacially-lowered sea-levels of the Last Cold Stage. The presence of 'exotic' marine mammal artefacts such as the Kent's Cavern seal pendant and similar occurrences of marine fauna at Magdalenian inland sites raises questions about their acquisition and their significance for prehistoric populations. While these could have been exchanged between groups through networks, they could have also been acquired from coastal regions and transported to occupation sites through long-distance seasonal migrations.

749 THE CITY OF OSOR IN THE MATRIX OF THE ADRIATIC SEA ROUTES

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Fera, Martin (VIAS - Vienna Institute for Archaeological Science, University of Vienna) - Doneus, Nives (VIAS - Vienna Institute for Archaeological Science, University of Vienna) - Blečić Kavur, Martina (University of Primorska, Faculty of Humanities) - Kavur, Boris (University of Primorska, Faculty of Humanities)

Abstract format: Poster

The project "Osor beyond the myth" focuses on the Iron and Roman Age town of Osor at the meeting-point of northern Adriatic islands Cres and Lošinj, Croatia. The role as a maritime node since the Iron Age emerges from spectacular finds, as these include a whole range of goods originating from the Pannonian Plain to Greece. 100 years of tradition also produced numerous interpretations, although hardly any details are known about the coastal setting and the navigability around the city. Therefore, the project addresses the question of whether the maritime role of the city, as indicated by trade goods, can be supported by its landscape context.

The project will develop a combined approach that can do justice to the cultural, landscape and marine aspects of the site across the border between the land and the sea. Provenance studies are the starting point for analyses of the material evidence of the trade and related "visibility" of Osor on maritime routes. The backbone of the landscape-based approach is the use of airborne laser scanning, airborne laser bathymetry, terrestrial and underwater geophysical prospection and geoarchaeological research for data acquisition behind vegetation, sediments and seawater. New results will provide detailed evidence of the coastal and marine conditions that would have affected the navigation and allow for a fact-based discussion of the extent to which human intervention in the landscape was needed to support Osor's role in the region.

Finally, provenance analyses of traded goods will place the city of Osor in the matrix of regional and transregional maritime networks.

751 GRAVES? RITUAL USE OF BONES AND BONES AS MATERIAL CULTURE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Andreasson, Kajsa (Arkeologerna, statens historiska museer) - Claesson, Pia (Arkeologerna, Statens historiska museer) - Lennblad, Astrid (Lödöse museum) - Paring, Maria (Arkeologerna, Statens historiska museer)

Abstract format: Poster

Graves and their content have been the focal point of research throughout the history of archaeology. In recent years, the fragmented manner of the archaeological burial material has formed part of grave archaeology, often under the name *pars pro toto*, as in "the part (may apply) to the whole".

Based on recently excavated bronze and iron age burial monuments in western Sweden, it is indisputable that the bones found seldom represent a human skeleton in its entirety. What we see is a mess of cremation material and finds that seem to be strewn haphazardly, the material apparently incomplete. Everything seems to be in pieces: the bones of individuals (sometimes crushed), fragments of ceramics, and other artefacts, broken and destroyed. This seemingly messy and fragmented manner of the material raises the question: when cremated human bones are used in different archaeological contexts, how do we define graves? Is it perhaps time to further explore our ingrained concept of a grave, a concept largely shaped by our modern perceptions and traditions around death. If what we are excavating are not graves, then where are they?

This poster will present a comparative case study of excavations in western Sweden where the presence of cremated bones was interpreted as a part of the material culture. The intent is to shed light on this phenomenon, and therefore bones as material culture and the definition of the term "grave".

753 **ARCHAOMETRIC ANALYSIS OF ROMAN MOSAIC AND FRESCO FRAGMENTS FROM AQUILEIA: INSIGHTS INTO SUBURBAN SETTLEMENTS**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Traviglia, Arianna (Istituto Italiano di Tecnologia) - Stucchi, Neva (Istituto Italiano di Tecnologia) - Lamuraglia, Raffaella (Istituto Italiano di Tecnologia) - Franceschin, Giulia (Istituto Italiano di Tecnologia)

Abstract format: Poster

This poster presents the results of an archaeometric study conducted on mosaics and fresco fragments unearthed during archaeological fieldwalking surveys in the suburban region of Aquileia, a prominent Roman city situated in northeastern Italy. While mindful of the challenges associated with dating materials collected from surface prospection, characterization and careful examination of these fragments offer valuable insights into the typology of the site where they were discovered, along with providing broad chronological information.

Archaeometric investigation has yielded valuable insights into the composition of both mosaics and frescoes, shedding light on the raw materials utilized and their probable origins. The selection of specific marble types for mosaic composition or the use of particular pigments for fresco production [e.g., Cinnabar] can, in turn, offer valuable clues regarding the wealth of the commissioner and the level of craftsmanship they could afford. Furthermore, analyzing the layering of materials can contribute to determining the potential dating of the material, as exemplified by the characterization of the stratification of frescoes.

Information generated from the archaeometric analysis of mosaic and fresco fragments is then combined also with data and dating from other diagnostic materials such as glass, coins, and specific types of ceramics recovered at the same location to attempt to extract correlations from the co-occurrence of these materials within a single context as part of an archaeological assemblage. The outcome is a nuanced mapping of the settlement within the suburban areas of the Roman city.

754 **BUTCHERY PRACTICES IN THE ROMAN WORLD: THE CASE OF CURED BEEF SHOULDER**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Platts, Tracy (University of Sheffield)

Abstract format: Poster

Specific butchery marks on cattle scapulae have long been documented in Roman period faunal assemblages from the north-western provinces (e.g. Schmid, 1972; Lauwerier, 1988; Dobney, et al., 1996). Marks include perforated or 'hook-marked' scapula blades, chopped and trimmed glenoid cavities and spina, and shave marks on the scapula borders, and are widely described as evidence of cured beef shoulder. Interpretations differ in some regions, but the evidence is uniform in appearance and technique and suggestive of a systematic practice. The evidence is widespread in the north-western Empire but is largely unreported in other areas of the central and southern provinces, including Italy itself.

Prior to this research, the geographical and temporal origins and dissemination of this practice had not been fully investigated. This has been addressed through targeted recording of faunal assemblages from different site types, areas, and time periods from central and north-western Europe. Raw data provided by other zooarchaeological researchers and evidence from literature were also included in analyses to supplement the dataset.

Evidence suggests that cured beef shoulder did not originate in the Roman period but was already a local culinary tradition in areas of the north-western Empire, including present-day Netherlands and the Alpine region, where it is present in pre-Roman faunal material and in a variety of Roman period site types including one north of the Danubian limes. Evidence suggests the practice was adopted and disseminated by the Roman military, possibly via auxiliary and legionary soldiers from these areas. Although previously believed to be absent, some evidence of the practice is present in Roman sites from Iberia and central Italy.

The research has clarified the geography of this practice beyond previous knowledge and lay the foundations for further study of the cultural relationship between the expanding Roman Empire and indigenous traditions.

755 **FAR FROM ANY ROAD: INTERPRETING THE TRANSRIVERINE PERIPHERY OF STRADONICE OPPIDUM IN THE CONTEXT OF LA TÈNE PERIOD SETTLEMENT**

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Dycka, Michal (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic) - Venclova, Natalie (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic) - Dreslerova, Dagmar (AU - Institute of Archaeology of the Academy of Sciences of the Czech Republic)

Abstract format: Poster

The Archaeological Information System of the Czech Republic (AIS CR) is a tool designed to integrate digital resources on Czech archaeology. With more than 70,000 individual records of archaeological fieldwork, its content is an excellent example of big data. This poster aims to demonstrate, through a case study, how to evaluate such a dataset spatially. The focus is on the site of Nižbor, situated across from the Stradonice oppidum on the left bank of the Berounka River in the Křivoklátsko Protected Landscape Area, Central Bohemian Region, Czech Republic. A brief archaeological investigation documented a sunken hut along with the skeletal remains of an older man within its fill – an obvious example of excarnation. Both radiocarbon dating and relative dating of the pottery assemblage support a 2nd-century BC dating of the site, contemporaneous with the nearby oppidum. The central question stands: why was there a peripheral settlement situated in this marginal spot? Is it a testimony of an unknown fording place? A solitary house or part of an unknown larger settlement? The case study focuses on evaluating the spatial distribution of La Tène period settlements within a 50 km radius around Nižbor via the Cumulative Focal Mobility Network (CFMN), using the Digital Terrain Model of the Czech Republic of the 5th generation (DMR 5G) and the Model of Potential Floodplains in the Czech Republic, together with data from the Archaeological Information System of the Czech Republic (AIS CR). As a result, we present a regional settlement map contextualized within natural mobility corridors, thereby enhancing our understanding of La Tène period settlement distribution and its broader implications for landscape archaeology.

756 **MARBLE HERM FROM THE COLLECTION OF CARDINAL DA CARPI - THE SEARCH FOR THE HEAD OF THE GODDESS HECATE**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Kucova, Stanislava (National Heritage Institute, Czech Republic; Masaryk University, Czech Republic) - Radostová, Šárka (National Heritage Institute, Czech Republic)

Abstract format: Poster

The marble herm of the goddess Hecate is an exceptional work of art from the beginning of the 2nd century AD. However, the statue is currently headless, and its head has been missing since the end of the 18th century. This paper provides the iconographic analysis and a description of the statue's antiquarian history and emphasizes the issues related to archival work and the effort in finding the missing part. The marble herm originally belonged to the collection of Cardinal Pio da Carpi and was formerly considered to be Venus with the Graces or the goddess Themis. Aldrovandi in 1550 described the herm as un termine with a female head and dancing figures. The identification of the work with the present torso was made possible by a drawing in the writings of the theologian Pighio (1568). From the estate of Cardinal da Carpi, the statue came into the possession of Cardinal Perrenot de Granvelle in Besancon, and then, at the request of Emperor Rudolf II, into his collection in Prague, this time with the head. After its stay in the Rudolphine collection, the statue was in the possession of the Czernin family and today is located in the Czech Republic at the state castle Jindřichův Hradec. Authors in the 20th century already classified the statue as a hecataion. An attempt was made to supplement the hecataion with a head matching the style of the Moravian Museum, formerly from the collections of the castle Lysice, but it was not successful. The poster addresses the question of when the head was damaged and lost and whether it would be possible to trace it and exemplifies the possibilities of a virtual assemblage of this ancient sculpture.

757 **MURANO COMMUNITY IN THE LIGHT OF EXCAVATION OF THE 17TH CENTURY CEMETERY NEAR BASILICA DEI SANTI MARIA E DONATO**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Zukowski, Robert (Institute of Archaeology and Ethnology Polish Academy of Sciences)

Abstract format: Poster

Basilica dei Santi Maria e Donato is a jewel of Venetian Romanesque architecture of the Ravenna type. Most likely, as a church, it was erected in the 7th century, but written sources date it only at the very end of the 10th century.

The oldest record confirming the existence of the church is a document signed in February of the year 999. The name „ecclesia baptismalis” appearing in the written sources indicates that already in the 11th century the church was accompanied by a baptistery that has not been preserved.

An indirect and additional confirmation of the hypothesis about the baptistery on the west side of the church is the current shape of the square in front of the façade of the Basilica in Campo San Donato.

It is very surprising that the presence of a building of this type in front of the basilica at the end of the 15th century is not confirmed by a detailed plan of Venice from around 1500 by Jacopo De'Barbari, but the last information about former baptistery relates to its final demolition in 1719.

The archaeological prospection revealed however that in the 17th century the square in front of basilica, where the remains of baptistery were still visible, was mainly used as a church cemetery. During the excavation 46 skeletal burials have been discovered, several of them in a secondary deposit.

Finds such as glass beads, personal adornment items in form of crosses and a medallion with inscription GIESU E MARIA VI DONO IL CUORE E LANIMA MIA give us an insight into the life of the community inhabiting Murano Island in the beginning of Modern Era in Italy.

759 **TRANSDISCIPLINARY STUDIES ON HUMAN PAST: THE EXAMPLE OF A NEW PROJECT ESTONIAN ROOTS**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Tambets, Kristiina (University of Tartu, Faculty of Science and Technology, Institute of Genomics) - Kushniarevich, Alena (University of Tartu, Faculty of Science and Technology, Institute of Genomics) - Klumpp, Gerson (University of Tartu, Faculty of Arts and Humanities, Institute of Estonian and General Linguistics) - Norvik, Miina (University of Tartu, Faculty of Arts and Humanities, Institute of Estonian and General Linguistics) - Saarma, Urmas (University of Tartu, Faculty of Science and Technology, Institute of Ecology and Earth Sciences) - Sarv, Mari (Estonian Literary Museum) - Tõrv, Mari (University of Tartu, Faculty of Arts and Humanities, Institute of History and Archaeology; University of Tartu, Faculty of Science and Technology, Institute of Chemistry) - Valk, Heiki (University of Tartu, Faculty of Arts and Humanities, Institute of History and Archaeology) - Veski, Siim (Tallinn University of Technology, School of Science, Department of Geology)

Abstract format: Poster

Starting in 2024, the Centre of Excellence (CoE) “Estonian Roots: Centre of Excellence for Transdisciplinary Studies on Ethnogenesis and Cultural Diversity” (Acronym “Estonian Roots”) has been established in Estonia. The synergy of Humanities and Natural Sciences allows the new CoE (2024–2030) to shed light on the formation of cultural and genetic diversity in Estonia and neighbouring areas in a vast transdisciplinary framework of genetics, archaeology, archaeozoology, archaeochemistry, linguistics, folkloristics and palaeoecology, unprecedented in its scope and capacity in the Eastern Baltics. CoE focuses on the evolution of peoples and cultures and their interactions with the environment on the eastern coast of the Baltic Sea since the first arrival of people after the Last Glacial Maximum. The 11,000 years of the settlement history will be analyzed in a novel areal and ecological context, allowing us to map the impact of abiotic (climate) and biotic (flora, fauna) factors on human cultures and populations, and making use of the existing and newly generated local dense datasets from different scientific sources. CoE facilitates synergistic approaches in archaeogenetics, archaeology, palaeoecology, and culture and language studies, enabling the synthesis of data on the region's populations and environment in the European context. In the poster, we will introduce our transdisciplinary framework of studying the human past to illuminate the prehistory of people in the current territory of Estonia and illustrate it with examples from some of the case studies. Further, we will discuss the challenges of bringing together the researchers, their data, methodologies, and perspectives on different scientific fields.

761 **BACK TO THE FUTURE. NEW DATA ON WESTERN-LUCANIA PREHISTORY FROM THE ARCHIVES OF R. ROSS HOLLOWAY'S AT THE BROWN UNIVERSITY**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Truffi, Michele (Dipartimento di Studi Umanistici - Università degli Studi Roma Tre; Associazione ORTA) - Nomi, Federico (Scuola Superiore Meridionale; Associazione ORTA)

Abstract format: Poster

The rethinking of old excavations and finds considering new analytical possibilities offered by the growing interdisciplinarity and technological advancements in archaeological research is a crucial theme of the third millennium.

Recently, within the framework of our research in Western Lucania, we succeeded in a rescue operation for the archaeological finds from the 1960s excavations conducted by Brown University in the Buccino territory (Salerno province, Italy). This research had highlighted significant sites for understanding the prehistory of the area. The Brown team, led by Prof. R. Ross Holloway, employed a multidisciplinary approach that was entirely innovative for its time. In addition to physical anthropology, archaeozoology, archaeometallurgy, and trace analysis on lithics, statistical-mathematical methods based on the digitization of findings were employed.

Here we present a topographic reconstruction of the archaeological evidence based on archival data within the main archaeological sites investigated by Brown: Sant'Antonio (Eneolithic) and Tufariello di Buccino (Middle Bronze Age).

The study aims at integrating the data of the artifacts recovered from the warehouses of the Soprintendenza and the archives of Holloway's excavation documents, now preserved at the Joukowsky Institute for Archaeology and the Ancient World.

The research will use archival data to reassign the artifacts and features to their exact location and to create a GIS of the archaeological sites under investigation. We will also re-examine the chronotypology of the artifacts to be inserted into the geodatabase, considering the discoveries made in the last 50 years.

This analysis serves as a basis for future research developments focused on the integration and revision of multidisciplinary data using updated methodologies, as well as the resumption of field investigations.

763 **ARE 70 YEARS TOO LATE? A FAIR ARTICULATION OF LEGACY DATA, ONLINE VISUALISATION TOOLS, AND REPOSITORIES: THE HARISTOY-OXOCELHAYA 1956 EXCAVATION**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Plutniak, Sébastien (Laboratoire CITERES-LAT; CNRS)

Abstract format: Poster

In 1955, Spanish archaeologist José Miguel de Barandiarán, exiled in France, and French archaeologists Pierre Boucher and Georges Laplace excavated the Haristoy-Oxocelhaya cave. One year before, G. Laplace discovered rock art in this part of the famous Isturitz cave complex located in the Basque Country.

This excavation featured one of the early applications of systematic 3D coordinating of archaeological remains, a method which was first published in 1954 by Georges Laplace and Louis Méroc. The Haristoy case study raises interesting issues both from a history of science and a digital archaeology perspective.

1) Although this dataset features outstanding accuracy, it has never been analysed at that time and in subsequent decades due to the lack of computing technologies to process it.

2) Furthermore, this dataset has never been published and has been kept in archived field notebooks so far.

However, the recent availability of new digital technologies and data infrastructures made a significant change in this situation. This example demonstrates a decentralised approach to data publication and editorialisation in archaeology, emphasising the use of open-source, FAIR, and non-profit resources, namely: open data repositories for data storage, semantic web technologies for data exposition, academic documentation systems for dissemination, and the “archoViz” application – an open-source software for the visualisation, exploration, and web communication of archaeological spatial data. This approach – applied to the Haristoy case – illustrates the widening of possible venues and perspectives articulating the reuse of legacy data and modern computing technologies.

764 **ARCHAEOLOGICAL SUBSOIL FEATURE DETECTION WITH HYPERSPECTRAL SATELLITE IMAGES: THE PERSEO PROJECT**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Poggi, Giulio (Center for Cultural Heritage Technology, Istituto Italiano di Tecnologia, Venezia, Italy) - Sech, Gregory (Center for Cultural Heritage Technology, Istituto Italiano di Tecnologia, Venezia, Italy) - Ljubenovic, Marina (Center for Cultural Heritage Technology, Istituto Italiano di Tecnologia, Venezia, Italy) - Fiorucci, Marco (Center for Cultural Heritage Technology, Istituto Italiano di Tecnologia, Venezia, Italy) - Traviglia, Arianna (Center for Cultural Heritage Technology, Istituto Italiano di Tecnologia, Venezia, Italy)

Abstract format: Poster

Hyperspectral images have been successfully used in archaeological prospection to enhance the visibility of surface traces and anomalies related to subsoil archaeological deposits. While most archaeological applications have predominantly utilised data from airborne sensors, satellite hyperspectral data represent a relatively novel frontier due to their lower spatial resolution, which compromises the detection of small-scale features prevalent in the archaeological and geomorphological domains. In this framework, the PERSEO project, conducted in partnership with the Agenzia Spaziale Italiana (Italian Space Agency), aims to develop and apply pansharpening techniques to enhance the spatial resolution of hyperspectral products. Particularly, the project focuses on the use of the PRISMA satellite, which provides 240 bands in the VNIR-SWIR range at a 30m Ground Sampling Distance (GSD), coupled with a panchromatic acquisition at 5m GSD. This contribution offers the first comparative evaluation of pansharpening techniques applied to PRISMA hyperspectral data in the context of geo-archaeological prospection, using multiple case studies from the Mediterranean region as benchmark tests.

Moving from top-performing baseline techniques and the development of novel approaches based on the HySure method, results were evaluated to assess the actual improvement in the detection rate of subsoil features introduced using a wide spectrum of information and a higher spatial resolution. The application to several case studies and different archaeological object classes offered the possibility to explore the implications of the use of these data in archaeological practice, evaluating their contribution compared to the use of alternative sensors, such as multispectral images. The results underscore the effectiveness of pansharpening, establishing satellite hyperspectral data as a promising tool for advancing geo-archaeological prospection.

765 **THE MEDIEVAL COMMUNITY OF SANTA SEVERA (ROME, 7TH-15TH CENTURY CE): PRELIMINARY PALAEOGENOMIC ANALYSIS**

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Orefice, Giulia (PhD Program in Evolutionary Biology and Ecology, Department of Biology University of Rome Tor Vergata, Rome, Italy; Centre of Molecular Anthropology for Ancient DNA Studies, Department of Biology, University of Rome Tor Vergata, Rome, Italy) - Enei, Flavio (Museo Civico di Santa Marinella "Museo del Mare e della Navigazione Antica", Castello di Santa Severa, Rome, Italy) - Ottoni, Claudio (Centre of Molecular Anthropology for Ancient DNA Studies, Department of Biology, University of Rome Tor Vergata, Rome, Italy) - Martinez-Labarga, Cristina (Centre of Molecular Anthropology for Ancient DNA Studies, Department of Biology, University of Rome Tor Vergata, Rome, Italy)

Abstract format: Poster

This study aims to reconstruct the ancestry and kinship of Santa Severa's Medieval community.

The Castle of Santa Severa was built during the Medieval period overlying the Etruscan settlement of Pyrgi, which served as a pivotal hub that facilitated Mediterranean-wide trade for the Etruscan city of Caere. A Roman maritime colony was later established in the same location and was continuously occupied until the Middle Ages. Covering the ruins of Roman buildings, a large cemetery was discovered that was in use from the 7th to the 15th centuries CE. Excavation of the site revealed two cemetery areas: "Casa del Nostromo" and "Piazza della Rocca" dating to the Early and Late Medieval period, respectively. From a skeletal collection of 455 individuals, approximately 100 were selected based on archaeological and anthropological information. The archaeological survey also highlighted several sarcophagi containing multiple burials, suggesting potential kinship relationships among the individuals.

The primary objective of this project is to perform molecular analyses on skeletal remains to evaluate the genetic composition of the Medieval population from Santa Severa, and to assess the relationships between the two cemetery areas. Additionally, the study aims to evaluate potential family ties among individuals from multiple burials.

Preliminary sequencing at shallow depths have been conducted to investigate the degree of DNA preservation in the skeletal remains. The raw sequencing data have been processed using bioinformatic pipelines specifically developed for ancient DNA analysis. In this context, we present the preliminary palaeogenomic analysis of Santa Severa's Medieval community. Future steps will involve deep shotgun sequencing or targeted enrichment to reconstruct genome-wide variation in the individuals under investigation.

766 **BOYS AND GIRLS IN THE BRONZE AGE EUROPE: BURIAL PRACTICES AT THE MOKRIN NECROPOLIS (2100-1800 BC)**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Kreckovic Gavrilovic, Marija (University of Belgrade) - Amzirkov, Mina (Laboratory for Bioarchaeology, Faculty of Philosophy, University of Belgrade) - Porčić, Marko (Faculty of Philosophy, University of Belgrade) - Rebay-Salisbury, Katharina (Austrian Archaeological Institute) - Kanz, Fabian (Unit of Forensic Anthropology, Medical University of Vienna, Austria) - Wolf, Michael (Department of Analytical Chemistry, University of Vienna) - Milašinović, Lidija (Narodni muzej Kikinda) - Stefanović, Sofija (Laboratory for Bioarchaeology, Faculty of Philosophy, University of Belgrade)

Abstract format: Poster

The position of children in prehistoric societies has been under-researched so far, and the influence of the biological sex on their growth, development and social status is almost completely unknown. They remain an important missing variable in the investigation of the interplay between biological sex and social status in past societies. This could help us gain new understanding of kinship relationships, boundaries between childhood and adulthood and means of inheriting and/or achieving status.

The complex problem of the materiality of sex and gender of children was further exacerbated by the lack of reliable and affordable methods for determination of sex in children. In INFANO project, to bridge this gap, we are utilizing a proteomic analysis of peptides AMELY and AMELX to determine biological sex in 58 children from an Early Bronze Age necropolis Mokrin in Northern Serbia. This Maros site is known for a strict norm in the funerary ritual which hinges on sex, shown in almost strict binary gender normativity of body treatment and grave inventory for adult men and women. Our hypothesis is that binary gender will be evident in the graves of children as well. Here we present the grave inventory of boys and girls buried at Mokrin, and discuss if there are sets of grave items that are gender specific and if those sets are the same for boys and men and girls and women.

767 **A PRELIMINARY STUDY ON THE EFFECTS OF CHILDHOOD ADVERSITIES IN THE MEDIEVAL POPULATION OF LEOPOLI-CENCELLE (RM, 9TH-16TH C.E.)**

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Galfano, Federica (PhD Program in Evolutionary Biology and Ecology, Department of Biology, University of Rome "Tor Vergata", Rome, Italy; Center of Molecular Anthropology for ancient DNA studies, Laboratory of Skeletal Biology and Forensic Anthropology, Department of Biology, University of Rome "Tor Vergata", Rome, Italy) - De Angelis, Flavio (Department of Biology, California State University Northridge, Northridge, USA; Department of Mental, Physical Health, and Preventive Medicine, University of Campania "Luigi Vanvitelli", Naples, Italy) - Marchi, Damiano (Department of Biology, University of Pisa, Pisa, Italy) - Maccioni, Francesca (Department of Radiological, Oncological and Anatomical-pathological Sciences, Sapienza University of Rome, Rome, Italy) - Casagrande, Giulia (Department of Classics, Sapienza University of Rome, Rome, Italy) - Annoscia, Giorgia (Department of Classics, Sapienza University of Rome, Rome, Italy) - Gazzaniga, Valentina (Department of Sciences and Medico-Surgical Biotechnologies, Sapienza University of Rome, Rome, Italy) - Martínez-Labarga, Cristina (Center of Molecular Anthropology for ancient DNA studies, Laboratory of Skeletal Biology and Forensic Anthropology, Department of Biology, University of Rome "Tor Vergata", Rome, Italy)

Abstract format: Poster

The study on childhood in Middle Ages has also recently expanded in relation to high infant mortality. Children were not excluded from harsh living conditions like high population density, poor hygiene, contact with pathogens and poor parental care.

The skeletal sample from Leopoli-Cencelle (9th-16th centuries CE) is a model for understanding the Italian medieval period for different reasons, such as the large sample size, the good preservation of the material, and the well-preserved archaeological evidence. In the cemetery area near St. Peter's Church, besides adult individuals, several infant burials, including fetuses, were discovered.

Children's bodies are fragile, so the study is very difficult. In this sense, bioarchaeology and paleopathology have refined approaches toward biological materials characterized by a high level of fragility. The children's exposure to repeated stressors can affect body development. Moreover, the genetic predisposition to develop certain anthropometric characteristics could be influenced by environmental factors, limiting genetically regulated phenotypic expression.

Advanced imaging methods will be used to examine children's bone structure and mineral density to explore the long-term implications of stress-induced phenotype changes. In this research, the same samples will be subjected to ancient DNA analysis to explore the genetic composition of populations and determine molecular sex. The DNA will be extracted using silica-based extraction methods and Illumina double-stranded libraries will be shotgun sequenced.

For the preliminary analysis, a sample of 30 well-preserved children aged from different age classes (foetus, perinatal, 1-6 years, 7-12 years, 13-19 years) will be selected.

The outcome of this project is therefore to explore how children cope with adequate growth in stressful conditions in a diachronic perspective, that can be read as a degree of human adaptation to the environment.

The research was financed by MUR "PRIN 2022 - Prot. 202255L4YW", "Early-life adversities: writing a biological history of childhood through a transdisciplinary approach".

771 ARCHAEOLOGICAL INVESTIGATIONS AT CASTRONOVO DI SICILIA: A MULTIDISCIPLINARY APPROACH

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Molinari, Alessandra (University of Rome Tor Vergata) - Orecchioni, Paola (University of Rome Tor Vergata) - Giovannini, Fabio (Instituto de Historia del Centro de Ciencias Humanas y Sociales di Madrid,) - Hummler, Madeleine (University of York) - Antoniono, Meo (University of Rome Tor Vergata) - Primavera, Milena (Università del Salento) - Colangeli, Francesca (University of Rome Tor Vergata) - Lundy, Jasmine (University of Rome Tor Vergata) - Aniceti, Veronica (University of Sheffield) - Ughi, Alice (University of York)

Abstract format: Poster

The intensive investigation of Castronovo di Sicilia and its environs has been the axial point of the ERC research project: Sicily in Transition: The Archeology of Regime Change, conducted by the Universities of York, Rome Tor Vergata and Salento and focused on the Byzantine, Islamic and Norman-Swabian Sicily. The principal central places and the main investigation points were the Byzantine fortress of Monte Kassar, the Norman castle of Colle San Vitale, and the multi-period area of Casale San Pietro. The main aim of the research was to supply the Castronovo area with a full biography from the 6th to the 13th century and so provide an epitome of the social and economic experience in an inland part of central Sicily. To achieve this goal, interventions of varying intensity were applied including intensive survey using drone flights, geophysics, geoarchaeological and archaeobotanical analysis of the sediments, test pits, or extensive excavations for large areas.

The study of artifacts (ceramic, glass, and metal objects) has been implemented by provenance analysis and the organic content of the ceramics; while carbon dating stable isotope and DNA analysis have been applied to ecofacts (plants, human and animal remains).

774 NEW APPROACHES IN THE COMMUNICATION OF PREHISTORY AT THE MUSEUM OF ANTHROPOLOGY OF THE UNIVERSITY OF NAPLES FEDERICO II

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Borrelli, Lucia (Museum of Anthropology, Naples) - Salomone, Flavia (Istituto Italiano Antropologia)

Abstract format: Poster

The Museum of Anthropology of the University of Naples Federico II, established in 1881, holds a rich heritage of osteological, archaeological and ethnographic collections that document the scientific researches of scholars who worked at the University and testify to the important Neapolitan cultural tradition.

Recently, the Museum has undertaken a work of reconsideration and enhancement of the ancient heritage in order to construct a museum narrative on anthropological themes according to current scientific knowledge, also to dispel prejudices about the perception of humanity deriving from past theories. It has created new exhibits, supported by multimedia products, and didactic-educational itineraries to give the public new tools for in-depth study of Prehistory and ancient civilisations and to encourage the correct interpretation of contemporary reality, the development of critical thinking and communication skills.

Inclusivity and accessibility have been at the centre of the Museum's educational and communicative work to increase the socio-cultural dialogue with the territory, to break down barriers and reach increasingly broad and heterogeneous segments of the public. The challenge was to find new and diversified languages that could tell the story of the present starting from the objects of the past: temporary exhibitions, workshops, meetings, debates, and book presentations were flanked by continuous communicative research work in line with the University's Third Mission. Varied programmes were created involving cultural associations of "social interest", governmental organisations such as UNAR for the "I AM A MAN" project, schools with PCTO routes and the traditional "Grazie Darwin" event. Immersive archaeological excavation experiences with the aid of multimedia technology have been realised for children.

The Museum's commitment resulted in the attraction and involvement of the entire citizenry on human origin and evolution themes, updated to promote reflections on multiculturalism, social inclusion, against all forms of intolerance and racism, and environmental protection.

775 ARCHEOLOGY AND ART

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Streichardt, Silvana (Streichardt and Wedekind GbR (SWA)) - Wesemann, Anna (Streichardt and Wedekind GbR (SWA))

Abstract format: Poster

What happens when archeology and art meet? A new perspective on archaeological finds and excavations is created. Together with the German-Italian artist Flavio Apel, Streichardt and Wedekind GbR (SWA) has started an exhibition project. The artist was born in Rome and came into contact with archaeological objects in his early childhood. For the exhibition planned for December in an art gallery in Göttingen (Germany), we will pick out motifs, either archaeological finds or excavation situations, which Flavio will artistically implement as pencil drawings. His search for perfection and realistic accuracy leads to his own interpretations and a different presentation of the objects through his images. At the planned exhibition the objects and excavations will be shown together with Flavio's pictures. With the poster we would like to provide an insight into the exhibition concept and some of the selected motifs. SWA is a private archaeological services company founded in 2011 that has already carried out numerous excavations. The aim of the exhibition is to bring the excavations with their finds and context closer to a wider audience.

776 SOCIAL STATUS OF GLASS IN THE 14TH-17TH CENTURIES. ARCHAEOLOGICAL FINDS FROM THE NEW TOWN OF PRAGUE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Ždárská, Anna (National Heritage Institute, Regional Office in Prague) - Podliska, Jaroslav (National Heritage Institute, Regional Office in Prague)

Abstract format: Poster

Understanding the standard of living and the unequal distribution of wealth within medieval and modern towns and their societies constitutes a complex and challenging task, and its research relies on the assessment of multiple sources (historical, archaeological and environmental). This poster presents a selection of glass findings obtained during two large-scale archaeological excavations carried out between 2009 and 2013 in the north-western section of the city district of Nové Město (New Town).

The historical layers comprised predominantly the medieval and early modern remains of the houses of the New Town burghers, including diverse cesspits and wells, which were used secondarily for waste disposal. The excavation of their fillings has yielded a rich collection of material culture covering a wide span from the founding of the New Town in 1348 to the brink of the industrial era at the end of the 18th century.

Glass vessels represented the second most frequent group of tableware. The abundance of glassware proves its popularity among the town's general population since the beginning of the New Town community, as well as the ability of the producers and sellers to satisfy the gradually growing demand for such products.

The analysis of the archaeological glass findings allowed the authors to gain insight into the unequal distribution of wealth among the town's population and to gather information on how the owners perceived the function, significance and value of these artifacts in different historical periods.

777 COMBINING OSTEOLOGY, MUSEUMIZATION AND ENHANCEMENT: THE CASE OF THE CAI CUTU TOMB (PERUGIA, ITALY)

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Candilio, Francesca (Museo delle Civiltà, Italian Ministry of Culture, Rome, Italy) - Bianchi, Vittoria (Dipartimento di Beni Culturali, Alma Mater Studiorum, University of Bologna, Ravenna, Italy) - Cecconi, Viola (Independent researcher, Museo delle Civiltà, Italian Ministry of Culture, Rome, Italy) - Esposito, Carmen (Dipartimento di Beni Culturali, Alma Mater Studiorum, University of Bologna, Ravenna, Italy) - Sperduti, Alessandra (Museo delle Civiltà, Italian Ministry of Culture, Rome, Italy) - Turchetti, Maria Angela (Musei Nazionali di Perugia - Direzione Regionale Musei nazionali Umbria)

Abstract format: Poster

The tomb of the Cai Cutu was discovered near Perugia (Italy) in 1983. Recognizing the site's uniqueness and fragile state of preservation, it was deemed necessary to facilitate access through a museumization project that ultimately culminated in its complete reconstruction at the National Archaeological Museum of Umbria (MANU).

The hypogeum, dating between the 3rd and the 1st centuries BCE, features a cruciform layout and contains a sandstone sarcophagus as well as 50 inscribed and, at times, richly decorated travertine cinerary urns. The presence of onomastic inscriptions, both in Etruscan and Latin, has enabled the tentative reconstruction of the genealogy of the Cai Cutu family and prompted hypotheses regarding their probable servile origin. Furthermore, the fact that all the

names inscribed are interpreted as masculine strongly suggests that this funerary space was reserved for male members of the family.

The bioarchaeological analyses aimed at discerning the demographic profile of the sample and reconstructing the funerary ritual lend support to the existing hypotheses, indicating at the very least a pronounced predominance of males and a pattern of single-use burials.

This study is integrated within a broader enhancement framework, aimed at fostering greater awareness and understanding of this significant context by both the scientific community and the general public. It combines the results achieved here through macroscopic analyses with those collected through a meticulous review of archaeological finds, as well as through the use of biomolecular and microscopic methodologies.

778 RETOLD: DIGITALLY PRESERVING ARCHAEOLOGICAL OPEN-AIR MUSEUMS CULTURAL HERITAGE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Masriera-Esquerria, Clara (Universitat Autònoma de Barcelona) - Siebrecht, Matilda (EXARC)

Abstract format: Poster

The European project called RETOLD, led by the international association EXARC, aims to digitally preserve the heritage generated by archaeological open-air museums. These museums play a crucial role in understanding ancient crafts and construction techniques. The project focuses on creating a standardized digital system for collecting, digitizing and disseminating knowledge (data) related to the processes of building reconstruction and handcrafted objects.

As preservation RETOLD aimed to preserve memories (data) associated with experimental archaeology. For standardization, it establishes a standardized system for collecting and digitizing these memories (data) that are open access to technical staff, researchers and general public.

The project has run from January 2021 until December 2024. On September 2024, the Retold webapp will be launched and open to other Archaeological Open-Air Museums.

This project is led by EXARC in partnership with the tech company NUWA (<https://www.nuwa.ie/>), the Universitat Autònoma de Barcelona (UAB) - Prehistory department, and three open-air museums: Düppel (Stadtmuseum Berlin) (DE); Stone Age Park Albersdorf (DE) and ASTRA (RO).

780 DOCUMENTING PREHISTORIC ROCK ART IN JEBEL SHAQADUD IN THE EASTERN SAHEL

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Varadzinová, Lenka (Charles University, Faculty of Arts) - Unger, Jiří (Institute of Archaeology of the Czech Academy of Sciences, Prague) - Zavřel, Jan (Independent researcher) - Varadzin, Ladislav (Institute of Archaeology of the Czech Academy of Sciences, Prague)

Abstract format: Poster

Renewed exploration at Jebel Shaqadud in the savanna region of north-western Butana in central Sudan has recorded five rock-art locations which concentrate in the area of the Shaqadud site complex, the most significant prehistoric settlement site in the Eastern Sahel. All feature only petroglyphs, with three locations containing figurative rock art with predominance of giraffes engaged in a limited number of compositions, one location only geometric rock art, and four sites (also) non-figurative marks. Most of the petroglyphs are entirely repatinated and some severely weathered, with many of them difficult to record using the standard means of field rock-art research. In 2021–2023, diverse documentation methods were employed to record the evidence at these sites, including 3D photogrammetry (SfM) and documentation by a hand-held optical scanner. In this poster, we present and compare the results obtained by the two approaches. The findings may be useful for future field research in Nubian sandstone environments.

781 MAKING EGYPTIAN MUMMIES VISIBLE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Ejsmond, Wojciech (Warsaw Mummy Project) - Szilke, Stanisław (Warsaw Mummy Project) - Ożarek-Szilke, Marzena (Warsaw Mummy Project) - Jaworski, Marcin (Warsaw Mummy Project)

Abstract format: Poster

As human remains ancient Egyptian mummies are not an easy subject for display for the wider public and research. On the one hand, they require the preservation of the dignity of human remains, on the other their study is methodologically challenging due to the uniqueness of each embalmed body. Furthermore, computed tomography (CT) and related software are quickly evolving, thus the methodology of the research is subject to changes.

The Warsaw Mummy Project was launched in December 2015 to conduct a comprehensive and multidisciplinary investigation of mummies at the National Museum in Warsaw. The project includes non-invasive examinations, i.e. CT and X-raying. Radiological imaging helped to answer questions about the sex, biological age, possible causes of death etc. of the individuals. The project goes beyond archaeological, anthropological, Egyptological, and medical analyses. Standard clinical software is not designed by default to examine mummified remains and artefacts. It is hard to establish standards or the workflow for postprocessing of the radiological documentation since every embalmed body is unique in its peculiarities, e.g. various radiological densities of embalming substances, materials, and foreign objects (e.g. amulets). Thus, in each case, we need to individualise our approach.

One of the crucial aspects of our project is to produce comprehensive images showing what is under the wrappings in which we can observe bandages, embalming substances, visceral packages, amulets, tissues, bones, etc. As an innovation, a hologram of a mummy presents a new way of displaying radiological images that can serve as both documentation and as an interactive object of display at museums since showing human remains is becoming a controversial practice. The poster aims to show our methodology for processing and visualising radiological data.

782 ARCHAEOLOGY IN TIMES OF ENERGY TRANSITION

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Strohmeier, Emanuel (Streichardt and Wedekind GbR (SWA)) - Ossenberg, Gero (Streichardt and Wedekind GbR (SWA))

Abstract format: Poster

More and more countries transition their energy infrastructure from fossil energy to renewable energy. Therefore lots of construction projects take place all around Europe.

This is especially important for archaeological supported projects such as solar farms, wind farms, electricity networks, etc. Especially in Europe where many different cultures settled across the whole continent for thousands of years it is not uncommon to find archaeological remains while constructing big energy projects. In Germany, large-scale energy route projects were initiated in a rapid process. In terms of climate protection, these are in the public interest. Over hundreds of kilometres, there is now the opportunity to gain far-reaching insights into past cultural and settlement landscapes. While other infrastructure projects have so far only been archaeologically monitored in areas of previously known sites, the responsible authorities have now supervised the entire routes of the newly developed energy lines. This approach led to the discovery of a wealth of previously unknown sites along fertile old settlement landscapes. Naturally, the data base of finds also increased significantly. Everyday archaeological life is now clearly dominated by energy projects, while other large infrastructure projects are declining noticeably. While, for example, larger motorway projects only consisted of partial expansions, we are confronted with a completely different situation here: the energy routes run through areas that have not yet been archaeologically developed. Not only do we benefit from those changes, but we also face different challenges such as conflicts of interest between archaeology and a fast transition for renewable energies. What can society gain from our work and what can we provide? We aim to answer questions that yet need to be answered. Archaeology has a special responsibility in this respect – also in the sense of the public interest.

783 PREHISTORIC SEMI-PORTABLE GRINDING TABLES FROM THE OPEN AIR SITE OF GARN EL TAMADA AT THE SIXTH NILE CATARACT, SUDAN

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Varadzin, Ladislav (Institute of Archaeology of the CAS, Prague, Ladislav Varadzin) - Varadzinová, Lenka (Czech Institute of Egyptology, Faculty of Arts, Charles University, Prague, Czech Republic)

Abstract format: Poster

This poster presents the discovery of a series of massive but movable granite blocks with grinding surfaces found during surface survey of the open air Holocene prehistoric site of Garn El Tamada located in the northwestern foothills of the Sabaloka Mountains in central Sudan. The flat and sub-horizontal surfaces of these blocks bear differently shaped and sized grinding surfaces in some repetitive arrangement, pointing to a differentiated, multi-purpose use of these facilities, some of which are likely to be a relic of a single household. The spatial distribution of these finds within the site's topography allows us to see in an unexpected detail the internal layout and estimate the number of homesteads on a single settlement site, which is usually impossible on prehistoric sites in Sudan without archaeological excavations. The findings presented in this poster highlight the potential of semi-mobile grinding devices made of durable materials for the research of intra-site patterning and organization of labour.

787 HIERARCHICAL ORGANISATION OF LARGE NEOLITHIC SETTLEMENTS, IDENTIFIED THROUGH POWER-LAW DISTRIBUTED HOUSE SIZES

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Bruvoll, Hallvard (University of Oslo, Department of Archaeology, Conservation and History)

Abstract format: Poster

While the dynamics of social inequality have been the subject of much debate in archaeology in recent years, much less attention has been given to hierarchical social organisation. In cases where hierarchy has been included as study object, it has mostly been conflated with inequality, leading to much confusion in the literature. Hierarchical organisation of societies is generally understood simplistically as synonymous with despotic top-down rule, while sociological and anthropological research strongly suggests that it is rather a universal phenomenon that emerges spontaneously in social groups that grow beyond certain thresholds.

Presented here is the first evidence of intra-site hierarchical organisation of settlements from the European Neolithic, as identified through the power-law distribution of building sizes. In the two sampled study areas and periods – Linear Pottery settlements in south-west Slovakia (c. 5300-4950 BCE) and Trypillia B2/C1 settlements in central Ukraine (c. 4100-3600 BCE) – only the largest settlements exhibit this special characteristic. This suggests that hierarchy tends to emerge in large human settlements irrespectively of political system, a hypothesis in line with much sociological research, but that will need to be further explored in other prehistoric settings.

788 BUSINESS ARCHAEOLOGY: MAIN DEFINITIONS AND SCIENTIFIC DISCIPLINE OVERVIEW

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Taratukhin, Victor (University of Muenster) - Pulyavina, Natalia (The Stanford Center at the Incheon Global Campus (SCIGC))

Abstract format: Poster

Business Archaeology is a new interdisciplinary discipline proposed by Michael Shanks, Victor Taratukhin, and Natalia Pulyavina as part of the Stanford Janus Network (Shanks, Taratukhin, and Pulyavina, 2023). It focuses on human experience in the past and present through artifacts and translates such knowledge to the future and strategies in business and management.

Cultural Diagnostics is central to the Business Archaeology framework (Taratukhin, Shanks and Pulyavina, 2023). It enables a comprehensive journey from historical insights to contemporary company conditions. The process includes three phases: Exploring the Past, Exploring the Present, and Orchestrating Futures. Of course, Business Archaeology as a discipline is certainly broader than the built-in method of cultural diagnostics. Business Archaeology employs a multidisciplinary approach, incorporating history, anthropology, sociology, psychology, and multiple management disciplines. It is also a set of tools and techniques, both archaeological and related to methods of creating innovations, such as the Stanford Design Method (Design Thinking), Business games, etc. It uses a variety of sources, from company artifacts to interviews of long-standing employees.

Business archaeology is presented in three components: research, education, and practice. Joint academic programs and courses in Business Archaeology at both undergraduate and graduate levels, merging archaeology and management, and developing research topics for doctoral studies are crucial to success in the discipline. Business Archaeology Labs will enhance the practical aspects of the discipline, offering students an opportunity to conduct industry-related projects and work with corporate artifacts. The educational elements of Business Archaeology should extend to direct engagement with the industry, defining models of collaboration between academic institutions and businesses.

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789 NEOLITHIC SLASH-AND-BURN EXPERIMENT FORCHTENBERG (GERMANY): A COMPARISON BETWEEN DENDROECOLOGICAL INVESTIGATIONS AND ANTHRACOLOGICAL ANALYSIS FROM AN EXPERIMENTAL COPPICE WOODLAND

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Knapp, Hannes (Curt-Engelhorn-Zentrum Archäometrie) - Blume, Sanja (Curt-Engelhorn-Zentrum Archäometrie) - Nelle, Oliver (Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart)

Abstract format: Poster

In the context of the Neolithic slash-and-burn experiment at Forchtenberg (SW Germany; see poster #564, Nelle et al.), we provide data on a combined approach of dendroecological and anthracological analysis to elucidate the growth dynamics of trees and the relationship between utilized wood and charcoal produced after slash-and-burn, to be used as a modern analogue for the interpretation of archaeological wood and charcoal finds.

The site Forchtenberg, with 2,5 ha, is situated on a moderate south-western slope at 325 m a.s.l. (mean annual precipitation 900 mm, average annual temperature 8.5°C). At the beginning of the 20th century the deciduous forest was transformed from a coppice with standards to a high canopy forest. During the last 25 years plots up to 900 m² were cleared in different years by the Forchtenberg team and partly burned resulting in different forest succession stages directly neighboring each other.

During spring 2023 an area of 900 m² was cleared and, the felled trees were sampled. The area was characterized primarily by shoots from coppiced wood and natural rejuvenation, with the occasional old trees which were not felled during the last clearing in 2006. Main tree species were Acer, Salix, Betula, Carpinus, Fraxinus, with minor proportions of Fagus, Populus and Quercus. For a better evaluation of the growth response to disturbances increment cores from older trees were taken from the vicinity. This allows a better comparison of the tree's response to disturbances within different exploitation systems

After dendroecological sampling the felled trees were used for slash-and-burn during autumn. Charcoal samples were taken afterwards from the surface, to elucidate potential indications of coppice in the anthracological record together with age and diameter analysis and average radial growth rate. Dendroecology and anthracology provide both complementary as well as supplementary information to depict the used wood for slash-and-burn.

790 THE ICONOGRAPHY OF FEMALE GENITALIA IN HUMAN FIGURE METAL PENDANTS WITHIN THE CONTEXT OF THE LATE BRONZE AGE SOUTHERN LEVANT

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Symes, Elsa (Independent researcher)

Abstract format: Poster

A popular and well-documented style of metal pendant from the interconnected region of the Southern Levant in the Late Bronze Age is the human figure or nude goddess pendant. The sixteen extant metal pendants from the sites of Megiddo, Lachish, Minet el-Beida, Ugarit and Tell el-Ajjul provide the basis for this analysis. This style has been explored since its first excavation over a century ago and has provided a lively ongoing discourse, particularly with the incorporation of mother-goddess worship debates. General assumptions have so far suggested the specific face, breast and vulva combination is a fertility or erotic representation. Even without a definitive understanding of the religious intention of the pendants, they provide evidence of the external spiritual and artistic influences.

This poster will focus on the genitalia within the remarkably varied corpus providing some insight into the intended depiction, as well as the intended audience. The variations within the female genitalia representations can be viewed as infantilisation with overly schematic renderings or leaning more towards fertility-related imagery with visible labia and pubic hair. Other incorporations into the pubic region include tree branches, perhaps reinforcing specific goddess iconography like the Egyptian Hathor, while there are other arguments for the presence of a pelvic girdle atop the pubic region potentially bringing different symbolism into some pendants. The analysis of this corpus is also extended further to consider external influences from Mesopotamia and Egypt, and the depictions in other mediums including clay plaques and figurines.

This style of pendant is an exemplar of the interrelationship between the Southern Levant and Egypt at the end of the Bronze Age. The interchangeability present provided local artisans with a general blueprint of a goddess pendant that could be successfully translated into different sects of religion further promoting the internationalisation of this time and region.

COMPOSITIONAL CHARACTERISATION OF EARLY IRON AGE POTTERY FROM ETRURIA: CHALLENGES AND NEW PERSPECTIVES

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Andreadakis, Efraim (Archaeometry Research Group, Eberhard Karls University of Tübingen) - Diakatou, Maria (Archaeometry Research Group, Eberhard Karls University of Tübingen) - Deimichei, Giulia (Archaeometry Research Group, Eberhard Karls University of Tübingen) - Morandi, Lionello (Archaeometry Research Group, Eberhard Karls University of Tübingen; Department of Civilisations and Forms of Knowledge, University of Pisa) - Amicone, Silvia (Archaeometry Research Group, Eberhard Karls University of Tübingen; Institute of Archaeology, University College London)

Abstract format: Poster

During the early Iron Age (late 10th—late 8th century BCE), the Etruria region (central Italy) underwent significant sociocultural changes and fundamental innovations, resulting in various social, political, and economic developments. Throughout these transformative shifts, numerous sites in the region displayed the presence of the so-called Villanovan material culture.

Villanovan pottery has been thoroughly investigated from a stylistic point of view. However, paramount research questions about the production, circulation, and exchange of early Iron Age pottery from Etruria remain to be addressed by means of a comprehensive scientific study.

This work aims to characterise with an interdisciplinary approach pottery from different early Iron Age production centres in Etruria, to reveal pottery making recipes and set the base for an investigation on patterns of circulation and exchange among proto-Etruscan communities, as well as between Etruria and other Mediterranean cultures.

To do so, we carried out archaeometric analyses, including ceramic petrography and X-ray fluorescence on pottery found in different key sites from both northern and southern Etruria. To link pottery to its centre of production, we carried out systematic sampling and analysis of all geological formations and clay sources around the main settlements, from inland valleys to river mouths on the coast. This has allowed us to define a mineralogical and chemical fingerprint of vessels produced in Etruria at each site examined.

In this poster we present the preliminary results of this work which provides for the first time a robust reference study for investigating pottery technology and circulation in Etruria and in the Mediterranean basin during the early 1st Millennium BCE.

Given the systematic geological study undertaken for this research, the results are also relevant for the study of production and circulation of central Italian pottery from different cultural and chronological contexts.

FIRST INSIGHTS INTO THE ANCIENT ORAL MICROBIOME OF EGYPTIAN CAT MUMMIES

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Baldoni, Marica (Department of Biology, University of Rome Tor Vergata, Rome Italy) - De Martino, Marco (Department of Biology, University of Rome Tor Vergata, Rome Italy) - Di Corcia, Tullia (Department of Biology, University of Rome Tor Vergata, Rome Italy) - Rovelli, Valentina (Department of Biology, University of Rome Tor Vergata, Rome Italy) - Serventi, Patrizia (Department of Biology, University of Rome Tor Vergata, Rome Italy) - De Cupere, Bea (Royal Belgian Institute of Natural Sciences, Brussels Belgium) - Van Neer, Wim (Royal Belgian Institute of Natural Sciences, Brussels Belgium) - Ottoni, Claudio (Department of Biology, University of Rome Tor Vergata, Rome Italy)

Abstract format: Poster

Cats, our intriguing “domestic” companions, share a long-standing relationship with humans. As renowned pest-control agents and hosts of several zoonotic pathogens, they also played a key role in the animal-human pathogen transmission. In this perspective, it is known that cat bites represent a significant threat for human health, even though the transmission of microorganisms due to prolonged contact was also documented [1-2].

The cat oral microbiome may offer key insights into the understanding of zoonotic transmission to humans [1], and at the same time shed light on the influence of diet, disease, and other environmental variables in the cat oral microbiota within the anthropogenic niche [1,3-4].

Metagenomic analysis of dental calculus demonstrated to be a valuable tool for investigating modern and ancient human and animal oral microbiomes [e.g. 5-7]. This research focuses on the analysis of dental calculus from twelve ancient Egyptian cat mummies aiming at reconstructing their oral microbial composition. By shotgun sequencing double-stranded genomic libraries obtained from calculus samples, we provide here the first ancient oral microbiome data from Egyptian cat mummies. This offers unprecedented insights into the oral microbiome of cats from the past, the anthropogenic factors that may have influenced it, and the evolution of commensal and pathogenic oral microbial species.

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FELINE VOYAGERS: TRACING HUMAN HISTORY THROUGH PALEOGENOMICS OF CATS IN VIKING HARBOUR SETTLEMENTS

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Serventi, Patrizia (University of Rome Tor Vergata, Department of Biology, Rome, Italy) - De Cupere, Bea (Royal Belgian Institute of Natural Sciences, Brussels, Belgium) - Mouraud, Betty (University of Lille, Department of Biology, Lille, France) - Rovelli, Valentina (University of Rome Tor Vergata, Department of Biology, Rome, Italy) - De Martino, Marco (University of Rome Tor Vergata, Department of Biology, Rome, Italy) - Baldoni, Marica (University of Rome Tor Vergata, Department of Biology, Rome, Italy) - Di Corcia, Tullia (University of Rome Tor Vergata, Department of Biology, Rome, Italy) - Schmölcke, Ulrich (Leibniz-Zentrum für Archäologie - Center for Baltic and Scandinavian Archaeology (LEIZA-ZBSA), Schleswig, Germany) - Van Neer, Wim (Royal Belgian Institute of Natural Sciences, Brussels, Belgium) - Ottoni, Claudio (University of Rome Tor Vergata, Department of Biology, Rome, Italy)

Abstract format: Poster

The analysis of the genetic makeup of ancient wild and domestic animals proved to be a key tool to unravel human migrations and routes of trade and connectivity in the past. Undoubtedly, cats (*Felis silvestris*) have a long history of association with humans, valued for their dual role of companions and pest controllers, particularly in maritime activities and settlements. For this reason, they represent valuable bio-proxies to reconstruct human-mediated translocations.

We applied cutting-edge genomic techniques to analyse cat remains recovered from two harbour settlements dated to the Viking Age, Haithabu (AD 800-1050) and Schleswig (AD 1050-1250), in northern Germany. Their strategic positions, leveraging natural features and navigational benefits, contributed significantly to their prominence in local and long-distance trade networks across Europe (and beyond) during the Middle Ages. Here, we show the preliminary results of ancient DNA (aDNA) analyses conducted on over 50 cat specimens, one of the most extensive cat genetic dataset from a single site assembled to date. We generated via shotgun sequencing complete mitochondrial genomes and low-coverage genome-wide data that allowed us to diachronically investigate the intertwined histories of humans and their feline companions in the two Viking harbours. Our genomic dataset represents a key tool to outline the spatial and temporal dispersal of cats in Europe via human connectivity, and elucidate ancient admixture between domestic and European wildcat populations.

HOME: PALAEO-LITHIC SHELTERS IN EAST-CENTRAL EUROPE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Chu, Wei (Leiden University)

Abstract format: Poster

From penthouses to igloos, homes are a cornerstone of human society, deeply entrenched in our evolutionary past. Their staggering array of architecture simultaneously shape and reflect our sociocultural traditions, structure our local economies, and have enabled us to inhabit all four corners of the earth. Yet surprisingly little is known about their earliest forms—Palaeolithic shelters. This is because no systematic attempts have been made to target their early archaeological signatures. Here, I present the new project HOME that will search for a diversity of Palaeolithic shelters during the Late Pleistocene through informed systematic surveys and excavations of archaeological sites in East-Central Europe, a place where early mammoth bone structures suggest precocious shelters, but where the record remains inconclusive. This project's goal is to uncover and assess a variety of Palaeolithic shelters with the aim to understand the diverse ways that humans lived and survived in some of the coldest, harshest climates. The objectives are to: (1) Recognize the factors that influence the location and design of forager shelters through a goal-directed study of ethnographic documentation. (2) Develop new geophysical methods to identify open-air shelter residues in large-scale archaeological surveys. (3) Determine how one of the earliest unambiguous built structures, a mammoth bone structure, was used with the latest techniques in archaeological science. (4) Compare and contrast how these open-air shelters relate to a regional cave occupation through targeted excavations. The results will elucidate how our

ancestors adapted to past climate change and expanded into new biomes, ultimately leading to our ubiquitous population of the earth. In addition to its significance to archaeology and anthropology, the outcomes have implications for theories of culture, evolution and human resilience by helping us understand the physical building blocks of early societies.

797 **ARCHAEOLOGICAL ANIMAL AND PLANT REMAINS OF 15TH-19TH CENTURIES FROM IASI CITY (NE ROMANIA)**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Stanc, Simina Margareta (Alexandru Ioan Cuza University of Iași, Romania) - Danu, Mihaela (Alexandru Ioan Cuza University of Iași, Romania) - Bilavski, George (Alexandru Ioan Cuza University of Iași, Romania) - Pirnau-Bacumenco, Ludmila (Alexandru Ioan Cuza University of Iași, Romania) - Bejenaru, Luminita (Alexandru Ioan Cuza University of Iași, Romania)

Abstract format: Poster

The investigated area from Iasi City (NE Romania), researched in 2021-2022, has a particular historical and archaeological potential due to its location in the core of the medieval city, near the Princely Court. The archaeological discoveries are dated to Middle Age (15th-17th centuries) and to the Modern period (18th-19th centuries). The ruins of the former "St. Petersburg Hotel", which overlapped the houses of the Ghica boyar family, were excavated during the research. Archaeological complexes, older or contemporary with these buildings were investigated, from which numerous artifacts of heritage importance were recovered (e.g., local and imported kitchenware, a monetary of 14th-15th centuries, numerous other coins, decorative objects, pipes, tiles, iron tools, glass vessels of 17th-19th centuries etc.). Numerous housing complexes, lime and clay extraction pits for constructions, water supply systems or stone sewers were also discovered and researched.

The analyze of animal and plant remains aims to contribute at the economic and environmental evaluation of the settlement. Phytoliths are the main vegetal remains studied in this work. Animal remains are described in terms of their frequencies based on the number of identified specimens and the minimum number of individuals. Archaeozoological results highlight the dominance of domestic mammals (i.e., cattle, sheep/goat, pig, horse, dog), cattle being the preferred species for consumption. Few remains were identified as belonging to wild mammals (i.e., red deer, wild boar, roe deer, hare, wolf), and also to birds, fish, and molluscs.

This work was supported by a grant of Ministry of Education from Romania, CNCS-UEFISCDI, project number PN-III-P4-PCE2021-1180, within PNCDI III.

800 **LINEAR POTTERY IN SOUTHERN LOWER SAXONY (GERMANY): HOW ANALYSIS OF ORNAMENTS CAN TELL THE STORY OF STYLES, TRANSFER AND CHRONOLOGY**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Stoffner, Sabine (Streichardt and Wedekind GbR (SWA)) - Streichardt, Silvana (Streichardt and Wedekind GbR (SWA))

Abstract format: Poster

The Linear Pottery in southern Lower Saxony (Germany) was divided into 7 phases about 25 years ago. The basis for this were mainly surface finds and from the settlement area of Diemarden. The various ornaments of fine ceramics were evaluated and a relative chronology based on the development of ceramics was presented. It seems nowadays that some elements of the decoration are dated too early or too late (e.g. plastic strips with accompanying scratch lines). In addition, consistent elements (e.g. undecorated rims) and adherence to old traditions in the decoration make it difficult to assign a phase. Correlation with neighboring regions is therefore difficult.

Decoration styles and elements from the west, central Germany and the northern Harz region are taken up, especially in the younger and youngest Linear Pottery. The influences are reflected differently within the pottery of different sites in southern Lower Saxony and can show communication and transfer routes. A regional style has not yet been determined.

There are many sites of Linear pottery, especially in the Leine Valley, which number will now raise through several power-line-projects. In order to be able to carry out a precise chronology, phase division and style development, the ceramics from future sites should be recorded using a uniform system. The basis for this is the catalog of ornaments from "bandkeramik_online". The evaluation of closed complexes of finds should then make it possible to highlight the influences and peculiarities of the style in ceramics, as well as to revise the regional phase division and link it to neighboring areas.

804 **LATE NEOLITHIC SITE OF KOTLINA IN EASTERN CROATIA: EXCAVATIONS 2018-2023**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Rajkovic, Dragana (Archaeological museum Osijek) - Vitezović, Selena (Institute of Archaeology, Belgrade)

Abstract format: Poster

The site of Kotlina – Suzai Hegy is situated in eastern Croatia, in Baranja region, near the town of Beli Manastir. The prehistoric site is situated on south-eastern slopes of Bansko brdo, elongated loess elevation, on the edge of a large ravine, approximately 10 km to the east from the Danube River. The site was noted during field surveys carried out in the second half of the 20th century, and in 2018 Archaeological Museum in Osijek initiated systematic researches within the project „Kotlina – the prehistoric site“.

In 2018-2019 non-destructive magnetic prospection was carried out. The magnetometric data showed the numerous pits of different size, as well as 60-m diameter ring ditch system. In 2018 excavations were initiated, and in the period 2018-2023 approximately four trenches were excavated, located to the south of the ditch (that is, outside of it), covering the total surface of 130m². Excavations revealed numerous structures and features: rubbish pits, post holes, dwellings, as well as several burials, containing inhumated remains of several individuals and rich grave offerings: ceramic vessels, polished stone tools, ornaments from mollusc shells. Other findings include ceramic vessels, in particular pots with painted motifs, characteristic for the Lengyel culture, numerous lithic tools, including a substantial amount of obsidian, bone tools and personal ornaments. This poster will present the most important results from these researches.

806 **INVESTIGATING THE BIOLOGICAL BACKGROUND OF THE CASALECCHIO DI RENO CELTIC COMMUNITY (BOLOGNA, ITALY; 4TH-3RD CENTURY BC) THROUGH NON-METRIC DENTAL TRAITS**

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Mameli, Davide (Alma Mater Studiorum Università di Bologna) - Sorrentino, Rita (Alma Mater Studiorum Università di Bologna) - Luzzati, Giselle (Alma Mater Studiorum Università di Bologna) - Nicolosi, Teresa (Alma Mater Studiorum Università di Bologna) - Piccirilli, Erica (Alma Mater Studiorum Università di Bologna) - Mariotti, Valentina (Alma Mater Studiorum Università di Bologna) - Novotny, Friederike (University of Vienna – NHM Vienna) - Spannagl-Steiner, Michaela (University of Vienna – NHM Vienna) - Ramsel, Peter (University of Vienna) - Belcastro, Maria (Alma Mater Studiorum Università di Bologna)

Abstract format: Poster

Archaeological data attest the earliest presence of the Boii Celtic tribe in the Po Valley (Northern Italy) in Casalecchio di Reno necropolis (Bologna) during the 4th century BC. Ancient sources (Dion. Hal., I, 18, 5; Pol., II, 17; Serv., Ad Aen., X, 168) describe several types of interaction (i.e., replacement, integration) between Celts and local populations (mostly Etruscans) in the Po Valley.

In Casalecchio, archaeological data suggest a continuity of occupation from the Neolithic to medieval time. The presence of Etruscans is well attested (village and funerary area).

This contribution aims at investigating the non-metric dental traits (ASUDAS method) of the Celtic community of Casalecchio. Our data were compared with other Bronze/Iron Age groups from Italian and European territories already studied by Coppa et al. (1998), Anttil (2016), Sorrentino et al. (2018) and Piccirilli et al. (2023), using the same methods.

Preliminary results suggest that Casalecchio shows biological affinity both with Celtic and Italic (especially Etruscans) groups, letting to hypothesize the relationship between local and foreign individuals.

Therefore, a future direction of this research would be to assess the local/non-local origin of the individuals of Casalecchio through the strontium and oxygen isotope analysis. Furthermore, the sample will be integrated with data from "Celts" from cemeteries in Austria.

This research was funded by the Austrian Science Fund FWF (Project P36086-G).

808 CONTINUITY VS. DISCONTINUITY IN CASALECCHIO DI RENO (BOLOGNA) FROM THE IRON AGE TO LATE ANTIQUITY: A NON-METRIC DENTAL TRAITS ANALYSIS

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Luzzati, Giselle (Alma Mater Studiorum University of Bologna) - Sorrentino, Rita (Alma Mater Studiorum University of Bologna) - Mameli, Davide (Alma Mater Studiorum University of Bologna) - Mariotti, Valentina (Alma Mater Studiorum University of Bologna) - Nicolosi, Teresa (Alma Mater Studiorum University of Bologna) - Poli, Vanessa (Soprintendenza Archeologia, Belle Arti e Paesaggio per la città metropolitana di Bologna e le province di Modena, Reggio Emilia e Ferrara) - Novotny, Friederike (University of Vienna – NHM Vienna) - Spannagl-Steiner, Michaela (University of Vienna – NHM Vienna) - Rams, Peter (University of Vienna) - Belcastro, Maria Giovanna (Alma Mater Studiorum University of Bologna)

Abstract format: Poster

The Zone 'A' of Casalecchio di Reno (Bologna, Italy) represents an intriguing archaeological context, with documented habitation continuity from the Neolithic period to the Early Middle Ages. In this study, we aim to explore the biological composition of the population inhabiting this area from the late Iron Age to late Roman Antiquity. For this purpose, we assessed and analyzed non-metric dental traits using the ASUDAS system, then proceeded to calculate the Mean Measure of Divergence (MMD).

The dental samples we analyzed belong to the Roman Necropolis A (2nd-5th century CE) and B (2nd-3rd century CE), as well as to the late antique Necropolis, for a total of 80 individuals examined. These three burial grounds likely represent the funerary area of a nearby village of farmers and traders, particularly thriving during late Antiquity. Additionally, we included in the analysis data from the Celtic Boii Necropolis of Casalecchio di Reno (4th-3rd century BC, 92 individuals).

Preliminary results suggest a biological affinity between the A and B Roman groups, as well as with the late antiquity Romans, indicating a potentially biological continuity through the centuries in this rural settlement in Casalecchio. On the other hand the MMD values also display a significant biological distance between the Boii Celts and all the Roman groups, suggesting a potential scenario where these two populations might not have extensively mixed. As a result, our data highlights the lack of a significant biological contribution from the Casalecchio Celts to the Romans subsequently settled in the area.

The research was partly funded by the Austrian Science Fund FWF (Project P36086-G).

810 THE WEIBULL MODEL TO RECONSTRUCT NEANDERTHAL POPULATION STRUCTURE FROM THE UPPER VALLEY OF THE LOZOYA RIVER (SPAIN)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Reyes Rojas, Andrea (Departamento de Geodinámica, Estratigrafía y Paleontología, Universidad Complutense de Madrid) - Rodríguez-Gómez, Guillermo (Departamento de Geodinámica, Estratigrafía y Paleontología, Universidad Complutense de Madrid; Centro UCM-ISCIIE de Evolución y Comportamiento Humanos) - Martín-González, Jesús (Departamento de Matemáticas y Computación, Universidad de Burgos) - Luis Arsuaga, Juan (Departamento de Geodinámica, Estratigrafía y Paleontología, Universidad Complutense de Madrid; Centro UCM-ISCIIE de Evolución y Comportamiento Humanos)

Abstract format: Poster

Paleodemographic reconstruction is useful to understand the development of extinct species, and in the case of humans, it is of great interest and scientific debate. However, the fossil record is partial and are usually not complete enough to provide this information. Therefore, it is necessary to approach these studies using alternative methods. One of these is the estimation of survival and mortality profiles, which allow us to reconstruct the structure of the populations, estimate the carrying capacity and the availability of meat resources in paleoecosystems. This can be done in extinct populations through mathematical models. The main objective of this study is to validate one of these models, the Weibull model, as a tool to obtain profiles of survival, mortality, and age structure of mammal species. For this purpose, we analyzed 13 current mammal populations that meet or are close to meeting conditions of stability and stationarity, which are the conditions imposed on the Weibull model to obtain long-term profiles and structures. As input to the Weibull model, the values of the reproduction rate by age classes are used and the population structures are obtained as outputs. Statistical analyzes of chi-squared test were carried out to compare the observed population structures with the estimated ones and the results obtained allowed the model to be validated. Thanks to this validation, we reconstruct the population structure of the Neanderthal groups (*Homo neanderthalensis*) that inhabited the upper valley of the Lozoya river (Madrid, Spain) during the Late Pleistocene, based on reproduction rate values of current hunter-gatherer populations.

813 A MEDIEVAL GATEWAY TO THE CONTINENT, NEW ARCHEOLOGY IN KALMAR OLD TOWN

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Stibéus, Magnus (202100-4953) - Hellgren, Felicia (202100-4953) - Palm, Filip (202100-4953) - Lindgren, Ola (202100-4953)

Abstract format: Poster

Kalmar was one of the most important towns of medieval Sweden, comparable with the North German market towns of the Hanseatic league. Situated on the southeastern coast of Sweden, close to the Danish border, it served as a gateway between Sweden and the rest of Europe. The town played an important role during the late medieval union of the Nordic countries, known as the Kalmar union.

During the Middle Ages a few thousand people of various cultural backgrounds, lived and worked within the town walls. The town was moved to a nearby island during the 1700th century, leaving much of the old town untouched below the surface until modern times.

The aim of this poster is to show the importance of collecting so called 'mass materials', how to work with it, present it and what it can give. The study will provide insight into several areas of the town, including the center and the harbor quarters, which can tell us about merchants and craftsmen. It is also possible to discuss the private and public; the local and global; as well as how the town handled crises.

Recent years large excavations were conducted due to the renewal of the Kalmar water system. This has led to a total distance of 1,3 km or 6000 m² being excavated, making a cross-section through the entire town. This corresponds to 50 plots, over 200 buildings, amongst them 30 stone houses with cellars, and parts of the medieval streets and alleys. The excavation generated tens of thousands artefacts which present a rare opportunity but also many challenges. The largest find categories are animal bones (2000 kg) and ceramics (25 000 shards). The material also includes metal objects, glass, worked bone and macrofossils, engaging specialists from many disciplines.

814 EXPANSION TO THE TOP OF THE NEOLITHIC WORLD. THE GALLERY GRAVE AT SELJE, NORWAY

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Smiarowski, Konrad (University of Bergen) - Ramstad, Morten (University of Bergen) - Roberts, Howell (University of Bergen) - Dahl, Yvonne (University of Bergen)

Abstract format: Poster

In 2023, The University Museum of Bergen excavated a Late Neolithic gallery grave at Selje, - the first such monument discovered in Western Norway. The collapsed stone built chamber and semi-articulated human remains were recorded using hybrid recording techniques including photogrammetry for detailed 3d modelling. The grave contained the remains of several individuals buried around 2000 cal BC. A large quantity of faunal remains was also recovered, together with remains of multiple structures such as houses, middens and burials from several periods.

Apart from new knowledge about the neolithization processes in Norway the context has the potential to contribute a deeper understanding of population dynamics and the social organization of the Late Neolithic expansion in Scandinavia and beyond. In the poster we will present the project, highlighting interdisciplinary studies combining archaeology, human osteology, stable isotope analyses, mtDNA analyses, palaeopathology and archaeobotany.

We will use novel techniques for integrating the complex multi-period dataset and disseminating results. The aim of the poster presentation is to spark interest in the project and encourage broader collaborations.

815 COLOURS FOR THE AFTERLIFE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Cholakova, Anastasia (National Institute of Archaeology with Museum, Bulgarian Academy of Sciences) - Pashova, Maria (Regional Museum of History, Blagoevgrad, Bulgaria) - Gratuze, Bernard (Institut de Recherche sur les Archéomatériaux, Orléans, France)

Abstract format: Poster

The aim of this poster presentation is to shed light on the role of coloured glass in the jewellery found in the grave assemblages of a medieval necropolis (ca 10th – 12th c.) at the present-day village of Tuhovishte, SW Bulgaria, in the Mesta River valley. The site is identified as a burial ground of a small rural community that has inhabited a remote mountainous area, with clear evidence of conservative traditions of the burial rite, likely rooted in the pre-Christian intangible heritage of the population. A particular emphasis of the presentation is put on a rich grave assemblage that contains, beside all other grave goods, a remarkable set of glass bangles and thousands of glass beads, with an impressive variety of colours, production and decoration techniques. The laboratory analyses of the chemical glass compositions demonstrate that the jewellery placed in the grave have originated from different regions and even

from different time periods, hence posing a certain interpretive challenge to the comprehension of such a specifically focused and still amazingly complex material record.

816 EXPLORING PUBLIC PERCEPTION: AN ONGOING PROJECT ON THE IMPACT OF ANCIENT HUMAN REMAINS VIA COMPUTERIZED CRANIOFACIAL DEPICTION

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Manzollino, Roberta (Interdepartmental Center of Research DigiLab, Sapienza University of Rome, Rome, Italy; Institute for Mummy Studies, Eurac Research, Bolzano, Italy; Suor Orsola Benincasa University of Naples, Naples, Italy) - Liu, Jessica (Face Lab, Liverpool John Moores University, Liverpool, UK) - Malatesta, Saverio Giulio (Interdepartmental Center of Research DigiLab, Sapienza University of Rome, Rome, Italy) - Leopardi, Laura (Interdepartmental Center of Research DigiLab, Sapienza University of Rome, Rome, Italy) - Genovese, Gianluca (Suor Orsola Benincasa University of Naples, Naples, Italy) - Montanari, Roberto (Suor Orsola Benincasa University of Naples, Naples, Italy) - Palombini, Augusto (Institute of Heritage Science - National Research Council of Italy) - Wilkinson, Caroline (Face Lab, Liverpool John Moores University, Liverpool, UK) - Paladin, Alice (Institute for Mummy Studies, Eurac Research, Bolzano, Italy)

Abstract format: Poster

The ancient human remains are of great interest to both the public and scientific community due to their symbolic, emotional and cultural values. Thus, they are considered "culturally sensitive artifacts". However, there remains a lack of comprehensive definition for the status of "human remains", beyond some international regulations (e.g., ICOM) for their display in museum collections. Consequently, there is a growing debate within the scientific community about the ethical issues surrounding this topic. Increased awareness is also reflected in the public's interest when encountering human remains in a museum.

In this regard, computerized craniofacial depiction can play a central role in disobjectifying ancient human remains. By restoring their physical appearance, visitors can virtually meet an individual of the past, no longer seen as an abstraction but as a human being. Consequently, using this technique, our objective is to enhance comprehension of these issues through a multi-level approach to investigate the interest that these remains can generate among museum audiences and to determine whether the display of craniofacial depiction can provoke a response from visitors. Therefore, the skeletal human remains currently housed at the Museum of the Colle del Duomo di Viterbo (Rome) will be bioanthropologically analysed for the first time. Moreover, the measurement of visitor interest will be achieved by detecting indexes of interest and behavioural dynamics using sensor systems and subsequent data processing employing AI techniques, developed within ARTEMISIA project (CNR-ISPC). Data from motion sensors (i.e., stops, transit, direction of attention) and biometric data (i.e., gender, stature) will be used in a completely anonymous way and then analysed with AI algorithms. This will allow us to obtain both an overall analysis of the museum experience and to identify possible methods of individual profiling before and after the visualization of the craniofacial depiction.

817 ADVANCES IN SEX DETERMINATION IN PLEISTOCENE CAVE BEARS: INTEGRATING PALEOPROTEOMICS AND MORPHOMETRICS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Gutiérrez- Carbajal, Amanda (CENIEH (National Research Center on Human Evolution), Burgos, Spain; Institut de Biologia Evolutiva (CSIC-Universitat Pompeu Fabra), Barcelona, Spain) - Villalba de Alvarado, Mónica (Centro Mixto UCM-ISCI de Evolución y Comportamiento Humanos, Madrid, Spain Dept. de Prehistoria, Historia Antigua y Arqueología, Universidad Complutense de Madrid, Madrid, Spain; Dept. de Prehistoria, Historia Antigua y Arqueología, Universidad Complutense de Madrid, Madrid, Spain; Musée de l'Homme, Paris, France) - Santos- Ureta, Elena (Centro Mixto UCM-ISCI de Evolución y Comportamiento Humanos, Madrid, Spain; CENIEH (National Research Center on Human Evolution), Burgos, Spain; Cátedra de Otoacústica Evolutiva y Paleoantropología (HM Hospitales-Universidad de Alcalá), Departamento de Ciencias de la Vida, Universidad de Alcalá, Alcalá de Henares, Madrid, Spain) - Kelley, Joanna (Ecology and Evolutionary Biology, University of California Santa Cruz, Santa Cruz, California, CA, USA) - Lizano, Esther (Institut de Biologia Evolutiva (CSIC-Universitat Pompeu Fabra), Barcelona, Spain; Institut Catala de Paleontologia Miquel Crusafont, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain) - Marquès- Bonet, Tomàs (Institut de Biologia Evolutiva (CSIC-Universitat Pompeu Fabra), Barcelona, Spain; Institut Catala de Paleontologia Miquel Crusafont, Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Spain) - Arsuaga, Juan Luis (Centro Mixto UCM-ISCI de Evolución y Comportamiento Humanos, Madrid, Spain Dept. de Prehistoria, Historia Antigua y Arqueología, Universidad Complutense de Madrid, Madrid, Spain; Departamento de Geodinámica, Estratigrafía y Paleontología, Facultad de Ciencias Geológicas, Universidad Complutense de Madrid, Madrid, Spain) - Martínón- Torres, María (CENIEH (National Research Center on Human Evolution), Burgos, Spain; Department of Anthropology, University College London, London, UK)

Abstract format: Poster

Sexual dimorphism in the Ursidae family is commonly observed, with males typically exhibiting a significantly larger size than females, which varies between 10% and 50% depending on the species. Particularly, cave bears are known for showing pronounced sexual dimorphism, highlighted in several morphological dimensions such as the diameter of canines, skull size, and limb bones.

Paleoproteomics emerges as a viable strategy for sex determination in ancient specimens, especially in cases where conventional methods face limitations due to fragmented or incomplete remains. Here, a rapid and sensitive mass spectrometry (MS)-based method is presented for determining biological sex in bears using dental enamel, incorporating proteomic extraction via acid etching to minimize material destruction.

The method has been tested on a set of canines from the Middle Pleistocene cave bear species *Ursus deningeri* from the Sima de los Huesos site, within the archaeological and paleontological complex of the Sierra de Atapuerca, Burgos, Spain. The sexual determination of these specimens was previously assigned through morphometric methods, as described by Koby (1949) and Kurtén (1955).

By reconstructing isoforms of the Amelogenin protein from isolated X and Y chromosomes of current *Ursus arctos*, significant differences between AMELX and AMELY sequences were observed, enabling reliable sex determination through this enamel protein.

Amelogenin exhibits high conservation in mammals, being completely identical between cave bears and current brown bears. This similarity allows the use of these sequences as a reference for reconstructing both sequences in ancient specimens.

This study presents a novel application of palaeoproteomics integrating with morphometrics in Pleistocene bears, offering a valuable alternative in situations of fossil material scarcity, where dental enamel may be the only preserved tissue source. This approach will facilitate more comprehensive investigations into cave bear populations, as well as understanding their demographics, behavior, and social structure.

820 SUBSISTENCE ECONOMY IN COMMUNITIES OF 14-18TH CENTURIES FROM THE EAST OF ROMANIAN CARPATHIANS: ARCHAEOLOGICAL RECORDS OF VEGETAL AND ANIMAL REMAINS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Danu, Mihaela (Alexandru Ioan Cuza University of Iasi, Faculty of Biology) - Stanc, Simina (Alexandru Ioan Cuza University of Iasi, Faculty of Biology) - Bejenaru, Luminița (Alexandru Ioan Cuza University of Iasi, Faculty of Biology)

Abstract format: Poster

The present study focuses on several archaeological sites of 14-18th centuries located in the Romanian extra-Carpathian area, more precisely between Subcarpathians and Prut river. Bioarchaeological research was conducted to understand of the subsistence economy and to gain insights into how environmental conditions, geographical features, and at times, the political-military landscape influenced daily life and habits.

The applied methodology involved a detailed analysis of vegetal micro-remains, particularly phytoliths, and an archaeozoological approach to understand the dynamics of the economy and environment during the transition from the Middle Ages to the modern period, in this area. The economic features were not uniform but varied in response to the local topography, climate, and whether the sites were urban or rural. The results of this work shed light also on what is common for the local economies to the east of Carpathians, revealing a significant dependence on livestock husbandry (e.g., cattle, sheep/goat, pig) and cereal cultivation (e.g., wheat, barley, oats, rye) as central pillars of their agricultural framework. The cereals were foundational to the settlements' food economy, serving as primary sources of carbohydrates and forming the basis of the diet not only for inhabitants but also for domestic animals. Beyond the local consumption, cereals likely played a role in the wider economy at regional level, including the trade.

By analysing the both vegetal and animal remains recovered from archaeological sites, it is possible to gain a multi-faceted understanding of the medieval and premodern landscape, revealing the complexity of people-environment interactions in communities to the east of Carpathians.

This work was supported by a grant of Ministry of Education from Romania, CNCS-UEFISCDI, project number PN-III-P4-PCE2021-1180, within PNCDI III.

821 USING COLLAGEN FINGERPRINTING TO EXPLORE THE FAUNAL SPECTRUM AT AMARA WEST, A LATE-SECOND MILLENNIUM BCE COLONIAL CENTRE IN UPPER NUBIA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Williams, Ellie (Archaeology, Canterbury Christ Church University) - Ruebens, Karen (Department of Archaeology, University of Reading) - Smith, Geoff (School of Anthropology and Conservation, University of Kent) - Spencer, Neal (Fitzwilliam Museum, University of Cambridge) - Weinstock, Jaco (Archaeology, University of Southampton)

Abstract format: Poster

Since 2008 British Museum-led investigations at Amara West (c. 1280-1070 BC) in Upper Nubia (present day northern Sudan), have revealed significant insights into the lived experience of a town designed as a centre for the pharaonic administration of Upper Nubia. Ongoing zooarchaeological analysis has produced a dataset of c. 40,000 recorded faunal specimens, contributing important evidence for subsistence practices, diet, animal management, mobility, and localised environmental change. A particularly interesting finding is the high proportion of caprine versus ovine remains, as initial morphological assessment suggested (following Zeder and Lapham 2010).

To gain additional data on the bovids at Amara West we applied Zooarchaeology by Mass Spectrometry (ZooMS) to 138 specimens. In a first step, 90 faunal specimens that were assigned to either goat (n=55), sheep/goat (n=30) or sheep (n=1) were chosen for analysis. These specimens included astragalus, calcaneus, humerus, metatarsal, phalanx 1, radius/ulna and tibia, and derive from a range of site phases, and from houses, storerooms, and open spaces. Some of the samples come from earlier (c. 1500-1400BCE) desert encampments that predate the town, from the first decades of pharaonic control of the area. In a second step, 48 additional bone fragments, most of which were thought to be wild bovids, were sampled. Collagen was extracted using an acid demineralisation (HCl) protocol and while collagen preservation was variable, over 60% of the sampled bone fragments could be identified taxonomically.

ZooMS confirmed the dominance of capra as no sheep were identified; this contrasts with other sites in the region (e.g. Sai and Kerma) and potentially reveals distinctive approaches to livestock management in different parts of colonised Nubia. This poster outlines our approaches – particularly the applicability/value of ZooMS – discusses some of the complexities of the data set and analysis, and presents some preliminary interpretations on the findings"

822 "PIECING TOGETHER PAST STORIES": COMMINGLED HUMAN REMAINS FROM THE CEMETERY OF THE THIRD ORDER OF OUR LADY OF CARMO (PORTO)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Rodrigues, Zélia (LABOH – Laboratory of Biological Anthropology and Human Osteology, CRIA – Centro em Rede de Investigação em Antropologia, Faculdade de Ciências Sociais e Humanas, Universidade NOVA de Lisboa, Portugal; Arqueologia e Património Lda.) - Malcherek, Anne (LABOH – Laboratory of Biological Anthropology and Human Osteology, CRIA – Centro em Rede de Investigação em Antropologia, Faculdade de Ciências Sociais e Humanas, Universidade NOVA de Lisboa, Portugal) - Fonseca, Vitor (Arqueologia e Património Lda.) - Fonseca, Jorge (Arqueologia e Património Lda.) - Pereira, Maria Graça (Arqueologia e Património Lda.) - Alves Cardoso, Francisca (LABOH – Laboratory of Biological Anthropology and Human Osteology, CRIA – Centro em Rede de Investigação em Antropologia, Faculdade de Ciências Sociais e Humanas, Universidade NOVA de Lisboa, Portugal; In2PAST - Associate Laboratory for Research and Innovation in Heritage, Arts, Sustainability and Territory (Portugal))

Abstract format: Poster

This research explores secondary depositions (SD) identified and excavated during the archaeological intervention (2022-2024) at the cemetery of the Hospital of the Third Order of Our Lady of Carmo (CARMO) – Porto (Portugal). The cemetery operated between 1801 and 1869, a historical period marked by the Napoleonic wars in Europe, the Siege of Porto during the Civil Revolution and cholera pan/epidemics. The term SD is used loosely here to identify disarticulated and/or re-organised clusters of human remains resulting from post-depositional disturbances, intentional or not, after the primary burial of the body. This preliminary study categorised SD into different typologies based on their position, spatial and stratigraphic distribution, and bone element representation. Drawings, photographs, orthophotography, and on-site recording were used to build the profile of the depositions. To date, 140 SD clusters were identified, amongst which distinct types can be distinguished based on variations in the following features: minimum number of individuals (MNI), bones present, organisation of bone elements, presence/absence of burial container such as coffins, and spatial relation of SD to other architectural and burial features. The MNI per SD ranged from 1 to 250 and the total number of individuals recovered from SD is approximately 800. Some clusters show a distinct composition of bone elements present, for example being composed entirely of long bones and skulls. In terms of variation in spatial organisation SD were found both within and beyond the boundaries of the main cemetery. The stratigraphic data suggested that some SDs were produced after the cemetery's abandonment, and others occurred as part of the management of the burial space; all indicate distinct events and show the informative potential of SD in accessing historical events and cultural practices of past populations.

823 EXPLORING THE ORIGINS OF GROG WITH SEM-EDS: THE BRONZE AGE CERAMICS FROM CROATIA

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Neral, Natali (Institute of Archaeology, Zagreb, Croatia) - Kudelić, Andreja (Institute of Archaeology, Zagreb, Croatia) - Quinn, Patrick (Institute of Archaeology, University College London)

Abstract format: Poster

Studying the composition of ancient pottery and its origin is very challenging mainly because ceramics is usually composed of several components; the raw clay and tempering materials that are usually added. To investigate the origin of certain pottery raw materials it is necessary to apply analytical methods that ensure the precise geochemical composition of the clay matrix and added tempers, and enables determination of certain technological features. Therefore, using scanning electron microscopy equipped with energy dispersive X-ray spectroscopy (SEM-EDS) and ceramic petrography, this research presents an analysis of the grog-tempered, Bronze Age ceramics from two archaeological sites situated in different geographical regions; Biranj site from Central Dalmatia and Molve-Topolova site situated in Continental Croatia. The intensive grog tempering was particularly common in continental Croatia during the Middle and Late Bronze Age, while along the eastern Adriatic coast, the addition of a small amount of grog is characteristic exclusively for Early and Middle Bronze Age communities. By comparing the geochemical compositions of ceramic matrix and grog, the aim of this study is to consider whether the grog is foreign or originates from the same source as the clay and to examine the variations in grog practice among communities exposed to different cultural influences. The preliminary results suggest that grog has a different geochemical composition compared to clay matrix. These may strongly indicate imports, transported from another manufacturing region or migrations of potters and/or pottery due to various cultural or socio-economic reasons. In addition, differences in pottery practice between regions also reflect cultural influences from the Mediterranean and Central Europe.

824 SKELETAL DANCE: ADVANCING UNDERSTANDING OF PAST EXCAVATIONS THROUGH ARCHEOTHANATOLOGY AND DIGITAL METHODS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Durczak, Kinga (Antea Group)

Abstract format: Poster

The core mission of archeoethanatology is to deepen our understanding of post-mortem interactions with human remains across diverse historical periods and geographical contexts. By exploring the intricate web of cultural, social, and environmental influences on the treatment of the deceased, this interdisciplinary field aims to reconstruct past societies' attitudes towards death and illuminate the complexities of funerary customs. Through meticulous analysis of burial practices, mortuary rituals, and taphonomic processes, archeoethanatology contributes to a nuanced comprehension of human behavior and belief systems throughout history.

Presently, a wealth of documentation methods exists, ranging from traditional techniques like drawings and photographs to cutting-edge digital technologies such as Geographic Information Systems (GIS) and 3D image-based modeling. However, the application of these methods to older excavations raises questions about feasibility, data availability, and cost-effectiveness.

Despite these challenges, leveraging advanced documentation techniques in old excavations remains a viable possibility. With careful planning and innovative approaches, researchers can harness these methods to extract valuable insights from existing data sets and enhance our understanding of human behavior.

Indeed, such endeavors offer a significant opportunity to advance our knowledge of past societies and inform future research directions. By learning from these projects, we can refine our methodologies, deepen our understanding of human behavior, and apply this knowledge to address contemporary challenges in archaeology and beyond.

825 EXPLORING WINE PRODUCTION STRUCTURES: CHARACTERIZATION OF BUILDING MATERIALS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Girimonte, Genea (ERAAUB, IAUB, Universitat de Barcelona) - Pecci, Alessandra (ERAAUB, IAUB, Universitat de Barcelona; INSA-UB, Universitat de Barcelona) - Reynolds, Paul (ICREA) - Forn, Clara (Museu de Badalona) - Miriello, Domenico (Università della Calabria)

Abstract format: Poster

In Roman times, production installations of wine, as well oil or fish by products, usually involved the presence of plastered vats where substances were collected and /or decanted/fermented.

In this work we propose to explore mortars and plasters characterization of the coatings of the vats to verify if the materials used in the construction of these may be correlated with the type of product processed within them. In other words, if the mortars and plasters used in the construction of production structures may show characteristics that reflect the past use of the structure itself.

Within the framework of this research, we will present the results of analyses conducted on various samples obtained from Baetulo, renowned for its distinctive wine production. We will detail the proposed methodology, including sampling procedures and mortar analysis protocols, as well as discuss the potential challenges and opportunities arising from the application of this investigative approach.

This work is part of the activities of the FI-SDUR 2022 (5635122) contract of Genea Girimonte in the PhD program "Sociedad y Cultura: Historia, Antropología, Arte y Patrimonio" at the University of Barcelona financed by AGAUR - Gencat, the project RACAMed II (PID2020-113409GB-I00), financed by MCIN/AEI/10.13039/501100011033 (A. Pecci, P. Reynolds), the ERAAUB (2021 SGR 00696), the Institut de Arqueologia de la Universitat de Barcelona (IAUB) y del INSA-UB, María de Maeztu Unit of Excellence 2021, MCIN/AEI/CEX2021-001234-M and the Università della Calabria.

826 THE MODELLING LINK BETWEEN HOMININS AND THE ENVIRONMENT

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Lomborg, Kamilla (CNRS UMR 5602 GEODE Géographie de l'Environnement, Maison de la Recherche, Université Toulouse II Jean Jaurès) - Cucart-Mora, Carolina (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine) - Hall, Harry (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine; Department of Archaeology, Classics and Egyptology, University of Liverpool) - Reschke, Jan-Olaf (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine; Institute for Ecology, Evolution and Diversity, Goethe University; ROCEEH Research Center, Senckenberg Research Institute) - Grove, Matt (Department of Archaeology, Classics and Egyptology, University of Liverpool) - Hertler, Christine (ROCEEH Research Center, Senckenberg Research Institute) - Gaudou, Benoit (Institut de Recherche en Informatique de Toulouse, Université Toulouse I Capitole) - Saqalli, Mehdi (CNRS UMR 5602 GEODE Géographie de l'Environnement, Maison de la Recherche, Université Toulouse II Jean Jaurès) - Riede, Felix (Department of Archaeology and Heritage Studies, Aarhus University) - Moncel, Marie-Hélène (CNRS UMR 7194 HNHP, National Museum of Natural History, Institut de Paleontologie Humaine)

Abstract format: Poster

The poster intends to demonstrate the opportunities of computational methods in the investigation of the interactions between hominins and their environment, more specifically on environmental reconstructions and agent-based modelling analysis. With two examples within this subject, the methodology is demonstrated by two different research questions: 1) The impact of environmental parameters on hominin dispersal in the Early Pleistocene, and 2) Lithic raw material procurement strategies of Neanderthals in the Middle Palaeolithic. The poster is designed around the common ground for the two studies:

- A landscape model, which can include both climate, vegetation and lithic resources.
- Agent settings, which determine the abilities of the simulated hominin populations.

For the question of hominin dispersal, the use of climatic and vegetational data is emphasised, since this aspect demonstrates how a landscape model can be used to test hypotheses with simulations of population dispersals in a representative environment. This can help connect the strings given by the archaeological record, with testing possible scenarios in an observable environment. The second study demonstrates how simple agent-based models can contribute with a quantitatively testing of hypotheses made from archaeological and ethnographical investigations. This is a great attribution to reject or confirm hypotheses on procurement strategies and even identify important parameters. By approaching two different research questions with the same methodological framework, it is demonstrated how environmental reconstruction and agent-based modelling are valuable tools for further exploration of hominin-environment interactions of the past.

827 ENVIRONMENTAL PROTECTION VS. HERITAGE PROTECTION: WHAT CHANCES FOR A COMMON ACTION?

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Ventura, Paola (Ministero della Cultura)

Abstract format: Poster

The amendment, in 2021, of the art. 9 of the Italian Constitution has combined the protection of "the landscape and the historical and artistic heritage of the Nation" with the protection of "the environment, biodiversity and ecosystems, also in the interest of future generations". Albeit the shared satisfaction for the recognition of the urgency of an incisive action to face the climate and environmental crisis, a minority of legal experts had soon raised some doubts about a possible conflict between the safeguard of cultural heritage and the needs of a rapid green conversion of the production system.

The legislative frame is analyzed, from the first derogatory rules for the authorizations concerning green energy production plants, through emergency decrees as a consequence of embargo on gas imports from Russia, to a series of laws for the implementation of the National Recovery and Resilience Plan (Italian: PNRR), subject to ongoing changes (a government bill, including the unsuitability of agricultural fields for photovoltaic systems is being examined just now – May 2024). Subsequently, we focus on the impact on the landscape and the archaeological assets – the visible, and even more the "invisible" ones.

Some case-studies (Friuli Venezia Giulia Region, NE Italy) are showcased: we try to provide figures about the authorization requests for new plant projects - with special regard to location choices - and the related archaeological impact assessment procedures (as far as possible, with data under constant evolution).

Indeed, the main purpose of this poster is a reflection about the chances to overcome the more and more frequent opposition between natural environment and cultural heritage, aiming to safeguard them both in a balanced manner.

828 **NEW DATA ON THE GRAVETTIAN AND SOLUTREAN OCCUPATIONS AT COVA DE LES CENDRES (ALICANTE, SPAIN)**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Bel, Miguel Ángel (PREMEDOC-GIUV2015-213, Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València; UNIARQ-Centro de Arqueologia da Universidade de Lisboa, Faculdade de Letras de Lisboa, Universidade de Lisboa) - Badal, Ernestina (PREMEDOC-GIUV2015-213, Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València) - Martínez-Alfaro, Álvaro (PREMEDOC-GIUV2015-213, Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València) - Martínez-Varea, Carmen M. (GIR PREHUSAL. Departamento de Prehistoria, Hª Antigua y Arqueología, Universidad de Salamanca) - Real, Cristina (PREMEDOC-GIUV2015-213, Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València) - Roman, Dídac (Pre-EINA, Departament d'Història, Geografia i Art, Facultat de Ciències Humanes i Socials, Universitat Jaume I) - Villaverde, Valentín (PREMEDOC-GIUV2015-213, Departament de Prehistòria, Arqueologia i Història Antiga, Universitat de València)

Abstract format: Poster

Cova de les Cendres (Alicante, Spain) is a crucial site for reconstructing the different Upper Palaeolithic chrono-cultural periods in the Mediterranean basin of the Iberian Peninsula, from the Evolved Aurignacian to the Upper Magdalenian. Focusing on the Gravettian and Solutrean, human occupations of both periods were well documented in one part of the excavated area of the site (Sector B), and the results have already been published.

This poster presents new information recovered in Sector A during the last field campaign. Beneath the Magdalenian sequence preserved in this sector, we documented deposits with diagnostic Gravettian and Solutrean lithic industry. The retouched materials include some backed pieces attributable to the Gravettian and remarkable examples of Solutrean pieces with flat retouch. Furthermore, we provide radiocarbon dates that align with the lithic industry. The documentation of lithic pieces and dates from the older phases of the Solutrean is particularly noteworthy, especially considering that recent phases are better represented in Sector B. This new data enhances our understanding of the Gravettian and Solutrean and underscores the importance of human occupations in the cave during these periods, particularly in relation to specific Solutrean phases.

829 **LAYERS OF LANDSCAPES: DIACHRONIC AND MULTIMODAL APPROACHES TO UNRAVELLING THE ROMAN TERRITORIES AT AQUILEIA**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Giovanelli, Riccardo (Istituto Italiano di Tecnologia) - Traviglia, Arianna (Istituto Italiano di Tecnologia) - Poggi, Giulio (Istituto Italiano di Tecnologia)

Abstract format: Poster

For nearly two decades, our team has been exploring the cultural landscape surrounding Aquileia, Italy, unraveling its dynamic transformations over time. A cornerstone of our research involves the development of advanced fieldwork methodologies that integrate remote sensing technologies. These include satellite multispectral imaging, airborne hyperspectral analysis, historical flight imagery, and LiDAR models. These methods have revealed paleo-landscape features like ancient coastlines and river networks, as well as archaeological structures, settlements, and centuriation axes. Artificial Intelligence techniques have further improved our ability to rapidly assess large areas and identify promising sites for detailed field investigation.

Our fieldwork, augmented by handheld tablets for semi-automated, geolocated annotations in conjunction with traditional GPS methods, has unearthed numerous archaeological sites and corroborated findings from remote sensing analyses. These efforts have yielded a wealth of artifacts, including pottery shards, which have been catalogued and subjected to advanced archaeometric analysis. For instance, the identification of a field abundant in mosaic glass fragments and colored tesserae suggests the presence of a Roman-era furnace specializing in coloring and creating elaborately decorated glassware.

By integrating these varied methodologies, our research aims to advance the elaboration of technological and methodological standards to boost the understanding of how natural and human actions shaped the ancient landscape of Aquileia. This multidisciplinary approach aids in reconstructing the historical and cultural context while emphasizing the importance of preserving our cultural heritage amidst modern-day challenges.

830 **SILIROCK: A NEW CHERT REFERENCE COLLECTION FOR CENTRAL ITALY**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Carletti, Elena (Sapienza University of Rome) - Eramo, Giacomo (University of Bari) - Conati Barbaro, Cecilia (Sapienza University of Rome)

Abstract format: Poster

Chert provenance analyses are rapidly increasing among the scientific community due to their potential in unravelling hidden aspects about prehistoric groups and societies. Hence, access to lithotheques (i.e., comparative collections of siliceous rocks) is essential to link archaeological raw materials to geological sources.

In this contribution, we present the first project of construction of a lithotheque for the Sabina region (central Italy) as a valuable tool for provenance analysis. The collection is composed of knappable raw materials collected during field surveys in Sabina and neighbouring areas (Umbria and Abruzzi regions) by researchers from the Department of Antiquities, Sapienza University of Rome.

The aim of the SiliROck project is to create a digital platform open to archaeologist and other scholars interested in siliceous rocks provenance to better understand raw material acquisition, circulation, and mobility throughout Prehistory.

The SiliROck lithotheque will be available online as an open-access space to provide information about the availability, distribution, and localization of chert sources across central Italy. To date, the collection is stored at the Origini Museum (Sapienza University of Rome) and is accessible to scholars previa request.

The virtual platform, beyond providing fresh comparative data, will encourage scientific inter-operability, cooperation, and data sharing, according to the FAIR principles.

831 **MORE THAN JUST FOOD: USE AND IDENTIFICATION OF BIVALVE SHELLS AS TEMPERING MATERIAL IN NEOLITHIC POTTERY FROM LATVIA**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Haferberga, Vanda (University of Latvia) - Bērziņš, Valdis (University of Latvia Institute of Latvian History)

Abstract format: Poster

Bivalve shell is one of the most common tempering materials in Neolithic pottery of the eastern Baltic. It can be assumed that bivalves constituted a food source during the Neolithic, where the waste, namely the shell, was secondarily used by adding it as tempering material to the clay paste. Shell as tempering material in various clay paste recipes has been quite well studied (e.g. Sobkowiak-Tabaka et al. 2023).

However, much less research has been devoted to the identification of shell temper in the pottery fabric. Quite often, due to soil conditions, the shell has been dissolved from the pottery fabric, leaving only voids. The study focuses on the identification of this tempering material, trying to answer the question of whether it is possible to not only to identify shell but also to make taxonomic distinctions.

Experimental clay briquettes were prepared and compared to Neolithic pottery using a stereomicroscope as well as ceramic petrography.

The paper was prepared within the Latvian Council of Science funded project "Skills in Synergy, Crafts in Context: An Integrated Study of eastern Baltic Stone Age Technologies" (project no. lzp-2021/1-0119).

832 **THE ARCHAEOBOTANICAL RECORD OF MĂGURA GORGANA AT PIETRELE IN SOUTH ROMANIA (4550 - 4250 BC)**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Aquaro, Antonella (DAI - Deutsches Archäologisches Institut)

Abstract format: Poster

This poster presents the main results of the archaeobotanical investigation of the Copper Age settlement of Măgura Gorgana at Pietrele, South Romania. Here, extensive excavation efforts and systematic soil sampling have yielded a rich collection of charred plant macroremains, offering insights into at least 300 years of plant utilization (4550 - 4250 BC).

The recovered plants include cereals, pulses and stone fruits and provide a glimpse into the subsistence strategies and dietary habits of this prehistoric community. Utilizing an integrated approach, the analysis of different types of samples (e.g., stored, waste, or residues from grain processing) is combined with the interpretation of the context of origin within the settlement. The resulting comprehensive dataset of economically relevant plants shows that a big part of the diet was based on barley, emmer and einkorn wheat, lentils, peas and bitter vetch, flax, alongside a variety

of wild-collected fruits, including grapes, blackberries, raspberries and various types of plums such as dwarf cherry, cherry plum, bird cherry, blackthorn, hawthorn and cornelian cherry.

In the selection of preferred crops, a clear continuity is evident. Towards the end of the settlement, the predominance of barley likely indicates the necessity for a more resilient grain variety. Similarly, we can observe remarkable stability in the preference for lentils.

This poster outlines the results of the plant identifications and their relative abundance within samples, in combination with contextual information. This integrated approach sheds light on storage practices, processing techniques, and the organization of the settlement. By combining these aspects, we gain a comprehensive understanding of how the inhabitants interacted with their plant resources throughout the history of the settlement and discern patterns of adaptation and cultural preferences that shaped their community livelihoods over time.

834 FAMILY FESTIVAL OF ARCHAEOLOGY AND POTTERY: UTILISING ARCHAEOLOGICAL RESEARCH TO ENGAGE WITH AND IMPACT LOCAL COMMUNITIES

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Trinder, Ermelinda (Staffordshire University)

Abstract format: Poster

The Family Festival of Archaeology and Pottery was undertaken in Stoke-on-Trent, England, in one of the most famous areas for its pottery heritage. This project aimed to utilise the archaeological practice of pottery fragmentation, identified in Iron Age burial mounds in Albania, to bring together members from deprived areas, asylum seekers and refugees in a fun, safe and family-based environment. This paper will present how archaeological research has the potential to bring together diverse individuals and how it could provide people with a sense of community identity, cultural heritage, and civic pride.

This paper will argue that archaeological research can meaningfully impact and become a catalyst for positive change and can break down language, social, educational and financial barriers and inequalities. The success of the Family Festival of Archaeology and Pottery was based primarily on collaborating with three charitable organisations that are currently engaged in helping and supporting different communities within the area. This project created the foundation for meaningfully impacting social inequalities in local communities and promoting a sense of civic pride. However, this paper advocates for a structured framework organised by universities and government institutions that supports archaeologists and heritage professionals in engaging in long-term ways and meaningfully empowering their local communities.

836 CROSS-REFERENCING BIOARCHAEOLOGICAL EVIDENCE WITH HISTORICAL DATA, THE RESULTS FROM THE EARLY MODERN SARDINIAN CHURCH OF SANT'AVENDRACE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Gallisai, Alice (University of Cagliari, Italy) - Pietra, Giovanna (Soprintendenza Archeologia Belle Arti e Paesaggio per la Città Metropolitana di Cagliari e le Province di Oristano e Sud Sardegna, Italian Ministry of Culture, Rome, Italy) - Ippolito, Vincenzo (Independent researcher, Soprintendenza Archeologia Belle Arti e Paesaggio per la Città Metropolitana di Cagliari e le Province di Oristano e Sud Sardegna, Italian Ministry of Culture, Rome, Italy) - Caria, Laura (Museo Archeologico Nazionale di Cagliari, Italian Ministry of Culture, Rome, Italy) - Uccheddu, Giulia (Universidad de Granada, España) - Candilio, Francesca (Museo delle Civiltà, Italian Ministry of Culture, Rome, Italy)

Abstract format: Poster

Excavations conducted during public works for the refurbishment of the Church of Sant'Avendrace in Cagliari (Sardinia, Italy) led to the identification, meticulous excavation, and recovery of over 200 primary burials and associated commingled remains dating from the 16th to the early phases of the Early Modern Age.

This funerary context was ultimately closed following the extension of the Napoleonic edict of Saint Cloud (1804) to the Kingdom of Italy and then to Sardinia, which mandated the relocation of burial grounds away from inhabited areas and cultivated lands.

During this time period, spanning over little more than 200 years, the community of fishermen and breadmakers living along the coastline in the peripheral area of Cagliari was affected by numerous historically documented events of interest to the region, including two famines (1645, 1680), the Black Death (1652), attacks by Anglo-Dutch ships under Charles III (1708), and Spanish incursions (1717-1718).

This study leverages the abundance and variety of information granted by the defined and limited period of use (characterized by numerous events that would have affected health and living conditions); the availability, at the diocesan archive of Cagliari, of the *Quinque libri* (church registers where births and deaths were recorded); and the quality of

conservation of the osteological remains. It uses a multidisciplinary approach to analyze the historical data and the bioarchaeological evidence to assess how these corroborate one another. Preliminary findings suggest a strong agreement between the data collected in the archives and the examination of historical sources, with peaks in mortality consistent with church records during the years of the aforementioned historical events. Similarly, corroboration is attested in the results from the preliminary bio-archaeological analysis of approximately 50 individuals, which indicates a community marked by evidence of hardship and, in different occasions, signs of severe malnutrition.

837 A NEW BRANCH OF RESEARCH FOR ANALYSING ARCHAEOLOGICAL CONTEXT: APPLICATION OF DRONE-BASED MAGNETOMETER

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Mandorlo, Alessia (University of Salento)

Abstract format: Poster

In the last decades, various drone-based systems equipped with sensors, such as multispectral, thermal, and LiDAR have been tested in many archaeological sectors and in the rescue archaeology. In the most recent years, there has been a growing interest in the use of geophysical sensors like magnetometry and ground-penetrating radar in archaeology, leading to a new area of research. This poster will present the current state-of-the-art and potential applications of drone-based magnetometers in archaeology, in which magnetometry has proven to be an effective method for detecting and mapping archaeological features buried underground; at the same time, the Unmanned Aerial Vehicles (UAVs) have been widely recognized for their ability to map and survey archaeological sites from above. The combination of Unmanned Aerial Vehicles (UAVs) and magnetometers offers a promising approach for surveying and mapping archaeological sites that are difficult to access. By leveraging the advantages of drone-based magnetometry, it can enhance archaeological prospection in challenging terrain, on local and large scale and in relatively short time.

838 REFITTING CERAMICS FROM MIDDLE NEOLITHIC SETTLEMENTS: PRELIMINARY MORPHOLOGICAL AND SPATIAL ANALYSES FROM CAL SITJO SITE (4100-3700 BCE, NE IBERIAN PENINSULA)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Cámara Manzaneda, Javier (Departamento de Geografía e Historia, Universidad de La Laguna) - Gómez de Soler, Bruno (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili) - Chacón, M. Gema (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili; UMR 7194 - Histoire Naturelle de l'Homme Préhistorique) - Farkouch, Mourad (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili) - Suesta, Alfredo (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili) - Allué, Ethel (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili) - Mas, Bàrbara (Seminaris d'Estudis i Recerques Prehistòriques (SERP), Universitat de Barcelona; Institut d'Arqueologia de la Universitat de Barcelona (IAUB); Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA)) - Díez-Canseco, Celia (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili) - Vallverdú, Josep (Institut Català de Paleoeologia Humana i Evolució Social (IPHES-CERCA); Àrea de Prehistòria, Universitat Rovira i Virgili)

Abstract format: Poster

The Cal Sitjo site consist of a new archaeological sequence located in the chert-rich region of the town of Sant Martí de Tous (Barcelona, Spain), in the northeastern part of the Iberian Peninsula. This region highlights for the frequent number of archaeological sites, quarries, and workshops (e.g., Vilars de Tous, La Guinardera) which were potentially dedicated to the chert exploitation throughout prehistoric and modern times (Cámara 2017; Clop et al., 2005; Gómez de Soler et al., 2020; 2021).

Since the discovery of Cal Sitjo in 2019, the successive archaeological excavations carried out in one of the sectors have revealed around an 8 m sedimentary sequence with diachronic occupations dated from the Mesolithic to the Middle Neolithic (Gómez de Soler et al. 2023). One of the significant traits of the Neolithic layers is the frequent number of structures huddled in the excavated sector (e.g. post-holes, combustion, and stone-floor structures), which points towards the hypothetical articulation and repeated reorganization of the occupational space. Radiocarbon dates and diagnostic traits of the ceramic remains place these occupations during the Middle Neolithic and, particularly, at the end of the Postcardial regional Neolithic horizon (4070-3700 cal. BCE).

This paper aims to present the new obtained results from the latest archaeological fieldworks, which were mainly concentrated on the excavation of the Middle Neolithic layers, as well as to analyse the spatial distribution of potsherds within the succession of the Neolithic occupations and structures. Moreover, preliminary data on the typological and

technological characterization of the ceramic assemblage show not only the attribution of the assemblage to the Molinot regional style, but also the prevalence of the same Early Neolithic forming traditions during the Middle Neolithic in the NE Iberian Peninsula.

839 ORGANIC CONTENTS OF BRONZE AGE FUNERARY VESSELS FROM NORTH-WEST PORTUGAL

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Back, João Vinícius (Department of History, University of Minho, Portugal; ERGANE – Digital Archaeology, Federal University of Rio Grande do Sul, Brazil; University of Évora, Portugal) - Oliveira, César (HERCULES Laboratory, University of Évora, Portugal; IN2PAST – Associate Laboratory for Research and Innovation in Heritage, Arts, Sustainability and Territory, Portugal) - Bettencourt, Ana (Department of History, University of Minho, Portugal; IN2PAST – Associate Laboratory for Research and Innovation in Heritage, Arts, Sustainability and Territory, Portugal) - Sampaio, Hugo (Department of History, University of Minho, Portugal; IN2PAST – Associate Laboratory for Research and Innovation in Heritage, Arts, Sustainability and Territory, Portugal; LAB2PT – Landscapes, Heritage and Territory Laboratory, Portugal) - Vilas Boas, Luciano (Department of History, University of Minho, Portugal; IN2PAST – Associate Laboratory for Research and Innovation in Heritage, Arts, Sustainability and Territory, Portugal; LAB2PT – Landscapes, Heritage and Territory Laboratory, Portugal) - Gonçalves, Luís (Earth Sciences Center (CCT/UM), Earth Sciences Department, University of Minho, Portugal) - Bernardes, Paulo (LAB2PT – Landscapes, Heritage and Territory Laboratory, Portugal; Unity of Archaeology (Unidade de Arqueologia), University of Minho, Portugal)

Abstract format: Poster

The analysis of organic residues present in archaeological ceramic vessels plays a crucial role in determining the functions of these containers, providing valuable information about agro-pastoral and gathering practices, as well as the processing methods used and the selection of specific raw materials. However, its application to prehistoric vessels from the Iberian Northwest is still scarce. The proposal of this poster is to present a new project that aims to systematically use chromatographic techniques to study organic residues preserved in vessels from Bronze Age funerary contexts in north-western Portugal. Furthermore, samples were taken following the rigorous archaeological practices to avoid contamination and preserve the integrity of the residues. Some of the results obtained for horizontal rim vessels dating from the first half of the 2nd millennium BCE are presented. These results were compared with recently published studies of a vessel of this typology. The study of the organic chemical composition preserved in vessels of this type also contributes to answering the various hypotheses established about the use of horizontal rim vessels in funerary practices.

841 POTS BURIALS AS MORTUARY PRACTICE IN NEOLITHIC CENTRAL ANATOLIA (TÜRKİYE): THE CASE OF TEPECİK ÇİFTLİK

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Büyükkarakaya, Ali (Hacettepe University, Department of Anthropology; Human Behavioral Ecology and Archaeometry laboratory (IDEA lab)) - Godon, Martin (IFEA / Institut Français d'Études Anatoliennes)

Abstract format: Poster

In this paper, a phenomenon that has not been seen before as the mortuary practice in early Pottery Neolithic settlements in Southwest Asia is presented. Based on the stratigraphy of the settlement and the available calibrated radiocarbon dates, it can be said that members of the Tepecik-Çiftlik community in Central Anatolia (Türkiye) began to bury some of their babies who died at very early ages in pots, starting from the first half of the 7th millennium BCE. It was determined that the ages of these babies ranged from newborn to one year old. Potteries used for these burials are produced locally on site, and are mostly straight wall pots with flat bases. One can easily understand such typological selection when considering the deposition process of human remains and eventually offerings inside a container. Additionally, in the studies carried out, it was also observed that small bowls were used as grave goods in some of the graves of babies. In this contribution, we evaluate the traces of this particular form of mortuary behaviour, which continued throughout the 7th millennium at the settlement, in the context of the subject-object relationship in terms of the community's conceptualization of death by including bioarchaeological data.

842 THE THERMAL BATHS OF LA ONTAVIA AND THE MANSIO MARIANA, A ROMAN CONTEXT NEAR OF THE ROUTE OF VICARELLO CUPS

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Esquinas, Ana (EIDUNED. Universidad Nacional de Educación a Distancia)

Abstract format: Poster

This study aims to highlight the distribution and the interconnections between Roman-era sites located in the surroundings of the thermal baths of La Ontavia (Terrinches, Ciudad Real, Spain) and the mansio Mariana (Puebla del Príncipe, Ciudad Real, Spain). Mariana is an ancient Roman mansio which is mentioned in the Antonine Itinerary in section XXIX Item per Lusitaniam ab Emerita Caesarea Augusta and the Vicarello Cups. The territory referred to is located north of the Saltus Castulonensis.

La Ontavia is located just five kilometres away from Mariana, also in the vicinity of Vicarello Cups Roman road. It is a thermal complex of remarkable dimensions built in the High Imperial period, abandoned from the third century C.E. and in the Late Antique and High Medieval period was reused for funerary purposes.

Other settlements from the Roman period have been documented in the vicinity of both sites. We present a diachronic and comparative analysis of the rural population in this area based on extensive and intensive systematic surveys as well as some archaeological excavations.

The aim of this research is to analyse at various scales how the different settlement models are situated in this territory. It is also intended to study the connections between these settlements with the mansio Mariana, the thermal baths of La Ontavia and the Roman roads.

843 PETROGRAPHIC CHARACTERISATION OF ARABIAN QUARTZ-ARENITES: UNVEILING PETROGENESIS AND WEATHERING PROCESSES OF ABIOTIC PREHISTORIC RESOURCES

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Prieto, Alejandro (University of the Basque Country) - Cristóbal, Paula (Department of History, Geography and Communication. University of Burgos) - Crassard, Rémy (CNRS, UMR 5133 Archéorient) - Schiettecatte, Jérémie (CNRS, UMR 8167 'Orient & Méditerranée') - Hibert, Yamandú (Institute for Archaeological Sciences, Department of Paleoanthropology, University Tübingen)

Abstract format: Poster

The characterisation of abiotic resources has constituted a major topic in Prehistoric Archaeology since the 50s of the previous Century. Inferring human mobility, especially if the distance is high, still constitutes the main output of lithic raw material research. Furthermore, in the last decades, the characterisation of abiotic resources is diversifying the directions looking forward because the features of the rocks, different depending on the formative and weathering processes that have created and affected them, modify the way humans transformed, used and managed them. This interdependence between the rock features and their human use was obvious and thanks to interdisciplinary approaches that include petrography, technological analysis or use-wear analysis, among others, we are depicting new human behaviours and unveiling historic narratives of past human populations.

Nowadays, the Arabian Peninsula constitutes a relevant scenario for Palaeolithic research as the new archaeological discoveries are challenging the dispersion of the human populations out of Africa. In this area, little is known about the characteristics of the abiotic resources used by humans. In this presentation, we will give insights into the few quartz-arenites obtained from the Arabian Peninsula. The main objective of this presentation consists of the characterisation of lithic resources potentially exploited by past populations as this constitutes the cornerstone for later interdisciplinary research. With this aim we have characterised quartzite thin sections using high-resolution petrography and non-destructive stereomicroscopy. This allowed us to infer the genesis of the material, characterise how it has been weathered and determine particular features that can determine its human use.

844 A DIVIDED SEA?: COMPARING POTTERY USE IN JAPAN AND KOREA AT THE DAWN OF AGRICULTURE THROUGH ORGANIC RESIDUE ANALYSIS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Lundy, Jasmine (University of York) - Craig, Oliver (University of York) - Bondetti, Manon (University of York) - Murakami, Natsuki (Nara National Research Institute for Cultural Properties) - Brainerd, Leah (University of Cambridge) - Nicholson-Laylie, Sessa (University of York) - Sasaki, Miho (Nara National Research Institute for Cultural Properties) - Son, Joon-Ho (Korea University) - Crema, Enrico (University of Cambridge) - Shoda, Shinya (Nara National Research Institute for Cultural Properties)

Abstract format: Poster

In the first Millennium BC rice and millet agriculture was introduced to the Japanese archipelago from the Korean peninsula, first arriving in Northern Kyushu. A recent synthesis of radiocarbon dates from carbonised rice grains has helped elucidate the timing of this process and its subsequent dispersal through the Japanese archipelago. Yet relatively little is known regarding the extent to which rice and millet agriculture transformed diets and foodways in Japan. To investigate this, here we compare the results of stable isotope analysis of human bone and organic residue analysis (ORA) of cooking pots from contemporary sites in Korea and Northern Kyushu, Japan. Carbon and Nitrogen stable isotopes enable us to understand the major dietary sources (i.e., C3/C4 plants and terrestrial vs aquatic animals) and ORA gives direct chemical evidence of resources processed in the cooking vessels analysed.

During the first Millennium BC in Korea, stable isotope analysis of human remains has shown that millet, a C4 crop, was a major dietary source. The addition of ORA of Korean 'Mumun' pottery has enabled us to investigate culinary practices from a much wider range of sites. Our results, reinforce the human stable isotope data, as milliacin, a lipid biomarker for Broomcorn millet (*Panicum miliaceum*), was readily identified in Korean pottery.

In contrast, at contemporary sites in Kyushu, Japan, millet has not been identified in any Final Jomon/Initial Yayoi pottery and stable isotopes of Final Jomon/Initial Yayoi human remains from Kyushu point to diets dominated by terrestrial and aquatic foods rather than a C3 or C4 signal. Thus, it can be argued that, whilst some aspects of an agricultural package did enter Northern Kyushu, it did not have a major influence on the pre-existing culinary habits of the populations residing there at least in the introductory phase.

845 MISFITS OR NEIGHBOURS? DIET ($\delta^{13}C$, $\delta^{15}N$) AND MOBILITY ($\delta^{18}O$) IN THE NEOLITHIC SITES OF BĂLĂŢEANCA AND CERNICA (ROMANIA)

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: García-Vázquez, Ana (ArchaeoSciences Division, Research Institute of the University of Bucharest) - Vasile, Gabriel ("Vasile Pârvan" Institute of Archaeology, Romanian Academy, Bucharest, Romania) - Ştefan, Cristian ("Vasile Pârvan" Institute of Archaeology, Romanian Academy, Bucharest, Romania) - Bălăşescu, Adrian ("Vasile Pârvan" Institute of Archaeology, Romanian Academy, Bucharest, Romania)

Abstract format: Poster

The archaeological site of Bălăţeanca, located in the commune of Cernica (Ilfov Conty, Romania), was researched in the winter of 2020. The rescue excavations of the A0 Motorway surrounding Bucharest revealed a complex settlement with features from many time periods, from the Neolithic to the Middle Ages. The oldest habitation belong to Neolithic, Boian culture – phase Bolintineanu (ca. 5200-5000 BC).

Three graves from Boian culture containing human remains were excavated, alongside with a dozen of pits containing animal remains, possibly domestic. The graves correspond to two adults (M6 and M7) and a child aged 10-11 (M8). Isotopic analysis was conducted on the three humans and four animals (cattle and ovicaprines). The %N in the bone indicated that only two of these graves contained sufficient collagen (M6 and M8). The preservation of the animal remains was poor and didn't have enough collagen, with some of the bones completely burnt to a white colour. $\delta^{13}C$ and $\delta^{15}N$ results were compared with the nearby (3.7 km) and contemporary site of Cernica. The result for M6 showed a significantly lower $\delta^{15}N$ value compared to the entire population of Cernica, suggesting a diet with much less animal protein, whereas the child also exhibited a lower $\delta^{15}N$ than the neighbouring population, although their results could be more consistent with Cernica's diet. Regarding $\delta^{18}O$, all individuals seem to be of local origin, although M6 appears to have spent the last years of his/her life in a colder area.

846 THE STEĆCI TOMBSTONES AS MULTIETHNIC ARCHAEOLOGICAL HERITAGE AND SOCIAL PHENOMENON

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: anzur, lana nastja (University of Ljubljana) - Caval, Sasa (Stanford University; Research Centre of the Slovenian Academy of Sciences and Arts)

Abstract format: Poster

Stećci are medieval tombstones found in Bosnia and Herzegovina, Montenegro, Serbia, and Croatia. There are over 70,000 documented stećci, but the actual number could be even higher due to poor preservation and lack of archaeological research. Despite being in a politically divided area, stećci are not contested heritage. In fact, they can be used to overcome the division between different ethnic groups. This was demonstrated when they were added to the UNESCO World Heritage List as a multinational nomination in 2016.

Stećci are not limited to a single ethnic or religious group. They are a phenomenon defined by geographical and temporal boundaries. They come in various forms, with only about 8% being decorated. Around 400 have inscriptions in Bosnian Cyrillic and Glagolitic scripts, which are now extinct. However, the endurance of stećci is also evident in the use of forms in Early Modern Jewish tombstones in Central Bosnia. The iconography of the decorations on stećci is diverse, with many motifs linked to prehistory. Additionally, the symbols used in traditional Bosnian tattooing of Catholic women also clearly connect to those found on stećci. Building on the paradigms of participatory heritage discourse, we will present the impacts of the stećci as both cultural and social phenomenon, looking at how local people perceive them through the lens of community building and reconciliation.

847 CAVE CHURCH AT ZAHAITANSKA ROCK (CRIMEA): FOUND&LOST?

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Chuyeva, Kateryna (independent scholar) - Bobrovskyy, Tymur (The National Conservation Area "St. Sophia of Kyiv")

Abstract format: Poster

In 2004 a cave church with wall paintings was found at Zahaitanska Rock near Sevastopol (Crimea, Ukraine) by Dr. Tymur Bobrovskyy and Kateryna Chuyeva. The church is a part of the rock-cut cave complex and was cut down in a grotto at an altitude of about 25 meters from the foot of the cliff. During 2005-2006 excavation of the floor of the church and visual examination of the wall paintings were conducted by the authors of the discovery. According to the materials received, the church and its unique wall paintings were dated to the late 13th - early 14th century. Wall paintings covered about 15 m² total in apse and partly in a nave. The iconography program was described as fully as possible despite the heavy losses of paint layer, fungal deterioration etc.

The conservation measures were extremely needed for further preservation of the wall paintings. We started to elaborate on the program. Wall paintings were fragile, partly wet and kept crumbling. Unfortunately, it was not possible to start immediately due to the lack of financial support and the difficulty of access to the church.

In 2014 Crimea was annexed by the Russian Federation. We lost any access to the site. In 2017 a group of Russian amateur speleologists visited the church and chipped off a fragment of the wall-paintings to photograph the carved inscription which fragment became visible through the crumbling of murals. It was published by Dr. Vinogradov (Moscow) and contains the date "1303".

After 2014 the site was unattended and unrestored.

Since 2022 the risks of damage and loss of the wall paintings have increased due to the military operations in/near Sevastopol which is one of the most militarized zones despite the World Heritage Site located in the area.

848 ODESA ARCHAEOLOGICAL MUSEUM AT THE TIME OF FULL-SCALE WAR

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Lobanova, Mariia (Odesa Archaeological Museum of the National Academy of Science of Ukraine) - Kalashnikova, Nataliia (Odesa Archaeological Museum of the National Academy of Science of Ukraine)

Abstract format: Poster

The Odesa Archaeological Museum of the NAS of Ukraine is the oldest archaeological institution in Ukraine. The museum was founded in 1825 as Odesa Museum of Antiquities. In 2025, the institution will celebrate its 200th anniversary. This collection was granted the status of the "National Heritage of Ukraine" in 2008. It covers different historical stages. It includes large collections from prehistoric and ancient sites, numismatic collections, and Egyptian and Cypriot antiquities. The museum was constantly attacked during the war because of its location in the city center, close to the seaport.

In February 2022, the museum team removed the exhibited collection to a safe place and barricaded large objects. The building was heavily damaged (fallen ceilings, walls, broken windows) after the massive attacks by Russian Federation on Odesa in July 2023. Due to systematic shelling, the condition of the museum building is getting worse.

Military operations occurred on the Zmiinyi island, where the museum's branch institution has been since 2008. In Ancient times, the island was sacred to the hero Achilles and had a temple of the hero with a statue inside. According to the last pictures of the island, museum definitely damaged or destroyed.

The Museum received help from various international organizations (UNESCO, ALIPH, Museum for Change, organizations from Germany, Poland and Czech Republic). The museum team is implementing projects to digitize its collections and protect its building.

A full-scale war affects all aspects of the archaeological heritage in Ukraine and the Odesa region. Most projects are frozen, and settlements in strategic military places are being destroyed. Odesa Archaeological Museum is using all its efforts to preserve cultural heritage.

849 'ORGANIC TEMPER' AND THE EARLY NEOLITHIC POTTERY PRODUCTION: THE CHALLENGE OF INTERPRETATION

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Dzhafzova, Tanya (St Cyril and St Methodius University of Veliko Tarnovo, Bulgaria)

Abstract format: Poster

The seemingly uniform vegetal inclusions (usually interpreted as 'chaff'), standardly found in the clay paste used for pottery production at many Neolithic Eastern Balkan settlements, actually reveal much greater diversity in terms of used types of plants and vegetal parts.

The specific nature of the organic remains, the study of essential aspects of their role as potential functional temper, as well as the research on the various actual sources of vegetal inclusions used in the technological cycle of pottery production, refer to several major questions. Why was organic temper added? What were the plant materials that took place in the process of making ceramic vessels? How the diversity, established within this category of 'organic temper', can be explained?

These questions are tackled by the application of various macro- and microscopic analytical approaches. Potentially, a more comprehensive understanding of the studied materials thus sheds light on the essence of the interaction between two major cycles of the Neolithic way of life – the subsistence practices and the ceramic technology.

851 DENTAL CALCULUS OF LATE-IRON AGE ESTONIANS: DIRTY TEETH AND VALUABLE INFO

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Unt, Agnes (University of Tartu)

Abstract format: Poster

While the studies of ancient foodways are well-established within the Estonian archaeological discourse, the analysis of microremains from human dental calculus is an underutilised method. Applying this method, the first study of this size was conducted in Estonia on human dental calculus from the Kukruse Late Iron Age cemetery. A dedicated clean laboratory was established at the University of Tartu, Estonia, and the methodology was refined to suit the nature of the material. Work with a purpose-built reference collection was done in tandem with the analyses. All debris was recorded, yielding 1164 microdebris from the ten analysed individuals. Altogether 333 microremains belonged to kingdom Plantae of which Triticeae and Fabaceae starch granules were found. Interestingly, there was a lack of phytoliths in the samples, a phenomenon that needs to be investigated further. The presence of wood debris may be indicative of crafts or practises. A preliminary data comparison was done with the EA-IRMS and ORA analyses from the same site, suggesting that the microremains from dental calculus contained more material of plant and less of animal origin than may seem from the previous results. This dental calculus analysis is the first of its kind on this scale in Estonia, opening a small window into the dietary practises of ancient populations of Estonia.

852 EXPLORING ANCIENT NETWORKS: A SURVEY ON ETRUSCAN EVIDENCE ALONG THE THE SECCHIA RIVER FROM THE APENNINES TO MODENA

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Battaglia, Sara (Università degli Studi Roma Tre) - Tulipano, Jacopo Francesco (Università degli Studi di Roma La Sapienza)

Abstract format: Poster

This poster aims to present an investigation into Etruscan mobility within the territories surrounding the Secchia River (situated in the province of Modena). The research is based on a comprehensive review of published archaeological data focusing on the Secchia Valley intersected with topographical and ancient landscape data.

Utilizing sources such as the Atlas of Archaeological Heritage of the Province of Modena and subsequent publications, the study aims, in its initial phase, to analyze and systematize data pertaining to the Iron Age. This endeavour is crucial for delineating areas of Etruscan influence and identifying Etruscan settlements and other sites across the Province of Modena, ranging from the Apennines to the course of the Po River.

The significance of this research lies in its focus on an area historically marginalized due to its proximity to Bologna (the Etruscan Felsina) and overshadowed by more substantial discoveries in neighbouring territories.

In addition to archaeological findings, the second phase of this research investigates evidence from topography, toponymy and popular traditions, particularly highlighting indicators of potential Etruscan occupation or influence along the Apennine ridge.

Historically, rivers and mountain ranges have often served as territorial boundaries. However, recent works are aiding a re-evaluation of these landscapes as crucial elements facilitating communication and interaction between adjacent territories and cultures. This shift in perspective underscores the importance of investigating the Secchia Valley and its surroundings within the broader context of ancient mobility patterns.

This poster will detail the methodologies employed in this investigation, utilizing GIS to register archaeological and topographical data, and subsequently intersecting those data to draw preliminary conclusions. These tools are instrumental in identifying potential communication routes linking the Po Valley with the northern Tyrrhenian slope, shedding light on the intricate networks of Etruscan mobility in the region.

854 POTTER'S STAMPS ON ITALIC TERRA SIGILLATA IN THE ROMAN CITY OF POLLENTIA (ALCÚDIA, MALLORCA, BALEARIC ISLANDS)

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Plaza Conesa, Paula (ERAAUB, Institut d'Arqueologia de la Universitat de Barcelona (IAUB); Universitat de Barcelona (UB), Spain) - Guimarães, Raquel (ERAAUB, Institut d'Arqueologia de la Universitat de Barcelona (IAUB); Universitat de Barcelona (UB), Spain; Fundação para a Ciência e a Tecnologia (FCT)) - Siclari, Patrizia (ERAAUB, Institut d'Arqueologia de la Universitat de Barcelona (IAUB)) - Talavera Montes, Antonio Jesús () - Cau-Ontiveros, Miguel Ángel (ERAAUB, Institut d'Arqueologia de la Universitat de Barcelona (IAUB); Universitat de Barcelona (UB), Spain; ICREA, Passeig Lluís Companys 23, 08010 Barcelona, Spain, Chercheur Associé, Aix Marseille Univ, CNRS, CCJ, Aix-en-Provence, France) - Mas Florit, Catalina (ERAAUB, Institut d'Arqueologia de la Universitat de Barcelona (IAUB); Universitat de Barcelona (UB), Spain) - Chávez-Álvarez, M^a Esther (Grupo de investigación ARQHISPA, Departamento de Geografía e Historia, Universidad de La Laguna, Spain)

Abstract format: Poster

This study offers a first insight into the commercialization of terra sigillata (or Samian Ware) from Italic officinae from around the turn of the era until the 2nd century AD in Pollentia. The Roman city of Pollentia, is located in Alcúdia, on the island of Mallorca (Balearic Islands, Spain). According to classical authors, it was founded in 123 BC by the consul Quintus Caecilius Metellus, after the conquest of the island. Both unpublished and previously published data have been utilized for the analysis of the sigillata stamps. These materials have been classified and grouped by periods and associated with officinae for the purpose of analyzing the commercial distribution of the product within the city and throughout the trade networks of Hispania. In this regard, the initial data suggests that Pollentia demonstrates a significant predominance of imported Italic sigillatas, even during periods when sigillatas of South Gallic or Hispanic origin held hegemony.

MULTIPROXY APPROACHES FOR THE RECONSTRUCTION OF SITE FORMATION PROCESSES ASSOCIATED WITH THE COLLUVIAL DEPOSIT OF AMOREIRA ARCHAEOLOGICAL SITE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Adewumi, Opeyemi (Geosciences Centre (CGEO), University of Coimbra, Portugal.; University of Coimbra (Polo II), Faculty of Sciences and Technology, Department of Earth Sciences and Geosciences Centre, Coimbra, Portugal.; Earth and Memory Institute, Mação, Portugal.; IPHES, Institut Català de Paleocologia Humana i Evolució Social, C/Escorxador s/n, 43003 Tarragona, Spain.) - Lattao, Virginia (Geosciences Centre (CGEO), University of Coimbra, Portugal.; University of Coimbra (Polo II), Faculty of Sciences and Technology, Department of Earth Sciences and Geosciences Centre, Coimbra, Portugal.; Earth and Memory Institute, Mação, Portugal.) - Vallverdú, Josep (IPHES, Institut Català de Paleocologia Humana i Evolució Social, C/Escorxador s/n, 43003 Tarragona, Spain.; Área de Prehistoria, Universitat Rovira i Virgili (URV), Avenida de Catalunya 35, 43002 Tarragona, Spain.) - Rosina, Pierluigi (Geosciences Centre (CGEO), University of Coimbra, Portugal.; Earth and Memory Institute, Mação, Portugal.; Polytechnic Institute of Tomar, Portugal.) - Oosterbeek, Luiz (Geosciences Centre (CGEO), University of Coimbra, Portugal.; Earth and Memory Institute, Mação, Portugal.; Polytechnic Institute of Tomar, Portugal.) - Gomes, Hugo (Geosciences Centre (CGEO), University of Coimbra, Portugal.; Earth and Memory Institute, Mação, Portugal.; Polytechnic Institute of Tomar, Portugal.) - Marrocchino, Elena (Department of Environmental and Prevention Sciences, University of Ferrara, Italy.)

Abstract format: Poster

Colluvial deposits are accumulations of sediment, rock fragments, and soil that result from the downslope movement of material largely due to gravitational forces. These deposits often play a significant role in archaeological site formation processes, impacting the preservation and stratigraphy of artefacts and features. Understanding the formation of colluvial deposits is crucial for interpreting the archaeological record accurately. This paper presents a multiproxy study conducted at the Amoreira Archaeological site, located on the right bank of the Tagus River, in the municipality of Abrantes, Portugal.

Micromorphological technique was combined with other microscale analyses such as stable isotope analysis (in particular $\delta^{13}C$), XRF and LOI analyses to study the sediment from the site for the reconstruction of its site formation processes. Micromorphology, in particular, has provided insights into the nature of the formation of colluvial deposits at the site of Amoreira. The analysis identified spodosols as the major type of soil for this site, usually formed in cool and humid climates evidencing, coarse-textured initial materials, the presence of vegetation that supplies mobile and sesquioxide, leading to the subsequent movement, and deposition of organic compounds. These processes are considered a contributing factor to the disruption of occupational sequences at the Amoreira site. In addition, other complementary analyses also gave useful insights in reconstructing the environmental changes that occurred at the studied site during human occupation. Therefore, this paper will contribute to the knowledge of the site formation processes associated with the Colluvial deposit of Amoreira Archaeological Site, in the middle Tagus region of Portugal.

THE ARCHAEOLORE GROUP: ARCHAEOLOGY, ORAL TRADITION AND PLACE NAMES - DELVING INTO NEW PERSPECTIVES

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Vieira, Alexandra (Independent researcher)

Abstract format: Poster

In the span of just a few generations, our connection with the environment and the landscapes has undergone a profound transformation. We find ourselves in an increasingly interconnected and globalized world, a world that has gradually distanced us from old traditions and our natural surroundings. Our grandparents possessed precious empirical knowledge, gleaned from a lifetime intertwined with the world around them. However, this invaluable intangible heritage is now evaporating at an alarming rate.

The catalyst for this disheartening loss can be traced back to a generational rupture, driven by a complex number of circumstances. As a result, we stand at a precipice where the very essence of our connection to the land, our history, and our heritage is at risk of slipping through our fingers. It is now, more than ever, of utmost urgency and importance to delve into the recent past and rediscover how communities once intricately wove themselves into the fabric of their landscapes. In this quest, we must turn to the profound reservoir of social memory to unravel the intricate tapestry of our relationship with the land, before it fades into obscurity.

Therefore, the ArchaeoLore Group aims to bring together researchers from diverse backgrounds to investigate the rich cultural heritage (tangible and intangible) and oral narratives embedded in our landscapes. By combining archaeological evidence, myths, oral traditions, folklore, and the study of place names, we strive to gain a deeper understanding of the intricate connections between past/present societies and their environments.

Therefore we must explore the relationship between archaeological landscapes and oral traditions, study the role of folklore in shaping place names and sacred places, or investigate the intersection of intangible and tangible cultural heritage associated with specific regions.

ISLAND ARCHAEOLOGY IN SAINT KITTS AND NEVIS (LESSER ANTILLES): NEW DATA ON PRE-CONTACT POPULATION FROM FIELD SURVEYS AND ARCHAEOGENETICS

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: COPPA, ALFREDO (Sapienza University of Rome; Department of Evolutionary Anthropology, University of Vienna, Austria) - Truffi, Michele (Università degli Studi Roma Tre; Associazione ORTA) - Lucci, Michaela (Department of Environmental Biology, Sapienza University of Rome, Italy) - Guidi, Alessandro (Università degli Studi Roma Tre) - Nomi, Federico (Scuola Superiore Meridionale; Associazione ORTA)

Abstract format: Poster

The pre-contact history of the Caribbean prior to European arrival is a narrative rich in migrations and interactions among relatively small communities. After decades of archaeological research in the Greater and Lesser Antilles, archaeogenetics has begun to shed new light on these dynamics, helping to clarify several obscure points.

Despite these strides, the study of pre-contact archaeology in the Lesser Antilles has faced challenges in maintaining consistent research efforts over time. The case of Saint Kitts and Nevis, a small federation consisting of two islands in the north of the Lesser Antilles, is emblematic. The main archaeological projects on the main island of Saint Kitts are the field surveys and test excavations conducted in the 1970s by C. Goodwin and D. V. Armstrong and the excavation in the early 1990s of the Bloody Point site by S. E. Farr. As for the smaller island, Nevis, the only systematic project is the survey by S. M. Wilson, carried out in the 1980s.

Here we show the preliminary results of a research project initiated in 2021 which goal was twofold: to assess the preservation status of key prehistoric archaeological sites on St Kitts and Nevis, and to conduct new archaeogenetic analyses on skeletal remains from pre-contact indigenous populations on St Kitts.

The survey showed that traces of prehistoric sites found in past research can still be found on the ground, but also highlighted how rapid changes in the landscape due to both natural and anthropogenic phenomena are threatening their preservation.

The aDNA analyses on the skeletal remains of the Bloody Point and Sugar Factory Pier sites have made it possible to extrapolate genomic sequences of 7 out of 9 samples, whose analysis will add a fundamental piece to our knowledge of the mobility of the indigenous peoples of the Lesser Antilles"

OBSIDIAN TRADE IN THE LATE BRONZE AGE AT NURAGHE SANTA BARBARA DI BAULADU (SARDINIA, ITALY)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Tykot, Robert (University of South Florida, Tampa)

Abstract format: Poster

Among the finds recovered during the excavations of the Late Bronze-Early Iron Age site of Nuraghe Santa Barbara di Bauladu in Sardinia are >1000 obsidian artifacts. Analyses were conducted identifying the specific geological sources that were used on >600 of the artifacts, allowing the reconstruction of prehistoric trade and exchange patterns. This study provides statistically significant data that may be compared with results from both contemporary LBA/EIA sites as well as examination of changes over time starting in the Early Neolithic.

Santa Barbara di Bauladu is a complex Nuragic site with multiple external towers, constructed about 1500 BCE. The later village on the west side of the Nuraghe (1200-800 BCE) revealed evidence for bronze, copper, and lead metal casting used for tools and the well-known bronzetti figurines. During the LBA, there were also contacts with the eastern Mediterranean, as indicated by finds of oxhide ingots and Mycenaean ceramics at sites in Sardinia. Obsidian stone tools continued to be used throughout the Bronze Age, however, with the material obtained from different subresources at Monte Arci.

Non-destructive analyses using a Bruker Tracer 5e X-ray fluorescence spectrometer were conducted, on many geological samples from each of the sources and the obsidian artifacts from Nuraghe Santa Barbara. Results for trace elements were used to assign each artifact to a specific Monte Arci subresource (SA - 90, SB1 - 9, SB2 - 99, SC - 419). The proportion of each is compared for different parts of the site, and with five other Nuragic sites with at least 25 artifacts tested: Ortu Comidu, Duos Nuraghes, Serbine, Urpes, and Mitza Pidighi. The patterns for these Nuragic sites are compared with Neolithic and Copper Age sites, with changes over time in socioeconomic complexity integrated in our interpretations.

861 **AUGUSTAE, NOBILISSIMAE, DOMINAE: CONSIDERATIONS ON THE ROLE OF MATERIAL DATA ON THE TITULATURE OF THE 4TH CENTURY AD IMPERIAL WOMEN**

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Garibotti, Martina (University of Verona) - Romano, Antonio (Le Mans Université)

Abstract format: Poster

The poster aims to provide insights into the role of material evidence - such as inscriptions and coins - in examining the titulature of imperial women from 284 AD to 395 AD. From 284 AD onwards, a significant shift in the titulature assigned to imperial women is observed: for instance, the title "Mater Castrorum" disappears, and that of "Augusta" experiences a drastic decline in attributions. Material evidence indicates that this change does not signify the cessation of conferring honorary titles upon women but rather the adoption of new titles like "Nobilissima Femina" and "Domina Nostra".

Ambiguity surrounds the roles played by women of the domus Augusta at court, making the titles bestowed upon them particularly significant nodes. Consequently, titulature emerges as one of the primary avenues for investigating the functions of women within the imperial family. This circumstance poses a challenge for the 4th century AD, as the scarcity of material evidence about women, such as coins and inscriptions, complicates the systematic study of titles, compounded by the unreliability of historiographical sources.

The importance of these sources in titulature studies is underscored by the fact that for the Valentinian dynasty - a period for which no epigraphic or numismatic evidence can be attributed to imperial women - it is impossible to ascertain which titles were associated with these women. This issue sometimes extends to their onomastics as well. Therefore, contrary to what their scarcity would suggest, the poster aims to highlight the significance of material sources in studying imperial women of the 4th century AD in general, particularly their titulature. It aims to highlight the need for an interdisciplinary approach that integrates historiographic and archaeological sources. Additionally, the poster would propose some reflections on the possible reasons for this scarcity of material evidence.

864 **AN ARCHAOMETRIC STUDY TO SOLVE THE MYSTERY OF THE ORIGINAL LAYOUT OF THE AUGUSTAN TROPHY OF SAINT-BERTRAND-DE COMMINGES?**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: PIANET, isabelle (Université Bordeaux-Montaigne) - Iuliano, Adriana (Université Bordeaux-Montaigne) - Galluzzi, Francesca (Université Bordeaux-Montaigne) - Savin, Marie-Claire (Institut Català d'Arqueologia Clàssica)

Abstract format: Poster

The Augustan trophy of Saint-Bertrand-de-Comminges (Occitanie, France) is a remarkable composition of mannequins and captives sculpted in the round (16-13 B.C.). It is composed of three distinct trophies - Gallic, Hispanic, and Naval - each of them comprising different elements, more or less sculpted, and a Victory. All of them are made of white marble, whose crystalline appearance suggests it comes from local quarries. The statues also display numerous traces of red and black polychromy.

Its reconstruction is still the subject of debate: Is it a single monument representing a commemoration of the victories of Augustus? Or can we consider that the Victory is not part of it, as proposed by some authors on archaeological, stylistic, and historical grounds?

Answering this question requires a global archaeometric approach to elucidate the provenance of marbles and the chemical nature of pigments. This is the goal of this work, for which:

A detailed study of samples taken from scattered areas of the monument was performed using petrography, CL, isotopes, NMR, and ICPOES. The results obtained were compared with marbles extracted from nearby quarries using statistical tools such as ACP to determine the provenance of marbles.

An in situ analysis of the areas exhibiting traces of pigments was done using portable digital microscopy, FORS, and pXRF.

In conclusion, some elements are made of marbles of different qualities coming from different quarries in the region with red ochre being the primary pigment used for decorating the different elements.

865 **AUTOMATIC DETECTION OF TELL SITES IN CENTRAL IRAQ USING MACHINE LEARNING ON OPEN ACCESS SATELLITE SYNTHETIC APERTURE RADAR IMAGERY**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Chiricallo, Elena (Università Ca' Foscari di Venezia; Istituto Italiano di Tecnologia) - Poggi, Giulio (Istituto Italiano di Tecnologia) - Jatrapitpornchai, Raveerat (Istituto Italiano di Tecnologia) - Fiorucci, Marco (Istituto Italiano di Tecnologia) - Vascon, Sebastiano (Università Ca' Foscari di Venezia) - Traviglia, Arianna (Istituto Italiano di Tecnologia)

Abstract format: Poster

Tells are archaeological settlement mounds peculiar to the Near and Middle Eastern landscapes and dating back from the Neolithic period to the Bronze Age. Their systematic mapping offers valuable insights into the emergence, development and organization of the early complex human societies and serves as a crucial measure for their preservation against threats such as looting and large-scale alteration of the landscape resulting from destructive anthropogenic activities such as agriculture, industry, and transport.

Due to the pronounced topographic elevation of tells sites, manual visual inspection of satellite Synthetic Aperture Radar (SAR) imagery has been successfully used to map tells in remote and hazardous regions. However, these approaches proved to be time-consuming when systematically mapping tells, considering the large number scattered across the landscape. Machine Learning-based approaches can help speed up the screening process and improve the detection accuracy across large geographical areas.

In this study, a new Machine Learning pipeline for the automatic detection and segmentation of tell sites in Central Iraq on satellite SAR data has been developed and tested. The pipeline employs open-access, medium-resolution SAR products from Copernicus Sentinel and Third-Party Missions (i.e., Copernicus Global 30-meter Digital Elevation Model and multi-temporal Sentinel-1 amplitude images) and supervised object-based classification methods. The proposed workflow, tailored and validated based on the physical attributes of tells, can also be employed to identify topographic features exhibiting similar characteristics, such as ancient settlement mounds and burial mounds. This capability proves especially valuable in remote and hazardous regions where conducting systematic on-site inspections is impractical due to political instability or in regions where the use of LiDAR scanning from drone and airborne sensors is restricted.

869 **PERSISTING IN THE FACE OF CHALLENGE: THE CHOICE OF RAW MATERIALS IN PREHISTORIC CERAMIC PRODUCTION ALONG THE EASTERN ADRIATIC COAST**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Kudelic, Andreja (Institute of Archaeology Zagreb) - Neral, Natali (Institute of Archaeology Zagreb)

Abstract format: Poster

It is well known that the study of the operational sequence of an ancient craft practice provides data for technological considerations but also for a socially oriented interpretation. Following this premise, the aim of the research is to investigate the Bronze Age pottery practices in the relatively unexplored area of the eastern Adriatic coast and hinterland. The assumption that variability in the choice of raw materials and production techniques can be a good indicator of socio-economic changes encouraged us to consider prehistoric communities in a wider social context. The focus of the research is ceramics from fourteen archaeological sites distributed along the eastern Adriatic coast and the hinterland of central Dalmatia.

By applying a multi-analytical approach (optical microscopy, p-XRF, SEM-EDS, and ICP-MS, ICP-ES) the goal is to determine the characteristics of paste recipes, the type and proportion of non-plastic tempers intentionally added to the clay, and to provide information on the production techniques and firing conditions. Through a comparative analysis, the aim is to consider the variability in pottery practice from the Early to the end of the Late Bronze Age in order to better understand the wide range of behaviours that are directly related to ancient pottery produced in a certain social environment.

The research showed that the Bronze Age potters used locally available clay and non-plastic temper materials: calcite, sedimentary rocks and grog. The results indicate a correlation between tempering material selection with spatial and chronological frameworks. It has also been observed that the choice of calcite shows a long-lasting and very persistent tradition while the use of grog could be related to the periodic influences of various social factors.

SPECIAL BURIAL GROUNDS FOR INFANTS AND BABIES IN THE MEDIEVAL AND EARLY MODERN PERIODS - SINGLE OCCURRENCES OR TRANSREGIONAL PHENOMENON?

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Mateovics-László, Orsolya (ARDIG Archäologischer GesmbH) - Nyárádi, Zolt (Muesul Haáz Rezső, Odorheiu Secuiesc, Romania) - Portschy, Jennifer (Asinoe GmbH, Krems a.d. Donau, Austria) - Rác, Miklós (Free-lancer) - Hausmair, Barbara (Department of Archaeologies, Universität Innsbruck, Austria)

Abstract format: Poster

In recent decades, bioarchaeology has increasingly focused on studying past childhood and the social bonds of children and parents within society. Apart from biological information obtained from their skeletal remains, comprehensive examinations of burial contexts provided further understanding of the funerary behaviour of various societies, revealing a wide variety of practices. Among these, age-specific rites led to the formation of peculiar clusters of fetal and neonatal burials, as the early stages of life had a special spiritual significance in different periods and cultural entities. Children who died in the womb or during/soon after birth often evoked controversial attitudes, as many societies consider them as liminal beings who require special treatment to secure their transition into the afterlife or prevent them from harming the living.

The proposed poster intends to draw attention to medieval and early modern burial sites in central and eastern Europe that were exclusively used to bury prematurely deceased children. To date, only a few such places have been published as isolated case studies, raising the question if they constitute single occurrences or are representative of a transregional phenomenon of special burial practices that has not been properly recognized yet. By presenting case studies from Austria, Hungary and Transylvania, this poster is supposed to ignite exchange on such special burial grounds and advance the study of the archaeology of early infant death and burial and parental grief responses.

DOWN BY THE RIVERS: RECONSTRUCTING THE MAGDALENIAN OCCUPATION AT ÉTIOLLES-LE COUDRAY (FRANCE) USING GEOPHYSICAL METHODS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Corradini, Erica (Institute of Geosciences, Christian-Albrechts-University Kiel, 24118 Kiel, Germany) - Wilken, Dennis (Institute of Geosciences, Christian-Albrechts-University Kiel, 24118 Kiel, Germany) - Le Jeune, Yann (Service Archéologie de Loire-Atlantique, UMR 6566, 35700 Rennes, France) - Weber, Mara (Museum für Archäologie Schloss Gottorf, UMR 8068, 24837 Schleswig, Germany) - Wunderlich, Tina (Institute of Geosciences, Christian-Albrechts-University Kiel, 24118 Kiel, Germany) - Caron-Lavolette, Elisa (Technologie et Ethnologie des Mondes Préhistoriques, UMR 8068, F-92023 Nanterre, France) - Mevel, Ludovic (Technologie et Ethnologie des Mondes Préhistoriques, UMR 8068, F-92023 Nanterre, France) - Valentin, Boris (Ecole d'histoire del l'art et d'archéologie de la Sorbonne, Université Paris 1, UMR 8068, F-75006 Paris, France) - Villa, Valentina (CNRS, CEPAM Cultures et Environnements, Préhistoire, Antiquité, Moyen Âge, Université Côte d'Azur, UMR 7264, 06300 Nice, France) - Rabbel, Wolfgang (Institute of Geosciences, Christian-Albrechts-University Kiel, 24118 Kiel, Germany)

Abstract format: Poster

An investigation of the Magdalenian occupation at Étioilles-Les Coudray (France) was conducted using geophysical methods and corings. Based on ground-penetrating radar (GPR), electrical resistivity tomography (ERT), electromagnetic induction (EMI), and stratigraphic information, we present a reconstruction of the main sediment interfaces carrying the Magdalenian occupation. Étioilles-Les Coudray is one of the most important open-air campsites in the Paris Basin, where consecutive settlements distributed along the Hauldres stream were preserved by silts. The geoarchaeological goals were, in particular, the reconstruction of the ancient environment in which hunter-gatherers settled, providing spatialized known stratigraphy able to find an echo in the Seine Valley. We observed that the major reflections in the GPR records were generated from interfaces that have grain size variation: (1) the bottom of the Holocene colluvium and (2) the bottom of the upper Late Glacial silt. EMI and ERT show a very clear horizon associated with the upper Late Glacial silt, in some places even more clearly defined than with GPR. We confirmed the presence of a channel along the slope, placed under Locus 1, and a second channel of the same type globally following the paleotopography of Locus 2. We created a thickness map of the "beige sandy silt" and hypothesized a high probability of good preservation conditions of Magdalenian evidence. Finally, the detection of several localized diffraction hyperbolas in the GPR record offers the possibility to obtain the ground truth of the geophysical results in the near future and verify the nature (archaeological or geological) of these features.

LA MARMOTTA (LAKE OF BRACCIANO, ITALY): UNRAVELLING THE FATE OF AN EARLY NEOLITHIC COMMUNITY THROUGH GEOARCHAEOLOGICAL APPROACH

Abstract theme: 7. Archaeology of Sustainability through World Crises, Climate Change and War

Abstract authors: Nomi, Federico (Scuola Superiore Meridionale) - Mineo, Mario (Museo delle Civiltà, Rome, Italy; Associazione ORTA, Italy) - Moreno Caballud, Ana (Pyrenean Institute of Ecology (IPE-CSIC), Spain) - Bartolomé, Miguel (Departamento de Geología, Museo Nacional de Ciencias Naturales (CSIC), Spain; Swiss Institute for Speleology and Karst Studies (SISKA), Switzerland; Department of Earth Sciences, Geological Institute, ETH, Zurich, Switzerland) - Galofré, Marcel (Pyrenean Institute of Ecology (IPE-CSIC), Spain) - Dulias, Katharina (Technische Universität Braunschweig, Institut für Geosysteme und Bioindikation, Braunschweig, Germany) - Victoria Nogales, Luis (Technische Universität Braunschweig, Institut für Geosysteme und Bioindikation, Braunschweig, Germany) - Gibaja, Juan (Institució Milà y Fontanals (CSIC), Spain) - Iriarte Avilés, Eneko (University of Burgos, Department of History, Geography and Communication, Laboratory of Human Evolution-IsoTOPIK Lab, Spain) - Truffi, Michele (Dipartimento di Studi Umanistici, Università degli Studi Roma Tre, Italy)

Abstract format: Poster

The emergence of the Neolithic economy ushered in a distinct capability for reshaping landscapes by human communities. The relocations necessitated to discover suitable land for agriculture and animal husbandry resulted in these communities occupying varied ecological niches, often interconnected by access to water sources. Among these, perilacustrine environments exemplify such adaptations.

The settlement of 'La Marmotta' (Anguillara Sabazia, Italy), now submerged beneath the waters of Lake Bracciano, served as a shoreline settlement inhabited for a prolonged period during the Early Neolithic (ca. 5690 - 5260 cal BC). The exceptional nature of the site is due to the excellent preservation of some classes of materials that are usually subject to rapid deterioration, including five dugout pirogues, numerous wooden artifacts and plant remains. The abundance of findings coupled with multidisciplinary analysis has facilitated a meticulous reconstruction of numerous aspects of the inhabitants' way of life at La Marmotta.

However, several inquiries persist regarding broader aspects such as the true extent of the site or the reasons behind its abrupt abandonment, which remain unresolved. Moreover, the discovery of additional traces of a Neolithic settlement phase, coinciding with the abandonment of La Marmotta and located less than 400 metres from the current shoreline, shortly before the site's identification in the late 1980s, has prompted speculation that the community migrated inland following a natural event that precipitated the site's abandonment.

To address these inquiries, we employ an interdisciplinary geoarchaeological approach, involving the extraction of geological cores both within the lake and inland.

Here, we present the preliminary findings of our analysis on the samples extracted from the cores (archaeological, palaeobotanical, geochemistry, sedimentary aDNA), accompanied by their geoarchaeological description. Our aim is to provide a paleoenvironmental reconstruction of the geomorphological conditions preceding, concurrent with, and after the occupation of the La Marmotta site.

PRIN 2020 THE TIME OF CASTLES: AN ANALYSIS PROCEDURE FOR DATING MORTARS FROM DONORATICO CASTLE (LIVORNO, ITALY)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Calandra, Sara (Department of Earth Sciences, University of Florence, Florence, Italy) - Pecchioli, Elena (Department of Earth Sciences, University of Florence, Florence, Italy) - Salvatici, Teresa (Department of Earth Sciences, University of Florence, Florence, Italy) - Garzonio, Carlo Alberto (Department of Earth Sciences, University of Florence, Florence, Italy) - Lubritto, Carmine (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, MARE Centre, Caserta, Italy) - Mantile, Noemi (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, MARE Centre, Caserta, Italy) - Giacometti, Valentina (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, MARE Centre, Caserta, Italy) - Di Cicco, Maria Rosa (Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, MARE Centre, Caserta, Italy) - Buonincontri, Mauro Paolo (Department of History and Cultural Heritage, University of Siena) - Bianchi, Giovanna (Department of History and Cultural Heritage, University of Siena, Siena, Italy)

Abstract format: Poster

The PRIN 2020 CASTLES Project focuses on studying mediaeval castles in Italy, particularly their chronology and transformations using archaeometric analysis of mortars and charcoal. The project aims at conducting multidisciplinary research to establish a new chronology for the construction sites of incastellamento (11th-12th centuries), focusing on the timings of castle development. In this contribution we examine the case study of Donoratico Castle (Livorno, Italy), a site in Tuscany, where the existing archaeological evidence dates from the 12th century.

Several bedding mortars from the housing unit, church, towers, and surrounding wall inside Donoratico Castle were sampled. We propose a specific characterization procedure to choose the samples suitable for dating. A detailed minero-petrographic, chemical, and physical characterization was carried out to extract the binder and lump samples suitable for radiocarbon dating. The minero-petrographic data highlighted mortars constituted by a weakly hydraulic lime binder, obtained burning a marly limestone. The aggregate is constituted by quartz, feldspars, and rock fragments (rhyolites, fossiliferous and micritic limestones), with a heterogeneous distribution, a different grain size and binder/aggregate ratio. From mortar samples of church and housing units, lumps were selected and analysed through chemical analysis and observations using cathodoluminescence. These analyses reveal the presence of both geogenic and anthropogenic calcite.

Starting from the characterization results, the samples were selected for radiocarbon concentration measurement, using accelerator mass spectrometry (AMS). The data obtained reveals a date range from the first half of the 13th century in one case, and from the second half of the 13th century in another. This is further confirmed by radiocarbon dating of charcoal fragments found within the same mortars. This initial study shows that while Donoratico Castle has an archaeological date from the 12th century, this is not entirely consistent with the archaeometric dating from the first and second halves of the 13th century.

874 BETWEEN TRADITION AND INNOVATION: A MULTIDISCIPLINARY APPROACH TO THE STUDY OF THE ANCIENT VIA TRAIANA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Stricchiola, Sofia (Università del Salento)

Abstract format: Poster

In line with the increasing technological development applied to archaeology, it is becoming more and more important to contribute to the innovation of the traditional topographical approach to the study of the ancient landscape. The following poster proposes the presentation of the methodological aspects of a project involving the case study of Via Traiana.

Specifically, the procedures implemented in Remote Sensing (the science of identifying, observing, interpreting and measuring objects without coming into direct contact with them) are used.

The methodology identified is based on the comparison of several non-invasive investigations, such as traditional direct and systematic ground surveys, aerotopographic surveys and, finally, geophysical prospecting (Ground Penetrating Radar and magnetometry). This integration allows, on one hand, the implementation of data concerning the ancient route of the Via Traiana and its road stations and, on the other, the testing of the effectiveness of the different methodologies, understanding their limits and potentialities. By doing so, a multidisciplinary approach is identified, which can be reproduced to multiple case studies, and which provides a large datasets of knowledge with a reduced use of instruments, time and money compared to a stratigraphic survey.

Finally, this poster presents the preliminary results of the photointerpretation carried out for the area between the two ancient cities of Herdonia and Canusium. The research begins here with the aim of proposing an hypothesis on the location of the statio Furfane, which is named only in the Tabula Peutingeriana.

875 DIGESTING THE DATA: VALIDATION IN ANCIENT METAGENOMIC STUDIES IS ESSENTIAL

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Pach, Aleksandra Laura (Globe Institute, Faculty of Health and Medical Sciences, University of Copenhagen, Øster Farimagsgade 5A, 1253 Copenhagen, Denmark) - Lanigan, Liam (Globe Institute, Faculty of Health and Medical Sciences, University of Copenhagen, Øster Farimagsgade 5A, 1253 Copenhagen, Denmark; School of Archaeology, University of Copenhagen, Karen Blixens Plads 8, 2300 Copenhagen Denmark) - Niemann, Jonas (Globe Institute, Faculty of Health and Medical Sciences, University of Copenhagen, Øster Farimagsgade 5A, 1253 Copenhagen, Denmark) - Winther Pedersen, Mikkel (Globe Institute, Faculty of Health and Medical Sciences, University of Copenhagen, Øster Farimagsgade 5A, 1253 Copenhagen, Denmark) - Schroeder, Hannes (Globe Institute, Faculty of Health and Medical Sciences, University of Copenhagen, Øster Farimagsgade 5A, 1253 Copenhagen, Denmark; School of Archaeology, University of Copenhagen, Karen Blixens Plads 8, 2300 Copenhagen Denmark)

Abstract format: Poster

Shotgun DNA sequencing of archaeological samples, such as dental calculus, coprolites, or mastics, provides a powerful tool for reconstructing ancient microbial communities and gaining valuable insights into the diet and subsistence strategies of past communities. However, reliably identifying eukaryotic taxa poses a challenge. One of the main obstacles is the risk of false positives, which can arise due to different reasons, including sample contamination, the presence of contamination in published reference genomes, and sequence homology between closely related taxa. In this

study, we re-analyse five previously published datasets (Jensen et al. 2019, Maixner et al. 2016, Maixner et al. 2021, Rampelli et al. 2021, Reynoso-García et al. 2023) using two different ancient metagenomic workflows that have been previously employed to detect eukaryotic taxa in complex ancient metagenomic datasets. Our study highlights the risk of obtaining false positive results in ancient metagenomic studies and underlines the need for rigorous validation.

876 A BIOARCHAEOLOGICAL EXPLORATION OF THE INDIVIDUALS FROM THE VÁROSFALVA BURIAL MOUND IN TRANSYLVANIA, ROMANIA (15TH - 19TH CENTURY)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Reeves, Vanessa (University of South Florida) - Nyárádi, Zsolt (Haáz Rezzo Múzeum) - Bethard, Jonathan (University of South Florida)

Abstract format: Poster

Very few bioarchaeological studies have been conducted on the Szekler people of Transylvania, a region now located in Romania. These ethnically Hungarian peoples have occupied the Carpathian Basin since at least 1000 CE, and for most of history served as cavalymen and defenders on the Hungarian Kingdom frontier. This bioarchaeological project seeks to explore the lived experiences of the Szekler people interred in the Városfalva village burial mound (in Orășeni, Romania). In the 1960s, a raised earthen mound was discovered north of the village of Városfalva, in the valley of the Homorodul Mare River, and had begun to be utilized for materials for a local road repaving project. During this process human remains were discovered, and the repaving project was halted. Test pits and small-scale excavations were undertaken by several previous archaeologists from the Haáz Rezzo Múzeum, however no excavation journals or artifacts were retained from these explorations. In 2016, large-scale organized archaeological excavations began at the site, which unearthed 58 cemetery graves. Associated burial artifacts, such as coins, helped provide a general date range for the initial use of the archaeological site (14th -16th century), with burials continuing in to the early 19th century. This poster will present the biological profile information, including age at death, sex, pathologies, and traumas for the individuals interred at the Városfalva village burial mound. Preliminary stable isotope data (C and N) will also be presented with a discussion of the individuals' dietary profiles and compared to isotopic data generated from other nearby Szekler communities.

877 APPLICATION OF ZOOMS TO FAUNAL ASSEMBLAGES FROM PREHISTORIC CROATIA TO PROVIDE INSIGHTS ON IDENTIFICATION AND PRESERVATION

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Caraballo-Santiago, Angelica (University of California Santa Barbara) - Zavodny, Emily (University of Central Florida) - Krigbaum, John (University of Florida)

Abstract format: Poster

The transition from the Copper Age to the Bronze and Iron Ages is shown through changing sociopolitical and economic organization reflected in faunal material. With ZooMS (Zooarchaeology by Mass Spectrometry), fragments deemed unidentifiable through morphological analysis can be identified through chemical analysis. This poster tests the application of ZooMS to 34 samples from faunal assemblages collected from 2 different sites in Croatia. Otočac-Stari Grad (n=27), a Copper Age site with poor preservation, and Piplica (n=7), a Bronze-Iron Age site with good preservation. By using samples from these sites, the aim is to compare the level of identification possible through ZooMS given differing levels of preservation.

ZooMS, also known as Collagen Peptide Mass Fingerprinting, is an interdisciplinary analytical technique that has been gaining traction in the field of archaeological sciences in the last decade. The identification of certain collagen peptides can be used to identify a bone sample down to taxonomic genus.

From the 34 samples tested, 31 produced identifiable ZooMS spectra (91.2%) From ZooMS analysis, the level of identification improved in 25 samples (73.5%), but 3 samples were unidentifiable (8.8%). Of the 31 identifiable samples, 9 samples (29.0%) had a lower level of identification. Samples from Otočac-Stari Grad had a higher rate of failure and lower level of ZooMS identification compared to Piplica. Due to preservation of the material, the C (COL1α2 502-519), E (COL1α2 454-483), G, and G' (COL1α2 757-789) peptides consistently were missing from most spectra. While identification can be made without these peptides, particularly the C and G peptides are important for differentiation between goat (Capra), sheep (Ovis), and deer (Cervidae). The B (COL1α2 484-498), P2 (COL1α2 292-309), and D (COL1α2 793-816) peptides were the most abundant and resistant to weathering. Future research will integrate ZooMS into larger faunal studies to supplement morphological analysis of animal husbandry.

878 HOLOCENE CLIMATIC VARIATIONS ASSOCIATED TO CADAVAL CAVE DEPOSIT

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Lattao, Virginia (Geosciences Centre, University of Coimbra, Portugal; University of Coimbra (Polo II), Faculty of Sciences and Technology, Department of Earth Sciences and Geosciences Centre, Coimbra, Portugal; Earth and Memory Institute, Mação, Portugal) - Adewumi, Opeyemi L. (Geosciences Centre, University of Coimbra, Portugal; University of Coimbra (Polo II), Faculty of Sciences and Technology, Department of Earth Sciences and Geosciences Centre, Coimbra, Portugal; Earth and Memory Institute, Mação, Portugal; IPHES, Institut Català de Paleoecologia Humana i Evolució Social, C/Escorxador s/n, 43003 Tarragona, Spain) - Ferreira, Cristina (Geosciences Centre, University of Coimbra, Portugal; Earth and Memory Institute, Mação, Portugal) - Rosina, Pierluigi (Polytechnic Institute of Tomar, Portugal; Geosciences Centre, University of Coimbra, Portugal; Earth and Memory Institute, Mação, Portugal) - Vallverdú, Josep (IPHES, Institut Català de Paleoecologia Humana i Evolució Social, C/Escorxador s/n, 43003 Tarragona, Spain; Àrea de Prehistòria, Universitat Rovira i Virgili (URV), Avenida de Catalunya 35, 43002 Tarragona, Spain) - Garcês, Sara (Polytechnic Institute of Tomar, Portugal; Geosciences Centre, University of Coimbra, Portugal; Earth and Memory Institute, Mação, Portugal) - Gomes, Hugo (Polytechnic Institute of Tomar, Portugal; Geosciences Centre, University of Coimbra, Portugal; Earth and Memory Institute, Mação, Portugal) - Marrocchino, Elena (Department of Environmental and Prevention Sciences, University of Ferrara, Italy) - Pereira, Telmo (University Autónoma de Lisboa, Lisbon, Portugal; Geosciences Centre, University of Coimbra, Portugal) - Oosterbeek, Luiz (Polytechnic Institute of Tomar, Portugal; Geosciences Centre, University of Coimbra, Portugal; Earth and Memory Institute, Mação, Portugal)

Abstract format: Poster

The analysis of stable isotopes has been used to reconstruct environmental variations in continental contexts. Our goal is to verify the possibility of applying this analytical methodology to cave deposits that contain archaeological traces of human occupation. To do so, different and relevant methodologies were applied in the same stratigraphic section of the Cadaval cave deposits, such as stable isotope analysis (in particular $\delta^{13}C$), pollinic, non-pollinic palynomorph and microcarbon studies, microstratigraphy, XRF and LOI analyses to discriminate the organic component present and to identify the composition of the sediments.

Part of this work is integrated into the Pluriannual PIPA "Strategies of Occupation of the Territory in the Holocene in the Middle Tagus" and the MTAS project "Tasks in movement through forms: the agro-pastoral dispersion to and from Alto Ribatejo". The results help to elucidate changes in vegetation patterns and changes in climatic conditions. The study aims to obtain data on the composition of the landscape during the various phases of occupation of the cavity and its relationship with human behaviour.

879 SEXUAL DIMORPHISM: AN ODONTOMETRIC APPROACH

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Price, Bethan (Cardiff University)

Abstract format: Poster

Sex estimation has long been used to help examine and interpret past populations. It gives us a staggering insight into social networks and hierarchies, dietary differences, and disease frequencies, amongst other things, that all feed into our current understanding of how past populations were structured and how they functioned.

Previous studies indicate a level of sexual dimorphism in the dentition reflected in dental metrics, enamel surface area and dentine deposition (Fernée, Zakrzewski and Brown, 2020). However, in previous studies, these approaches are frequently limited to adult skeletal remains. Sex estimation of juveniles is a difficult goal given that skeletal maturity is incomplete, but it would be incredibly useful when interpreting past populations.

This research builds upon this and a previous MSc project as part of a present PhD thesis. It includes applying an odontometric approach to adult and juvenile individuals from various medieval populations in Britain in the hopes of determining a methodology for sex estimation in juvenile populations, supported by amelogenin testing. It will also examine the differences in diet and disease between sexes.

Bibliography:

Fernée, C., Zakrzewski, S. and Brown, K.R. (2020). 'Dimorphism in Dental Tissues: Sex differences in Archaeological Individuals for Multiple Tooth Types', *American Journal of Physical Anthropology*, vol.175(1), p.106-127.

881 OUR NOBLE STEEDS - THEIR DIRTY OLD MULES. DEPICTIONS OF ROMAN AND NON-ROMAN EQUINES ON ROMAN IMPERIAL MONUMENTS

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Nagy, Goldie (Johannes Gutenberg-Universität Mainz)

Abstract format: Poster

The utilization of horses as "war machines" fundamentally changed ancient warfare. Especially in the time of the Roman Empire the cavalry advanced from a formerly niche arm of service only accessible for a small wealthy elite to an essential part of the Roman Military (Kemkes 2007, 109; Klinkhammer 2022, 114).

This poster attempts to investigate the depiction of equines on official Roman monuments, such as the triumphal columns of Trajan and Marcus Aurelius, to determine function and conceptualization of these animals in their iconographic context.

The study does not focus on horses but regards all equines, including mules as beasts of burden carrying weaponry and goods for the soldiers. They were often overlooked in past studies of involvement of animals of war, even though they were an important pillar of Roman military logistics.

Furthermore, this work compares how equines are conceptualized depending on the groups they are associated with (Romans; friendly/romanized locals and allies; enemy groups). What differences can be seen in depictions of their quantity, handling, behavior and equipment depending on the figures they are paired up with? What can be said about the depicted groups by looking at the equines they employ for war?

To conclude, this poster attempts to examine how depictions of different equines are utilized to conceptualize and enforce certain pictorial narratives of wars as recounted by the Roman victors.

Kemkes 2007: M. Kemkes, Die Reiter Roms. Treue Diener des Imperiums, in: A. Wiczorek (Ed.), *Pferdestärken. Das Pferd bewegt die Menschheit*. Exhibition catalogue Mannheim (Mainz 2007) 119-124.

Klinkhammer 2022: H. Klinkhammer, Die Reiterei des Römischen Weltreichs. Katalog, in: S. Ebers – A. Lichtenberger – H. Nieswandt (Eds.), *Das Pferd in der Antike. Von Troja bis Olympia*. Exhibition catalogue Münster (Darmstadt 2022) 114-116.

883 LAB TRASH. THE ARCHAEOLOGY OF ARCHAEOSCIENCE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: del Río, Judit (University of Burgos)

Abstract format: Poster

The archaeomagnetic laboratory at Burgos University (Spain) hosts a variety of geophysical research applied to the understanding of archaeological phenomena, particularly those related to ancient fire technologies. Together with results, this research yields waste, usually in the form of surplus rocks, blocks, and sediments collected together in a sturdy plastic box until it is time for its disposal. What follows is a small-scale case study consisting in the archaeological excavation of the refuse resulting from archaeo- and paleomagnetic studies. This project inevitably follows the path set by The Garbage Project (Rathje, 1974), both in its study of daily waste – although of a different kind – and in the main role that the archaeological method plays in it. I am set to explore how 'doing things archaeologically' allows for a different treatment of my own samples and, I argue, for a different mindset than the one I adopt when conducting experiments. In line with what Shanks & McGuire proposed already in 1996, the craft of archaeology in/ of the laboratory produces a knowledge that helps me situate my own academic work as somebody who is perennially stranded at the crossroads between archaeological theory and scientific practice.

Rathje, W. L. (1974). The Garbage Project: a new way of looking at the problems of archaeology. *Archaeology*, 27(4), 236-241.

Shanks, M., & McGuire, R. H. (1996). The craft of archaeology. *American antiquity*, 61(1), 75-88.

885 ALTINUM AND IULIA CONCORDIA: SPACES AND FUNCTIONING OF ROMAN RIVER-LAGOON PORTS AT THE GATEWAY TO THE NORTHERN ADRIATIC

Abstract theme: 6. The Mediterranean from Within

Abstract authors: Rosatti, Elisabetta (Sapienza Università di Roma, Dipartimento di Scienze dell'Antichità)

Abstract format: Poster

The Roman cities of Altinum and Iulia Concordia, situated near the ancient lagoons of Venice and Caorle in the Northern Adriatic region of Italy, were ports with distinctive features as hubs between river, lagoon and sea trade. These settlements, positioned on slightly high grounds, were surrounded and crossed by a network of natural and artificial waterways along which quays and storehouses were established.

This contribution presents the structure and the first steps of an ongoing research project aimed to clarify how these two ports worked by studying spaces, “users” – goods and boats – and the mutual interaction between them.

Research conducted so far within various institutions’ archives has made it possible to collect excavation data from edited contexts and some unpublished documentation. Additionally, historical maps and aerial photographs have also been assembled to better comprehend the landscape and reconstruct the urban water network. A coring campaign recently begun in Altinum is also providing crucial data on paleocanals, including width and depth, which are essential for navigation analysis.

All collected data are being studied and integrated into a GIS project that will make it possible to reconstruct an initial overview of the port spaces of the two sites under investigation.

888 MORPHOLOGY OF NEOLITHIC CATTLE FROM THE BALKANS, TURKEY, AND POLAND

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Gembicki, Maciej (The Faculty of Archaeology University of Adam Mickiewicz) - Bălăşescu, Adrian (“Vasile Pârvan” Institute of Archaeology, Romanian Academy, Bucharest, Romania) - Radu, Valentin (ArchaeoSciences Platform, Research Institute of the University of Bucharest (ICUB); University of Bucharest, Bucharest, Romania; National Museum of Romanian History, Bucharest, Romania) - Dimitrijević, Ivana (Institute of Archaeology, Belgrade Serbia)

Abstract format: Poster

Different morphotypes of cattle in the Early and Middle Neolithic are often explained as animals of different degrees of domestication or populations of different origins. The distinction between the morphotypes is mainly based on the study of the size of their bones, but more information is needed to link this biometric data to genetic variation between the populations of this region. This poster presents the preliminary results of the project - Changes in the morphology of cattle after the domestication period and its environmental conditions—in the case of Central Anatolia, Western Balkans, and Central Europe. Our investigation seeks to identify distinct morphotypes of cattle based on bone size and shape. We utilize traditional biometric methods, including the Logarithm Size Index, alongside three-dimensional geometric morphometrics applied to astragali. The results are based on data from Turkish, Romanian, Serbian, and Polish sites, as well as a reference collection of contemporary cattle from Poland.

889 POTENTIAL OF AIRBORNE LASER SCANNING AT VERY HIGH RESOLUTION FOR THE PROTECTION OF CULTURAL HERITAGE IN SLOVAKIA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Mino, Martin (Monument Board of Slovak Republic) - Lieskovsky, Tibor (Slovak University of Technology, Faculty of Civil Engineering) - Bisták, Peter (Monument Board of Slovak Republic) - Neumann, Martin (Monument Board of Slovak Republic) - Kmetová, Petra (Monument Board of Slovak Republic) - Pristáš, Martin (Monument Board of Slovak Republic) - Šperka, Jakub (Slovak University of Technology, Faculty of Civil Engineering) - Ďuračiová, Renáta (Slovak University of Technology, Faculty of Civil Engineering)

Abstract format: Poster

Since 2023, a new project (APVV-22-0151) aimed at exploitation of airborne laser scanning (ALS) data with high resolution has started under the aegis of Slovak University of Technology (collaborating parties are Monuments Board of Slovak Republic and Archaeological Institute of SAS).

Today, in Slovakia the ALS data are available in the form of digital elevation model (DEM) at a resolution of 1 m/px, which enables collecting detailed information about the enormous number of archaeological relics in the landscape. However, raw data can be processed at a four-time higher resolution. DEM at such high resolution makes it possible for archaeologists to use new spatial data more efficiently and thus to identify, explore, and better protect even parts of archaeological heritage that cannot be identified by using other data sources. Very high-resolution DEM will make it possible to identify the magnitude of features of anthropogenic origin that would not be identified otherwise. The main goals are also to create a methodology for their validation, verifying selected groups of relics directly in the field, design and creation of archaeological spatial database, and publishing a catalogue of representative types of relics of a fossil cultural landscape that will also be usable also within international cooperations. The work also aims at comparing two or more available ALS data sources, their quality, and possibility for change detection. The possibilities of identifying relics and verifying them in the field are tested in 3 regions of Slovakia (Tribeč Mountains, Štiavnické vrchy Mountains, Medzibodrožie). The result can help to manage and protect cultural and historical heritage in Slovakia.

891 CHRONICLE OF A DEATH FORETOLD? THE STATUS OF ARCHAEOLOGY IN DEVELOPER-FUNDED PROJECTS

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Díaz de Liaño, Guillermo (MOLA (Museum of London Archaeology))

Abstract format: Poster

This poster addresses, using ethnographic evidence obtained during the study of the relationship between archaeology and construction, one of the key issues in developer-funded archaeological projects in the UK: the perception of archaeology as a risk for construction and development.

The poster explores the main reasons why developers and construction perceive archaeology as a risk to their projects, to then review the key measures that key stakeholders in both archaeology and construction are proposing, within the current framework, to address and fix the issue.

However, the poster will also analyse the methodological and ethical consequences of these measures, insofar they are not neutral and have an impact on how commercial archaeology is practiced. This poster argues that while some of the practices used to adapt developer-led archaeology to construction environments can have a positive impact for archaeology, the contractual submission of archaeology to construction might not only diminish the agency of archaeologists, but also affect the very epistemological and axiological foundations of the discipline.

892 EXPERIMENTAL PREPARATION AND CARBONIZATION OF TAMALES TO DETERMINE PRESERVATION POTENTIAL IN THE ARCHAEOLOGICAL RECORD

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Cagnato, Clarissa (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice) - Longo, Laura (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice) - Bonetto, Alessandro (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice) - Badetti, Elena (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice) - Marcomini, Antonio (Department of Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice)

Abstract format: Poster

Tamales, prepared traditionally from masa (maize dough) filled with meat, vegetables, and/or fruits before being wrapped in leaves and steamed, are believed to have been consumed by the ancient Maya. Epigraphically, tamales were represented by the glyph wa or wah, and also depicted in Classic Maya iconography, from murals to polychrome ceramic vessels. Besides the Dresden Codex (Maya book), which mentions the use of some meat products in the preparation of Maya tamales, the types of plants used in their elaboration remains much more elusive, as is any direct archaeological evidence of such foods. To understand under what conditions archaeologists might be able to recover evidence of these foods and to develop a reference collection, we carried out a set of replicative experiments whereby tamales were prepared using a range of ingredients available to the ancient Maya, and subsequently exposed to varying thermal conditions for different periods of time. In this poster we present the results obtained from this study, providing a range of qualitative and quantitative information of use to archaeobotanists working in Mesoamerica, but also potentially beyond.

893 LOSS DRIVEN HERITAGE: SYCAMORE GAP AND THE HERITAGE VALUES OF HADRIAN'S WALL

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Hiscock, Alex (University of Edinburgh) - Johnston, Emily (University of Edinburgh)

Abstract format: Poster

Sycamore Gap has become an emblem of Hadrian's Wall, a frequent feature for photographers and a stopping point for travellers, which has contributed to the development of intangible values associated with Hadrian's Wall at the confluence of landscape, 'natural' and ancient archaeological aesthetics. Prior to its felling, the sycamore tree had become embedded with meaning in both local and global communities, which have all exhibited different attachments and memories associated with the site. The felling of the sycamore in September 2023, and the public media explosion that followed represents a key moment of heritage interaction online and offline, as these communities emerged on social media to comment on news articles, post photos and share memories associated with the landmark.

This poster explores the status of the Sycamore Gap in entangled local and global communities, through exploration of these 'loss driven' interactions and outlines the values associated with the Hadrian's Wall World Heritage Site that have emerged in their wake. Timeseries data collected from X (formally Twitter) as well as testimonies collected from local stakeholders are compared to outline transformations that have occurred across global and local scales.

894 COPING LEADS TO CREATIVITY. BURIAL STRATEGIES AND IDENTITY EXPRESSION IN THE FUNERARY RECORD OF THE LATER IRON AGE

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: de Roest, Karla (University of Groningen (Groningen Institute of Archaeology))

Abstract format: Poster

In the later Iron Age (c. 500 BCE–100 CE) of the North-eastern part of the Netherlands funerary options are less visible, but also seemingly less regulated than in previous periods. The obscurity is partly due to less monumentally constructed graves in the landscape, and further hindered by the dissolvment of bone material in the prevalent sandy soil conditions. Whereas cremation practices benefit the preservation of bone material, the absence of urns or mounds is less favourable; there is the likelihood of missed graves during excavation. Although the North-eastern part of the Netherlands is taken as a case study here, the dispersed image seems to be wider phenomenon, as shown by other studies.

Presumably, the existence of multiple burial customs within a local society, reflects a new way of expression of norms. Clear correlations between social status, age, provenance and so forth, and disposal choices elude us although recent scientific methods bring some clarity.

That the monumentality of graves decreased and the reasons behind funerary choices are currently not fully understood, does not mean that coping with the inevitable change in societal relations after life-changing events became less important. The expression of identity will undoubtedly have been manipulated and communicated during the funerary process.

The model suggested in the current research, demonstrates that it is possible to understand expressions of identity and coping strategies in a changing world during the Iron Age, despite the unclarity and lack of uniformity of the archaeological data. This is achieved by applying sociological models, behavioural and neurological studies, and to combine these with archaeological methods studying finds morphologically and through ever-improving laboratory methods. From this, likely scenario's or narratives of the steps in decision-making are deduced that will further advance our understanding of the various ways Iron Age people dealt with their deceased.

896 MEDIATING AND ENTERTAINING: AN EDUCATIONAL FACT SHEET ON HORREA PIPERATARIA FOR THE PARCO'S EDUCATION, DIDACTICS AND TRAINING SERVICE

Abstract theme: 3. The Life of Archaeological Heritage in Society

Abstract authors: Dipino, Luana (Independent Researcher)

Abstract format: Poster

Public archaeology plays an essential role in the practice of modern archaeologists: not limiting itself to mere research but extending to the dissemination of contents, archaeology can act as a bridge between the past and the public

This poster outlines a public archaeology activity undertaken during an internship at the Colosseum Archaeological Park, supervised by Dr. Andrea Schiappelli. It focused on creating an educational fact sheet about the Horrea Piperataria, ancient warehouses constructed under Emperor Domitian, above Neronian-era structures, for preserving, storing, and selling spices. This initiative is part of a larger outreach and entertainment project of the PARCo's Education, Didactics, and Training Service. Personal involvement in excavations carried out at the site by Sapienza University (Prof. Domenico Palombi) inspired this project [1].

The fact sheet, tailored for school audiences, will be soon part of the "Strolling around with Tarpea" series on the PARCo website. It illustrates the role of spices in medical art and daily life, showing the buildings where spices were sold and the urban changes that occurred over time. Highlighted is a neighborhood historically associated with medicine, transitioning from ancient spice tabernae to a medieval church honoring saints Cosmas and Damian still protectors of doctors and pharmacists today [2].

In addition, the current project involves the development of an interactive serious game soon to be available on PARCo's website: imagining being a character from the past walking around in today's Rome, it will allow students to learn how ancient warehouses were located, with a focus on spices used in the Roman world.

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2. Palombi, D., Compitum Acilium. La scoperta, il monumento e la tradizione medica del quartiere, Rend. Pont. Acc, 70,1998, 115-135.

898 BRACTEATES AND BELOKS- THE COMPOSITION OF IRON AGE GOLD

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Jouttijarvi, Arne (Heimdal-archaeometry)

Abstract format: Poster

It is often assumed that the Iron Age gold objects in Scandinavia were made from Roman coins, and thus were of relatively high purity. In general, Roman gold coins maintained their gold content, unlike silver coins, which were at times severely debased by addition of copper. Results from two separate projects aimed at elucidating the technology of two specific types of objects seem to add some nuance to this picture. In both cases, the analyzes were made with p-XRF, which was calibrated against standard gold alloys.

Analyses of around 150 bracteates from Danish and Norwegian finds show, that the composition changes systematically according to the typology, so that A bracteates has the highest gold content, and the contents of silver and copper increase in B, C and to D bracteates. The composition seems to be strongly controlled, as is also known from some types of coins, and follows exactly the same course as seen, for example, in Merovingian and Visigothic coins from the period between. 450 and 650 AD. The changes in composition seem to have caused certain technical problems for the artisans who made the bracteates.

On the basis of analyses of around 100 Gold Berlocks from the 1st to 2nd centuries, also from Danish and Norwegian finds, it could be concluded that two different alloys were generally used. One with a relatively high purity (about 70-80 % gold) and the other made of about equal parts gold and silver. It thus appears to be the relatively rare type of alloy "electrum". These berlocks often have a very pale-yellow color, and in some cases can be mistaken for silver. The choice of this particular composition must, however, be assumed to have been deliberate. Here, the different compositions of the base metal have meant that varying solders have been used.

900 HEAT TREATMENT OF CHERT IN THE EARLY MESOLITHIC AT ROTTENBURG-SIEBENLINDEN (SOUTHWEST GERMANY)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Huber, Hannah (Eberhard Karls Universität Tübingen) - Tafelmaier, Yvonne (State Office for Cultural Heritage Baden-Württemberg) - Kind, Claus-Joachim (retired, previously State Office for Cultural Heritage Baden-Württemberg) - Schmidt, Patrick (Eberhard Karls Universität Tübingen)

Abstract format: Poster

Evidence for heat treatment is documented at several sites of the Early Mesolithic of Southwestern Germany. However, unambiguous evidence so far is restricted to a single type of raw material and to cave sites of a restricted region, the Swabian Jura. The open-air site of Rottenburg-Siebenlinden provides the possibility to investigate heat treatment outside of this region and on an additional raw material. For the lithic assemblages of the site's Early Mesolithic horizons, thermal alterations were recorded, and heat treatment was proposed. In our study, we experimentally heated Middle Triassic Chert, the predominant raw material at the site, and reanalyzed the lithic assemblage of archaeological horizon III at Rottenburg-Siebenlinden, focusing on gloss contrast, the best available criterion for establishing intent. The artefacts classified as gloss contrast artefacts were analyzed for surface roughness using laser-scanning microscopy, to strengthen the macroscopic observations. Gloss contrast artefacts were then used as visual references to assess the relative proportion of heat treated material in the assemblage. Our results show that heat treatment was applied to a wider range of raw materials than previously thought. They also suggest that heat treatment was regularly used in Early Mesolithic reduction sequences regardless of raw material. These findings have implications for our understanding of Early Mesolithic technology, by highlighting that the last Central European hunter-gatherers were more flexible in terms of their material choices and that heat treatment was a more widespread phenomenon than previously thought.

901 DATING ROCK ART IN EASTERN SOUTH AMERICA: A HIGH-PRECISION U-SERIES DATING

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Chim, Eliane (Museu de Arqueologia e Etnologia, Universidade de São Paulo) - Strikis, Nicolás (Instituto de Geociências, Universidade de São Paulo) - da Cruz Junior, Francisco (Instituto de Geociências, Universidade de São Paulo) - Strauss, Andre (Museu de Arqueologia e Etnologia, Universidade de São Paulo)

Abstract format: Poster

America was the last continent to be populated by modern humans. However, the date of their arrival is still a controversial issue. The consensus among archaeologists is that the entire continent had already been occupied at the end of Pleistocene, 11,700 years before present (BP). It is from this period that sufficient evidence emerges to formulate theories about past ways of life, based on adaptation to different environments, as well as the variability of subsistence

practices and technology. Although it is recognized that many sites with rock paintings were already occupied during this period, there is no precise indication of when people started producing rock art, whether it was during this time or throughout the Holocene. The lack of direct absolute dating makes it difficult to determine the rock art chronology and associate figures with material culture found in stratigraphic contexts. Therefore, absolute chronological data are crucial for reducing speculation in defining styles and avoiding oversimplified interpretations of rock art. In the last two decades, however, improvements in uranium-thorium dating (U/Th) have allowed the method to be used to date rock paintings. Here, we systematically applied the U/Th method to date 44 samples of 23 carbonate coatings directly associated with cave paintings at four archaeological sites in eastern South America. Our results reveal that rock art began to be produced in the end of Pleistocene and continued throughout the Holocene. This first approach is part of a large project to establish the chronology of rock art production in eastern South America.

902 DECODING THE HEAVEN OVER OURANOPOLIS

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Denk, Olivia (University of Basel)

Abstract format: Poster

Probably in 316 BC, Alexarchos, the brother of the Macedonian king Cassander, founded Ouranopolis (“Heavenly City”) on the Chalcidice peninsula in northern Greece. The location of the city is linked today with the area of ancient Sane near modern Nea Roda, where a Hellenistic cult building has been excavated. The archaeological material suggests that Apollo or Apollo-Helios was worshipped in a trinity with Artemis and Leto or with Selene and Eos. The coinage of Ouranopolis represents a particularly interesting case in terms of the illustration of astronomic-related components. The silver and bronze coins show on the obverse a solar disc or an eight-rayed star or rather a star with a crescent moon, while on the reverse sits a figure usually interpreted as Aphrodite Ourania on a celestial sphere with a special headdress and holding a scepter. The legend reads ΟΥΡΑΝΙΔΩΝ (the Ouranids) or ΟΥΡΑΝΙΔΩΩΝ ΠΟΛΕΩΣ (of the city of the Ouranids), providing an insight into a unique community. This poster aims to visualize the celestial elements (sun, crescent moon, star) and other features with the focus of a new interpretation, which proposes that the coin depict the god Helios or the personification of the sky (Ouranos) instead of the heavenly Aphrodite. This case study explores a Hellenistic worldview through a new interdisciplinary approach to Ouranopolitian coinage.

903 COMPARATIVE ANALYSIS OF 3D DENTINE WEAR RATES IN MESOLITHIC AND NEOLITHIC POPULATIONS FROM THE NEAR EAST AND THE IBERIAN PENINSULA

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Carrascal Olmo, Susana (Archaeology Institute of the University of Barcelona; University of Barcelona; Autonomous University of Barcelona) - Estebananz-Sánchez, Ferran (Archaeology Institute of the University of Barcelona) - Martínez, Laura (University of Barcelona; Archaeology Institute of the University of Barcelona) - Umbelino, Claudia (Coimbra University) - Chamel, Bérénice (Maison de l’Orient et de la Méditerranée) - Khawam, Rima (National Museum of Damascus) - Molist, Miquel (Autonomous University of Barcelona) - Subirà, Eulàlia (Autonomous University of Barcelona) - Pérez-Pérez, Alejandro (University of Barcelona; Archaeology Institute of the University of Barcelona)

Abstract format: Poster

We present a comparative analysis of 3D dentin exposure rates in human populations from the Mesolithic and Neolithic periods in the Near East and the Iberian Peninsula whose archaeological analyses indicated distinct patterns of food production and ecological conditions. These samples provide a relevant model for testing dietary hypotheses in relation to regression models of dentin exposure in relation to age at death. The archaeological samples studied provide clear insights into dietary habits, lifestyle changes over time and oral health during the transition from a predominantly hunter-gatherer Mesolithic lifestyle to a sedentary, agricultural Neolithic society. Significant shifts in dentin exposure rates are expected, both between cultural traditions and geographical areas, as new dietary challenges and food consumption adaptations accompany this transition. The main goal of the present research is to investigate the prevalence, potential causes and implications of dentine exposure rates during the transition from hunter-gatherer to Neolithic agriculturalist human populations, as well as the implications of regional dispersal in the Mediterranean during the agricultural transition.

904 RYE IN POLAND: INSIGHTS FROM ARCHAEOLOGICAL DATABASES ACROSS THE NEOLITHIC TO IRON AGE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Jesionowski, Michal (University of Warsaw)

Abstract format: Poster

Presentation explores the diverse archaeological perspectives surrounding the cultivation of rye in Poland, spanning from the Neolithic to the Iron Age. Utilizing comprehensive datasets and innovative methodologies, I aim to shed light on the agricultural practices and cultural dynamics that shaped ancient Polish societies.

In the context of bridging gaps between archaeological sciences, humanities, and the digital era, my study emphasizes the transformative potential of archaeological databases. Through the integration of advanced scientific approaches, I analyze extensive datasets to reconstruct the distribution and significance of rye across various archaeological sites in Poland. Additionally, I conduct comparative analyses with contemporaneous sites across Europe, aiming to discern regional variations and broader cultural interactions during this pivotal historical period.

This research not only contributes to our understanding of rye cultivation but also offers insights into the complexities of ancient societies and their relationships with their environment. By synthesizing data from multiple sources, I strive to provide a nuanced interpretation of the archaeological record, enriching our understanding of the past.

905 STUDY OF THE CONSTRUCTION TECHNOLOGY OF BYZANTINE POTTERY FROM ANCIENT SIKYON. THE COMPARISON WITH OTHER NEARBY MAJOR POTTERY PRODUCTION CENTRES

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Panagopoulou, Adamantia (Institute of Nanoscience and Nanotechnology “Demokritos” National Center for Scientific Research, Athens.)

Abstract format: Poster

In the present case study, the manufacturing technology of glazed pottery from Ancient Sikyon in Greece was investigated. The samples belong to the collection of Byzantine - Christian Museum of Athens and came from the excavation in the area of Ancient Sikyon conducted by the archaeologist Anastasios Orlandos. An assemblage of eleven ceramic fragments was examined for their advancement of production technology (decoration, surface treatment), and they dated in Byzantine Period. The chemical peculiarities of the glaze and fabric composition applied to the glazed pottery were investigated. Furthermore, structural analysis was carried out, which included the determination of the crystalline and non-crystalline phases of the structure and coating and the uniform distribution of the components during firing, focusing on construction technology. This was accomplished by following an analytical process that took into account the compositional analyses of pigments, slip coatings, and glazes. The physicochemical analysis was carried out using Optical Microscopy (OM), X-Ray Fluorescence Spectroscopy (pXRF), Scanning Electron Microscopy (SEM-EDS), X-Ray Diffraction Spectroscopy (XRD), Fourier transform infrared spectroscopy (FTIR), and Raman Spectroscopy. At the end, the construction technology of the examined samples was compared with that of other nearby major manufactured centres during the Byzantine Period, such as the Athenian Agora and Chalcis in Euboea.

906 AN INVISIBLE WORLD OF COLORS - COPPER-ALLOYS IN THE BRONZE AGE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Jensen, Simone (Heimdal Archaeometry)

Abstract format: Poster

The poster will present a study of the use of colors in bronze jewelry and decorative ornaments from Denmark's late Bronze Age (around 1100-500 BC). These analyses result in a more detailed knowledge of the bronzesmiths' production of bronze artifacts. Based on previous research, on possible colors of tin-bronzes, the colors are divided into five groups: red, orange, golden, silver, and tinned. XRF analyses are used to determine the chemical composition of the chosen artifacts, thus making it possible to estimate the original colors of the bronzes used. The analyses show the use of all five colors in the different types of jewelry and decoration artifacts. Based on this, it is possible to recognize certain tendencies in specific types of artifacts, such as the tutuli, which have mostly been produced in a golden color, and within a different range of 3% in tin content. Furthermore, by applying the theories about the bronzesmith and this person's skills and knowledge, two possible chaîne opératoires to produce the artifacts in a chosen color are presented. This study shows the perspective of future research on the colors in bronze artifacts from the bronze age.

907 TWO TREES OR NOT TWO TREES? EXPLORING REGIONAL VEGETATION DIVERSITY ON NEOLITHIC SHETLAND

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Mosley, Hazel (Queen's University Belfast)

Abstract format: Poster

Shetland, an island group off the north coast of Scotland, was occupied by Neolithic farmers from the early fourth millennium BC. Within a couple of hundred years, people were using a distinctive rock called felsite to make highly polished tools, which were distributed widely across the archipelago. Only a small number of Early Neolithic sites have been identified in Shetland with even fewer independently dated, but the extraction, use, deposition and distribution of felsite artefacts across the archipelago provides both a useful proxy for human activity and an insight into how communities lived within their wider island landscape.

The landscape of Shetland today is an almost treeless patchwork of farmland, heath and blanket bog, but palynological studies show that, during the Neolithic, vegetation was much more diverse. Several records show high values of tree and shrub pollen, but, due to the problem of wind transport, researchers are circumspect about whether these really represent local woodlands. Previous studies have focussed on south and south-west Mainland, meaning the palaeoenvironmental context of felsite quarries and key felsite-associated sites in the north-west has not been fully examined.

Through analysis of pollen, non-pollen palynomorphs and microcharcoal from new peat cores, we uncover divergent patterns of land use and human impact at sites associated with the quarrying, production, use and deposition of felsite artefacts. This new data is integrated with existing palaeoecological studies to explore regional variations in vegetation. Pollen modelling approaches are used to explore taphonomic issues with pollen transport and deposition, along with GIS to visualise and manage palaeoecological and archaeological data, examine variations in land-cover, and explore spatial and temporal relationships.

908 ARCHAOMETRIC INSIGHTS INTO BRONZE AGE CERAMICS THE FORTIFIED SETTLEMENT IN EAST SLOVAKIA

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Gašpar, Adam (Institute of Archaeology of the Slovak Academy of Sciences) - Petřík, Jan (Department of Geological Sciences, Masaryk University) - Olšav, Štefan (Institute of Archaeology of the Slovak Academy of Sciences)

Abstract format: Poster

Over 40 years of systematic archaeological research at the Bronze Age site in Nižná Myšľa, near Košice, has uncovered the key site of Otomani-Füzesabony Cultural Complex (OFCC), characterized by a distinctive ceramic style. Our petrographic study focuses on the later phase of occupation, scrutinizing ceramics from a significant fortified settlement spanning approximately 75,000 m².

Strategically positioned on a terrace near the confluence of three Carpathian rivers, and with its location along the Amber Road, the site facilitated extensive trade networks. Through macroscopic observations, we identified diverse ceramic recipes and technologies within the fortified central site.

Analyzing over 100 samples of varied vessel types revealed distinct fabric characteristics. Chemical composition analysis identified main production groups and outliers. Petrographic analysis, utilizing optical microscopy on select samples, categorized fabric groups based on provenance and technology. Provenance classification indicates significant ceramic exchange within the presumed hinterland, with sporadic evidence of imports.

These insights deepen our understanding of Bronze Age ceramic production and exchange networks within the broader region. We aim to contextualize these findings with other fortified settlements and outline avenues for future ceramic research.

910 CONNECTING CULINARY TRADITIONS: COMPARING EVERYDAY COOKING VESSELS ACROSS SUB-SAHARAN NORTH AFRICA (C.1000 BCE-1000 CE)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Matthews, Steven (Deutsches Archäologisches Institut) - Nowotnick, Ulrike (Deutsches Archäologisches Institut)

Abstract format: Poster

The Connecting Foodways project (DAI, Berlin) investigates the culinary traditions of Early Iron Age sub-Saharan North Africa for evidence of interregional interaction, based on domestic, everyday foodways. The focus is upon the

study of food technologies, specifically cooking pots and their technical dimensions, and food stuffs, such as food traces and botanical remains. These are used in combination to investigate cultural transmission via household-level interaction over the long-term.

Comparing key technical characteristics of globular cooking pots, including fabric, wall thickness, size of mouth opening, etc., we investigate similarities in function across sub-Saharan North Africa, as well as regional changes in these over time. These are analysed in conjunction with a comparison of plant and animal lipids recovered from the same cooking pots using gas chromatography-mass spectrometry (GC-MS) and gas chromatography-combustion-isotope ratio mass spectrometry (GC-C-IRMS), in collaboration with Dr. Julie Dunne (University of Bristol). Here we present a first overview of results, focusing on the analysis of these food technologies and food stuffs from across sub-Saharan North Africa in interregional, comparative perspective.

911 MICROSCOPIC PERSPECTIVES ON EARLY NEOLITHIC POTTERY IN BISKUPICE, POLAND

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Glód, Anna (Institute of Archeology and Ethnology Polish Academy of Sciences) - Kurzawska, Aldona (Faculty of Archaeology Adam Mickiewicz University) - Sobkowiak-Tabaka, Iwona (Faculty of Archaeology Adam Mickiewicz University) - Moskal-del Hoyo, Magdalena (W. Szafer Institute of Botany, Polish Academy of Sciences) - Mrozek-Wysocka, Małgorzata (Institute of Geology, Adam Mickiewicz University)

Abstract format: Poster

Pottery fragments are commonly encountered at prehistoric settlement sites. Those associated with the early Neolithic period, specifically with the Linear Band Pottery Culture (LBK), provide valuable insights into the culture and technology of the first farming communities in Poland. Residues found on pottery surfaces, such as pigments, food crusts, and other organic remains can provide information about past environments and dietary customs, enriching our comprehension of past subsistence strategies and culinary practices.

A significant assemblage of pottery remains discovered at Biskupice (Southern Poland), dating from 5200 to 5000 BC is associated with only one occupation phase at the settlement, enabling an in-depth study. In our research, alongside petrographic studies, we carried out a thorough analytical and microscopic analysis specifically focusing on pottery surfaces, aiming to detect residues such as pigments, food crusts, or wood tar. We selected samples for further examination using both optical and digital microscopes. Scanning Electron Microscope (SEM-EDS) facilitated the identification of charred plant remains and remains of red pigments. Chemical analysis was conducted specifically on the red residues to determine the proportions of major elements and their compositions. Results from the multiple analyses were combined with the taphonomy of the excavated features and archaeobotanical studies.

912 VIRTUAL REUNION AND MATERIALLY-INFORMED ANALYSIS: STUDYING AN ETRUSCAN VOTIVE DEPOSIT DIVIDED ACROSS CONTINENTS

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Faas-Bush, Susanna (University of California, Berkeley, USA)

Abstract format: Poster

A substantial collection of Etruscan votives – predominantly female heads and figurines – discovered at Caere in December 1885, the Vignaccia deposit was later split up between many museums worldwide, with about 800 entering the collections of the Phoebe A. Hearst Museum of Anthropology in Berkeley. While the majority were cataloged and published in 1988 by Helen Nagy, in the 1920s a subset of 30 votives had been sent to New Zealand in an exchange with the Tūhura Otago Museum in Dunedin, where they remain unpublished and decontextualized, severed from the larger collection.

This poster presents the results of my ongoing efforts across multiple continents to virtually reunite the disparate parts of this votive deposit – photographs of new types from the deposit found in Dunedin and evidence of polychromy on multiple female votive heads.

This research project is also focused on examining evidence from autopsy of the artifacts about how these votives functioned in individual worship. Drawing on new materialist, sensory archaeology, and usewear methodologies, this entails close examination of the artifacts to identify wear based on specific, particular use or engagement with the objects, as well as consideration of both the life history and the physical and sensory affordances of the artifacts. I present several examples that sketch out a more intimate, personal history of votive and dedicant.

913 LIFE IN THE CASTLE KRYSTYNA OF KOZIEGŁOWY

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Ginter, Artur (University of Lodz) - Kittel, Piotr (University of Lodz) - Kłusek, Marzena (Silesian University of Technology) - Michczyńska, Danuta (Silesian University of Technology) - Piotrowska, Natalia (Silesian University of Technology) - Pawełczyk, Fatima (Silesian University of Technology) - Poręba, Grzegorz (Silesian University of Technology) - Tudyka, Konrad (Silesian University of Technology) - Woźniak, Zuzanna (University of Lodz) - Ustrzycka, Alicja (Silesian University of Technology)

Abstract format: Poster

Krystyn of Koziegłowy was born in 1350. Already in the 1380s he was a well-known personage in Lesser Poland, but the peak of his career was connected with the person of the King of Poland and Lithuania - Władysław Jagiełło. In undetermined circumstances, he became the king's right-hand man, participating at his side in all the most important events for Poland - including the battle against the Teutonic Order at Grunwald. In Koziegłowy, on a former early medieval stronghold, he built a magnificent castle that dominated the area long after his death. The castle was abandoned in the 16th century, after which the walls were dismantled in the 19th century. Thanks to the fact that no major construction work was carried out on the castle in the modern period, the medieval layers and the artefacts they contained had been waiting to be discovered since the 16th century. This poster aims to present the history of the site, from the first settlers who appeared in the 3rd-4th centuries AD, through the early medieval fortress defending an important trade route and an area where silver, lead and iron mines were located, to the medieval knight's castle visited by King Władysław Jagiełło himself.

914 THE GOLD.PT PROJECT AND THE STUDY OF A SET OF GOLD EARRINGS DECORATED WITH GRANULATED SPHERES

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Figueiredo, Elin (Department of Conservation and Restoration, School of Science and Technology, NOVA University of Lisbon (NOVA FCT), Caparica, Portugal; Centre of Materials Research (CENIMAT/i3N), NOVA School of Science and Technology (FCT-NOVA), Lisbon, Portugal) - Serrano, Sofia (Department of Conservation and Restoration, School of Science and Technology, NOVA University of Lisbon (NOVA FCT), Caparica, Portugal; Centre of Materials Research (CENIMAT/i3N), NOVA School of Science and Technology (FCT-NOVA), Lisbon, Portugal) - Figueiredo-Persson, Sofia (Centre for the Humanities (CHAM), School of Social Sciences and Humanities, NOVA University of Lisbon (NOVA FCSH), Lisbon, Portugal) CHAM, Centre of Humanities, Lisbon, Portugal)

Abstract format: Poster

In Portugal, the Gold.PT project is studying more than one hundred protohistoric gold and silver artefacts. The artefacts form part of the goldsmith's collection at the National Archaeological Museum in Lisbon and include both historical acquisitions and recent archaeological finds.

During the Late Bronze Age and the Iron Age, the gold and silver metallurgy of the Iberian Peninsula brought together a set of characteristics, both in typology and technology, which reflect Atlantic and Mediterranean influences, as well as endogenous attributes linked to the Iberian communities.

This paper presents a study of six gold earrings from the Iron Age, consisting of an open hoop with a triangular drop of granular beads soldered to the hoop. These forms originate from the ancient Mediterranean, with elaborated parallels found in the interior of Iberia. It is interesting to note that all six gold earrings are made of solid gold, reflecting older forms connected to Late Bronze Age, instead of later ones, which include hollow pieces.

Elemental XRF analysis of the hoop and the granules shows that the region of the granules contain more copper than the hoop itself. This suggests the use of a solder to weld the beads together and into the hoop, with a lower melting temperature than the gold alloy used to make the hoop. The gold alloy of the hoop and granules contains silver and copper in amounts that are within the composition of other Iron Age western Iberian gold artefacts.

915 BRAZILIAN CENTRAL PLATEAU IN THE PLEISTOCENE/HOLOCENE TRANSITION AND THE EARLY HOLOCENE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Straioto, Haruan (Museu de Arqueologia e Etnologia, Universidade de São Paulo) - Chim, Eliane (Museu de Arqueologia e Etnologia, Universidade de São Paulo) - Oliveira, Rodrigo (Museu de Arqueologia e Etnologia, Universidade de São Paulo) - Strauss, André (Museu de Arqueologia e Etnologia, Universidade de São Paulo)

Abstract format: Poster

South America was the last continent to be populated by humans and the chronology of earliest occupation are hotly debated. In the Brazilian Central Plateau there is evidence of human occupation since 14.0 ky cal BP. Models of dispersal suggest an intensification of occupied areas around 11.0 ky cal BP, followed by a process of regionalization after two millennia. The study of lithic technology, as the major evidence available, is crucial to understand these long-term processes. Distinct technological organization of lithic production are identified since the early period in the region. In some areas, there is the production of formal tools, characterized by thick flakes with unifacial retouch. Conversely, numerous contemporary sites lack formal lithic artifact production, with flake tools (mostly unretouched) being the predominant type of manufactured instrument. In this work, we compare the technological variability of assemblages from three rock shelters in different areas of the Brazilian Central Plateau during the period between 14.0 and 9.0 ky cal BP. At the Lapa do Santo site the lithic industry primarily involves the production of quartz flake tools (rock crystal), without the manufacturing of formal artifacts. At the Lapa do Boquete site, the lithic industry is distinguished by the production of formal artifacts exhibiting unifacial flaking, a characteristic of the Early Holocene in the Brazilian Central Plateau. Meanwhile, at the Toca da Braúna I site, during the period's occupations, the lithic industry is characterized by both the production of formal unifacial artifacts and the manufacturing of flake tools, primarily made of quartz. One of the factors under analysis is the relationship between raw material availability and technological schemes. From a diachronic perspective, we examine how regionalization processes have influenced the adoption of distinct operative schemes across various areas.

918 FROM THE CITY TO ITS TERRITORY: RECONSTRUCTING THE ROMAN LANDSCAPE OF VEII

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Pavanello, Elena (Sapienza Università di Roma)

Abstract format: Poster

Veii was the first city of Etruria conquered by Rome in 396 BC. Ancient sources describe how the event took place on the plateau and the hinterland, even so, they don't always match with the archaeological evidences. Furthermore, most of the Etruscan and Roman remains of the urban and rural settlement are not longer visible, while the natural environment has grown up and the evidences have become part of a hidden palimpsest to explore.

Over the years the urban and territorial area has been investigated by antiquarians, topographers and archaeologists using different techniques such as surface survey, geophysical prospection, excavations and aerial photography that led to the production of a large amount of 'legacy' data. Integrating the datasets of these researches into a dedicated Informatic System is becoming essential to manage and, most of all, to understand the ancient multilayered landscape.

Scholars agreed to talk about continuity instead of discontinuity after the Roman expansion. However, it is still difficult to trace the boundaries of the *ager veientanus* with the surrounding territories before the event and most of all how the interaction with Rome could have shaped the Etruscan area.

Analysing the data, the poster will present a reconstruction of the entire archaeological settlement of Veii, with a multiscalar approach, from a monumental to a urban and territorial scale. The aim is to understand the Roman impact on the *ager* by defining the area of concern, from its conquest to its abandonment, during the 4th century AD.

919 TRACKING ANCIENT PLANT PATHOGENS AND THEIR POTENTIAL TO EXPLORE PALAEOECOLOGICAL CHANGES AND PLANT/HUMAN INTERACTIONS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: MORANDI, LIONELLO (Department of Civilisations and Forms of Knowledge, University of Pisa; Archaeometry Research Group, Eberhard Karls University of Tübingen) - MAZZUCCO, NICCOLÒ (Department of Civilisations and Forms of Knowledge, University of Pisa) - SARROCCO, SABRINA (Department of Agriculture, Food and Environment, University of Pisa)

Abstract format: Poster

There is nowadays a large body of evidence testifying to the spread and evolution of pathogens throughout human history. Within this line of research, so far the majority of efforts have been devoted almost exclusively to human- and animal-related pathogens, shedding light on issues such as ancient disease outbreaks (e.g. plague and tuberculo-

sis) resulting from large-scale population movements and renovated subsistence practices, chiefly the introduction of Neolithic lifestyles involving a close proximity with domesticates. However, within the last decade, only scant attention has been given to the investigation of the history of plant pathogens and their evolutionary pathways subsequent to the shaping of new ecological niches, especially following the onset of agriculture and related landscape modifications. Building on previous palaeoecological literature and recent data from archaeological artefacts, we aim to select a range of finds and biological proxies which will enable us to address the issue of past plant pathology. Well-preserved organic materials and sedimentary samples are particularly promising in this regard, and by applying a suite of analytical methods ranging from genetics to micropalaeontology and GC/MS, a protocol can be set up to track long-term changes and human-induced modifications in the plant pathogen record.

921 NUBIANS IN FIRST INTERMEDIATE PERIOD AND EARLY MIDDLE KINGDOM EGYPT (CA. 2200-1900): AN INTERSECTIONAL APPROACH

Abstract theme: 4. Persisting with Change: Theory and Archaeological Scrutiny

Abstract authors: Matic, Uros (University of Graz) - Ejsmond, Wojciech (Institute of Mediterranean and Oriental Cultures, Polish Academy of Sciences)

Abstract format: Poster

Thinking of ancient Egypt as an ethnically homogenous state still prevails and seems to be an inheritance of the 19th and early 20th centuries' views. Of course, the situation was more complex and several ethnic groups were living under the pharaoh's scepter. Furthermore, Egyptology has generally been reluctant to reflect on its own theories and methods and their historical contingency, as well as to apply, test, or reflect on the body of theory outside its narrow sphere. An intersectional approach to identity is well-known in some archaeologies, whereas in others, such as Egyptology, it is rarely, if ever, considered. Thus, a fresh rethinking and re-examination of identities is needed. For this, we need to go beyond defining people from only one perspective.

In short, an intersectional approach to identity considers that various facets of identity, such as age, gender, ethnicity, status, etc., can intersect in a myriad of ways. In this poster, we will apply an intersectional approach to the identity of Nubians in First Intermediate and early Middle Kingdom Egypt (ca. 2200-1900 BCE). We analyze both self-representations of Nubian men and women in ancient Egyptian art of this period, and representations of Nubian men and women done by others. We argue that age, gender, status, and ethnicity intersect in these representations, differentiating between: Nubian men in Egyptian service, Nubian women, Nubian women in Egyptian service, women of Nubian origin married to Egyptian kings, boys from mixed Nubian-Egyptian marriages depicted as Nubians, and girls from such marriages depicted as Nubians. We discuss the possible reasons behind the children from these marriages being depicted as Nubian rather than Egyptian.

923 INTERPRETING MIGRATION PATTERNS: INSIGHTS FROM STRONTIUM ISOTOPE ANALYSIS OF THE EARLY MEDIEVAL CEMETERY OF ALTHEIM-ESSENBACH, BAVARIA (GERMANY)

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Velte, Maren (State Collection of Anthropology Munich) - Seyr, Elsa (State Collection of Anthropology Munich) - Brather, Sebastian (Albert Ludwigs University Freiburg) - Patzold, Steffen (Eberhard Karls University Tübingen) - Meier, Mischa (Eberhard Karls University Tübingen) - Schmidt-Hofner, Sebastian (Eberhard Karls University Tübingen) - Burger, Joachim (Johannes Gutenberg University Mainz) - Harbeck, Michaela (State Collection of Anthropology Munich)

Abstract format: Poster

There has been much discussion about the role that migration played in the transition from Late Roman to Early Medieval times, particularly in the formation of the Baiuvarian tribe and the founding of their tribal dukedom, which took place from the 5th to the 6th century in what is now Southern Bavaria (Germany). The cemetery of Altheim-Essenbach is one of the largest Early Medieval row cemeteries ("Reihengräberfelder") in this region. As part of an ongoing interdisciplinary research project, genetic, osteological and isotope-chemical data were collected from 100 burials dating between the 5th and the 7th century. This contribution focuses on the performed strontium isotope analysis, a pivotal tool in migration research enabling the detection of migrants originating from geologically diverse areas. While preceding studies suggest a high migration rate (of around 24%) in Southern Bavaria in the 5th century, $87\text{Sr}/86\text{Sr}$ data from Altheim-Essenbach indicate a notably low proportion of migrants (approximately 6%). We here discuss the possible interpretations of this result, considering the additional data collected from the burials. In doing so, we also demonstrate the limitations of strontium isotope analysis, even with large data sets.

926 ANALYSING QUARTZITE VARIABILITY OF THE EL SOTILLO ACHEULEAN ASSEMBLAGE (CIUDAD REAL, SPAIN)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Abrunhosa, Ana (IPHES-CERCA - Institut Català de Paleoeologia Humana i Evolució Social, Spain.; Universitat Rovira i Virgili (URV), Departament d'Història i Història de l'Art, Tarragona, Spain; ICArEHB - Interdisciplinary Center for Archaeology and Evolution of Human Behaviour, FCHE - Universidade do Algarve, Portugal) - Heras-Bastida, Sergio (Departamento de Prehistoria, Historia Antigua y Arqueología, Universidad Complutense de Madrid, Madrid, Spain) - Pérez-González, Alfredo (I.D.E.A. - Instituto de Evolución en África, Madrid, Spain) - Rubio-Jara, Susana (Departamento de Prehistoria, Historia Antigua y Arqueología, Universidad Complutense de Madrid, Madrid, Spain; I.D.E.A. - Instituto de Evolución en África, Madrid, Spain) - Méndez-Quintas, Eduardo (Grupo de Estudios de Arqueología, Antigüidade e Território (GEAAT), University of Vigo, Ourense, Spain; I.D.E.A. - Instituto de Evolución en África, Madrid, Spain) - Panera, Joaquín (Departamento de Prehistoria, Historia Antigua y Arqueología, Universidad Complutense de Madrid, Madrid, Spain; I.D.E.A. - Instituto de Evolución en África, Madrid, Spain) - Santonja, Manuel (I.D.E.A. - Instituto de Evolución en África, Madrid, Spain)

Abstract format: Poster

The complexity of early humans' behaviour is linked to the degree of technological specialization and variability of raw materials exploited. However, the timing of when early humans transitioned from merely expediently exploring locally available materials to exhibiting more sophisticated behaviours remains a topic of ongoing debate and limited research, particularly in older chronological contexts.

The Acheulean techno-complex, originating in Africa c. 2 million years ago, marked a significant milestone in human technological advancement. This phase, which lasted until c. 300,000 years according to most records, is characterized by symmetrical objects and standardized shapes crafted from large flakes such as bifaces and scrapers.

In contrast, the Iberian Large Flake Acheulean (LFA) persisted until the final stages of the Middle Pleistocene, with sites such as Porto Maior, Ambrona, and Torralba dating between 400,000 and 150,000 years ago, coexisting with the Middle Palaeolithic. Technological similarities between African Acheulean and those in the Iberian Peninsula, the Aquitaine region in France, and the Near East are apparent.

A significant concentration of Acheulean sites in the Iberian Peninsula, particularly along river terraces such as those along the central sector of the Guadiana River basin, highlights the region's importance. El Sotillo stands out as one of the largest Acheulean assemblages in Europe with a complex stratigraphic sequence with Mousterian and Acheulean levels.

This paper focuses on the raw material analysis of the Acheulean assemblage from El Sotillo's level 5, composed mainly of quartzite and dated to 245–345 ka by OSL. Quartzite sub-groups are identified by examining macroscopic and microscopic features through thin sections. This characterization, encompassing grain size, porosity, intergranular contacts, and cementation, facilitates understanding the rock's mechanical behaviour. By correlating this data with techno-typological studies, patterns in raw material procurement and exploitation at El Sotillo during this period can be assessed.

927 FROM ROME TO AQUITANIA: CHARACTERISING THE PAINTING TECHNIQUE OF THE GALLO-ROMAN WALL PAINTINGS OF LIMONUM

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Iuliano, Adriana (Archéosciences Bordeaux, CNRS/University Bordeaux Montaigne/University of Bordeaux) - Galluzzi, Francesca (Archéosciences Bordeaux, CNRS/University Bordeaux Montaigne/University of Bordeaux) - Pianet, Isabelle (Archéosciences Bordeaux, CNRS/University Bordeaux Montaigne/University of Bordeaux) - Carrive, Mathilde (Hellénisation et romanisation dans le monde antique (HeRMA), University of Poitiers)

Abstract format: Poster

Roman influence expanded in Gaul from the 3rd century BC and culminated with the conquest and administration of the region under Augustus, bringing with it new construction and decoration techniques, including wall painting. Gallo-Roman decorative traditions, initially strongly influenced by Italian models, are known for gradually acquiring a certain autonomy and originality in the second half of the 1st century AD. This raises questions on possible changes in the choice of pigments and painting technique made by craftsmen of the time.

Painting production in Gaul is well studied and documented from an archaeological and artistic point of view. In the last ten years, archaeometric studies have also been carried out, although limited to a single building or a group of close and/or contemporary buildings, therefore not allowing a comprehensive study of the practices employed in ancient painting. For this reason, this research focuses on the investigation of a larger corpus of wall paintings in the

Aquitania province: that of Limonum (modern-day Poitiers, France). Several lots of painted plasters were selected and analysed to characterise the colour palette and understand the evolution of the painting technique used.

A multi-analytical approach was followed. In a first step, non-invasive techniques such as portable microscopy, hyperspectral imaging, XRF spectroscopy and XRD analysis were used. This allowed for the characterisation of red and yellow ochres, green earth, Egyptian blue, cinnabar, carbon black, and for the selection of sampling areas. Micro-invasive analyses were carried out in a second step, including optical microscopy, SEM-EDS, and micro-Raman and FTIR spectroscopy. Point and molecular analyses confirmed previously obtained results, while stratigraphic observations gave insights on the painting technique, revealing the presence of mezzo frescoes and lime paintings.

928 WHEN THE OLD ONES ARE GONE: BIOARCHAEOLOGICAL ANALYSIS OF AN INDIGENOUS MUMMY FROM BRAZIL AT THE TIME OF EUROPEAN CONTACTS

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Borges, Caroline (Department of History, Federal Rural University of Pernambuco, Dom Manuel de Medeiros street, s/n, 52171-900, Recife, PE, Brazil) - Cunha, Claudia (Coordenação da Graduação em Arqueologia/Programa de Pós-graduação em Arqueologia – Universidade Federal do Piauí, Brasil. Centro de Investigação em Antropologia e Saúde – Universidade de Coimbra, Portugal) - Tomé, Tiago (Departamento de Antropologia e Arqueologia - Faculdade de Filosofia e Ciências Humanas - Universidade Federal de Minas Gerais) - Magalhães, Sônia (Coordenação da Graduação em Arqueologia/Programa de Pós-graduação em Arqueologia – Universidade Federal do Piauí, Brasil) - Spehner, Olivier (Akia Consulting) - Saless, Kevin (Department of Anthropology, Masaryk University, Faculty of Science, Kotlářská 2, 611 37 Brno, Czechia)

Abstract format: Poster

This study presents a multidisciplinary investigation into an Indigenous naturally mummified individual who was deposited on the surface of a room inside a cave in Colônia de Gurgéia, Piauí, northeast of Brazil. The burial cave is located in the semiarid region where Caatinga vegetation – deciduous shrub forest autochthonous to Brazil – predominates. Our aim is to reconstruct the life history of this individual by biogeochemical and bioarchaeological analysis. Bioanthropological information recovered suggests that this individual is an elderly female individual who presented several health issues at death. Some are related to advanced age such as osteoarthritis in different joints and deformities of the vertebral bodies. In addition, she presents evidence of an on-going periapical infection at the time of death, periodontal disease, and ante mortem loss of different teeth. Moreover, she displays evidence of a healed fracture to one of her ribs. The elderly woman underwent a funerary ritual involving body decoration and body wrapping in a sleeping hammock before being placed in the surface of the cave. This practice remains prevalent among indigenous communities in Brazil nowadays. The exceptional preservation of the body enables stable carbon and nitrogen isotope analysis of bone, skin, hair, nail, and oral mucous membrane samples offering nuanced insights into her dietary patterns during her adulthood and her late life. Finally, we provide the two first ¹⁴C radiocarbon dates for this individual showing that she lived in the edge of the beginning of the European colonization of Americas. By synthesizing these diverse analytical approaches, this research contributes to a deeper understanding of this individual's life. Also, this study enriches our comprehension of Indigenous history and cultural practices in Brazil, elucidating the complexities of the first contacts, honoring the enduring legacies of Indigenous peoples in the Americas.

929 HORSES AND HUMANS. AN OVERVIEW OF LATE IRON AGE DATA FROM LOWER DANUBE AREA

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Magureanu, Despina (Institute of Archaeology „Vasile Parvan”) - Matei, Sebastian (Buzau County Museum)

Abstract format: Poster

Archaeological research carried out at Late La Tène period settlements of pre-Roman Dacia uncovered contexts with equid bones. As generally acknowledged, osteological remains discovered on archaeological sites constitute a coherent documentary source. The archaeozoological analyzes carried out mainly in the Lower Danube area yielded data on certain types of human-horse relationships. Owning such animals emphasizes the attention paid to their breeding and care. Most horse remains originate from contexts with profane functionality, public spaces, but mainly waste pits. Horse remains are few when compared to other species. For sure, horse was occasionally eaten, in certain circumstances. It was sub-adult specimens or old animals that were intended for food consumption. The bone assemblage studied indicates the presence of two horse breeds. One, more robust, with semi-massive limbs, was used more for domestic activities. The horses of the other breed, of smaller size, were riding horses, sometimes also used for military purposes.

Completing the image of the equestrian equipment, the distribution of certain artefacts is suggestive of horses material culture. For the studied time frame, harness elements like bits, or rider elements like spurs, were discovered in the Lower Danube area settlements.

The importance of riding horses turns them into emblems as indicators of social status. The iconographic analysis of certain figurines of unique character, such as those from Cârloșnești, Buzău County representing a rider and his horse (image of a riding hero), emphasizes the strong connection between man and horse, as well as an equestrian tradition.

Representations of horsemen with symbolic valences can be found on artifacts belonging to the Toreutes and the Statuaria attributed to the Geto-Dacians.

We here present our study within the wider frame, paralleling them to finds of horse bones and horse material culture, or horse representation from other sites in the Lower and Middle Danube area.

930 THE ALGHERO PLAGUE EPIDEMIC (SARDINIA, A.D. 1582-1583): THE INTERSECTION BETWEEN HISTORY OF MEDICINE AND PALEOPATHOLOGY

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Varotto, Elena (College of Humanities, Arts and Social Sciences, Flinders University) - Milanese, Marco (History, human sciences and education, University of Sassari, Italy) - Galassi, Francesco Maria (Department of Anthropology, Faculty of Biology and Environmental Protection, University of Lodz, Poland)

Abstract format: Poster

This communication explores, through a multidisciplinary approach, the intersection between the study of plague by means of historical sources and data originating from the bioarchaeological and paleopathological study of human remains retrieved from the cemetery of the ex-Jesuit college of San Michele in Alghero (Sardinia, Italy) excavated under the scientific directorship of one of the authors (M.M.) in 2009.

The mass plague burial comprises sixteen long and narrow graves called “trenches”, each holding the remains of 2 to 30 individuals, and additional multiple graves for a total of ca. 200 plague victims, who orderly lay next to one another, potentially including entire families laid down together. It thus represents a unicum in Mediterranean funerary archaeology. The fact that the plague occurred in a short time range and this is no ordinary mass grave allows scientists to obtain a more precise snapshot of pathological conditions, especially congenital ones.

In this communication, we will thus recapitulate the preventive measures adopted by the Protomedicus Quinto Tiberio Angelerio to fight the advancing plague and compare them with similar contemporary measures adopted in Italy during the recent COVID-19 pandemic. Not only will they be listed, but their supposed efficacy will be highlighted in light of the medical knowledge of the day. Furthermore, the presentation will thus focus on one specific rare congenital anomaly found in Alghero, namely Klippel Feil Syndrome found in four individuals. To this date, this is the sole cemetery in Italy to have yielded such a high number of cases of this disorder, while in most instances only single cases are found by paleopathologists. This is in direct connection with the specific cemetery situation described above. Finally, the importance of combining sources in paleopathological research will be stressed as a potential asset devised to improve the overall quality and sensitivity of retrospective diagnostics.

933 SACRED SPACE, INSCRIBED WALLS, AND PAINTED NARRATIVES - ANALYZING A NEWLY DISCOVERED CHAMBER IN DONGOLA

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Skarzynska, Magdalena (Polish Centre of Mediterranean Archaeology UW) - Deptuła, Agata (Polish Centre of Mediterranean Archaeology UW)

Abstract format: Poster

In early 2023, researchers working under the ERC grant “Umma” in Old Dongola made a remarkable discovery beneath the floor of a 16th-century house: a small chamber adorned with paintings and inscriptions dating back to the 13th century. This find was hailed as one of the top 10 archaeological discoveries of the previous year and garnered mention in over 100 scholarly and popular publications worldwide. The paintings depict figures such as the Virgin Mary, Christ, and a scene featuring a Nubian king alongside Christ and the Archangel Michael. However, the portrayal of the Nubian ruler differs from typical depictions of royal patronage by saints and archangels; here, the king bows to Christ seated on clouds, kissing his hand. In addition to the paintings, inscriptions in both Old Nubian and Greek were found on the walls. While the Old Nubian texts reference historical events unrelated to the chamber itself, the Greek inscriptions unequivocally reveal the chamber's liturgical function. These texts contain prayers from the liturgy of Pre-sanctified Gifts, allowing for communion on non-liturgical days of the year. Similar prayers are known from the prothesis of several Nubian churches, although this chamber's inscriptions feature a more extensive collection. Our poster will focus on the epigraphic and iconographic analysis of this space, seeking to elucidate the relationship between its representations and the liturgical character of the texts.

934 MICRO CT DETAILS OF A POSSIBLE KIDNEY STONE FROM THE 13-16TH CENTURIES, KNIGHTS' TEMPLARS CHURCH RAŠAŠKA - RAČEŠA (CROATIA)

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Sarkic, Natasa (Aita Bioarchaeology) - Cighetti, Roberto (Aita Bioarchaeology, Barcelona, Spain; Osteoarc, Via Giacomo Matteotti, 7, Gornate Olona VA, Italy) - Erjevac, Igor (University of Zagreb, School of Medicine, Center for Reproductive and Regenerative Medicine, Laboratory for Mineralized Tissue;4) - González-Garrido, Laura (Universidad de León, Área de Antropología Física, Departamento de Biodiversidad y Gestión Ambiental, Campus de Vegazana, León, Spain; University of Coimbra, Research Centre for Anthropology and Health, Department of Life Sciences, Calçada Martim de Freitas, Coimbra, Portugal) - Mihaljevic, Marija (Nova Gradiska Town Museum)

Abstract format: Poster

During the excavation of the Rašaška site in Croatia, dating from the 13th to 16th centuries, a male skeleton, aged over 30 years old, was discovered with a light brown irregularly shaped calcified mass in the abdominal region. Upon macroscopic examination, the recovered mass indicates the potential diagnosis of a urolith extending from the renal pelvis into at least four calyces, each displaying dilated and rounded apices. Micro-CT scanning further elucidated the radiopaque nature of the stone and notably lacking distinct lamina. Following a thorough differential diagnosis, the mass was identified as consistent with staghorn uroliths, often associated with chronic urinary tract infections, likely exerting adverse effects on the overall health of the individual. While calcified formations are extensively documented in clinical research, their occurrence is less frequently reported within the realm of Paleopathology. Therefore, the rigorous archaeological excavation techniques and refined identification methodologies for such calcified formations is imperative for advancing recognition, enhancing diagnostic accuracy, and deepening interpretative understanding of past populations. Subsequent investigations will focus on determining the chemical composition of this kidney stone, offering further insights into the health status"

935 THE WOODEN TECHNOMORPHOLOGICAL VARIETY OF ARCHITECTURAL ELEMENTS AT THE LUCONE D SITE

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Maltese, Giuseppe (Department of Cultures and Civilizations, University of Verona - Italy) - Baioni, Marco (Museo Archeologico della Valle Sabbia - Italy)

Abstract format: Poster

The Lucone D pile-dwelling site, situated in an inframorraine basin near Lake Garda and dendrochronologically dated between 2034 and 1967 ± 10 B.C., has provided a wide range of horizontal wooden elements, probably part of the buildings. A total of 1060 wooden elements, 550 of which are horizontal, were identified in Sector 1, preserved through exceptional events such as fire or abandonment in water. To define the different types of horizontal elements found on the excavation, and to achieve a clearer and more complete classification of the woody assemblages, given the absence of an appropriate classification in the archaeological literature, wood technology sources were consulted. Thus, a classification of the elements based on the measurements of their horizontal section was proposed, distinguishing between beam, small beam, joist, lath, plank, board and small board. Joists and boards were found to be the most representative, accounting for 42.73% and 28.79%, respectively.

Furthermore, the combination of xylological analyses and the classification of wooden assemblages allows for a more complete and detailed understanding of the construction techniques found at the site. The predominance of oak, especially of the ROBUR variety (*Quercus* sp. sez. ROBUR), for large-scale elements is evident and finds comparison at other sites in the Benaco region.

The techno-morphological investigation of the horizontal elements discovered at Lucone D has enabled a detailed analysis of wood-working techniques during the Bronze Age, highlighting a remarkable level of technical and architectural complexity, as well as carpentry skills.

938 THE MARKETPLACE AT GERASA/JERASH, 6TH-9TH CENTURY CE

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Simpson, Ian (Leiden University)

Abstract format: Poster

This poster presents results of excavations and archival research that have unearthed and reconstructed the continued commercial and social life of Roman Gerasa in Jordan in Late Antiquity and the Early Islamic Period. It presents evidence and materials from the marketplace in Jarash in studies by the Islamic Jarash Project and Market Section, including architecture, accounts ledgers, commercial products, coins and seals. Together these provide insight into

the evolving market infrastructure of the town in the 6th-9th centuries CE, and demonstrates marketplace organization, the context of social interaction, and social and economic changes that took place during the initial formation and expansion of Islam. The marketplace under study is located outside an early mosque in central Jarash and formed a site of cultural and not only commercial exchange. It shows that a planned commercial and industrial program was initiated in the Late Byzantine period to facilitate trade and exchange, which continued into the Abbasid period.

941 RITHMS PROJECT: HOW DIGITAL TECHNOLOGY CAN HELP US PROTECT CULTURAL HERITAGE

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: De Bernardin, Michela (Istituto Italiano di Tecnologia (Center for Cultural Heritage Technology)) - Giovannelli, Riccardo (Istituto Italiano di Tecnologia (Center for Cultural Heritage Technology)) - Leeson, Madison (Istituto Italiano di Tecnologia (Center for Cultural Heritage Technology)) - Traviglia, Arianna (Istituto Italiano di Tecnologia (Center for Cultural Heritage Technology))

Abstract format: Poster

In recent decades, the devastation of archaeological sites, particularly in conflict-affected areas of the Middle East, has reached unprecedented levels, sparking public concern and raising awareness about the perils of looting and illicit trafficking in cultural heritage.

Dedicated units within Law Enforcement Agencies (LEAs) have developed databases of stolen artefacts and engaged in provenance research activities. Concurrently, an increasing number of museums have made their archaeological collections more accessible to the public through repositories and inventories.

Within the European project RITHMS (Research, Intelligence, Technology for Heritage, and Market Security), this wealth of information is expanded by Open Source Intelligence (OSINT) data sourced from public websites and social media. Leveraging the innovative application of social network analysis methodology, RITHMS aims to illuminate the intricate web of connections among actors involved in the trade and trafficking of stolen archaeological items.

This technological advancement equips LEAs with more precise and timely intelligence, empowering their investigative efforts. The interoperable digital platform developed by the RITHMS project promises invaluable insights, enabling the identification of active organized criminal networks. Consequently, LEAs can address the criminal phenomenon more efficiently and preempt the further proliferation of illicit activities.

943 UNFINISHED, BROKEN AND DISCARDED: AN ANALYSIS OF THE NEOLITHIC AMBER PROCESSING TECHNIQUES IN THE EASTERN BALTIC (LATVIA)

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Cakare, Agnese (Institute of Latvian History, University of Latvia)

Abstract format: Poster

In the archaeological record from the Eastern Baltic region amber occurs most prominently throughout the Middle and Late Neolithic (4th-3rd mill. BC). It was collected along the Baltic coast and worked into jewellery and figurines, traveling far inland, but processed where amber raw material were abundant. Three major Neolithic amber processing centers are known in present-day Latvia: Sārnate, Siliņupe and Lubāns Lake basin. So far, the collections have been studied mainly from a typological point of view, and less from a technological one, related to the methods used to transform the material. This study focuses on combining experimental and microscopic analysis to investigate the techniques and materials used to treat amber by examining amber rough-outs, broken artifacts and final products from the above-mentioned amber processing sites. Depending on the characteristics of the amber, the type of jewellery intended, the complexity of manufacture, the availability of resources and the skill of the maker, the techniques used varied. Amber was worked using tools made from both locally available material (antler, sandstone, Silurian flint) and imported Cretaceous flint, while the processing techniques identified suggest an interplay of the materials: some of the techniques were used to work flint before the appearance of amber.

945 BONE GROWTH CHANGES IN NON-ADULTS IN THE CONTEXT OF URBANIZATION AND CLIMATE CHANGE IN 13TH-18TH CENTURY BERLIN

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Brennan, Emily (University of South Carolina)

Abstract format: Poster

The study of non-adult skeletal individuals offers an opportunity to study not only the biological and physical changes of growth and development but also the effects of social, cultural, and environmental exposures during early periods of the life course. Since children are regarded as the most vulnerable members of the population, evaluation of non-adult health trends have been used to examine the health consequences of large scale changes in society, like urbanization

and climate change. Using non-adult individuals, those under 18 years of age, (n = 69) excavated from the St. Peter's Square in Berlin dated between c. 1200 -1717, this study seeks to determine whether environmental factors, namely a volatile climate and urban growth in the early modern period (1500-1800), are associated with inhibited bone growth, as measured by endochondral, appositional, and cortical growth, measured via radiological scans. Results suggest that bone growth measures were largely the same for non-adults between the late medieval (c. 1200 – 1500) and early modern periods. For both time periods, individuals under 5 years of age were compared to individuals older than five since differences of immunocompetency exist between these age groups. In the early modern period individuals under 5 display greater values for bone growth measures compared to those over 5. This may be interpreted as a display of greater resilience in that individuals who survived early childhood did so even with evidence of earlier life stress. These results may reflect differential investment in parenting in post-Reformation Berlin. The new Church emphasized the importance of not only marriage, but motherhood for women, with an emphasis on both pre- and post-natal care for mothers and infants. This study demonstrates the utility of using radiological imaging to measure bone growth and the importance of contextualizing such measures with cultural and temporal experiences of childhood.

946 **SINERGICALLY ASSEMBLING THE PUZZLE OF PREHISTORIC PORTABLE ART FROM GIOVANNA CAVE (SIRACUSA, SICILY) THROUGH A DIGITAL HUMANITIES APPROACH**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Zampetti, Daniela (Fondazione Sapienza Università di Roma)

Abstract format: Poster

Understanding cognitive complexity of prehistoric human beings is currently improving thanks also to the developments of scientific technologies and new holistic approach based on the interaction between several disciplines.

Overall, the production of engraved figurative and abstract signs on portable limestone stones reflects the cognitive complexity of prehistoric human beings. Their ability to conceptualize, plan, and execute such intricate designs speaks to us also about their capacity for innovation in choosing a visual way to express ideas.

This research is following a multi-dimensional and interdisciplinary methodological approach to bridge the gap between the seen and unseen aspects of the twenty-two engraved fragments found at Giovanna Cave.

Through a holistic investigation encompassing geology, bioarchaeology, naked eyes visual analysis, lens/lower magnification microscopic analysis/ macro-photography, 3D surface and volume reconstruction (Structure from Motion) the study aims to dig deeper into the cognitive and symbolic significance of limestone and pebble artworks.

In this research program we are committed to use low-cost resources in order to disseminate not only data but also good affordable practices, comparing and experimenting with scanners, photogrammetry, AutoCAD and VR. We plan also to explore different interfaces to visualise and analyze, building different layers of information available on digital twins. The goal is not just to create the models of the engraved limestone fragments but to experiment with, exploring them also within a VR experience with Eye and Hand Tracking to better understand ancestors' ergonomics and manual ability in the engraving production processes.

947 **COOKING OVER FIRE: INTENDED AND ACTUAL FUNCTION OF THIRD-MILLENNIUM COOKING POTS, EASTERN CROATIA**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Miloglav, Ina (University of Zagreb) - Vuković, Jasna (University of Belgrade) - Vuković, Miroslav (University of Zagreb) - Balen, Jacqueline (Archaeological Museum in Zagreb)

Abstract format: Poster

Intended (suitability of vessel's attributes for different functions as a result of potter's technical choices) and actual (use-alterations) function are two aspects related to modes of use of ceramic vessels. Both aspects will be examined in the case of S-profiled pots with a polished upper part and textured lower part, and usually with two tunnel handles from the site of Prisunjača, typical forms belonging to the Late Copper Age Vučedol culture of Eastern Croatia (2880-2450 BC). Technological traits: intentional blackening of their upper parts and textured surfaces of the lower body suggest that preferable performance characteristics could be related to thermal food processing. Use-alteration traces: abrasion on the handles as the consequence of suspending the vessel over the fire, and carbon deposits on vessels' interiors were identified by macroscopic examination and observation under a stereoscopic microscope. They also suggest the function of cooking with the presence of water. Analysis of the spatial distribution of the pots revealed that the majority of the specimens were found inside the house. Together with already conducted organic residue analyses from other neighboring contemporary sites, it can be stated that their function of cooking meals on a daily basis is not questionable.

949 **NEW DATA ABOUT SUBSISTENCE STRATEGIES DURING THE MESOLITHIC IN THE INTERIOR OF THE CANTABRIAN REGION: INSIGHTS FROM ARANGAS CAVE (SPAIN)**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Ruiz Cristóbal, Patricia (University of Cantabria) - Portero Hernández, Rodrigo (University of Salamanca) - Arias Cabal, Pablo (University of Cantabria; International Institute for Prehistoric Research of Cantabria (IIIPC))

Abstract format: Poster

In this poster we present the archaeozoological and taphonomic analysis of macromammal remains from level 3 of Arangas cave. The location of this site, in the mountainous interior of eastern Asturias, contrasts to the numerous known coastal sites from the Mesolithic of Cantabrian Spain. Level 3, dated to the VIII millennium cal BP, has revealed a high number of well-preserved macromammal remains, unlike most of the contexts studied in the same geographical area.

These aspects position the site as a key location for understanding the subsistence strategies of late hunter-gatherers groups. For this purpose, we conducted an analysis of macromammal samples from squares F8, G12, and G13 to provide new data into the management of animal resources within the context of Mesolithic human group subsistence strategies.

Through anatomical and taxonomic identification, we analyze the animal species exploited and assess their representation at the site using quantification measures. Additionally, we estimate the caloric contribution of each species to the human diet to understand their respective roles. We also inferred the paleoeconomic behavior according to the seasonality of hunting activity and the processing and consumption of the prey from the study of taphonomic marks, which provided the anthropic contribution of the faunal deposit.

950 **PREDICTING ANCIENT HUMAN POPULATION MOVEMENTS USING PHYLOGENOMICS OF ANCIENT COMMENSAL MICROBES**

Abstract theme: 2. Archaeological Sciences, Humanities and the Digital era: Bridging the Gaps

Abstract authors: Willingham Grijalba, Arve Lee (Université Paris Cité) - Ponce-Soto, Gabriel Yaxal (Université Paris Cité) - Rascovan, Nicolás (Université Paris Cité)

Abstract format: Poster

Dental calculus is the calcified biofilm that accumulates on teeth's surfaces during an individual's life. This exceptionally preserves a genetic record of an individual's oral microbiome, one of the most stable and conserved human microbial communities across populations, which is composed of hundreds of species. However, most of what we know about oral microbiomes is based on modern samples, and little is known regarding these human-microbe associations over large spatiotemporal scales, and how informative they can be about an individual's history. We hypothesize that the ancient oral microbiome is likely maintained within human populations over long periods and therefore it can reflect human population movements throughout time. To test this hypothesis, I am analyzing multiple individuals from the Southern Cone of the Americas, a region rich in archaeological record but yet underexplored using paleogenomic approaches. Phylogenomic methods were used to reconstruct the relationship between strains of oral microbial species recovered from individuals across multiple spatiotemporal contexts. When combined with archaeological data, we reveal strong biogeographic associations for several species, bringing novel insight into the long-term association between humans and their commensal microbes. We propose that this type of data and the implemented analytical approaches can be used to contribute a novel and complementary approach to investigate ancient human demography.

951 **CARRYING CAPACITY AND MEAT AVAILABILITY FOR THE NEANDERTHAL GROUPS IN THE UPPER VALLEY OF THE LOZOYA RIVER (MADRID, SPAIN)**

Abstract theme: 1. The Material Record: Current Trends and Future Directions

Abstract authors: Rodríguez-Gómez, Guillermo (Universidad Complutense de Madrid) - Molino, Lucía (Universidad Complutense de Madrid) - Arsuaga, Juan Luis (Centro UCM-ISCIIL de Evolución y Comportamiento Humanos; Universidad Complutense de Madrid)

Abstract format: Poster

The site of Cueva del Camino (CdC) is one of the richest paleontological sites in the Calvero de la Higuera complex (Pinilla del Valle, Madrid, Spain) of the Upper Valley of the Lozoya River. Its faunal assemblage, with mammals of different sizes, corresponds to a late interglacial period (MIS 5c), with dates around 90,000 years ago. This rich fauna, together with the remains of lithic industry and two Neanderthal molars, has made it possible to study the behavior, interaction with the environment and subsistence strategies of human groups in the past. The results of studies carried out over the last three decades have allowed the site to be interpreted as a hyena den with sporadic human presence.

The objective of this work is to determine the ecological conditions and meat resources available to humans in the large mammal paleocommunity of CdC, through the estimation of prey biomass (PB) or carrying capacity and meat availability (TAB), and to infer whether the resources of this paleoecosystem were sufficient to sustain human groups in a stable manner. To evaluate and contextualize the paleoecological conditions of CdC, the results were compared with other paleoecosystems of the Iberian Peninsula and with present-day ecosystems in Africa. The results reflect similar conditions with respect to some sites in the Sierra de Atapuerca and also with the current ecosystem of the Kruger National Park (South Africa). From the PB values, estimates of the density (ind/km²) and population size of the CdC human groups were made, and a great similarity with the values of present-day hunter-gatherer populations was observed. These approximations allow us to conclude that the CdC ecosystem could have had sufficient animal resources to stably support a Neanderthal group of approximately 28 individuals in the Upper Valley of the Lozoya River.

952 GLOBAL FISHING IN THE NORTH ATLANTIC. BASQUE FISHERIES IN CANADA AND IRELAND AND THE OUTLANDS

Abstract theme: 5. All Roads Lead to Rome: Multiscalar Interactions

Abstract authors: Escribano-Ruiz, Sergio (University of the Basque Country (UPV/EHU))

Abstract format: Poster

Since the Middle Ages, Basque society have been involved in deep-sea fishing in the North Atlantic. The first known experiences along the British coasts soon spread to North America and then moved to Greenland. The new lines of research developed from archeology are calling for a history of fisheries that surpasses the traditional economic and Eurocentric vision that emanates from traditional historiography. In this poster we will try to represent how the mobility paradigm may be applied to the Basque fisheries of the North Atlantic and how it depicts its development within a clear capitalist scheme, aspects that are not thematically far from traditional historiography but that will be considered according to recent theoretical frameworks. Thus, we will claim that these economic models not based on agricultural production, the Outlands, represent the prelude to capitalism. But we will also consider the way in which such a large-scale economic activity affected both local societies and the actors involved.

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Rosatti, Elisabetta	885	Tambets, Kristiina	759	Zorzin, Nicolas	81
Rose, Thomas	623	Taratukhin, Victor	788	Zukowski, Robert	757
Rotunno, Rocco	622	Theilade, Bodil	48	Ždárská, Anna	776
Rouco Collazo, Jorge	496	Thiery, Florian	42	Magureanu, Despina	929
Rovelli, Valentina	711	Thorlacius, Snædís	580		
Ruiz Cristóbal, Patricia	949	Tiede, Vance	156		
S		Tobalina-Pulido, Leticia	94		
Sabatini, Serena	324	Traviglia, Arianna	753		
Sacristán, Luisa	598	Trinder, Ermelinda	834		
Salova, Julia	480	Trusler, Kate	681		
Samadelli, Marco	466	Tulipano, Jacopo Francesco	557		
Sánchez, Alberto	584	Tykot, Robert	860		
Sánchez, Irene	376	U			
Sarkic, Natasa	934	Unt, Agnes	851		
Sáró, Csilla	709	Usai, Donatella	542		